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Faculty Salary Inversion, Compression, and Market Salary Gap in California State University Business Schools

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Abstract
Extant literature has examined salary compression and inversion in US academic institutions including arguments that compression constitutes a form of age discrimination. We assess these phenomena via estimated *full rank salaries* (across nine campuses in the teaching-oriented California State University (CSU) system) based on the notion that in the absence of compression and inversion, forecasted full rank salaries should be comparable across faculty ranks. Our results show that salary compression is present across all sampled Colleges of Business (COB), but not in other academic CSU colleges. In addition, the patterns of compression support the notion that salaries in CSU COBs are becoming more inverted as the gap between market and current salaries increases. Recommendations for policy and collective bargaining negotiations are also offered.

Keywords Salary compression · Salary inversion · Faculty salaries · Salary compression in academia

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Introduction

Extant literature has examined the relationship between seniority (or rank) and pay in tenure-granting academic institutions along with proposed remedies (Baker et al. 1994; Barbezat 1989, 2004; Bereman and Lengnick-Hall 1994; Brown and Woodbury 1998; Castle 2005; Duncan et al. 2004; Huseman et al. 1996; Jennings Jr. and McLaughlin 1997; Lamb and Moates 1999; Martinello 2009; Porter et al. 2008; Ransom 1993). Salary inversion and compression in the university workplace and their age discriminatory foundations are well-established (e.g., Crow 1994; O'Boyle 2001). [For a discussion of the history of academic salary compression and a literature review of the topic, see Barbezat 2004.] Past research into the seniority-salary relationship typically uses regression-based models that include a host of other independent factors predicted to impact salary such as performance, experience, length of time employed by the institution, and demographic characteristics. However, it is difficult to measure and control for all aspects of faculty productivity related to teaching, research, and service (Duncan et al. 2004, p. 293).

In the case of the California State University (CSU) system, such models do not accurately "fit" as promotion raises and potential equity raises are negotiated by a union (i.e., the California Faculty Association), and merit (performance-based) raises are not part of the current binding collective bargaining contract agreement (CBA).[1] Specifically, CSU faculty receive an automatic 9% raise with promotion from Assistant to Associate rank and again from Associate to Professor rank. However, in recent years, Deans have had the flexibility to award additional salary "enhancements" to faculty at the time of promotion with no real guidelines or limits. Such enhancements were not available when older Professors were promoted, and the current CBA does not include any comparable salary increase options for long-term Professors which has further fueled the inversion and compression "fire". While the CBA allows faculty to apply for market-based raises, such salary increases are rarely awarded. These inflexible characteristics make the CSU system an atypical case suggesting that analyzing and resolving any existing compression and/or inversion may also require novel analytic methods and solutions. Remedies proposed in the past typically incorporate faculty performance in their compression/inversion correction models (Huseman et al. 1996) and thus, offer limited insight for the CSU system.

Salary Compression and Inversion in Academia

Salary inversion and compression are often treated as synonymous, but more accurately, they are distinct constructs. Salary compression occurs when salaries of junior professors are very close to those of their more experienced colleagues (Jennings Jr. and McLaughlin 1997, p. 346) or, stated another way, when salary structures are not proportional to professional maturity (Snyder et al. 1992). The causes of objective pay compression in the academic labor market is fairly well-defined as demand/supply imbalances in specific disciplines where increasing salary offers surpass the merit and cost-of-living increases offered to current faculty (Bereman and Lengnick-Hall 1994, p. 470; Gomez-Mejia and Balkin 1987; Toutkoushian

[1] Faculty salaries in California institutions of higher learning use a market component to determine salaries offered to new hires. Annual increases for cost-of-living and other factors are negotiated by the California Faculty Association and are awarded at the same rate to all faculty. In the past, some CBAs included merit raises, but those are no longer available.

1998). This rationale leads to the conclusion that "the salary differential between junior and senior faculty is smaller than it should be" (Toutkoushian 1998, p. 88). Similarly, Brown and Woodbury (1998) speculate that salary compression in academia is the result of two forces: (1) falling supplies of new PhD.s in many fields and (2) university budget constraints where administrators offered competitive salaries to new faculty to meet demand in high growth disciplines while allowing existing pay gaps between entry-level and senior faculty to shrink. Decreased mobility for senior ranks creates additional pressures on the compensation system as it becomes more difficult for existing faculty to find comparable or better positions elsewhere, thereby contributing to pay compression. Increased salary compression is also associated with an increase in the value of outside options (e.g., consulting) (McDonald and Sorensen 2017).

Salary inversion occurs when junior faculty salaries exceed those of faculty who are more senior in terms of experience and/or qualifications. Inversion is the more serious of the two salary issues since, when inversion exists, compression must also exist, whereas the reverse is not necessarily true. Faculty salary inversion is likely the result of a policy adopted by many US colleges and universities under which entry level wages fluctuate with changing market rates (Bereman and Lengnick-Hall 1994; Duncan et al. 2004; Huseman et al. 1996; Toutkoushian 1998). In the field of business, new faculty and replacement faculty salaries have increased significantly since 2001 (AACSB 2019) and salaries for existing faculty have not kept pace with salaries offered to new hires with less teaching and research experience, thereby creating an inverted salary structure (Bereman and Lengnick-Hall 1994; Brown and Woodbury 2004; Duncan et al. 2004; Huseman et al. 1996; Noe et al. 2017; Richardson and Thomas 2013). In recent decades, the business discipline has been perhaps the most compressed (e.g., McDonald and Sorensen 2017) and inverted academic field of study. This problem is exacerbated at universities such as CSU where union contracts often limit administrators' ability to differentially adjust salaries/inequities caused by market forces as we confirm below.

Inverted salary structures in academic settings are inherently age-discriminatory. O'Boyle (2001) provides a comprehensive look at these phenomena arguing that disparate impact (effect) and disparate treatment (intent) cannot be separated as they are inextricably intertwined (p. 960). That is, disparate treatment is masked within common employment practices in the university workplace that (1) views longer-service (older) faculty as inferior to younger faculty with more recent Ph.Ds. and that (2) writes off the superior teaching, research, and service records of older faculty as inconsequential. Thus, in the university workplace, "disparate impact signifies disparate treatment and reinforces it" (p. 960). The author goes on to explain how one university (Louisiana Tech University) utilized five strategies (resistance, pretense, evasion, denial, and approval) to hide its discriminatory intent behind discriminatory effect. Evidence that academic institutions often treat longer-service faculty in an age-disparate manner is well-known (e.g., Crow 1994; Martinello 2009; O'Boyle 2001; Ransom 1993). Correcting salary inversion and age-discriminatory salary practices is costly for the university as it requires that salaries be raised for older, longer-service faculty to be comparable to salaries of new hires. Typically, universities justify their inverted salary structures based on budgetary constraints arguing that other funding needs have higher priorities (Barbezat 2004; O'Boyle 2001) and that they are a regrettable consequence of how the market system works (Crow 1994).

Salary compression/inversion contributes to a number of human resource problems in university settings including reduced morale, higher faculty turnover, increased complaints,

lower research productivity, decreased pay satisfaction, and changes in classroom performance (Crow 1994; Barbezat 2004; Gomez-Mejia and Balkin 1987; Jennings Jr. and McLaughlin 1997; Lamb and Moates 1999; McDonald and Sorensen 2017; Snyder et al. 1992). The fact that faculty morale deteriorates is often acknowledged as unfortunate but is nonetheless tolerated at the institutional level. In addition, faculty and their collective bargaining agencies have too often implicitly approved of this unfair system through their silence. Another overlooked consequence of a compressed salary structure is that senior faculty often take on administrative roles (e.g., Department Chairs, Program Directorships, Associate Deans) as a means of increasing their salaries. When faculty serve in administrative positions, their teaching and research activities/expectations decline. As more tenured faculty take on administrative roles, more adjunct and lecturer faculty are hired to teach the courses previously assigned to those senior faculty. In addition, research expectations for administrators are reduced and thus, the end result is that students take more courses from adjunct (non-tenured) faculty and overall, faculty research productivity declines. In summary, senior faculty often seek administrative roles to enhance their salary which diverts them from their primary roles to educate students and to conduct quality research.

Study Outline and Goals

The purpose of this study is to expand on previous faculty salary compression and inversion literature that offers limited insight into the situation faced by the CSU system. The CSU system offers a unique set of circumstances (e.g., CBA restrictions and mandates) that has enabled and perhaps nurtured salary compression and inversion in the field most impacted by increasing faculty market salaries. To date, to our knowledge, no other studies examine salary compression/inversion in an institutional system with a similar set of such restrictive characteristics. We first present findings that show a consistent pattern of salary inversion and compression in the Colleges of Business (COB) at nine CSU campuses not evident in other academic colleges. Specifically, the campuses for which we secured data are Fresno, Fullerton, Long Beach, Los Angeles, Northridge, Sacramento, San Bernardino, San Diego, and San Jose.[2] Secondly, we present evidence that there is an increasing gap between market salaries and current salaries for COB faculty. Third, we show that the data for one of the largest CSU Colleges of Business suggests that this compression and inversion constitute a form of age discrimination.

Theoretical Perspectives

A variety of labor market theories predict higher earnings for more senior employees (e.g., Duncan et al. 2004; Topel 1991). For example, according to the theory of human capital, faculty members have different quantities of skills and attributes ("human capital") that affect their productivity. Faculty salaries differ across individuals when universities reward faculty based on their human capital or productivity (Toutkoushian and Paulsen 2016). The specific

[2] Enrollments (Fall 2019) are: Fresno = 24,139; Fullerton = 39,868; Long Beach = 38,074; Los Angeles = 26,361 ; Northridge = 38,391; Sacramento = 31,156; San Bernardino = 20,311; San Diego = 35,081; San Jose = 33,282. These nine campuses serve 60% of the CSU student population ($N = 481{,}9290$). Long Beach, Fullerton, Northridge, and San Diego are the 4 largest CSU campuses in terms of student enrollments.

human capital perspective argues that senior workers with firm-specific skills are paid higher salaries in an attempt to discourage them from leaving with skills often paid for by the firm (Becker 1994). However, such models do not accurately reflect salary structures in many academic settings, especially in state-supported teaching-oriented institutions bound by collective bargaining agreements that do not include performance productivity stipulations. In contrast, internal market theory argues that pay levels for entry level faculty must be tied to the external market and must be high enough to attract qualified applicants. While the external market guides new hire salaries, salaries for existing employees are more affected by internal rules/procedures and budgetary constraints (Gomez-Mejia and Balkin 1987) which can lead to pay compression and inversion.

Descriptive wage theory (Baker et al. 1994) offers an explanation for the U-shaped wage tenure pattern experienced by tenured professors. In contrast to empirical evidence that seniority is positively related to salary for most occupations, the opposite holds for university faculty. The negative correlation between salary and seniority is typically attributed to the mobility costs for faculty and the market power possessed by US universities (Brown and Woodbury 1998; Ransom 1993). The geographic separation of campuses translates into a high degree of monopsony power for universities and high mobility costs discourage faculty from seeking higher salaries elsewhere (Ransom 1993). To avoid uprooting a family and leaving behind all that is familiar (e.g., social and work networks), faculty are willing to work for lower wages relative to less experienced junior colleagues which may allow the employer to act opportunistically (Black and Lowenstein 1991).

An agency theory perspective has also been applied to explain faculty pay in academic settings (Gomez-Mejia and Balkin 1992). An agency relationship is established when one party hires another party – an agent – with specialized knowledge and skills (Eisenhardt 1989). However, this theoretical framework offers limited insight into understanding compression/inversion in the CSU system as agency theory-based hypotheses rely heavily on research productivity and other measures of performance as determinants of faculty pay. The CBA for the CSU system offers no options for merit pay and there are no salary enhancements available to full-rank professors regardless of research productivity or teaching performance.

A comparison of multiple salary inversion empirical models confirms that there is no one best approach to deal with faculty salary inversion, that administration of the inversion models varies for public versus public institutions, and that unionized faculty bound by a CBA may complicate the inversion correction in many ways (Jennings Jr. and McLaughlin 1997). In addition, discipline effects are often masked in past research of academic salary structures. For example, a national salary survey of public universities reports that business-related disciplines experienced greater salary compression than other "high demand" disciplines between 1979/80 and 1989/90 (Bereman and Lengnick-Hall 1994). A study of faculty salary compression using national data yields an overall finding of no salary compression, but a limited number of disciplines (e.g., business, economics) do exhibit significant salary compression (Barbezat 2004). Most recently, a study of mean-based salary compression ratios across 15 disciplines over 22 years among 76–118 (depending on year) public universities concludes that compression is not present in most disciplines but that it is prevalent and increasing in business-related disciplines (McDonald and Sorensen 2017[3]). Richardson and Thomas (2013) argue that "the problems of salary compression and, in some instances, salary inversion, have been among the most persistent and difficult compensation issues facing colleges and schools of business for

[3] Most of the sampled universities have a stronger research-orientation than the CSU campuses.

decades" (p. 21). In the next section, we show that the College of Business is an outlier compared to other colleges on California campuses with a heavy teaching orientation (i.e., CSU campuses). Unlike senior COB faculty, senior faculty in other colleges earn salaries that are, on average, not inverted and exhibit only limited compression.

Methodology

The Data

Base rate monthly salary data were secured from the Office of Public Records and Audit at nine CSU campuses (CSU Fresno, CSU Fullerton (CSUF), CSU Long Beach (CSULB), CSU Los Angeles (CSULA), CSU Northridge (CSUN), CSU Sacramento (CSUS), CSU San Bernardino (CSUSB), State Diego State University (SDSU), and San Jose State University (SJSU)). All salary data are from the March or April 2019 pay warrants. [March and April 2019 instructional faculty salaries are equivalent.] The data were then processed as follows:

- All base rate data represent full month "Instructional Faculty" salaries (job code 2360).
- Only Tenure/Tenure Track faculty are included in the analysis. Lecturers and other instructional positions (e.g., Librarians) are excluded.
- Department Chairs whose positions are 100% directorships (job codes 2481, 2482) are excluded as their "base rate" instructional salary is unknown. Faculty with 100% "Grant-assisted Specially-funded Instructional Faculty" job codes (2387, 2388) are excluded.
- A few CSU campuses (e.g., CSU Fresno, CSULA, CSUN) house the Department of Economics in the College of Business. This is not typical across the CSU campuses and market salaries for Economics faculty differ significantly from other business departments. Thus, for those affected campuses, Economics faculty are excluded from the college-based analyses presented below.

Dependent Measures

Salary systems can be assessed via a continuum ranging from a structured system where salary is based solely on professional maturity (measured by rank and time in rank) to an unstructured system where salary is based solely on merit (Hansen 1988a, 1988b; Snyder et al. 1992). Marketplace adjustments are also common in academia, most notably in the field of business. While salary structures tend to be based on professional maturity, merit, and market conditions, research indicates that there are also significant discipline effects and thus, salary compression in academia is best diagnosed via rank, time in rank, and discipline (Snyder et al. 1992). Currently, there is no merit system in the CSU system and thus merit raises are not part of the analyses and conclusions reported here.

Given the terms of the current CBA that guarantees a minimum 9% salary increase for each rank promotion, estimates of junior faculty full professor salaries are easily determined. Accordingly, for all the CSU campuses examined here, we calculate *Full Professor Salary* (base salary after all promotions) using the current guaranteed raise of 9% that is awarded when faculty are promoted from Associate professor to Full professor rank and when Assistant professors are promoted to Associate professor rank. If salaries are not compressed or inverted,

Table 1 Average Annual & Monthly Market Salaries (2018/2019) ($)

Departments	*Assistant*	*Associate*	*Professor*
Accountancy	156,500 (13,042)	155,300 (12,942)	173,700 (14,475)
Information Systems	122,300 (10,192)	129,000 (10,750)	156,700 (13,058)
Finance	162,700 (13,558)	161,300 (13,442)	193,200 (16,100)
Management	115,400 (9617)	127,900 (10,658)	150,800 (12,567)
Management/HRM	118,800 (9900)	125,200 (10,433)	155,200 (12,933)
Marketing	131,500 (10,958)	136,400 (11,367)	169,600 (14,133)

Source: AACSB *2018–19 Staff Compensation and Demographics Salary Survey*. Monthly salaries rounded to the nearest dollar are in parentheses.

the resulting *Full Professor Salary* measure should be comparable across professor ranks for a given discipline: i.e., once promoted to Full rank, current Assistant and Associate professors in a particular field would earn about the same monthly base salary as current Full professors. To the extent that Deans grant salary enhancements (i.e., raises in excess of the guaranteed 9%) to promoted CSU COB faculty, the inversion patterns reported below will increase, as discussed in more detail below.

In addition to the estimated full rank salary measures, we also calculate the *GAP* between current annual salary and annual market rate salary (i.e., market salary – current salary), as estimated by the AACSB [*The Association to Advance Collegiate Schools of Business*] 2018–2019 US Salary Report for public accredited schools of business in the US (see Table 1).

Analysis and Results

The first set of analyses examines the impact of faculty rank and college on the estimated *salary once promoted to full rank* construct. Separate ANOVA models are estimated for each of the nine sampled CSU campuses (see Table 2). Figure 1 summarizes the rank effects for the nine CSU campuses. In addition, we examine the rank x department effects for each COB.

CSU Fresno

Using the estimated monthly Full professor salaries (*Full Salary 9%*) for all faculty as the dependent variable (salary means are rounded off to the nearest dollar) and *rank* and *college* as

Table 2 Mean Monthly *Full Rank Faculty Salaries* ($) by Campus

Campus	*N*	*Assistant*	*Associate*	*Full Professor*
CSU Fresno	587	8101	8393	9191
CSU Fullerton	744	8577	8693	9277
CSU Long Beach	839	8745	8929	9389
CSU Los Angeles	521	8546	8465	9290
CSU Northridge	725	8326	8414	8914
CSU Sacramento	682	8140	8181	8783
CSU San Bernardino	404	7916	8386	9232
San Diego State	683	9392	9285	10,005
San Jose State	524	8777	8716	9341
Total	5709			

Estimated marginal means.

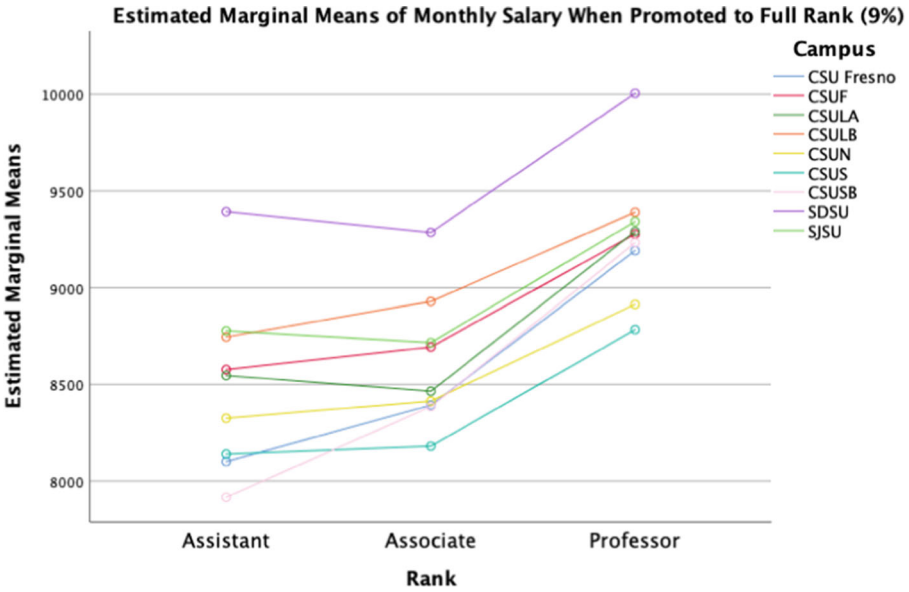

Fig. 1 Rank x Campus Effects for 9 CSU Campuses – Full Professor Salary (9%)*.

* See Table 2 for rank x campus estimated marginal means

the independent variables, when all CSU Fresno colleges are included in the model, there is a strong direct rank main effect ($F(2,563) = 146.15$, $p < .0001$, partial eta squared = .34, observed power = 1.0). The mean full rank monthly salary for current Full professors ($M = \$9191$) is significantly higher than the average full rank monthly salaries (9%) for both Associate ($M = \$8393$) and Assistant professors ($M = \$8101$). Planned comparisons show that the three ranks' salaries are significantly different from each other ($p < .01$) with a direct relationship (Assistant < Associate < Full). In contrast, this relationship is not what emerges for the COB.

Salary inversion is clear within the COB at CSU Fresno. An Analysis of Variance (ANOVA) test confirms that Full professor salaries in the COB have not kept up with increasing salaries offered to newer and younger faculty. Using the estimated monthly Full professor salaries (*Full Salary 9%*) for all faculty as the dependent variable (salary means are rounded off to the nearest dollar) and *rank* and *department* as the independent variables, there is a significant rank main effect. Assistant professors in the COB at Fresno ($M = \$11{,}840$) will earn more when promoted than current Full professors ($M = \$10{,}804$) and Associate professors once promoted ($M = \$10{,}280$; $F(2,31) = 6.96$, $p = .003$, partial eta squared = .31, observed power = 0.90). Planned comparisons reveal that Assistant professor full rank salaries are greater than full rank salaries for the two more senior ranks which are, in turn, comparable to one another.

Trying to draw substantive conclusions from such aggregated data that does not include important department and college-specific factors (e.g., college and department size, market salaries for specific fields, the distribution of assistant/associate/full faculty, faculty demand in specific disciplines, number of faculty recently hired at the assistant rank) may hamper the meaning of this type of analysis. However, it is clear that faculty in the COB are being treated differently than faculty in other

colleges and disciplines with no apparent justification. In particular, nonbusiness Full professors across campus will make more than Assistant and Associate professors in their respective disciplines even after those junior faculty receive two raises of 9% each. Below, we show that this pattern of results is robust across eight other CSU campuses. Because the pattern of results is similar across all CSU campuses, we present figures showing rank x college effects for only the four largest CSU campuses.[4]

CSU Fullerton

For CSU Fullerton (CSUF), when all colleges are included in the model, there is a strong rank main effect ($F(2,720) = 66.77$, $p < .0001$, partial eta squared = .16, observed power = 1.0). [See Fig. 3.] The mean full rank monthly salary for current Full professors ($M = \$9277$) is significantly higher than the average full rank monthly salaries (9%) for both Associate ($M = \$8693$) and Assistant professors ($M = \$8577$). Planned comparisons show that the three ranks' salaries are significantly different from each other with a consistent direct relationship (Assistant < Associate < Full).

In contrast, this relationship is not what emerges for the COB. Full rank monthly salaries for Assistant professors in the COB at CSUF ($M = \$11,927$) > Associate professors ($M = \$11,469$) > Full professors ($M = \$11,054$) ($F(2,84) = 18.10$, $p < .001$, partial eta squared = .30, observed power = 1.0). There are some department differences that are not reflected in the overall results: i.e., in the Departments of Marketing and Information Systems, Associate professors earn less than Full professors.

CSU Long Beach

For CSULB, there is a strong *rank* main effect for the multi-college aggregated data ($F(2,817) = 116.01$, $p < .0001$, partial eta squared = .22, observed power = 1.0), but the nature of the rank effect differs for the COB versus all other colleges (see Fig. 3). Across all colleges, the mean full rank monthly salary for current Full professors ($M = \$9389$) is significantly higher than the average full rank monthly salaries (once promoted to full) for both Associate ($M = \$8929$) and Assistant professors ($M = \$8745$). Planned comparisons show that the three faculty groups are significantly different from each other ($p < .01$) with a pattern (Assistant < Associate < Full) that is opposite to what we see in the COB.

Salary inversion is clear within the COB at CSULB. An Analysis of Variance (ANOVA) test reveals there is a significant rank main effect ($F(2,58) = 42.96$, $p < .0001$, partial eta squared = .60, observed power = 1.00). Castle (2005) argues that past studies over-estimate the seniority effect because they fail to account for time in rank. In response, we tested a second model for the COB where *time in rank (months)* is included as a covariate. The model F decreases ($F(2,57) = 18.89$, $p < .0001$, partial eta squared = .40, observed power = 1.0), but the effects and conclusions remain the same as the simple model: average monthly salaries for Assistants ($11,790) > Associates ($11,512) > Full professors ($10,959).[5]

[4] Figures for the other five campuses are available upon request from the first author.

[5] Note: The authors do not have access to *time in rank* data for the other CSU campuses. The year of the last promotion is part of faculty profiles in the COB at CSULB. Such faculty profiles are not posted on the other CSU websites.

The mean full rank monthly salary for current Full professors ($M = \$10{,}906$) is significantly lower than the average full rank monthly salaries for both Associate ($M = \$11{,}540$) and Assistant professors ($M = \$11{,}847$). Planned comparisons tested via Duncan's Multiple Range Test (Duncan 1955; Steel and Torrie 1960) show that the three ranks' salaries are significantly different from each other ($p < .01$) with a consistent inverse relationship (Assistant salary > Associate salary > Full salary). The department main effect ($F(2,58) = 10.06$, $p < .0001$, partial eta squared = .41, observed power = 1.00) reflects the well-known difference in relative salaries across business disciplines: e.g., Accounting faculty earn on average more than Management faculty, primarily due to supply versus demand for the different areas of study.[6] In summary, the data clearly show a consistent pattern of salary inversion and compression in the College of Business at CSULB.

CSU Los Angeles

For CSU Los Angeles (CSULA), when all colleges are included in the model, there is a strong rank main effect ($F(2,503) = 51.28$, $p < .0001$, partial eta squared = .17, observed power = 1.0). The mean full rank monthly salary for current Full professors ($M = \$9290$) is significantly higher than the average full rank monthly salaries (9%) for both Associate ($M = \$8465$) and Assistant professors ($M = \$8546$). Planned comparisons show that Full rank monthly salaries for current Full professors are significantly greater than Assistant and Associate mean full rank monthly salaries which are not different from each other (Full > Associate = Assistant).

In contrast, this relationship is not what emerges for the COB. As is the case for the results reported above for other campuses, full rank monthly salaries for Assistant professors in the COB at CSULA ($M = \$11{,}594$) exceed those of both Associate professors ($M = \$10{,}170$) and Full professors ($M = \$10{,}556$) with the latter two being statistically comparable to each other ($F(2,56) = 17.61$, $p < .001$, partial eta squared = .39, observed power = 1.0) (Assistant > Associate = Full). There are some department differences that are not reflected in the overall results: i.e., in the Departments of Finance and Law and Information Systems, Associate professors earn less than Full professors.

CSU Northridge

Looking at CSU Northridge (CSUN), a similar rank main effect is evident as reported above ($F(2,701) = 51.00$, $p < .0001$, partial eta squared = .13, observed power = 1.0). [See Fig. 4.] The mean full rank monthly salary for current Full professors ($M = \$8914$) is significantly higher than the average full rank monthly salaries (once promoted to full at 9%) for both Associate ($M = \$8414$) and Assistant professors ($M = \$8326$) which are not significantly different from each other according to a planned comparisons test.

Again, this relationship is not what emerges for the COB. Like the COB at CSULB, Full professors in the COB at CSUN will earn less ($M = \$10{,}074$) than Assistant professors ($M = \$11{,}739$) and Associate professors ($M = \$11{,}065$) once all faculty are promoted to full

[6] Department effects are not part of this study and thus, are not discussed further. The rank x department interaction is not significant ($p > .39$).

rank ($F(2,38) = 20.21$, $p < .0001$, partial eta squared = .52, observed power = 1.0). The three faculty group full salary means are significantly different from each other ($p < .05$).

CSU Sacramento

Looking at CSU Sacramento (CSUS), a similar rank main effect is evident as reported above ($F(2,661) = 66.85$, $p < .0001$, partial eta squared = .17, observed power = 1.0). The mean full rank monthly salary for current Full professors ($M = \$8783$) is significantly higher than the average full rank monthly salaries (once promoted to full at 9%) for both Associate ($M = \$8181$) and Assistant professors ($M = \$8140$) which are not significantly different from each other according to a planned comparisons test.

Again, this relationship is not what emerges for the COB. Similar to the previous campuses, Full professors in the COB at CSUS will earn less ($M = \$10{,}338$) than Assistant professors ($M = \$11{,}132$) and Associate professors ($M = \$10{,}533$) once all faculty are promoted to full rank ($F(2,43) = 4.76$, $p = .01$, partial eta squared = .18, observed power = 0.76). The three faculty group full salary means are significantly different from each other ($p < .05$).

CSU San Bernardino

Looking at CSU San Bernardino (CSUSB), a rank main effect is visible for the aggregated data ($F(2,389) = 175.79$, $p < .0001$, partial eta squared = .48, observed power = 1.0) The mean full rank monthly salary for current CSUSB Full professors ($M = \$9232$) is significantly higher than the average full rank monthly salaries (9%) for both Associate ($M = \$8386$) and Assistant professors ($M = \$7916$). Planned comparisons reveal that the monthly salary means for the three faculty ranks are significantly different from each other (Full > Associate > Assistant).

In contrast, findings for the COB at CSUSB differ from other CSUSB colleges and also differ from other CSU COBs.[7] Unlike other COBs analyzed here, the rank effect for the CSUSB COB is insignificant ($F(2,40) = 2.13$, *ns*), suggesting relatively comparable salaries across the three ranks. Examination of the rank means shows that Associate professors ($M = \$10{,}915$) in the COB at CSUSB will earn only slightly more than both current Full professors ($M = \$10{,}417$) and Assistant professors ($M = \$10{,}549$) once all faculty are promoted to full rank (assuming raises of 9%).

In spite of the insignificant overall rank F test, planned comparisons show that Associate full rank monthly salaries do exceed those of current Full and Assistant professors which are not different from each other ($p < .05$). These results suggest that, on average, the most recent COB hires had lower starting salaries than earlier hires who have been promoted to Associate and/or salary enhancements awarded to Assistants at the time of promotion have been generous. For reasons unknown, overall, faculty salary compression and inversion is less of a problem at CSUSB than at the other sampled campuses.

[7] Six Public Administration faculty are excluded from the CSUSB COB-based analyses to make COB-based analyses comparable across campuses. For the other CSU campuses, Pubic Administration is not part of the COB.

San Diego State University

At San Diego State University (SDSU), we find a similar rank main effect as reported above for the other campuses ($F(2,662) = 24.77$, $p < .0001$, partial eta squared = .07, observed power = 1.0). [See Fig. 5.] The mean full rank monthly salary for current Full professors ($M = \$10{,}005$) is significantly higher than the average full rank monthly salaries (once promoted to full at 9%) for both Associate ($M = \$9285$) and Assistant professors ($M = \$9392$) which are significantly different from each other (per planned comparisons, $p < .05$).

This Full > Associate > Assistant patterns of mean effects is not what emerges for the COB. Similar to the other campuses (except for CSUSB), Full professors in the COB at SDSU will earn less ($M = \$11{,}049$) than Assistant professors ($M = \$12{,}979$) and Associate professors ($M = \$12{,}394$) once all faculty are promoted to full rank ($F(2,42) = 17.54$, $p < .0001$, partial eta squared = .46, observed power = 1.0). Planned comparisons confirm that the Full professor monthly salary mean is significantly lower than monthly salary means for Associates and Assistants, which are not significantly different from each other ($p < .05$).

San Jose State University

For San Jose State University (SJSU), when all colleges are included in the model, there is a rank main effect ($F(2,503) = 16.53$, $p < .0001$, partial eta squared = .06, observed power = 1.0). The mean full rank monthly salary for current Full professors ($M = \$9341$) is significantly higher than the average full rank monthly salaries (once promoted to full at 9%) for both Associate ($M = \$8716$) and Assistant professors ($M = \$8777$). Post hoc planned comparisons show that average monthly salaries for Full professors are significantly higher than full rank monthly salaries for Associate and Assistant professors which, in turn, are not different from each other (Assistant = Associate < Full).

Analysis for the COB subsample shows a weaker rank main effect than that reported above for the other campuses ($F(2,37) = 2.62$, $p < .10$, partial eta squared = .12, observed power = 0.49). However, planned comparisons ($p < .05$) confirm that full rank monthly salaries for Assistant professors in the COB at SJSU ($M = \$11{,}488$) are significantly greater than those for Full professors ($M = \$10{,}713$) and Associate professors ($M = \$10{,}747$), which are not different from each other.

As noted above, while other important factors likely impact these results (e.g., the rise in faculty market salaries in the business field), it is clear that long-term senior faculty in the COB at CSU campuses tend to be treated less favorably with no substantive justification. In some cases, there are individual junior business faculty in the COB at CSU campuses earning more than their senior colleagues. While the literature shows an interest in understanding and correcting salary compression and inversion (e.g., Duncan et al. 2004), the CSU Administration tends to downplay or ignore the situation. For example, the last effort to correct salary inequities in the COB at CSULB was Fall 2016 at which time the Provost awarded minimal salary increases to the most impacted COB faculty. In spite of empirical evidence that the situation has deteriorated since that time, to date, the Provost has made no effort to rectify the problem.

Along with the evidence presented above of salary compression and inversion that tends to be confined to the COBs in the CSU system, in the next section, we also examine the gap between market salary rates and current salaries of CSU COB faculty.

Table 3 Mean Annual Faculty Salary *GAP* ($) by Campus

Campus	*N*	*Assistant*	*Associate*	*Full Professor*
CSU Fresno	587	18,094	28,913	40,127
CSU Fullerton	744	17,216	15,719	36,156
CSU Long Beach	839	18,304	14,936	37,933
CSU Los Angeles	521	20,569	31,416	42,132
CSU Northridge	725	15,274	17,983	43,728
CSU Sacramento	682	18,911	27,255	44,305
CSU San Bernardino	404	27,246	20,368	39,912
San Diego State	683	6592	8782	36,211
San Jose State	524	15,600	20,025	36,110
Total	5709			

Estimated marginal means.

Market Salary Gap

In addition to the inequities detailed above, there is a significant shortfall in CSU business faculty salaries compared to market salaries. Data from the AACSB 2018–2019 US Salary Report is used to establish current market salaries for public accredited schools of business in the US (see Table 1). We use this measure of market salaries and actual current CSU salaries to compute the salary shortfall for each faculty rank across the nine CSU campuses examined in this study. Specifically, we compute the estimated annual salary gap (*GAP*) as the difference between mean market salary at each faculty rank and the mean current CSU salary at the same rank. The results are presented in Table 3. We then perform separate Analyses of Variance (ANOVA) tests for each campus using *GAP* as the dependent variable and *rank* and *department* as the independent variables.

The results for all sampled CSU campuses clearly show a significant shortfall in senior faculty salaries and that the shortfall is a system-wide phenomenon. [See Fig. 6[8].] For CSU Fresno, the significant rank main effect ($F(2,31) = 18.85$, $p < .0001$, partial eta squared = .55, observed power = 1.0) shows that the mean GAP for current Full professors ($M = \$40,127$) is significantly greater than the mean GAP for Associate professors ($M = \$28,913$) which is, in turn, greater than the mean GAP for Assistant professors ($M = \$18,094$). Post hoc planned comparisons confirm that the salary gaps for the three ranks are significantly different from each other with a consistent seniority-inverse relationship (i.e., Assistant < Associate < Full).

For CSUF, there is a significant rank main effect for GAP ($F(2,84) = 87.29$, $p < .0001$, partial eta squared = .68, observed power = 1.0). The mean GAP for current CSUF Full professors in the COB ($M = \$36,156$) is significantly greater than the mean GAP for both Associate ($M = \$15,719$) and Assistant professors ($M = \$17,216$). Post hoc planned comparisons indicate that the mean GAP for Full professors is significantly greater than that for both Assistant and Associate professors which are not different from each other (i.e., Assistant = Associate < Full).

For CSULB, there is a significant rank main effect ($F(2,58) = 230.62$, $p < .0001$, partial eta squared = .89, observed power = 1.0). The mean GAP for current Full professors ($M = \$37,933$) is significantly greater than the mean GAP for both Associate ($M = \$14,936$) and Assistant professors ($M = \$18,304$). Post hoc planned comparisons show that the mean

[8] Since the results are consistent across campuses, we present just one figure of the GAP findings.

GAP for Full professors is significantly different from the two lower ranks (i.e., Assistant = Associate < Full). Full professor salaries have not kept up with market rates and Assistant and Associate professors in the COB at CSULB also lag market salary levels, but the gap is much less for them.

For CSULA, there is a significant rank main effect for GAP ($F(2,56) = 44.77$, $p < .0001$, partial eta squared = .62, observed power = 1.0). The mean GAP for current CSULA Full professors in the COB ($M = \$42,132$) is significantly greater than the mean GAP for both Associate ($M = \$31,416$) and Assistant professors ($M = \$20,569$). Post hoc planned comparisons indicate that the mean GAP salaries for the three ranks are different from each other (i.e., Assistant < Associate < Full).

For CSUN, the significant rank main effect ($F(2,34) = 50.19$, $p < .0001$, partial eta squared = .75, observed power = 1.0) shows that the mean GAP for current Full professors ($M = \$43,728$) is significantly greater than the mean GAP for both Associate ($M = \$17,983$) and Assistant professors ($M = \$15,274$). As reported above for other campuses, post hoc planned comparisons confirm that the mean GAP for Full professors is significantly different from the mean GAP for the two lower ranks which are not different from each other (i.e., Assistant = Associate < Full).

For CSUS, the significant rank main effect ($F(2,38) = 29.27$, $p < .0001$, partial eta squared = .61, observed power = 1.0) shows that the mean GAP for current Full professors ($M = \$44,305$) is significantly greater than the mean GAP for both Associate ($M = \$27,255$) and Assistant professors ($M = \$18,991$). As reported above for other campuses, post hoc planned comparisons confirm that the mean GAP for Full professors is significantly different from the mean GAP for the two lower ranks which are not different from each other (i.e., Assistant = Associate < Full).

For CSUSB, the significant rank main effect ($F(2,40) = 31.05$, $p < .0001$, partial eta squared = .61, observed power = 1.0) again shows that the mean GAP for current Full professors ($M = \$39,912$) is significantly greater than the mean GAP for both Associate ($M = \$20,368$) and Assistant professors ($M = \$27,246$). Planned comparisons confirm that the mean GAP for current Full professors is significantly different from the two lower ranks that are, in turn, comparable to each other (i.e., Assistant = Associate < Full).

For SDSU, there is a significant rank main effect ($F(2,42) = 37.29$, $p < .0001$, partial eta squared = .64, observed power = 1.0). As expected, the mean GAP for current SDSU Full professors in the COB ($M = \$36,211$) is significantly greater than the mean GAP for both Associate ($M = \$8782$) and Assistant professors ($M = \$6592$). Post hoc planned comparisons again show that the mean GAP for Full professors is significantly greater than the mean GAP for both Assistant and Associate professors, which are not different from each other (i.e., Assistant = Associate < Full). Notable for SDSU is that salaries for Assistant and Associate professors are closer to market rates than other campuses while current Full professor salaries are significantly lower than market salaries, commensurate with the other CSU campuses.

For SJSU, the significant rank main effect ($F(2,30) = 8.21$, $p = .001$, partial eta squared = .35, observed power = 0.94) supports that the mean GAP for current SDSU Full professors in the COB ($M = \$36,110$) is significantly greater than the mean GAP for both Associate ($M = \$20,025$) and Assistant professors ($M = \$15,600$). Post hoc planned comparisons indicate that the mean GAP for current Full professors is significantly greater than the mean GAP for both Assistant and Associate professors which are not different from each other (i.e., Assistant = Associate < Full).

In summary, in addition to the salary compression and inversion reported above for CSU Colleges of Business, salaries of Full professors in the Colleges of Business have a substantial lag behind market salaries that exceeds relatively lower salary lags for Assistant and Associate professors. With one exception (CSU Fresno), the salary gaps are statistically equal for Assistant and Associate professors whereas the gaps are significantly higher for Full professors. For CSU Fresno, the salary gaps between all three faculty groups are statistically significant.

Age Effects

Rank is inherently associated with age as the academic system is set up such that Assistant Professors are younger with less experience than both Associate and Full professors (see Table below). This is confirmed empirically as the correlation between professor rank and age in the COB at CSULB is significant (Spearman's $\rho = .82$, $p < .0001$). In addition, academic hiring and retention practices are designed to further enable and perpetuate an age bias. The argument that market conditions are antecedent to salary inversion and that the adverse impact on older faculty is merely a regrettable consequence assumes that buyers and sellers have freedom of choice. However, contrary to a market perspective, mobility becomes more difficult at higher ranks as older faculty do not have free choice since the market is accessible to only a few productive, usually younger, faculty (Crow 1994; Gomez-Mejia and Balkin 1987). Administrators at CSU campuses often restrict departments' ability to recruit/hire (older) faculty at higher than the Assistant ranks resulting in new hires who are, with rare exception, younger candidates with newly-earned Ph.Ds.

This notion of age bias was tested using the data for the COB at CSULB, the single campus where sufficient data were available. The year that one earned his/her bachelor's degree is a reliable surrogate for age. In the COB at CSULB, educational background data (i.e., year that faculty received their bachelor's degree) is part of the faculty profiles linked to the COB directory website: (http://web.csulb.edu/colleges/cba/contact/index.php.) Age was estimated based on the assumption that most faculty earned their bachelor's degree at age 22.[9] The table below summarizes age statistics by rank for faculty in the COB at CSULB.

Age Distribution for CSULB COB Faculty (2019)

	Mean Age	Median Age	St. Dev.
Assistant Professors	36.95	35.5	5.53
Associate Professors	47.38	45.0	8.00
Full Professors	61.58	63.0	9.82

A simple regression analysis, where Full professor salary (9%) is the dependent variable and age is the independent variable, supports that age has a significant inverse linear relationship with Full professor salary 9% (overall model $F(1,71) = 55.85$, $p < .0001$; model $R^2 = .44$;

[9] There were not sufficient age surrogate data available to replicate these analyses across the other sampled CSU campuses. No other CSU COB presents the year that each faculty member earned his/her Bachelor's degree. That data is not available via a PRA request.

β = −31.51, b = −.66, t = −7.47).[10] That is, younger faculty in the COB at CSULB earn more than their older more experienced counterparts once promoted to Full professor rank. For every one-year increase in age, average monthly salary declines $31.51 ($378 per year). The model R^2 of .44 indicates that 44% of the variance in Full professor monthly salary (9%) is explained by age. When *time in rank* is also controlled, age remains a significant predictor of Full professor salary, with an inverse relationship (model $F(2,70) = 31.03$, $p < .0001$; model $R^2 = .47$; β = −22.16, b = −.47, t = −3.53).

In summary, professor rank and age are highly correlated and, in the COB at CSULB, age has a significant inverse relationship with full rank salary even when *time in rank* is controlled. There is little reason to suspect that these age-based effects are not robust across other CSU campuses.

Discussion

Our data are consistent with the extant literature associated with salary compression and inversion in academic institutions that shows that faculty salary compression/inversion continues to increase for colleges of business (e.g., McDonald and Sorensen 2017). Past research has typically examined ratios of junior-senior faculty salaries and regression-based models that include various independent factors to explore the seniority-salary relationship using national and institutional data (e.g., Barbezat 2004; Duncan et al. 2004; Huseman et al. 1996; Jennings Jr. and McLaughlin 1997; Mohanty et al. 1986; Toutkoushian 1998). The ratio approach is problematic as interpretation of junior and senior salary ratios is difficult, there is no accepted standard for comparison, and the quality of junior and senior faculty may change in nonrandom ways (Barbezat 2004). The regression approach may be effective in certain academic settings (e.g., research-oriented institutions, cf. McDonald and Sorensen 2017), but accounting for all factors that impact salary at the national level is a challenge and institutional-level studies lack generalizability.

We examine salary data for 5709 tenure/tenure-track faculty at nine campuses in the CSU system (which collectively represent 60% of the CSU student population), the nation's largest four-year public university system with more than 481,000 registered students (fall 2019). As characterized above, the CSU system is atypical and thus, many theoretical/empirical frameworks and compression/inversion correction models utilized in the past do not lend themselves to accurately understand or correct the faculty salary structure at CSU. Our focus on estimated *full rank salary* comparisons is more fitting with the restrictions and mandates imposed by the current CBA, which make the CSU system a research anomaly. Analysis of estimated full rank salaries across the nine campuses shows a clear pattern of compression in the Colleges of Business that is not apparent in other academic colleges (see Figs. 2-5). While we do not examine longitudinal data, there are individual cases that clearly show that salary inversion is alive and well in the CSU COBs. In addition, the market gap analyses confirm that senior rank

[10] Much past literature on age-earnings profiles uses a quadratic specification, although others report that such specification results in biased estimates of earnings (e.g., Murphy and Welch 1990). For our data, the quadratic beta coefficient for age^2 was insignificant (b = 1.25, $p > .09$) and the negative beta coefficient for age remains highly significant (b = −1.90, t = −2.62, p = .01) (model $R^2 = .463$). Adding *time in rank* to the quadratic model increases R^2 slightly (=.496), but the negative beta coefficient for age is stable (b = −1.80, t = −2.53, p = .01) and time in rank is also negative (b = −.28, t = −2.15, $p < .05$). These effects and conclusions are the same when these analyses are repeated using the logarithm of salary as the dependent variable.

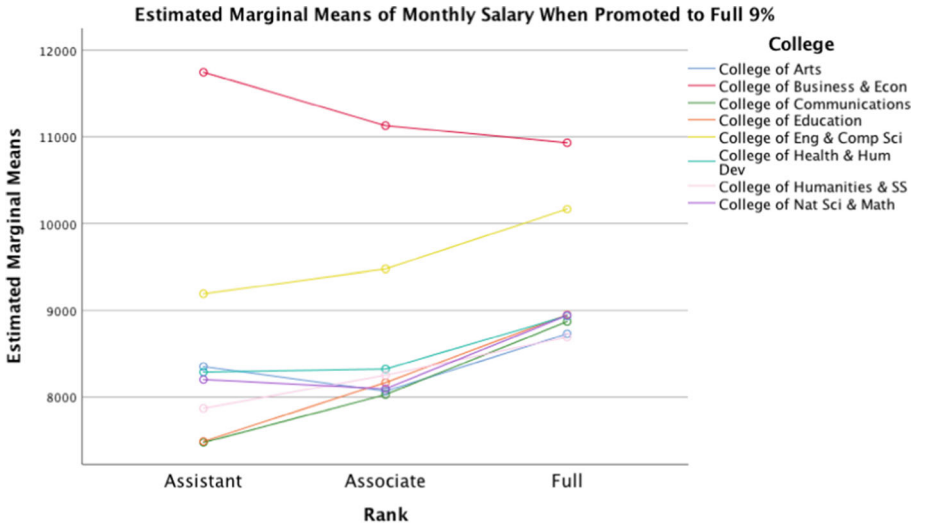

Fig. 2 Rank x College Effects for CSU Fullerton – Full Professor Salary (9%).

Rank Estimated Marginal Means:
Assistant Professor ($N = 220$): $8577.
Associate Professor ($N = 204$): $8693.
Full Professor ($N = 320$): $9277

faculty salaries severely lag market rates and some junior faculty in some business fields (e.g., management) earn near market rates while others have significant lags (e.g., accounting and finance) (cf. Bereman and Lengnick-Hall 1994). Our findings are consistent with past research that shows that the returns to seniority are far more negative in fields where entry-level salaries are high and growing (e.g., business) than in fields where entry-level salaries are low and stagnant (e.g., Brown and Woodbury 1998; McDonald and Sorensen 2017).

From a theoretical perspective, our data are consistent with many of the underlying tenets of internal market theory that predict that new hire salaries are driven most by the external market whereas salaries for senior faculty reflect internal traditions and budget constraints. As per this framework, new hire salaries in the CSU COBs are tied in part to the external market, but there are also secondary limits set by administration (e.g., the Provost traditionally sets a maximum that any new assistant can earn). Pay for existing faculty are driven more by internal university norms and the current negotiated CBA which prohibits merit raises. Unlike well-endowed research-oriented institutions, the CSU COBs are constrained by university budgetary restrictions that prevent deans from offering higher than normal salaries to new assistant professor "super stars". While CSU campuses have some flexibility to offer "perks" (e.g., summer support, graduate assistants), these typically are greatly lacking compared to incentives offered by elite schools. Our findings are also important in general for the literature examining empirical effects of monopsony in labor markets (Neuman and Wallace 2018). The fact that many senior faculty are willing to work for schools with inverted/compressed salary structures is consistent with the monopsony power and mobility cost arguments discussed above.

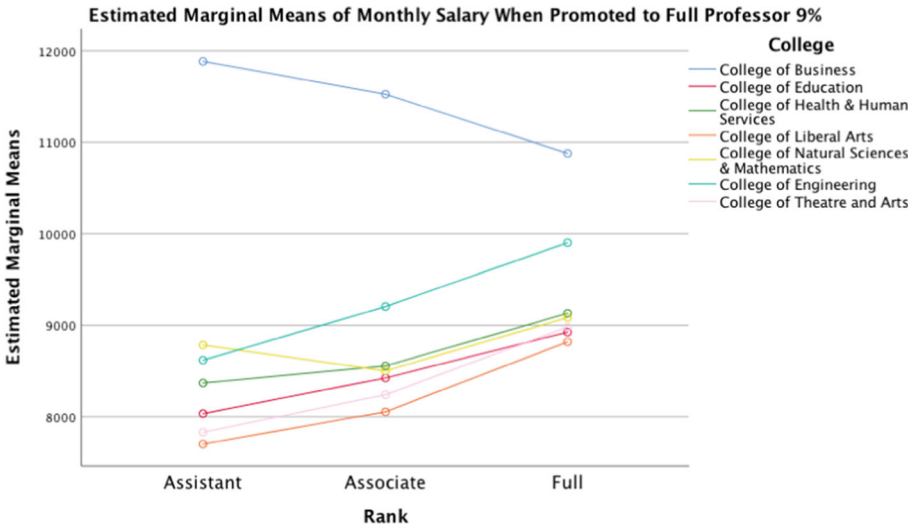

Fig. 3 Rank x College Effects for CSU Long Beach– Full Professor Salary (9%).

Rank Estimated Marginal Means:
Assistant Professor ($N = 243$): $8745.
Associate Professor ($N = 160$): $8929.
Full Professor ($N = 416$): $9389

Some other theoretical perspectives that have been applied to predict university faculty salaries are of little value for systems bound by restrictive collective bargaining agreements. For example, agency theory does not adequately explain the faculty salary structure in the CSU Colleges of Business as major framework components, research productivity and other measures of performance, have no role in the equation as set forth by the CBA. Similarly, the theory of human capital assumes that individual faculty possess unique skills and attributes that impact productivity that, if rewarded, may lead to differences in salaries across individuals.

This situation where long-term senior CSU COB faculty will earn less than younger junior faculty as measured by estimated full rank salaries is likely primarily the result of increased market salaries in business, salary enhancements given to lower rank faculty, and administrators' refusal to adjust senior rank salaries. The CBA allows for salary inversion adjustments, but is not specific about fund levels or about how these adjustments will be calculated. Perhaps not surprising, some CSU Provosts have been hesitant to implement such salary adjustments. Per CFA communications to its members (summer 2020), the recent COVID pandemic thwarted potential inversion negotiations between CSU administration and the collective bargaining agent. The fact that salary enhancements are only available at the time of promotion further fuels existing salary compression and inversion. Initiation of some sort of salary enhancement program for deserving long-term senior faculty has the potential to reduce salary compression and inversion and should improve faculty morale and productivity. A variety of compensation models that are grounded in discrepancy and equity theoretical orientations argue that employee satisfaction is a function of how much one earns, how much others are perceived to earn, and perceptions about what one should earn (Gomez-Mejia and Balkin 1987).

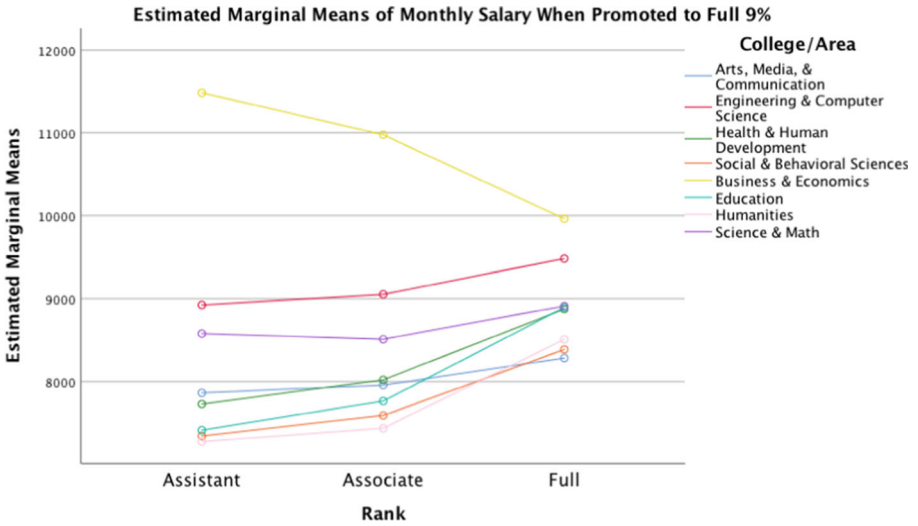

Fig. 4 Rank x College Effects for CSU Northridge – Full Professor Salary (9%).

Rank Estimated Marginal Means:
Assistant Professor ($N = 207$): $8326.
Associate Professor ($N = 169$): $8414.
Full Professor ($N = 349$): $8914

The CBA mandates that faculty receive a minimum 9% increase in salary at the time of promotion. To the extent that COB deans also award salary enhancements at the time of promotion, the compression and inversion illustrated here will be exacerbated. For example, in recent years, the Dean of the COB at CSULB has awarded salary enhancements of 3% for all faculty promotions, resulting in total raises of 12% for all promoted faculty. Re-doing our previous ANOVA analysis and using a *full rank salary 12%* measure (instead of a 9% measure) that assumes that each promotion includes a 12% raise in salary, the rank effect increases ($F(2,58) = 112.49$, $p < .0001$, partial eta squared = .80, observed power = 1.00).[11] The mean full rank monthly salary for current Full professors ($M = \$10{,}906$) is significantly lower than the average full rank monthly salaries for both Associate ($M = \$11{,}858$) and Assistant professors ($M = \$12{,}508$). The three ranks' salaries are significantly different from each other ($p < .0001$) with a consistent inverse relationship (Assistant salary > Associate salary > Full salary). In addition, the impact of age escalates for the full rank salary 12% regression model compared to the non-enhancement model presented earlier. That is, age has a significant inverse linear relationship with the full rank salary 12% measure (overall model $F(1,71) = 91.45$, $p < .0001$; model $R^2 = .56$; $\beta = -48.34$, $b = -.75$, $t = -9.56$). For every one-year increase in age, average monthly salary declines $48.34 ($580 per year).

We acknowledge that our aggregated analyses may mask salary compression and/or inversion in some departments and that there are individual cases where the CSU salary

[11] Comparable effects result when this analysis is conducted across the other 8 CSU COBs. Findings are available from the first author.

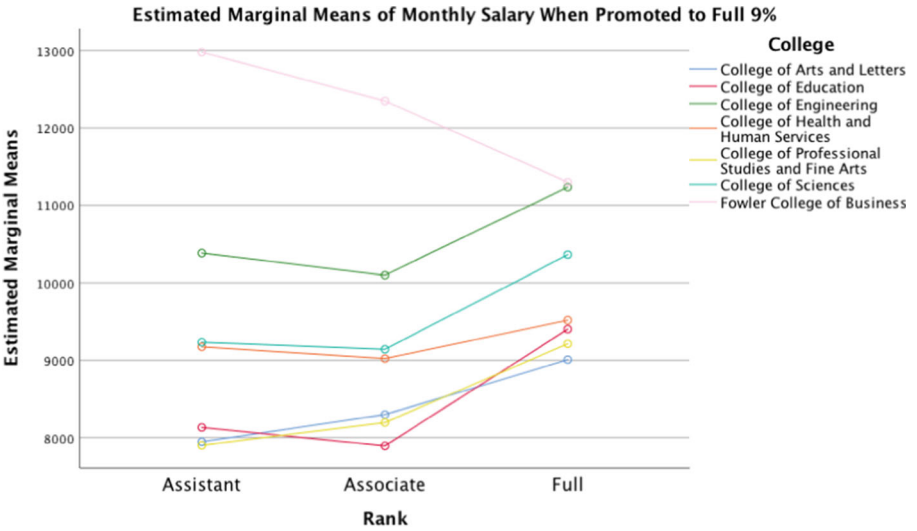

Fig. 5 Rank x College Effects for San Diego State – Full Professor Salary (9%).

Rank Estimated Marginal Means:
Assistant Professor (N = 204): $9392.
Associate Professor (N = 207): $9285.
Full Professor (*N* = 272): $10,005

system appears to be inequitable and discriminatory. It is also highly likely that some senior faculty in higher supply/lower demand disciplines earn significantly less than some junior faculty in their respective departments. Such individual cases are easy for administration to identify if they have the motivation to reduce salary compression/inversion.

Prior research suggests that compression effects may be inflated because they fail to account for *time in rank*. Above, we show that the rank effect remains strong for one campus where time in rank data is available and specified in the model. We have no reason to expect that this same result will not be robust across other campuses where the time in rank data were unavailable. The rank effects reported here are very strong ($p < .0001$) and we argue that it would take more than accounting for time in rank to render those insignificant.

The exact explanation of why senior faculty in other CSU colleges do not face the same demoralizing compensation situation is unclear and likely due to multiple factors including (low) discipline-specific faculty supply/demand and low growth in discipline market salary rates. In essence, our data may suggest that faculty salaries reflect a form of bias or "discipline discrimination" if such a concept exists. Given that faculty salaries are relatively higher in the COBs, CSU administrators are likely not motivated to allocate funds for an already "advantaged" discipline. However, if this attitude persists, recruiting and retaining competent and productive business faculty will be a major challenge that may ultimately impact accreditation. We would argue that the COBs and their faculty are important to the survival of the CSU system because business remains one of the most popular areas of study and helps generate significant outside support for the CSU system.

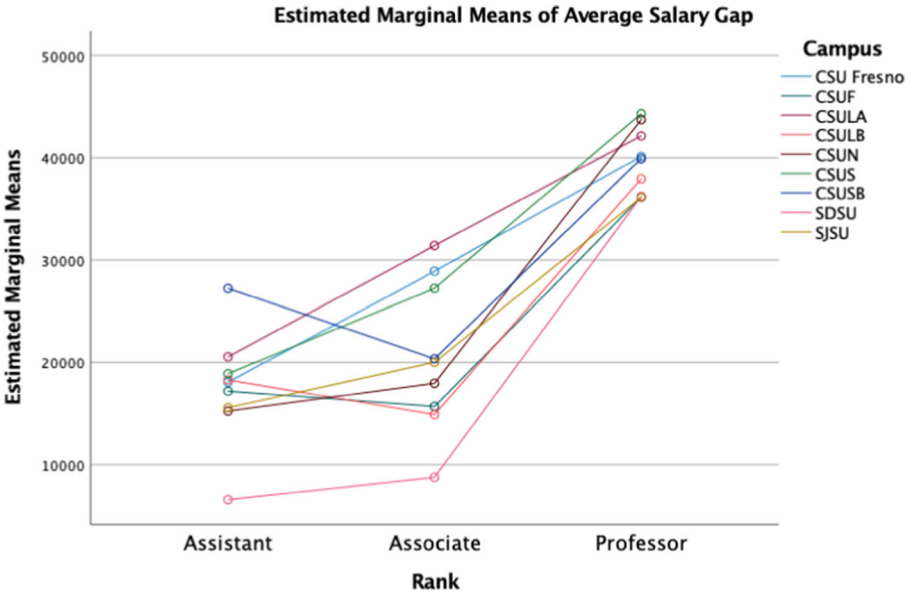

Fig. 6 COB Annual Salary GAP (Market – Current) by Rank for 9 CSUs.

* See Table 3 for rank x CSU COB estimated marginal means

Data also show that the salary compression and inversion effects work to create a form of age discrimination. As noted above, O'Boyle (2001) argues that disparate impact (effect) and disparate treatment (intent) cannot be separated since they are inextricably intertwined in academic settings. That is, disparate treatment is masked within common employment practices in the university workplace such that "disparate impact signifies disparate treatment and reinforces it" (p. 960). Crow (1994) warned that the language in the Civil Rights Act of 1991 may require business schools that pay newer faculty more than existing senior faculty to alter their traditional staffing and compensation practices to avoid allegations of discrimination. However, to date, academia has been able to ward off age discrimination accusations in part because faculty and collective bargaining organizations have tolerated the situation.

The inequitable salary structure reported here is unfair to long-term faculty for the obvious financial reasons (e.g., it negatively impacts pension benefits) and it has a demoralizing impact that is difficult to estimate. Salary inversion and compression are often justified by administrators based on the widely espoused belief that younger, more recent Ph.D. candidates are more energetic, more hungry to perform cutting-edge research, and more able to connect with students. However, empirical evidence shows that older college professors, those that have more teaching experience, tend to be evaluated more positively by students (De Beuckelaer et al. 2012). This is important when one is looking at teaching-oriented state-supported schools such as the CSUs.

Correcting Salary Compression/Inversion in CSU COBs

Lastly, we offer the following policy recommendations to CSU COB deans and administrators as well as their collective bargaining agents as they make future hiring,

promotion, and salary decisions/negotiations. First, across CSU campuses, it is important to offer new faculty salaries that are as near market rates as possible to attract talented and skilled candidates. Then, as necessary, the salaries of existing productive faculty at all ranks should be brought in line with the salaries offered to those new faculty; this appears to be consistent with the existing CBA that allows for salary inversion increases. COB deans should actively solicit salary raises for productive Full professors whose salaries are lower than current Associate and Assistant professors. Paul and Rubin (1984) demonstrate that "publish or perish" is the correct calculus for administrators to follow to maximize the quality of classroom instruction, a key goal for the CSUs. That is, research productivity and teaching quality are related and thus, rewarding faculty for quality and quantity publications is an efficient and desirable market result.

The current system of rewards and consequences in US universities tend to exacerbate pay discrimination. There are few tangible incentives for older tenured faculty to continue being productive researchers and there are no serious consequences when no effort is made. As noted by Crow (1994), the system almost encourages faculty to take it easy and to become unmarketable, thereby giving administration justification for not raising senior faculty salaries. It is reasonable to expect that any agreement by administration to address pay compression must also be paired with an agreement from collective bargaining agents to require senior faculty to maintain some level of research productivity.

Our data suggest that some junior faculty in non-COB departments may actually be underpaid relative to their senior colleagues. Offering higher starting salaries to Assistants and/or awarding appropriate salary enhancements at the time of promotion should lead to a more equitable salary structure in those affected areas.

The CSU collective bargaining agent, the California Faculty Association (CFA), must also step up to the plate and negotiate strongly for a faculty-centered salary inversion policy and associated budget allocation along with a structured market raise application process. The recent COVID pandemic has impacted contract negotiations, but in the interest of faculty morale and retention, salary equity and fairness must not be forgotten. In a case study, Graves and Kapla (2018) show how Northern Michigan University (NMU) used market adjustments, consistent correction of salary inversions, and defined initial salaries to create a transparent and justifiable salary structure that prevents the worst forms of compression. Other public university collective bargaining agents have successfully secured funds for inversion-based and performance-based raises (e.g., the UUP for the SUNY system).

Combatting salary compression and inversion will require time, money, cooperation, and creativity from all concerned parties including the collective bargaining agents. The goal of any proposed methods of salary adjustment should be to find fair and accurate outcomes (Duncan et al. 2004).

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Compliance with Ethical Standards

This manuscript is not being reviewed elsewhere and has not been presented at a scholarly or professional conference. The three authors wrote and approve of this submission.

All data used in this manuscript was secured from CSU Offices of Public Records & Audit and thus, no human subjects were involved.

Conflict of Interest The authors have no relevant financial or non-financial interests to disclose. The first author is employed by one of the CSU campuses examined in this article. The second and third authors are no longer affiliated with CSU, one being Professor Emeritus. The authors have no other conflicts of interest to declare that are relevant to the content of this article.

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