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UK Vice Chancellor compensation: Do they get what they deserve?☆

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ABSTRACT

The compensation received by UK Vice Chancellors (VCs) has been on an upward trend in recent years and attracted a lot of negative media attention. In this paper, we examine whether VCs receive the compensation they deserve. Using a panel dataset covering the academic years 2007/2008 to 2018/2019, we develop a model to predict expected VC compensation to determine whether VCs are over- or undercompensated. Our model finds that VCs are not overcompensated regarding their base salary, but some are overcompensated in terms of their benefits and pension contributions. However, there is very little difference in terms of characteristics of over- and undercompensated VCs, indicating that on average, UK VCs receive the compensation they deserve. For robustness purposes, we employ a variety of alternative model specifications and subsamples which all support our previous findings.

1. Introduction

Is it reasonable to treat Vice-Chancellors (VCs) as "just another Chief Executive Officer (CEO)?" If that is the case, and we argue here that this is so, then we should be able to interrogate their pay and conditions in a manner similar to that of corporate CEO's. Consequently, better performing and qualified VCs should receive higher compensation compared to their peers. In this paper, we examine whether VCs are under- or over-compensated through a proposed model as well as through a LASSO model and show that, on average, VCs are not overcompensated in terms of their base compensation and total compensation, however there is some discrepancies when we study the benefits and pension contributions of VCs.

The UK higher education sector has undergone significant changes over the last two decades, which have greatly increased the power and thus, we argue, the corporate nature, of university management. The UK higher education sector was significantly

liberalised and redesigned in 1992, with the then "polytechnic" colleges, third level institutions with a historic primary mission to provide degree and diploma certification in STEM orientated subjects, being converted to full university status and allowed to expand their range of subject offerings across all areas. Additional degree granting power and greater financial autonomy were also part of this initiative. In 1998 university fees for undergraduate studies were introduced. Since then there have been divergent fee growth paths across the countries of the UK, from essentially no fee for standard undergraduate studies in Scotland to fees of over £9000 per year in England.

When combined with general social and technological change, this has resulted in what Brown and Carasso (2013) sets as

> The most rapid and radical changes in the eight-hundred-year history of British higher education.

They also note that

> Universities and colleges (were) no longer to be state-subsidised service providers, setting their own priorities about what to offer students; rather they were to be treated as economic organisations selling specified services to the state and to others who were willing to purchase them …. . universities and colleges were also encouraged to sell a variety of academic services at full cost to other purchasers.

A variety of other analyses such as Molesworth et al. (2009) and Molesworth et al. (2010) have shown the comprehensive "marketisation" of the UK higher education scene, from discourse to mission statements to membership of corporate bodies and so on. Overall, since the early 1990s UK universities have moved to speak, act and behave much more like commercial corporate bodies. Parallel to this there has been an increased conceptualisation, both in the media and in academic analysis, of Vice Chancellors, the title given to UK university leaders, as being CEOs. From early studies such as Dolton and Ma (2003) through to Walker et al. (2019) and Gounopoulos et al. (2022) the analysis has been framed in terms of Vice Chancellors as CEOs. Indeed, a large number of UK Vice Chancellors title their office "Vice Chancellor and Chief Executive", which has attracted media attention.[1]

Vice Chancellors (VCs) are then reasonably cast CEOs of UK universities and have complete control and oversight of the university. Their role includes providing leadership in academic and administrative duties, represent the university externally, secure a financial base to allow the delivery of the university's mission, aims and objectives, as well as carry out ceremonial and civic duties. Therefore they are talented scholars and leaders, who have generally worked their way up the academic ladder to this high position. However the VC landscape has changed quite considerably in the last couple of decades in the UK due to a multitude of factors. Firstly, the Further and Higher Education Act (1992) allowed thirty-five polytechnics to become universities, leading to an increase in the supply of institutions offering university degrees. Also given the reduction in state financing and the dependence on student fees, VCs are becoming more managerial and marketing tools for universities. This may have led to VC roles becoming less about oversight of the universities and more towards the US model of Presidents of universities.

In the last couple of years, media attention of VC pay has attracted a lot of attention. For instance, the Guardian Newspaper wrote in March 2018 that VCs pay at British universities has far outstripped that of their peers in senior leadership roles across the public sector, while the Financial Times found in February 2019 that five UK universities paid their heads more than £500,000 during the 2017/2018 academic year, despite wider signs of pay restraint across the sector.[2,3] Furthermore, the Universities minster at the time, Jo Johnson, demanded restraint over VCs pay and that the pay policy should be published more openly.[4] Therefore the pay of VCs has attracted substantial public scrutiny. One of the most high-profile examples is Professor Dame Glynis Breakwell at the University of Bath, who during the 2016/17 academic year, received £471,000, an increase of 4.4% from the previous year, making her the highest paid VC in the country. The release of this information led to many media articles and politicians criticizing her high level of pay as well as student and staff protests which all contributed to her decision to retire in August 2018.

The controversy regarding VC pay has led to a modest literature, mainly studying the justification of the pay by examining the relationship between VC pay and the performance of the university. Dolton and Ma (2003) were the first to examine the pay of UK VCs on three Research Assessment Exercises and find that VC renumeration is higher for institutions with higher academic research performance. Tarbert et al. (2008) however find no relation between VC pay rewards and performance, although for the pre- and post 1992 University subsamples there is some evidence that pay awards are related to some 'mission-relevant' performance measures. They do find however a positive relationship between changes in the proportion of other highly paid employees and VC pay, which suggests that internal pay comparisons play an important role in remuneration committee decision making. Bachan and Reilly (2015) study whether VC pay is related to performance and find that VCs are rewarded for observable mission-based performance measures. They find that VCs are rewarded for widening participation for students educated at comprehensive schools, receiving more students from areas with low university participation and securing funding council income flows. However they conclude that the sizeable

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[1] See for example the titles in three representative universities, https://www2.aston.ac.uk/about/management-structure/alec-cameron or https://www.herts.ac.uk/about-us/governance/key-people/vice-chancellor or https://www.northumbria.ac.uk/about-us/leadership-governance/university-executive/vice-chancellor-and-chief-executive/and for media discussion see https://www.theguardian.com/education/2013/apr/16/higher-education-job-titles.

[2] For instance, a Guardian article had the headline "Vice-chancellors paid £500,000 or more at six universities in England", found at https://www.theguardian.com/education/2019/feb/12/vice-chancellors-pay-universities-england-2017-18.

[3] For instance, a Financial Times article had the headline "Five English universities paid their heads more than £500,000″, found at https://www.ft.com/content/cafdc39a-2eb5-11e9-ba00-0251022932c8.

[4] https://www.theguardian.com/education/2017/dec/13/universities-minister-demands-restraint. -over-vice-chancellors-pay.

increase in real pay in recent years cannot be readily explained. De Fraja et al. (2016) also study the relationship between academic salaries and research performance using the results of research excellence framework (REF). Their results indicate that the pay level and pay inequality in a department are positively related to performance. Walker et al. (2019) find evidence that VCs use their internal power within organisations to extract a disproportionate amount of the value created by the institution. They also find that greater transparency is associated to higher rates of remuneration. Recently, Gounopoulos et al. (2019) study UK VCs from 2001 to 2016 and find strong evidence that higher renumeration packages contribute to higher university performance. They show that a one standard deviation increase in VC pay leads to an increase of 2.21% in university performance, while a prestigious award also tends to increase university performance. Johnes and Virmani (2021) examine the relationship between VC pay and three measures of performance, namely managerial efficiency, performance in rankings and financial stability. They find that VCs are financially rewarded for their performance in rankings, while good managerial efficiency and financial stability are not rewarded in VC pay. Recently, Gounopoulos et al. (2022) show that VCs with managerial skills contribute to performance and supports the idea that diversity in academic leaders' lifetime benefits future performance.

However the literature to date has mainly studied the relationship between VC compensation and their subsequent performance. In this paper, we examine whether VCs are under- or overcompensated and follow Core et al. (1999), Brick et al. (2006) and Dah and Frye (2017) in defining excess compensation as the difference between the observed compensation levels and expected compensation levels after controlling for a number of variables that determine compensation of VCs. We develop motivation for our determinants of compensation based on the literature of CEO compensation and create three groups of determinants, namely VC characteristics, performance measures and institutional characteristics. Since the literature on VC compensation is small but growing, we lend ideas from the CEO compensation literature for determinants of VC compensation. We examine base salary, benefits, pension contributions and total compensation of VCs in order to gather a complete understanding of the compensation received by VCs in the UK. Our results indicate that on average, VCs are not overcompensated with regards to their base compensation and total compensation. However we do find evidence of excessive compensation in terms of benefits and pension contributions. Specifically, we find that VCs on average received excess benefits from 2008 up to 2015, while they have received excess pension contributions from 2013 to 2019. At the same time however, the magnitude of benefits received has grown while the magnitude of pension contributions has fallen which coincides with the UK government change in pension rules. We also show that when we examine the differences between those VCs that are under- and overcompensated, there are very few significant differences in terms of characteristics of the VCs. However our predicted model can be deemed subjective so we also implement a LASSO model to optimally determine VC compensation from a set of 45 variables. We find that our LASSO model results are very similar to our predicted model and that many of the variables in our original model are included in the LASSO model. We also show that our results are robust to alternative specifications, a subsample of Russell Group universities and a subsample of English only universities.

Therefore our work significantly adds to the literature on executive pay by studying in detail the pay received by VCs of UK universities. Previously studies (such as Dolton and Ma (2003); Tarbert et al. (2008); Bachan and Reilly (2015); De Fraja et al. (2016); Walker et al. (2019); Johnes and Virmani (2021)) examined VC pay in terms of how it relates to performance and the determinants of VC pay we are first to study whether VCs receive the expected level of compensation once we control for a number of variables that determine their compensation. We find that VCs in general do receive the pay they deserve but some of them do receive excess pension contributions.

We also add to the literature on executive pay in general. There is a wealth of literature examining executive pay, with studies examining the determinants of CEO pay (Cadman et al., 2010), CEO power and pay (Göx & Hemmer, 2020), firm performance and CEO pay (Banker et al., 2012) and the link between sustainable reporting and pay (Al-Shaer & Zaman, 2019).[5] Previous studies on executive pay have studied whether executives are overpaid (Brick et al., 2006; Dah & Frye, 2017) however our paper is the first to study this aspect in terms of VC compensation, which is an important and high controversial area given the previous mentioned changes in the way UK higher education has changed in the previous 20 years. Therefore our study is important to provide statistical evidence documenting whether UK VCs are over- or under-compensated.

The remaining parts of our paper are organized as follows. Section 2 presents the data, descriptive statistics and methodology employed in this paper while Section 3 presents the empirical results. Section 4 checks the robustness of our findings and Section 5 concludes.

2. Data and methodology

In this section, we explain the data collection procedure as well as provide summary statistics for the variables employed in this study.

2.1. Vice Chancellor pay

We initially collect data on real Vice Chancellor (VC) compensation in 2007 from the Times Higher Education website where we retrieve data from the 2007/2008 academic year to the 2018/2019 academic year, thereby capturing 12 full years of data.[6] This source provides information on the salary of each VC, including base salary, benefits, pension contributions and total salary for each

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[5] For an excellent review of the literature on executive compensation, see Winschel and Stawinoga (2019).
[6] Our data period is constrained by the lack of reliable data on the university variables before the 2007/2008 academic year.

University VC in the UK on a yearly basis. Therefore we employ four measures of VC pay, namely *BaseSalary*, which is the salary of the VC, *Benefits* which is any benefits the VC has received during the year, *Pension* which is the pension contribution provided to the VC and finally *TotalSalary* which is the total salary received including benefits and pension contributions. Some of our VCs receive benefits and some do not, and from our dataset, it is impossible to determine whether a VC has the opportunity to receive benefits in their contract, or no benefits are available. We must also note that some VCs may receive non-numerical benefits such as housing provisions, however this not captured in our dataset. Therefore, we do not place much emphasis on our https://www.sciencedirect.com/science/article/pii/S037842662200067 benefit results as to properly investigate this part of VCs compensation, we need information on the structure on their compensation contract which we do not have access to.[7]

However the source fails to separate the pay received by the outgoing VC or provide information on the out-going and in-coming VC where in some instances, it is difficult to distinguish between the two. This is important because in some instances there are large payoffs for VCs for "loss of office" that are included in the figures and therefore over-inflate the actually pay of the VC. For instance, Professor Don Nutbeam received £250,000 for "loss of office" at the University of Southampton during the 2014/2015 academic year which over-inflates the figures for the VC pay for the University of Southampton that year.[8] Therefore to avoid any overlap between VCs and any "loss of office" payments, we exclude any year in which there is an overlap of VC. This is also to avoid the issue where a university had two VCs during an academic year, thereby making it difficult to determine the impact of a certain VC on that institution. Therefore we only include academic years in which there is only one VC employed who saw out the full year in office. The dataset is an unbalanced panel including 885 institution year observations, 99 unique institutions and 187 unique VCs.

2.2. Determinants of VC pay

VC pay is determined by a negotiation between the Council (often the chair) and the VC themselves. We divide our determinants of VC pay into three non-mutually exclusive groups of determinants: VC characteristics, VC performance and institutional characteristics.

2.2.1. VC characteristics

We use nine VC characteristics as determinants of VC compensation taken mainly from the large literature on determinants of CEO pay. We capture VC gender, a dummy variable equal to one if the VC is a female, zero otherwise since female executives are generally found in the literature to receive less compensation than males (Bachan, 2008; Conyon, 2014; Gayle et al., 2012) and also include a dummy variable if the VC is British, zero otherwise since Yonker (2017); Urquhart and Zhang (2021); Gounopoulos et al. (2022) shows that geography affects both labor supply and demand in the market for CEOs. The age of the VC can also be a determining factor of compensation, since older VCs are likely to be more experienced, more powerful and thus associated with greater compensation (Bachan, 2008; Serfling, 2014; Yim, 2013). We also hypothesize that tenure has a positive relationship with compensation since longstanding VCs are more likely to extract rents (Bachan, 2008; Abernethy et al., 2015; Ozkan, 2011) and similarly, we also include a dummy variable equal to one if the VC has previous VC experience at another institution since experienced VCs will expect higher compensation than recently appointed VCs. Internally appointed VCs are likely to receive less compensation than outside appointments (Gounopoulos et al., 2019; Brockman et al., 2016; Elsaid & Davidson, 2016) so we include a dummy variable equal to one if the VC is internally appointed. We also include a dummy variable for Knighthood, which equals one if the VC has received a knighthood, zero otherwise since there is evidence in the literature that government awards can influence compensation of directors and CEOs (Siming, 2016; Gounopoulos et al., 2022; Raff, 2019). Finally, we also include a dummy variable, Oxbridge, which equals one if the VC studied at the University of Cambridge or the University of Oxford since Oxbridge graduates may bring some prestige with them and therefore receive higher compensation than non-Oxbridge graduates (Bachan, 2008; Gounopoulos et al., 2022; Walker et al., 2019).

2.2.2. VC performance

A VCs role is all-encompassing, with many different aims and performance measures therefore we use three measures of VC performance. First, we employ a number of different university rankings to determine the performance of institutions during a given year since different rankings capture a multitude of different characteristics. We firstly use the Guardian rankings, which is published every year in early June to reflect the previous year. For instance, the Guardian rankings released in June 2018 are called the Guardian rankings 2019 but are based on data from the 2016/2017. Unlike most other rankings, the Guardian rankings do not include a measure of research output but focuses strongly on the student experience. Specifically, it uses entry score (17%), feedback (5%), job prospects (17%), spending per student (17%), student/staff ratio (17%), teaching quality (10%) and value added (17%), which compares students' degree results with their entry qualifications. The second rankings we use is the independent Complete University Guide, which has been publishing rankings since 2008 and focuses on the four key areas of entry standards, student satisfaction, research quality and graduate prospects and giving an overall score. The ranking is published in April/May each year and reflects the previous year's statistics from the HESA and National Student Survey (NSS). For instance, the 2019 Complete University Guide published in May 2018 reflects university performance during the 2016/2017 academic year. The third and final ranking we employ is the Times Higher Education rankings, which claim to be the only global university performance table to judge research-intensive university across all of their core missions: teaching, research, knowledge transfer and international outlook. They use 13 carefully calibrated performance

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[7] As correctly noted by the reviewer, VCs do not receive stock/options like CEOs and any benefit they receive, is always much smaller than their base salary, unlike CEOs.

[8] See https://www.dailyecho.co.uk/news/15008310.former-university-vice-chancellor-received −250000-payoff-for-retiring-year-early/.

Table 1

This table reports the list of universities used in this paper.

Abertay University	Lancaster University	The University of Buckingham	University of Lincoln
Aberystwyth University	Leeds Beckett University	Ulster University	University of Liverpool
Anglia Ruskin University	Liverpool Hope University	University College London	University of Manchester
Aston University	Liverpool John Moores University	University of Aberdeen	University of Northampton
Bangor University	London Metropolitan University	University of Bath	University of Nottingham
Bath Spa University	London South Bank University	University of Bedfordshire	University of Oxford
Birmingham City University	Loughborough University	University of Birmingham	University of Plymouth
Bournemouth University	Manchester Metropolitan University	University of Bradford	University of Portsmouth
Brunel University London	Middlesex University	University of Brighton	University of Reading
Cardiff Metropolitan University	Newcastle University	University of Bristol	University of Salford
Cardiff University	Northumbria University	University of Cambridge	University of Sheffield
City, University of London	Nottingham Trent University	University of Central Lancashire	University of Southampton
Coventry University	Open University Milton Keynes	University of Chester	University of St Andrews
De Montfort University	Oxford Brookes University	University of Chichester	University of Strathclyde
Durham University	Queen Margaret University	University of East London	University of Surrey
Edge Hill University	Queen Mary University of London	University of Edinburgh	University of Sussex
Edinburgh Napier University	Queen's University Belfast	University of Essex	University of the West of England
Glasgow Caledonian University	Robert Gordon University	University of Exeter	University of Warwick
Goldsmiths, University of London	Roehampton University	University of Glasgow	University of West London
Harper Adams University College	Royal Holloway University of London	University of Gloucestershire	University of Westminster
Heriot-Watt University	Sheffield Hallam University	University of Greenwich	University of Winchester
Imperial College London	SOAS University of London	University of Huddersfield	University of Wolverhampton
Keele University	Swansea University	University of Hull	University of Worcester
King's College London	Teesside University	University of Leeds	University of York
Kingston University	The London School of Economics and Political Science	University of Leicester	

Table 2

This table reports the definitions of variables, along with their sources. More information on these variables can be sought from Section 2 in the paper.

Variable	Definition	Source
Panel A: Vice Chancellor Pay		
Base Salary	The base salary of the VC at year t (£)	The Times Higher Education
Pension	The pension contribution of the VC at year t (£)	The Times Higher Education
Other Benefits	Other benefits given to VCs at year t (£)	The Times Higher Education
Total Salary	The total salary of the VC, including the base salary, pension contribution and any other benefits of the VC at year t (£)	The Times Higher Education
Panel B: Vice Chancellor Characteristics		
Gender	Dummy variable equal to 1 if the VC is female, and 0 otherwise	Who's who, University profiles and Linkedin
Age	The age of the VC (years)	Who's who, University profiles and Linkedin
British	Dummy variable equal to 1 if the VC is a British national, and 0 otherwise	Who's who, University profiles and Linkedin
Previous VC	Dummy variable equal to 1 if the VC was previously a VC, and 0 otherwise	Who's who, University profiles and Linkedin
Tenure	The amount of time they have been a VC (years) at their University	Who's who, University profiles and Linkedin
VC experience	The amount of time they have been a VC (years) including previous appointments	Who's who, University profiles and Linkedin
Insider	Dummy variable equal to 1 if the VC is internally promoted to VC, and 0 otherwise	Who's who, University profiles and Linkedin
Knighthood	Dummy variable equal to 1 if the VC has a knighthood, and 0 otherwise	Who's who, University profiles and Linkedin
Oxbridge	Dummy variable equal to 1 if the VC has any degree from either the University of Cambridge or the University of Oxford	Who's who, University profiles and Linkedin
Panel C: Performance Measures		
Rankings	The average ranking of institutions from the Guardian, the Complete University Guide and the Times Higher Education rankings at year t	The Guardian, The Complete University Guide and the Times Higher Education websites
Surplus	The total surplus of the institution at year t	Higher Education Statistics Agency
Research Quality	The percentage of publications in journals in the top 10% according to CiteScore at year t	Higher Education Statistics Agency
Panel D: University Characteristics		
Total staff numbers	The logarithm of total number of staff at year t	Higher Education Statistics Agency
Total student numbers	The logarithm of total number of students at year t	Higher Education Statistics Agency
Average Staff Costs	The total staff cost divided by the total number of staff at the institution at year t	Higher Education Statistics Agency
London	A dummy variable equal to one if the institution is located in London, 0 otherwise	Higher Education Statistics Agency

Table 3

This table reports the correlation matrix of the main variables used in this study.

	Salary	Benefits	Pension	Total Comp	Salary	Benefits	Pension	Total Comp	Gender	Age	British	PrevVC	Tenure
Salary	1.0000												
Benefits	0.1818	1.0000											
Pension	−0.0668	−0.0814	1.0000										
Total Compensation	0.9219	0.4070	0.1836	1.0000									
Ln(Salary)	0.9907	0.1715	−0.0453	0.9172	1.0000								
Ln(Benefits)	0.0757	0.6364	−0.0523	0.2338	0.0740	1.0000							
Ln(Pension)	−0.2768	−0.1515	0.8136	−0.0757	−0.2597	−0.0861	1.0000						
Ln(Total Compensation)	0.9194	0.3785	0.1905	0.9915	0.9297	0.2310	−0.0672	1.0000					
Gender	−0.0382	−0.0296	−0.0489	−0.0492	−0.0442	0.0397	−0.0611	−0.0600	1.0000				
Age	0.2787	0.1410	−0.1701	0.2357	0.2834	0.0819	−0.2542	0.2373	−0.0101	1.0000			
British	−0.0414	−0.0643	−0.2585	−0.1278	−0.0491	−0.1082	−0.1685	−0.1300	−0.1155	0.0030	1.0000		
PrevVC	0.2476	−0.0015	0.0928	0.2489	0.2416	0.0318	0.0259	0.2385	−0.0651	0.1323	−0.3461	1.0000	
Tenure	0.1491	0.1280	−0.1256	0.1425	0.1570	0.1569	−0.2318	0.1518	−0.0654	0.4584	0.0741	−0.1068	1.0000
VC_Experience	0.2929	0.1169	−0.1136	0.2711	0.2905	0.1376	−0.2310	0.2681	−0.0845	0.5007	−0.0248	0.4015	0.7696
Insider	−0.0584	0.0824	−0.0885	−0.0524	−0.0535	0.1142	−0.0609	−0.0515	−0.0680	0.0213	0.1880	−0.1125	0.0808
Knighthood	0.2716	0.0558	0.0059	0.2682	0.2624	0.0490	−0.0412	0.2608	0.0143	0.2148	0.0337	0.1674	0.0586
Oxbridge	0.0069	−0.0310	−0.0177	−0.0107	−0.0085	−0.0411	−0.0821	−0.0249	−0.0785	−0.0679	0.0258	0.0495	−0.0230
Ranking	−0.4433	−0.0891	−0.1914	−0.4745	−0.4322	−0.0097	−0.0696	−0.4654	−0.0046	−0.0846	0.1828	−0.1279	0.0812
Surplus per employee	0.1025	−0.2303	0.0304	0.0384	0.1002	−0.0849	−0.0297	0.0464	−0.0159	−0.0291	0.0119	0.0225	0.0777
ResQual_SNIP	0.4941	0.1568	0.0904	0.5149	0.4937	0.0986	−0.0565	0.5141	−0.0051	0.1792	−0.1784	0.1700	−0.0319
Ln(TotalStaff)	0.4905	0.1000	0.1243	0.4993	0.4992	0.0521	0.0215	0.5062	−0.1358	0.1436	−0.0792	0.2674	−0.0785
Ln(TotalStudents)	0.3587	0.0512	0.0669	0.3583	0.3853	0.1139	0.0076	0.3827	−0.1943	0.0306	0.0442	0.2387	−0.0100
Averagestaffcost	0.2468	−0.1395	0.0855	0.2188	0.2546	0.0788	−0.0111	0.2367	−0.0410	0.0842	−0.1317	0.0700	−0.0514
London	0.0237	0.0326	0.0571	0.0349	0.0208	0.0389	0.0882	0.0324	−0.0876	0.0629	−0.1446	0.0493	−0.0849
RG	0.4217	0.1104	0.1784	0.4570	0.4103	0.0821	0.0612	0.4470	−0.1021	0.1697	−0.2478	0.2832	−0.0533
SNIP	0.4941	0.1568	0.0904	0.5149	0.4937	0.0986	−0.0565	0.5141	−0.0051	0.1792	−0.1784	0.1700	−0.0319
SJR	0.4860	0.1408	0.0907	0.5051	0.4855	0.0848	−0.0577	0.5050	0.0309	0.1763	−0.1881	0.1668	−0.0400
CiteScore	0.4365	0.1273	0.0957	0.4580	0.4358	0.0638	−0.0301	0.4563	0.0238	0.1669	−0.1936	0.1503	−0.0633

indicators to provide the most comprehensive and balanced comparison, trusted by students, academics, university leaders, industry and governments, while also being audited by PricewaterhouseCoopers (PWC). The Times Higher Education rankings report information from the previous year, in that the 2019 ranking came out in September 2018 and reflects information from the 2016/2017 academic year. Therefore we calculate a ranking variable which is the simple average of the three popular rankings where we expect that VC compensation to be negatively related to the rankings variable. At this point, we have to exclude Cranfield University and the Open University since the rankings above all fail to provide them with a ranking during our sample period. We also have to exclude some years of the University of Wolverhampton since they are also unranked from 2008/2009 to 2015/2016. For instance, if the ranking was published in 2015, that is linked to the academic year 2015/2016.[9] Table 1 reports the list of Universities in our unbalanced panel data sample. To match rankings with academic years, we match them with the year they were published.

Our second performance measure is surplus, which measures the amount of surplus (or deficit) the institution has made during that academic year. This variable captures all income received by the institution minus all expenses and therefore is a measure of the financial soundness of the institution. It also captures all research income as well as income from tuition fees and therefore we would expect a positive relationship between surplus and VC compensation.

Our third measure of performance is related to research quality and is the percentage of scholarly outputs that are published in journals in the top 25% according to Source Normalized Impact Paper (SNIP). This is measure of research output quality, rather than quantity and we would expect that institutions with a higher percentage of outputs in the top 25% of journals would have a better research culture, attract better students, academics, and therefore have better and higher paid VCs.

2.2.3. Institution characteristics

We also include a number of institutional characteristics that are likely to have an impact on the compensation of VC. We consider the size of the institution since the larger the institution, the larger the workload for the VC and therefore the higher the expected compensation (Linck et al., 2009). To do this, we include two variables, the total number of staff and the total number of students. We also control for the average salary across the institution since some institutions may in general, pay their staff more than in other institutions. Therefore we calculate staff average salary as the total cost of staff divided by the total number of staff at the institution. Finally, we include a London dummy variable, equal to one if the institution is located in London and zero otherwise, since a London weighting is often given to staff for working and living in the London area due to the high living costs in this area of the UK.

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[9] Even though the information for this ranking may be based on information from 2013 or 2014, VCs are likely to be rewarded after the ranking as become public knowledge and is published.

VC_Experience	Insider	Knighthood	Oxbridge	Ranking	Surplus per employee	ResQual	TotalStaff	Total Students	Average staffcost	London	RG	SNIP	SJR	CiteScore
1.0000														
0.0177	1.0000													
0.1916	0.0430	1.0000												
−0.0364	−0.2206	−0.0573	1.0000											
0.0080	0.1389	−0.2678	0.0074	1.0000										
0.1142	0.0442	0.0387	−0.0441	−0.0130	1.0000									
0.0967	−0.1241	0.2452	−0.0374	−0.7384	−0.0817	1.0000								
0.1017	−0.0393	0.2858	0.0281	−0.6391	0.0578	0.5956	1.0000							
0.1152	0.1392	0.1121	0.0036	−0.1755	0.1472	0.2305	0.7254	1.0000						
−0.0157	−0.0231	0.0990	−0.0402	−0.1219	0.2376	0.2257	0.0223	0.1866	1.0000					
−0.0459	−0.1016	−0.0385	−0.0368	0.1390	0.0137	−0.0911	−0.1403	−0.1557	0.2326	1.0000				
0.1237	−0.0938	0.2416	0.0000	−0.6435	0.0596	0.6119	0.7155	0.4020	0.2287	0.0054	1.0000			
0.0967	−0.1241	0.2452	−0.0374	−0.7384	−0.0817	1.0000	0.5956	0.2305	0.2257	−0.0911	0.6119	1.0000		
0.0921	−0.1539	0.2519	−0.0289	−0.7453	−0.0834	0.9436	0.5766	0.1937	0.2176	−0.1112	0.6026	0.9436	1.0000	
0.0648	−0.1381	0.2422	−0.0184	−0.7350	−0.1019	0.9349	0.5943	0.1924	0.1558	−0.1302	0.5985	0.9349	0.9588	1.0000

2.3. Descriptive statistics

Table 3 reports the correlation matrix of our variables while Table 4 reports the descriptive statistics of our variables of interest and consistent with the literature, we winsorize all compensation variables at the 1st and 99th percentile to minimize the impact of outliers.[10] We can see that the mean base salary for VCs is £247,454 with the highest pay at £389,290 and the lowest pay at £150,001. There is positive skewness indicating a high right-tail of base salary. Regarding VC benefits, we find that the average benefit is £8990.07 while the highest benefit received during one year was £75,001.00. We find that 44.6% of our VCs receive no benefit whatsoever, which is represented by the very high kurtosis. Most VCs receive pension contributions outside of their base salary, with the mean pension contribution at £27,545 and the highest £64,001. Our final measure of salary is total salary which includes all three of the previous components and shows that the average VC total compensation over our sample period is £285,671 with a high of £447,001 and a low of £174,001. Since all of these figures show some sort of non-normality in the skewness and kurtosis, we take the natural logarithm of each. Fig. 1 plots the four salary measures over time where we see that base salary and total salary have steadily increased over time. Interestingly, pension contribution has fallen since the 2010/2011 academic year while benefits experienced a sharp jump in the 2015/2016 academic year although this fell again the following year. Most notably, the average benefits increased substantially in the final year of our sample where we find in previous years, only 25% of VCs received benefits while in the final year of our sample, 74 VCs received benefits on top of their base salary.

In Panel B, we find that 17% of our VCs are female, which is much higher than the number of female CEOs generally found in large UK companies (Schopohl et al., 2021). The average age of our VCs is 59 years old, while 83% are British and 16% have previous VC experience. The average tenure of the VC is 5.9 years while 17% were internally appointed VCs. Also, 12% have Knighthoods while 26% have an Oxbridge education.[11]

2.4. Methodology

In order to examine whether VC pay is excessive and determinants of excessive pay, we follow the methodology of Brick et al.

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[10] As standard in the literature, we take the natural logarithm of each to deal with the non-normal nature of the data. However the benefits and pension variables have a number of zero terms so consistent with previous studies (such as Vallascas and Hagendorff (2012), so our log benefits and pension variables are the logarithm of 1 plus the benefits and pension respectively. winsorization are methods for reducing the effects of extreme values in the sample. The winsorized mean is computed after the k smallest observations are replaced by the (k+1)st smallest observation, and the k largest observations are replaced by the (k+1)st largest observation. In other words, the observations are winsorized at each end.

[11] As suggested by the reviewer, we also note that 15.26% of VCs have a PhD from Oxbridge.

Table 4

This table reports the descriptive statistics of the variables of interest explained in Section 2. We report the mean, standard deviation, minimum, maximum, 25th, 50th and 75th percentile as well as the skewness and kurtosis of each variable. We take the log transformation of the four salary measures as well as staff numbers and student numbers to reduce the issue of non-normality. We replace zero figures for benefits and pension with 1 in order to use the log transformation, consistent with the literature. The definitions of these variables are available from 2.

Variable	Obs	Mean	Std. Dev.	Min	Max	25th Percentile	50th Percentile	75th Percentile	Skewness	Kurtosis
Panel A: Vice-Chancellor Pay										
Base Salary	885	£247,454.00	50661.58	£150,001.00	£389,290.00	£212,001.00	£242,001.00	£275,001.00	0.63	3.29
Benefits	885	£8990.07	16181.63	£1.00	£75,001.00	£1.00	£1001.00	£10,001.00	2.32	7.90
Pension	885	£27,545.27	17654.26	£1.00	£64,001.00	£13,001.00	£31,001.00	£40,001.00	−0.24	2.17
Total Compensation	885	£285,671.80	57930.13	£174,001.00	£447,001.00	£244,001.00	£279,001.00	£318,001.00	0.64	3.20
Ln(Base Salary)	885	12.40	0.20	11.92	12.87	12.26	12.40	12.52	0.07	2.88
Ln(Benefits)	885	5.12	4.51	0.00	11.23	0.00	6.91	9.21	−0.16	1.21
Ln(Pension)	885	8.42	4.01	0.00	11.07	9.47	10.34	10.60	−1.58	3.60
Ln(Total Compensation)	885	12.54	0.20	12.07	13.01	12.40	12.54	12.67	0.12	2.77
Panel B: Vice-Chancellor Characteristics										
Gender	885	0.17	0.38	0.00	1.00	0.00	0.00	0.00	1.72	3.96
Age	885	58.70	4.53	45.00	71.00	56.00	59.00	62.00	−0.21	2.79
British	885	0.83	0.37	0.00	1.00	1.00	1.00	1.00	−1.79	4.22
Previous VC	885	0.16	0.37	0.00	1.00	0.00	0.00	0.00	1.83	4.34
Tenure	885	5.87	4.04	0.00	26.00	3.00	5.00	8.00	1.27	5.19
VC Experience	885	6.86	4.55	0.00	26.00	3.00	6.00	10.00	0.92	3.70
Insider	885	0.17	0.38	0.00	1.00	0.00	0.00	0.00	1.73	3.99
Knighthood	885	0.12	0.32	0.00	1.00	0.00	0.00	0.00	2.34	6.49
Oxbridge	885	0.26	0.44	0.00	1.00	0.00	0.00	1.00	1.12	2.24
Panel C: Performance										
Ranking	885	52.44	31.19	1.00	122.50	24.67	52.33	78.00	0.15	1.93
Surplus	885	1.84	4.54	−22.66	26.58	0.53	1.99	4.03	−1.07	8.64
Research Quality_SNIP	885	54.36	10.33	22.70	71.80	46.40	56.20	63.20	−0.47	2.32
Panel D: Institutional Characteristics										
Ln(Totalstaffnumbers)	885	7.99	0.69	6.08	10.29	7.50	7.96	8.43	0.00	3.02
Ln(Totalstudents)	885	9.74	0.49	8.24	11.72	9.47	9.80	10.08	−0.51	3.78
Avestaffcosts	885	35.65	9.87	10.47	70.16	27.68	36.75	42.24	0.08	2.72
London	885	0.19	0.39	0.00	1.00	0.00	0.00	0.00	1.56	3.44
RG	885	0.26	0.44	0.00	1.00	0.00	0.00	1.00	1.09	2.20
SNIP	885	54.36	10.33	22.70	71.80	46.40	56.20	63.20	−0.47	2.32
SJR	885	63.51	11.09	22.50	82.50	55.40	65.10	73.00	−0.56	2.73
CiteScore	885	60.38	10.12	22.90	77.60	53.10	61.90	68.90	−0.63	2.85

(2006) and Dah and Frye (2017) and regress VC compensation on the variables hypothesized to explain compensation outlined in Section 2.2. Specifically,

$$
\begin{aligned}
y_{i,t} = \quad & \alpha + \beta_1 \sum VC.C_{i,t-1} + \beta_2 \sum VC.P_{i,t-1} + \beta_3 \sum Instit.C_{i,t-1} \\
& + \beta_4 \sum Year_t + \beta_5 \sum Institution_t + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where $y_{i,t}$ is the natural logarithm of VC base salary, benefits, pension contributions and total salary respectively at time t. $\sum VC.C_{i,t-1}$ are the VC characteristics variables, $\sum VC.P_{i,t-1}$ are the VC performance variables while $\sum Instit.C_{i,t-1}$ are the Institution variables respectively, all lagged at time $t-1$. We lag our independent variables since we want to study the impact of VCs on the institution in the following year and therefore our regression mitigates the potential reverse causality and consistent with the literature. We also include year and institution fixed effects and standard errors are clustered by institution. To calculate excess compensation, we follow Brick et al. (2006) and Dah and Frye (2017) and calculate excess compensation as the residual of Equation (1). To get meaningful estimates of excess compensation (in £) we compute these values as the difference between the exponential of logged director actual compensation and the exponential of predicted compensation.[12]

3. Empirical results

3.1. Determinants of VC compensation

Table 5 reports the estimated determinants of VC compensation. Following prior literature (Brick et al., 2006; Dah & Frye, 2017) excess compensation is the residual of our regression of VC compensation on the variables hypothesized to explain compensation. The natural logarithm of VC base salary, benefits, pension and total salary are used as dependent variables. For the explanatory variables, as proposed in Section 2, we account for VC characteristics, VC performance measures and institutional characteristics.

Across all four specifications, we find that female VCs earn less than male VCs but they do not earn significantly less than male counterparts. We find no significant differences in terms of the VCs age, whether they are British or if they were previously a VC at the 5% significance level. We do find however that VCs with longer tenure receive significantly higher total salaries but no significant effect for VC experience, whether they are an insider, whether they have knighthood or if they are Oxbridge educated (at the 5% significance level). We do find that higher ranked institutions provide a significant higher total salary, while institutions with higher surplus provide a significantly higher base salary. We also find that VCs at institutions with higher staff numbers (and average staff costs) receive significantly higher base salaries and total salaries, while our London dummy is insignificant, indicating that London based VCs do not receive significantly higher salaries.

3.2. Summary statistics of excessive compensation

Tables 6 and 7 report the summary statistics of the VCs deemed to have positive and negative excess compensation for our four measures of VC compensation. Panel A of Table 6 shows that VCs with positive excess base compensation receive significantly less pension contributions than VCs who receive negative excess base compensation, possibly compensating those VCs whose base salary is lower. Panel B of Table 6 reports the characteristics of those VCs with positive and negative excess benefits and we find that those with positive excess benefits receive significantly higher benefits. Also, they have significantly larger number of students and are more likely to be in universities based in London. Those VCs who earn positive excess pension contributions in Panel A of Table 7 also earn significantly higher pension contributions and total compensation. Panel B of Table 7 reports that VCs who receive excess positive total compensation also receive significantly higher base salary, benefits, pension contributions and total salary which is not surprising since the total compensation measure is the accumulation of these three forms of compensation. VCs who receive excess positive total compensation also report significantly longer experience, Knighthood, surplus, higher ranking and larger number of staff and students. Therefore our results in Tables 6 and 7 indicate that there is very little difference in the characteristics of VCs with excess positive and negative compensation therefore indicating that there isn't a certain type of VC that generally receives excess positive (negative) compensation.

To shed light on the structure of VC compensation through time, Fig. 2 reports the average normal and excess compensation levels by year for base compensation, benefits, pensions and total compensation. VC base and total compensation have gradually increased over time with the vast majority of the pay not excessive. However, we observe fairly consistent compensation from 2009 to 2018 regarding benefits, with a huge increase in the excess benefits in the final year of our sample. This reflects the large increase in the number of VCs receiving benefits in the final year of our sample. A fairly opposite figure is revealed for pensions, where we find for 2008 to 2012 that on average there is no positive excess pension. But from 2013 to 2017, we find that the pension contribution has fallen substantially and that the average VC excess compensation is positive in terms of pension contributions. This coincides with the UK governments pension rule changes where from April 2015, withdrawals from a pension pot will be treated as income so the amount of tax paid on will depend on the amount of other income earned.[13] Therefore VCs may prefer more in terms of benefits than pension

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[12] We take the exponential of actual and predicted compensation since the natural logarithm of VC actual compensation is employed as the dependent variable in Equation (1).
[13] See https://www.gov.uk/government/news/pension-reforms-eight-things-you-should-know for more information.
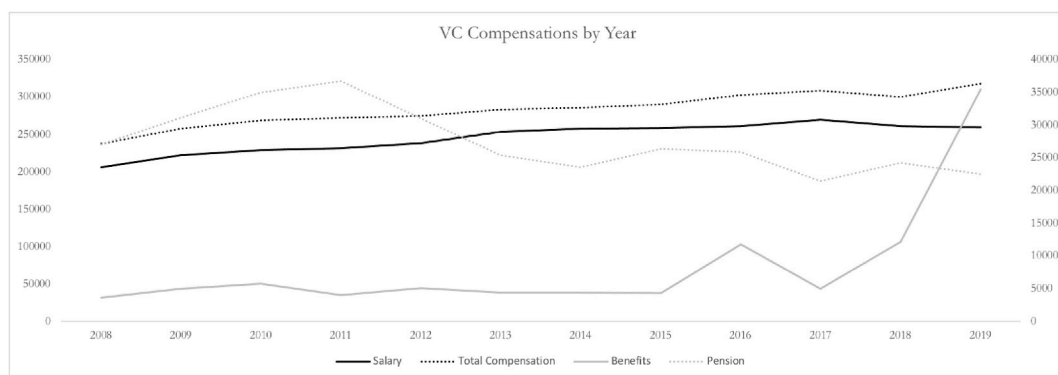
Fig. 1. This figure reports the average salary of Vice-Chancellors over our sample period. The base salary and total salary are aligned to the primary y-axis, while the benefits and pension contributions are aligned to the secondary y-axis.

Table 5

This table reports the pooled regression results from equation (1) of the determinants of VC pay. More information on these variables can be sought from Section 2 in the paper. Standard errors are clustered by institution and ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

	Ln(Base Salary)	Ln(Benefits)	Ln(Pension)	Ln(Total Salary)
L.Gender	−0.0283	−0.3949	−0.5684	−0.0524*
	(-1.01)	(-0.56)	(-0.65)	(-1.80)
L.Age	0.0019	−0.0807	−0.1028	−0.0007
	(0.61)	(-0.86)	(-1.19)	(-0.22)
L.British	0.0006	0.3010	−1.5481*	−0.0293
	(0.02)	(0.32)	(-1.75)	(-0.93)
L.Previous VC	−0.0113	1.8762	1.2517	0.0218
	(-0.22)	(1.13)	(1.15)	(0.38)
L.Tenure	0.0055	0.2475	0.0462	0.0130**
	(0.94)	(1.17)	(0.41)	(2.00)
L.VC Experience	0.0008	−0.1730	−0.1868*	−0.0066
	(0.15)	(-0.82)	(-1.90)	(-1.10)
L.Insider	−0.0011	0.1499	−0.2262	−0.0105
	(-0.04)	(0.18)	(-0.30)	(-0.35)
L.Knighthood	−0.0068	0.8930	0.4764	0.0153
	(-0.25)	(1.26)	(0.53)	(0.60)
L.Oxbridge	0.0069	−0.2242	−1.4261*	−0.0145
	(0.24)	(-0.28)	(-1.78)	(-0.49)
L.Ranking	−0.0009	−0.0265	−0.0504***	−0.0015**
	(-1.39)	(-1.31)	(-3.07)	(-2.37)
L.Surplus	0.0062**	−0.0263	−0.1083*	0.0038
	(2.54)	(-0.50)	(-1.74)	(1.39)
L.ResQual_SNIP	0.0010	0.0188	−0.1170***	−0.0005
	(0.65)	(0.45)	(-2.74)	(-0.34)
L.Ln(Totalstaffnumbers)	0.1067***	−0.0592	0.3299	0.1358***
	(3.02)	(-0.05)	(0.29)	(3.85)
L.Ln(Totalstudents)	−0.0216	0.6016	−0.4501	−0.0319
	(-0.62)	(0.56)	(-0.40)	(-0.89)
L.AverageStaffCosts	0.0041**	0.0303	0.0377	0.0055***
	(2.22)	(0.66)	(0.81)	(2.93)
L.London	0.0234	0.1523	0.6063	0.0217
	(0.72)	(0.13)	(0.53)	(0.61)
Constant	11.2990***	−0.1432	28.2386***	11.5540***
	(37.19)	(-0.02)	(3.43)	(33.14)
Year Dummies	Yes	Yes	Yes	Yes
Institution Dummies	Yes	Yes	Yes	Yes
Number of Observations	693	689	693	693
Adjusted R-square	0.7498	0.6083	0.4986	0.7262

contributions from 2015 which is supported by our findings in Fig. 2.

Therefore our analysis shows that VC base compensation and total compensation is not excessive throughout our sample period and that pension contributions have dropped substantially since 2013 while benefits received by VCs has grown substantially since 2016. However there remains some excess pension contributions.

Table 6

This table reports the summary statistics of the excess compensation of Vice-Chancellors of UK Universities for their base compensation and benefits. We report the summary statistics for VCs deemed to have excess positive compensation and excess negative compensation for their base compensation and benefits. More information on these variables can be sought from Section 2 in the paper.

Variable	Mean Positive Excess Compensation	Mean Negative Excess Compensation	Difference	t-stat
Panel A: Excess Base Compensation				
Base Salary	£274,889.10	£230,981.50	£43,907.60***	12.7956
Benefits	£10,512.48	£8938.80	£1573.69	1.22
Pension	£25,307.31	£29,456.21	-£4148.90***	−2.98
Total Compensation	£312,049.90	£271,802.10	£40,247.76***	9.81
Gender	0.1666667	0.1939058	−0.027239	−0.93
Age	59.33333	58.81163	0.521699	1.53
British	0.8508772	0.8171745	0.0337027	1.19
Previous VC	0.1754386	0.1523546	0.023084	0.82
Tenure	6.593567	6.277008	0.3165589	1.056
VC_Experience	7.777778	7.049861	0.7279163**	2.17
Insider	0.1812865	0.1689751	0.0123115	0.42
Knighthood	0.1491228	0.0969529	0.0521699**	2.11
Oxbridge	0.248538	0.2576177	−0.00908	−0.27
Ranking	47.79289	56.79686	−9.003975***	−3.86
Surplus	2.222856	1.679227	0.5436296	1.55
ResQual_SNIP	55.95161	53.73665	2.214965***	2.88
Ln(Totalstaffnumbers)	8.059829	7.885215	0.1746136***	3.35
Ln(TotalStudents)	9.777626	9.701781	0.075845**	2.02
Avestaffcosts	36.67538	36.13499	0.5403935	0.76
London	0.1900585	0.1911357	−0.001077	−0.03
Panel B: Excess Benefits				
Base Salary	£249892.05	£254663 .00	-£4770.45	1.25
Benefits	£14469.61	£4959.852	£9509.76***	7.72
Pension	£27918.46	£26932.51	£985.95	0.70
Total Compensation	£293946.19	£288681.3	£5265.62	1.20
Gender	0.1656977	0.1955307	−0.029833	−0.30
Age	59.03198	59.10056	−0.068582	−0.20
British	0.8081395	0.8575419	−0.049402	−1.75
Previous VC	0.1656977	0.1620112	0.0036865	0.13
Tenure	6.552326	6.301676	0.2506496	0.83
VC_Experience	7.517442	7.284916	0.2325257	0.69
Insider	0.1773256	0.1703911	0.0069345	0.24
Knighthood	0.1337209	0.1117318	0.0219891	0.88
Oxbridge	0.2587209	0.2486034	0.0101176	0.30
Ranking	52.87064	51.97765	0.8929858	0.37
Surplus	2.008729	1.884321	0.1244081	0.35
ResQual_SNIP	54.88673	54.76232	0.1244027	0.16
Ln(Totalstaffnumbers)	8.001685	7.938975	0.0627104	1.19
Ln(TotalStudents)	9.778124	9.699826	0.0782975**	2.09
Avestaffcosts	36.82387	36.01347	0.810399	1.14
London	0.2238372	0.1592179	0.0646193**	2.18

4. Robustness

In this section, we conduct a number of robustness tests to ensure our findings in the previous section are reliable. First, instead of developing our own model of determinants of VC compensation, we employ a least absolute shrinkage and selection operator (LASSO) model with 45 variables and let the LASSO model determine the important determinants of VC compensation. Second, we employ a fixed effects model and Fama and MacBeth (1973) model as alternative model specifications, as well as the elastic net model. Third, we restrict our analysis to Russell Group Universities only. Fourth, we restrict our analysis to English Universities only. Fifth, we remove the Guardian rankings from our ranking variable since its ranking is based on teaching only, and does not incorporate any research element. Finally, we also re-estimate our main analysis and instead of employing university fixed effects, we include VC fixed effects.

4.1. LASSO modelling

The LASSO model, originally proposed by Tibshirani (1996), is an extended form of an OLS regression which performs both variable selection and regularization through a shrinkage factor.[14] It is capable of enhancing the accuracy and the interpretability of

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[14] The LASSO model has been used quite a lot in the finance literature but only recently has it been employed in a corporate governance context, for instance Tian et al. (2015), Nazemia and Fabozzi (2018) and Sermpinis et al. (2018).

Table 7

This table reports the summary statistics of the excess compensation of Vice-Chancellors of UK Universities for their pension and total compensation. We report the summary statistics for VCs deemed to have excess positive compensation and excess negative compensation for their pension and total compensation. More information on these variables can be sought from Section 2 in the paper.

Variable	Mean Positive Excess Compensation	Mean Negative Excess Compensation	Difference	*t*-stat
Panel A: Excess Pension				
Base Salary	£249842.9	£255446.4	-£5603.455	−1.4614
Benefits	£9455.655	£9826.408	-£370.7536	−0.2874
Pension	£34745.1	£18200.81	£16544.29***	13.0865
Total Compensation	£295106.8	£286427.2	£8679.563**	1.979
Gender	0.1764706	0.1864952	−0.010025	−0.3423
Age	59.03581	59.10611	−0.070304	−0.2044
British	0.8209719	0.8488746	−0.027903	−0.9847
Previous VC	0.1611253	0.1672026	−0.006077	−0.2158
Tenure	6.317136	6.559486	−0.24235	−0.803
VC_Experience	7.268542	7.562701	−0.294159	−0.8695
Insider	0.1764706	0.170418	0.0060526	0.2099
Knighthood	0.1150895	0.1318328	−0.016743	−0.6714
Oxbridge	0.230179	0.2829582	−0.052779	−1.5973
Ranking	53.66752	50.84084	2.826683	1.1922
Surplus	1.77875	2.154657	−0.375907	−1.0643
ResQual_SNIP	54.60052	55.10261	−0.502086	−0.6462
Ln(Totalstaffnumbers)	7.951824	7.992184	−0.04036	−0.7636
Ln(TotalStudents)	9.733304	9.744343	−0.011039	−0.2922
Avestaffcosts	36.82944	35.88398	0.9454608	1.3239
London	0.2097187	0.1672026	0.0425161	1.4239
Panel B: Excess Total Compensation				
Base Salary	£269899.3	£234123	£35776.32***	10.0416
Benefits	£11873	£7454.032	£4418.968***	3.4514
Pension	£31272.55	£23458.6	£7813.95***	5.7089
Total Compensation	£315255.1	£266609.5	£48645.61***	12.2664
Gender	0.1675978	0.1942029	−0.026605	−0.9158
Age	59.1257	59.0029	0.1227998	0.3599
British	0.849162	0.8173913	0.0317707	1.13
Previous VC	0.1815642	0.1449275	0.0366367	1.3126
Tenure	6.617318	6.237681	0.3796373	1.2674
VC_Experience	7.782123	7.011594	0.7705287**	2.3018
Insider	0.1620112	0.1884058	−0.026395	−0.9201
Knighthood	0.150838	0.0927536	0.0580844**	2.3555
Oxbridge	0.2681564	0.2376812	0.0304753	0.9282
Ranking	48.53352	56.44589	−7.912374***	−3.3872
Surplus	2.422577	1.446769	0.9758082***	2.7975
ResQual_SNIP	55.33137	54.29018	1.041194	1.3513
Ln(Totalstaffnumbers)	8.047161	7.890263	0.1568974***	3.0091
Ln(TotalStudents)	9.776752	9.699171	0.077581**	2.0753
Avestaffcosts	36.64307	36.14346	0.4996011	0.704
London	0.198324	0.1826087	0.0157153	0.5297

classical regression methods (Tibshirani, 1996). Under a suitable choice of penalty power, the LASSO model selects variables by forcing some coefficients to zero and shrinking others. This reduces the variance of the estimated value and increases the accuracy of the regression prediction. Compared with other independent variable selection methods, LASSO can provide more stable and restricted models (Tibshirani, 1996; Tian et al., 2015) while also allowing the inclusion of many correlated variables.[15] It is also a computationally simple and efficient method (Efron et al., 2004) and consistent with the vast majority of the literature, we use the Bayesian information criterion (BIC) (Schwarz, 1978) to select the model.[16]

Table 8 presents the list of variables that we include in the LASSO model. This table includes the variables previously used in the original model but also includes further variables that we are able to capture that may be determinants on the compensation received by a VC. Table 9 reports the variables that the LASSO selects as significant determinants of VC compensation where there are number of variables selected that we included in our original model, such as tenure, gender, Knighthood, age, British, insider, research quality, London, surplus and ranking. However there are other variables that the LASSO model selects as important determinants of VC compensation. For instance, income from tuition fees is an important determinant of VC compensation across three of our measures of

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[15] This is especially important for our study as in our original model, as variables such as Russell Group and Grant Income may be important determinants of VC compensation but they were highly correlated with other variables and therefore we excluded them from our model.

[16] More information on the LASSO model can be found at Tibshirani (1996).

(a) Base Compensation

(b) Benefits

(c) Pension
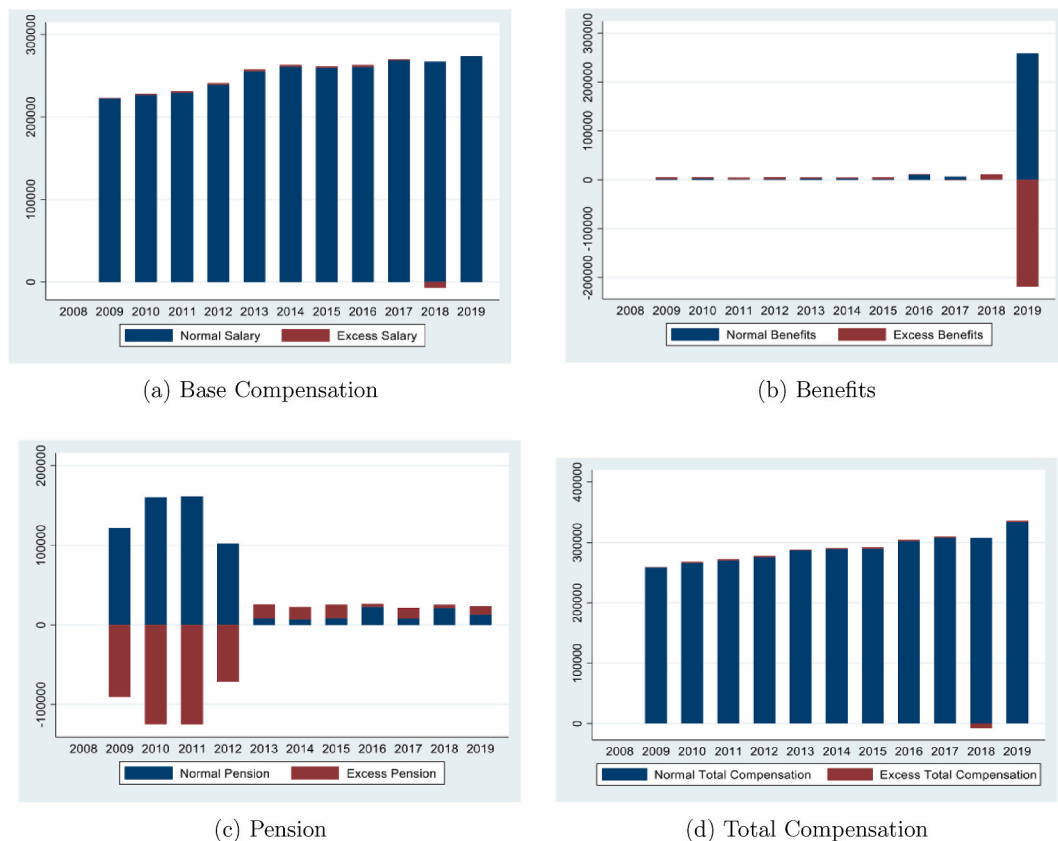

(d) Total Compensation

Fig. 2. This figure presents the average levels, in years from 2009 to 2019, of excess compensation of VCs. Excess compensation pound estimates are computed as the difference between the exponential of logged VC actual compensation and the exponential of predicted compensation. The mean VC compensation is the summation of the average normal and excess compensation levels.

VC compensation while the G94 variable is an important variable for base compensation and total compensation.[17] Overall, we can conclude that there is a large overlap in the variables that we pre-selected in our model with those selected by the LASSO model, and that there is no variable that is an important determinant for all four measures of compensation that is not included in our original analysis.

Fig. 3 sheds light on the structure of VC compensation through time by reporting the average normal and excess compensation levels by year for base compensation, benefits, pensions and total compensation calculated from the LASSO model. Similar to our model results, there is very little excess compensation in terms of base compensation and total compensation received by VC during our sample period. However the LASSO model suggests that there is excess VC benefits and pension contributions throughout the sample period with a very large jump in the final year for benefits, as found in our original analysis.[18] Overall the LASSO results support our previous findings in that VCs do not receive excess base or total compensation.

4.2. Alternative specifications

In our initial analysis, we developed a model to predict determinants of VC compensation using a pooled regression, while in the previous section we have conducted a LASSO model to select the important determinants of VC compensation. However one potential concern is that our results are model specific and using an alternative modelling technique may yield alternative findings. A limitation of the pooled OLS results is that the documented relation between VC compensation and the determinants of VC pay may simply reflect unobservable characteristics that influence both VC compensation and determinants of VC pay. The omission of these controls might

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[17] G94 refers to the group of 19 universities who, in 1994, created the 1994 Group of Universities all of which are devoted to high quality teaching and research. This group was created to defend these universities' interests following the creation of the Russell Group by larger research-intensive universities earlier that year. The 1994 Group originally represented seventeen universities, rising to nineteen, and then dropping to eleven. The Group started to falter in 2012, when a number of high performing members left to join the Russell Group. The 1994 Group ultimately dissolved in November 2013.

[18] To determine the superior model, we compare the fitness of various models in Section 4.2.

Table 8
This table reports the input list of variables used in the LASSO model to computationally select variables that determine VC compensation.
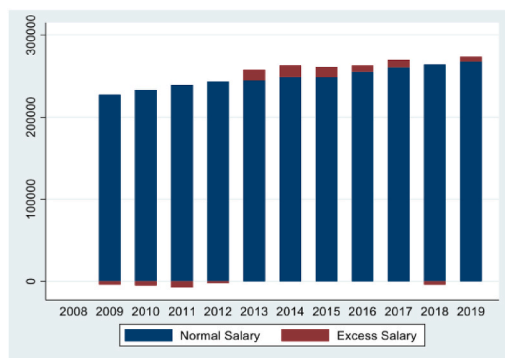
Variable	Definition	Source
Gender	Dummy variable equal to 1 if the VC is a female, and 0 otherwise	Whos who, University profiles and Linkedin
Age	The age of the VC in years	Whos who, University profiles and Linkedin
British	Dummy variable equal to 1 if the VC is a British, and 0 otherwise	Whos who, University profiles and Linkedin
Previous VC	Dummy variable equal to 1 if the VC has previous VC experience at another institution, and 0 otherwise	Whos who, University profiles and Linkedin
Tenure	The tenure of VC in years	Whos who, University profiles and Linkedin
VC Experience	Dummy variable equal to 1 if the VC has been a VC previously, and 0 otherwise.	Whos who, University profiles and Linkedin
Insider	Dummy variable equal to 1 if the VC is internally appointed, and 0 otherwise	Whos who, University profiles and Linkedin
Knighthood	Dummy variable equal to 1 if the VC has received a knighthood, and 0 otherwise	Whos who, University profiles and Linkedin
Oxbridge	Dummy variable equal to 1 if the VC studied at the University of Cambridge or the University of Oxford, and 0 otherwise	Whos who, University profiles and Linkedin
Ranking	The average ranking of the Guardian Rankings, the Complete University Guide and the Times Higher Education at year t	Rankings websites
Surplus per employee	The surplus or deficit per employee at year t. Surplus or deficit captures all income received by the institution minus all expenses and therefore is a measure of the financial soundness of the institution	HESA
Research Quality in top 25%	Percentage of scholarly outputs that are published in journals in the top 25% according to SNIP	SciVal
Ln(Total Staff)	The logarithm of the total number of staff at year t	HESA
Ln(TotalStudents)	Natural log of total number of students at year t	HESA
Average Staff Cost	The total cost of staff divided by the total number of staff at the institution	HESA
London	Dummy variable equal to 1 if the institution is located in London, and 0 otherwise	HESA
PhD	Dummy variable equal to 1 if the VC has a PhD, and 0 otherwise	Whos who, University profiles and Linkedin
RG	Dummy variable equal to 1 if the University is part of the Russell Group, and 0 otherwise	University website
G94	Dummy variable equal to 1 if the University is part of the G94 group, and 0 otherwise	University website
New	Dummy variable equal to 1 if the University is part of the new university group, and 0 otherwise	University website
Other	Dummy variable equal to 1 if the University is not part of the Russell Group, G94 or New groups, and 0 otherwise	Univeristy website
Social Sciences	Dummy variable equal to 1 if the VC studied a Social Science during their UG studies	Whos who, University profiles and Linkedin
Science	Dummy variable equal to 1 if the VC studied a Science during their UG studies	Whos who, University profiles and Linkedin
Humanities	Dummy variable equal to 1 if the VC studied a Humanity during their UG studies	Whos who, University profiles and Linkedin
Ln(Income Funding Bodies)	The logarithm of income received from funding bodies at year t	HESA
Ln(Income Tuition Fees)	The logarithm of income received from tuition fees at year t	HESA
Ln(Income.Other)	The logarithm of other income received at year t	HESA
Ln(Net Income)	The logarithm of net Income received at year t	HESA
Ln(Total Income from Research grants)	The logarithm of income from research grants at year t	HESA
Ln(BIS Research Councils)	The logarithm of income from BIS Research Councils at year t	HESA
Ln(UK based charities)	The logarithm of income from UK based charities at year t	HESA
Ln(UK central government)	The logarithm of income from UK central government at year t	HESA
Ln(Expend Staff Costs)	The logarithm of expenditure on staff at year t	HESA
Ln(Expend Other operating expenses)	The logarithm of expenditure on other operating expenses at year t	HESA
Ln(Expend Depreciation)	The logarithm of expenditure on depreciation at year t	HESA
Ln(Expend Interest)	The logarithm of expenditure on interest at year t	HESA
Ln(Expend Total)	The logarithm of total expenditure at year t	HESA
Ln(Full-Time Staff)	The logarithm of the total number of full-time staff at year t	HESA
Ln(Part-Time Staff)	The logarithm of total number of part-time staff at year t	HESA
Ln(Academic Staff Costs)	The logarithm of total academic staff costs at year t	HESA
Ln(Total Academic Staff)	The logarithm of the total number of academic staff at year t	HESA
Ln(Non-Academic Staff)	The logarithm of the total number of non-academic staff at year t	HESA
Ln(Total postgraduate)	The logarithm of total number of postgraduate students at year t	HESA
Ln(Total undergraduate)	The logarithm of total number of undergraduate students at year t	HESA
Ln(Total first degree)	The logarithm of total number of under graduates with a first degree at year t	HESA

lead us to incorrectly attribute the differences in VC compensations to differences in the pre-selected determinants of VC pay. We further exploit the panel dimension of our dataset to control for time-invariant institution-specific characteristics that may be correlated with omitted explanatory variables. For this purpose, we run panel fixed effects regressions with year and institution specific
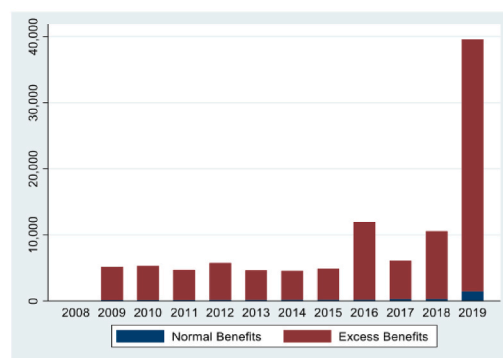
Table 9

This table reports the variables chosen by the LASSO model as important determinants of VC compensation. Variable definitions can be found in Tables 2 and 8
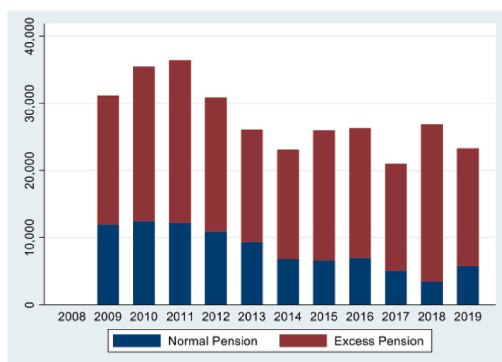
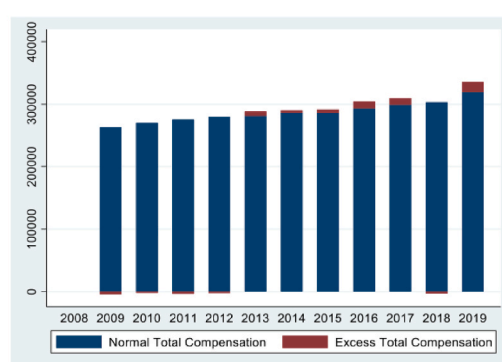|	Base Compensation	Benefits	Pension	Total Compensation
L.Ln(IncomeTutitionFees)	x	x	x	x
L.Ln(ExpendDepreciation)	x			x
L.Humanities	x			x
L.Surpluseremployee	x		x	x
L.VCExperience	x		x	x
L.SNIP	x			x
L.G94	x			x
L.Tenure	x	x	x	x
L.PhD	x	x	x	x
L.Gender	x		x	x
L.Age	x		x	
L.Knighthood	x			x
L.AverageStaffCost	x		x	
L.Oxbridge	x		x	
L.Insider	x	x		
L.British	x	x	x	x
L.Ln(Totalfirstdegree)		x		x
L.Ln(NetIncome)		x	x	
L.London		x	x	x
L.SS			x	
L.LnIncomeFundingBodyGrants		x	x	
L.Ranking			x	x
L.Other			x	x
L.PrevVC				x
Constant	x	x	x	x

(a) Base Compensation

(b) Benefits

(c) Pension

(d) Total Compensation

Fig. 3. This figure presents the average levels, in years from 2009 to 2019, of excess compensation of VCs according to the LASSO model. Excess compensation pound estimates are computed as the difference between the exponential of logged VC actual compensation and the exponential of predicted compensation. The mean VC compensation is the summation of the average normal and excess compensation levels.

Table 10

This table reports the *within* $- R^2$ and *adjusted* $- R^2$ of the pooled OLS, fixed effects regression, LASSO model and elastic net model.

Estimation Method	Dependent Variable	No. of Variables	*within* $- R^2$	Adj-R^2
Pooled OLS	Ln(Salary)	16	0.7498	0.6952
Pooled OLS	Ln(Benefits)	16	0.6083	0.5221
Pooled OLS	Ln(Pension)	16	0.4986	0.3891
Pooled OLS	Ln(Total Compensation)	16	0.7262	0.6665
Fixed Effects Regression	Ln(Salary)	16	0.4553	0.4340
Fixed Effects Regression	Ln(Benefits)	16	0.2768	0.2484
Fixed Effects Regression	Ln(Pension)	16	0.2531	0.2239
Fixed Effects Regression	Ln(Total Compensation)	16	0.4657	0.4448
Fama-MacBeth Regression	Ln(Salary)	16	0.2807	0.0252
Fama-MacBeth Regression	Ln(Benefits)	16	0.3778	0.1576
Fama-MacBeth Regression	Ln(Pension)	16	0.5621	0.4053
Fama-MacBeth Regression	Ln(Total Compensation)	16	0.5621	0.4053
LASSO Linear Prediction	Ln(Salary)	45	0.4625	0.4257
LASSO Linear Prediction	Ln(Benefits)	45	0.1388	0.0764
LASSO Linear Prediction	Ln(Pension)	45	0.1892	0.1307
LASSO Linear Prediction	Ln(Total Compensation)	45	0.4507	0.4131
ELASTIC Net Linear Prediction	Ln(Salary)	45	0.4591	0.4221
ELASTIC Net Linear Prediction	Ln(Benefits)	45	0.1388	0.0764
ELASTIC Net Linear Prediction	Ln(Pension)	45	0.1204	0.0570
ELASTIC Net Linear Prediction	Ln(Total Compensation)	45	0.4264	0.3871

dummy variables (Faccio et al., 2016; Florackis & Sainani, 2018) as well as the Fama and MacBeth (1973) regression model. Furthermore, we also implement the elastic net is a LASSO variant introduced by Zuo and Hastie (2005) that can further improve the accuracy of the estimation in the presence of highly correlated predictors Sermpinis et al. (2018). We do not report the full results from these models to conserve space but they yield qualitatively very similar results to our previous findings.[19] To determine the superiority of the models, in Table 10 we report the within-R^2 and adjusted-R^2 where for each measure of VC compensation, the within-R^2 and adjusted-R^2 is higher for the pooled OLS regression indicating that our original model offers a higher explanation of VC compensation than the fixed effects, Fama-MacBeth, LASSO or Elastic net models. Therefore these results suggest that we should place more emphasis and weight on our pooled OLS results than other model specifications.

4.3. Subsample of Russell Group universities

In our sample, we include all universities in the UK no matter the size, quality or history of the institution. In the UK, there is an elite group of universities called the Russell Group, established in 1994 to represent its members' interests, principally to government and parliament. It initially comprised of 18 research intensive British universities but has since expanded to 24 institutions.[20] According to the Russell Groups website, "our research-intensive, world-class universities play an important part in the intellectual life of the UK and have huge social, economic and cultural impacts locally, across the UK and around the globe".[21]

Therefore Russell Group universities may have different aims and strategies than non-Russell Group institutions and therefore attractive VCs with different skills and qualities than non-Russell Group institutions. To ensure that our results are not Russell Group specific, we re-estimate our models but include only the sample of Russell Group institutions from our population. Our results are qualitatively very similar indicating that our findings are robustness across Russell and non-Russell Group institutions.[22]

4.4. Subsample of English Universities

The Universities of the UK is made up of institutions in England, Scotland, Wales and Northern Ireland. However the institutions in each nation are quite different. For instance in Scotland, all standard honours degrees (undergraduate) take four years, while in England they only take 3 years. Also, students classified as 'home" students in Scotland pay no fees, while fees are dramatically lower for Northern Irish students studying in Northern Irish universities (and slightly lower for Welsh students studying in Wales). This is likely to have an impact on the recruitment and fees collected by these non-English universities and therefore for robustness, we re-estimate our analysis for England-based universities only. Although not reported to conserve space, our findings are highly consistent

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[19] However these full results are available upon request from the corresponding author.

[20] The members of the Russell Group are the University of Birmingham, University of Bristol, University of Cambridge, Cardiff University, Durham University, University of Edinburgh, University of Exeter, University of Glasgow, Imperial College London, King's College London, University of Leeds, University of Liverpool, London School of Economics, University of Manchester, Newcastle University, University of Nottingham, University of Oxford, Queen Mary University London, Queen's University Belfast, University of Sheffield, University of Southampton, University College London and University of Warwick and the University of York.

[21] See https://russellgroup.ac.uk/about/our-universities/for more details.

[22] We do not report the results to conserve space but are available upon request from the corresponding author.

with our previous findings.[23]

4.5. Excluding guardian rankings

One potential issue with our ranking variable is that we include the Guardian rankings to create our overall ranking, which could cause some concern given the Guardian does not include any research element in their calculations.[24] Therefore we re-estimate our findings but exclude the Guardian from our rankings measure. We find very consistent results with our previous analysis and find that new ranking variable still significantly related pensions and total salary while our main results remain unchanged.[25]

4.6. VC fixed effects

In our main analysis, we employ university fixed effects since we believe that university fixed effects will capture quite a considerable amount of unobserved characteristics. However as pointed our by a referee, VC fixed effects may more appropriate since our paper is focused on VC pay and these fixed effects may capture some endogeneity that university fixed effects is excluding. Therefore we re-estimate our initial analysis and include VC fixed effects and our findings are consistent with our previous analysis.[26] This is probably due to the fact that university fixed effects are capturing a vast majority of the VC fixed effects in that better VCs are generally at better universities and get paid accordingly.

5. Summary and conclusions

The compensation of CEOs has long been an area of interest and debate in the academic literature with many studies examining the determinants of CEO compensation and whether the performance of firms is linked to the compensation of the CEO. Surprisingly given the media interest of VC compensation in the UK, there is a lack of studies on VC compensation, the determinants and justification for such compensation. In this paper, we develop a model to predict VC compensation based on variables from the CEO compensation literature that are found to be significant drivers of CEO compensation and examine whether UK VCs earn excess compensation above the expected or normal level. Following Brick et al. (2006) and Dah and Frye (2017), define excess compensation as the difference between the observed compensation levels and expected compensation levels after controlling for three groups of variables, namely VC characteristics, performance measures and institutional characteristics.

We find that, on average, UK VCs are not overcompensated regarding their base salary or total salary received. However we do find evidence of excessive compensation in terms of benefits and pension contributions. Specifically, we find that VCs on average received excess benefits from 2008 up to 2015, while they have received excess pension contributions from 2013 to 2017. At the same time however, the magnitude of benefits received has grown while the magnitude of pension contributions has fallen which coincides with the UK government change in pension rules. Therefore it could the case that the VCs prefer renumeration outside of the base compensation in terms of benefits rather than pension contributions. We also show that there are very few significant differences in the characteristics of VCs that receive excess positive and negative compensation indicating that there isn't a certain type of VC that generally receives excess positive (negative) compensation.

However, our predicted model is based on determinants of CEO compensation and the determinants of VC compensation may be other variables that we did not capture in our model. Therefore we implement a LASSO model to optimally select important determinants of VC compensation from a selection of 45 variables. The LASSO model takes the subjectivity out of the modelling and let's the model select the variables that optimally determine VC compensation. Also, the LASSO model enables in the inclusion of variables that are highly correlated. We find that the LASSO model chooses a number of variables that we have already included in our initial modelling but also includes some other variables as important determinants of VC compensation. Nevertheless, the findings of the LASSO model are consistent with our initial model that VCs overall compensation is not excessive. For robustness purposes, instead of the pooled regression model we employ a fixed effects and a Fama-MacBeth (1973) model and instead of the LASSO model, we use an elastic net model where all models produce results consistent with our previous analysis. We also restrict our analysis to a subsample of Russell Group Universities and English Universities where we obtain qualitatively very similar results.

Our work therefore fits within the work on VCs where Tarbert et al. (2008) document no relation between VC pay and performance. Contrary to their findings and consistent with Gounopoulos et al. (2019); Johnes and Virmani (2021), we find that performance and pay are related and that better performing VCs receive the compensation they deserve. Our work is also consistent with the recent work of Bachan and Bryson (2021, p. 14110) who find that the gender wage gap in UK VCs has closed in the last two decades and given our sample starts in the 2007/2008 academic year, we support their finding. Specifically they show that the gender wage gap in VCs is no longer statistically significant and is accounted for by change in the attributes of male and female VCs and the universities they lead.

We must however point out that our findings are only applicable to the UK university sector and not universities in general or

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[23] We do not report the results to conserve space but are available upon request from the corresponding author.

[24] For clear, detailed information about the calculation of the Guardian ranking, see https://www.theguardian.com/education/2021/sep/11/methodology-behind-the-guardian-university-guide-2022.

[25] We do not report the results to conserve space but are available upon request from the corresponding author.

[26] We do not report the results to conserve space but are available upon request from the corresponding author.

corporate firms.[27] Different countries have different pay-scale for their university leaders with some countries having limits of the maximum their university leader can receive. Therefore we have to stress that our findings are specific to the UK only but future research may explore whether university leaders in other countries are also over- or under-compensated.

Overall, our paper provides evidence that UK VCs do not receive excess compensation in terms of base and total compensation, although there is some evidence of excess compensation in terms benefits and pension contributions. However there is very little difference in terms of characteristics of over- and under-compensated VCs therefore suggesting that UK VCs on average, receive the compensation they deserve.

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[27] We thank the reviewer for raising this point with us.