

Does leverage influence the impact of pay gaps on performance in listed retail and mining firms? Evidence from South Africa

Leverage and
the impact of
pay gaps

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Abstract

Purpose – Agency theory motivated this study, posing that leverage mitigates the agency problem. The aim was to examine whether leverage influences the relationship between executive-employee pay gaps (EEPGs) and firm performance. The study was conducted in the mining and retail sectors between 2012 and 2021.

Design/methodology/approach – Two EEPGs were featured based on their executive fixed pay and variable incentives accumulation. Proxies of firm performance were headline earnings per share; return on assets; earnings before interest, tax, depreciation and amortisation; and return on stock price. Data were collected from 76 JSE-listed firms in the retail and mining sectors and analysed using the two-step generalised method of moments.

Findings – The results revealed the hybrid implication of the pay gap for firm performance in the retail and mining sectors of South Africa, depending on the performance measures emphasised. More importantly, the study shows that with the moderating effects of leverage, firms can improve their performance while shrinking the pay gap.

Practical implications – The results have implications for policy addressing income inequality, debt management, executive compensation and regulatory reforms in South Africa concerning productivity and remuneration decisions.

Originality/value – The article provides specific literature for retail and mining industries on pay gaps, shows that it is possible to reduce the pay gap without compromising performance and suggests a new measure of performance that is more attuned to pay gap effect measurement.

Keywords Pay gap, Executive pay, Firm, Performance

Paper type Research paper

1. Introduction

The debate on executive pay, one of the variables used for executive-employee pay gaps (EEPGs), continues to intensify despite continuous advancement in corporate governance. Executive pay is excessive relative to firm performance over time (Abudy *et al.*, 2020). Among the proposed approaches to constrain executive pay is leverage, as according to agency theory, it reduces the amount of free cash flow over which executives have control (Jensen, 1986). However, the effect of leverage on executive pay has rarely been tested in the literature.

High executive pay has also attracted the public to EEPGs, as it pushes them upwards (Mdingi, 2017). High EEPGs are counted among the symptoms of economic inequality (The World Bank, 2018, 2022), unfair distribution of wealth (PwC, 2021) and social inequality (Lin *et al.*, 2013). These are prevalent in South Africa, known for its wealth inequality, opportunity



inequality and high EEPGs (The World Bank, 2018, 2022). Oxfam South Africa (2020) reported that some of South Africa's executives earn about 461 times the salaries of black women in the lowest pay rank. As a result, South Africa is popular as the most unequal society in the world, with the highest Gini coefficient of 0.63 and 0.76 in the respective years (The World Bank, 2018, 2022).

Attempts to curb executive pay, which would consequently restrain EEPG, such as say on pay and pay disclosure, have not been effective (Kim *et al.*, 2017; Tröger and Walz, 2019). Significant steps to particularly redress high EEPGs in South Africa have been taken. Firstly, legislation has been strengthened to improve governance; this manifested in the King IV Report (King IV), operative as of April 2017, requiring firms to explain the extent to which employee pay was considered when executive pay was determined (IoDSA, 2016). Secondly, the Department of Labour in South Africa introduced a minimum wage effective on 1 January 2019, and thirdly, the Minister of Trade and Industry, in September 2021, proposed an amendment to the South African Companies Act of 2008 to force firms to disclose EEPGs in their annual reports (PwC, 2021). However, mandatory disclosure of EEPGs is not yet effected in South Africa, accounting for one of the reasons why "inequality is high and stagnant" (The World Bank, 2022:1).

It is clear from the preceding discussion that South Africa is introducing more stringent regulations to reduce EEPGs, which can directly influence how firms' pay policies are structured. Meanwhile, it is unclear whether the intended lower EEPGs will appeal to South African firms regarding creating long-term shareholders' wealth. A significant indicator of a firm's wealth creation is firm performance (Kew and Alex, 2017), which has traditionally been examined against executive pay rather than EEPGs. Firm performance has predominantly been poor and rarely aligned to executive pay (Hughen *et al.*, 2019) across sectors. This was predominant before the 2008 economic recession, after which most corporate governance codes were effected against high executive pay. The literature is contradictory about the alignment of pay to performance after corporate governance codes, both locally and internationally. Instead, it suggests that higher EEPGs do not affect firm performance, which has also been witnessed in South Africa (Urson, 2016). Urson's (2016) is the only study that has investigated this association in the South African context. Literature from other countries, most of which were conducted in developed economies, supports that high EEPGs, rather than low ones, coincide with improved firm performance. The dilemma is attenuating the effect of EEPGs on firms' performance such that EEPGs can be lowered without hurting performance.

According to the literature, leverage has specific disciplinary effects on a firm's managers with the potential to moderate agency issues. Evidence from the study of Jensen (1986) on the strength of fixed obligation with leverage to curtail executives' activities to reduce agency problems has shown that high-levered firms are consistent with reduced executive pay. Raithatha and Komera (2016) controlled for leverage in a study on executive pay and firms' performance and reported that leverage has a significantly negative influence on executive pay. This result is not different from that of Gete and Gomez (2017) on executive pay and firm leverage. Earlier studies like Brick *et al.* (2006) empirically supported this assertion of a firm's leverage negatively influencing executive pay, with firms' specific risks, such as cash flow risk, instigated by leverage playing a significant role. The question arose whether the interaction of EEPGs and leverage will increase firms' financial performance despite efforts of lowering EEPGs.

This study investigated the association between EEPG and firm performance and, more importantly, tested the moderation effect of leverage on the relationship using data from JSE-listed firms in the retail and mining sectors. The South African mining sector is famous for disputes over wages triggered by perceived large EEPGs. For instance, mining sector CEOs earned an average of R28 million per annum (Labour Research Service, 2021a) in 2017. In contrast, employees earned an average of R72 000 (Mafoea-Nkalai and Tambani, 2017), translating into an EEPG of approximately 389. One of the disputes in 2012 led to the death of 34 miners (Lonmin Company, 2012). The wage demands impaired the mining sector workforce by more than 33,977,

although there has been an increase of over 6 000 jobs from 2020 to 2021 (Statista, 2022), interfering with total productivity and firm performance. Firm performance measured by profit before tax has decreased in the South African mining sector from 2014 to 2020.

The South African retail sector is a leading employer in the country's private sector (Labour Research Service, 2021b), with over 20% of the entire South African workforce (Dobbelstein *et al.*, 2016/20), most of which is unskilled labour. Retail sector CEOs earned an average of R15 million per annum in 2017; in contrast, ordinary staff earned an average of R53 764. This translates to a pay gap of 279, while firm performance in terms of profit before tax showed a downward curve, although revenue increased from 2014 to 2020 (Business Tech, 2022). Kenny (2003) highlights that the retail sector in South Africa tends to lower wage bills and restructure its workforce to have more casual and subcontract workers, which is likely to increase EEPGs. This suggests that some of the retail firms provide substandard employment and cheap labour while being characterised by wage unfairness and worker exploitation. Van Klaveren (2010) also observed lower wage bills in the Netherlands, leading to the author's conclusion that the retail environment is a low-wage sector. In the United States of America (USA), the Economic Policy Institute (2021) investigated 66 retail and food service firms and reported that the wage is abysmal in relation to executive pay and revenues over the same period. The issue of low wage levels in the retail sector was also unveiled more than 6 decades ago by Backman (1957), who associated it with high unskilled labour. As far as could be established, there is no literature on the amount of leverage in both sectors.

Contrary to the literature, we show that pay gaps negatively impact firm performance, with a significant positive influence of leverage on the effect of pay gaps on firm performance. Agency theory anticipates the possibility of high leverage to reduce EEPGs. These results are sensitive to the measurement of EEPGs to include either fixed pay or variable pay. The literature has mostly used total executive pay to determine the pay gap.

The study makes three contributions. Firstly, we provide evidence that lowering EEPGs without compromising performance through debt is possible. Secondly, we demonstrate the importance of performance measures aligned with key performance indicators (KPIs) to test agency theory. This is crucial to produce research that better associates with practice. Lastly, we provide specific literature for the retail and mining sectors in South Africa, which is known for high EEPGs, supplementing the lack of literature in the domain in the country.

2. Literature review and hypothesis development

Despite EEPG being among the most popular subjects in the global economic space and having attracted the attention of regulators in recent years, there is still limited research on it. Although this fact has been acknowledged in most similar studies, it is worse in South Africa. Simultaneously, the focus of the literature is very broad, as presented in the Table 1.

The literature on pay gap and firm performance has been the most common, and contradictory results have been reported. Cheng *et al.* (2017) and Banker *et al.* (2016)

Focus area	Authors
CEO to non-CEO pay gap with merits and demerits	Pissaris <i>et al.</i> (2010), Talavera <i>et al.</i> (2018)
Pay gap against employees' perception	Benedetti and Chen (2018)
Share options, financial reporting and CEO power/diversity	Smulowitz <i>et al.</i> (2019), Bao <i>et al.</i> (2021), Zhu <i>et al.</i> (2020), Alan <i>et al.</i> (2021)
Firm-specific factors, say on pay, executive's perceptions, innovation and pay disclosure	Reaser (1999), Crawford <i>et al.</i> (2021), Johnson (2018), Norman <i>et al.</i> (2020), Kelly and Seow (2016)
Firm performance	Banker <i>et al.</i> (2016), Cheng <i>et al.</i> (2017), Ferry <i>et al.</i> (2021), Luo <i>et al.</i> (2020), Dai <i>et al.</i> (2017)

Source(s): Authors' Reviews, 2023

Table 1.
Literature on pay gaps

evidenced a positive relationship between pay gap and firm performance, which supports the notion that high pay gaps tend to boost firm performance. This favours tournament theory and may have various interpretations, of which the first may be that the furor against high pay gaps is exaggerated (Banker *et al.*, 2016). This was confirmed by Byun (2014), who evidenced that low pay gaps are correlated with high executive turnover in the USA, suggesting that competitive executive pay, which favours high pay gaps, is essential for firms' success. This can also be interpreted as that pay gaps do not get high enough to compromise firm performance. Cheng *et al.* (2017) utilised logit and ordinary least squares (OLS) regression on 817 firms from the Pay Scale Global Database in 2011. They used the quotient of total CEO pay and average median employee pay to determine pay gap. Banker *et al.* (2016) focused on EEPGs in China with 5 835 observations between 2000 and 2009.

Rouen (2020) observed both a positive and a negative connection between pay gap and firm performance in the USA, depending on whether the pay gaps were linked to economic factors or not. Unlinked pay gaps were found to be detrimental to firm performance, while those that were linked led to increased firm performance, even if they were high. According to the author, unlinked pay gaps refer to pay gaps that were based on unexplainable factors such as favouritism. The author describes favouritism as anything that could not be linked to economic factors. This indicates that employees are willing to accept reasonable high pay gaps if they understand their basis, while unexplainable high pay gaps are likely to demoralise them (Rouen, 2020). Rouen (2020) conducted logit and OLS regression on 931 S&P 1500 firms between 2006 and 2013. Their pay gap was also determined from the quotient of total CEO pay and average employee pay.

Further to this, Ferry *et al.* (2021), Luo *et al.* (2020) and Dai *et al.* (2017) reported a U-shaped relationship, which indicates that pay gaps cannot linearly explain firm performance and cannot be related to the theories in question. According to Dai *et al.* (2017), this relationship seemed intensified in firms with more skilled workers, implying that perceptions of fairness over pay have an effect on employees' motivation. These results indicate that high pay gaps encourage executives to exert more effort in creating shareholders' wealth, but simultaneously have a potential to demotivate employees, which is likely to negatively affect firm performance (Ferry *et al.*, 2021). Ferry *et al.* (2021) define "pay gap" as executive pay divided by employee pay. Two-stage least squares and OLS were used on 29 firms and 224 observations in the tourism sector of Thailand between 2002 and 2018. Luo *et al.* (2020) used fixed-effects regression on 6 616 observations in China between 2008 and 2012. "Pay gap" was defined as the difference between the average cash pay of the three top executives and the average employee pay adjusted for social security payments. Dai *et al.* (2017) conducted their study in China on 6 488 observations between 2003 and 2011 through a two-stage regression and OLS. "Pay gap" was defined as the average top managers' pay, including supervisors, to average employee pay.

Urson (2016) and Pryce *et al.* (2011), on the other hand, found no evidence of the effect of pay gaps on firm performance, highlighting that neither high nor low pay gaps have a bearing on firm performance. Urson (2016) conducted the study on 325 observations in the consumer goods and services sectors in South Africa between 2006 and 2014. Linear regression was used, with "pay gap" defined as the quotient of CEO pay to average employee pay. Various categories of executive pay were used in this study, which included fixed pay, exercised share options and expensed long-term incentives in calculating three pay gaps. Lastly, Pryce *et al.* (2011) used a conceptual approach based on the existing literature with no specified number of articles.

All these studies were conducted in developed economies, except that of Urson (2016), the only study that was conducted in South Africa. Urson's study was conducted before King IV was implemented in April 2017, indicating that JSE-listed firms' reactions to the King IV pay gap regulation have not yet been revealed. It is also not known how the

reactions had an influence on firm performance for levered and unlevered firms, necessitating a new study.

Tournament theory encourages firms to pursue the highest EEPGs, which is believed to promote increased productivity. The intention is to motivate employees to compete for best talents and render their best performance to unlock high rewards (Guo, 2019). Firms' culture is built on the high EEPG strategy, which also favours firm performance. Therefore, tournament theory supports a positive relationship between EEPG and firm performance. Studies testing this theory found evidence of significant results supporting that high pay gap drives the performance of firms (Cheng *et al.*, 2017). Therefore, this study hypothesised as follows:

H1₁. EEPG is positively related to firms' performance in the retail and mining sectors in South Africa.

The assertion in the foregoing hypothesis indicates that low performance is consistent with low pay gaps, which is at variance with firm value creation. Policymakers desire to reduce income inequality by reducing pay gaps (IoDSA, 2016) with the potential to hamper firms' growth. Rationally, pay gaps should be reduced while still being able to increase firm performance. Agency theory encourages firms to adopt leverage, among other approaches, to constrain executive pay (Jensen and Meckling, 1976). Debt invested in profitable projects should improve firm performance. At the same time, the fixed contractual obligation has a discipline mechanism on the firms' executives (Nalarreason *et al.*, 2019). This should discipline managers from relying solely on compensation to incentivise themselves so that executive pay is reduced with a higher leverage ratio. This is confirmed by Brockman *et al.* (2010), who found that short-term leverage reduces executive optimism and helps control the agency problem. The literature also suggests that leverage neutralises the opportunistic conduct of executives and reduces executive pay (Albert and Robinson, 2013), highlighting that leverage should also reduce pay gaps. This suggests that agency theory supports the reduction of pay gaps, which coincides with the negative relationship between EEPGs and firm performance. Given the drive to lower EEPGs and still be able to increase firms' performance, this study hypothesised as follows:

H2₁. Leverage positively moderates the effect of EEPGs on firm performance in the retail and mining sectors in South Africa.

The results also provided guidance on whether leverage and executive pay need to be regulated to manage pay gaps.

3. Methodology

3.1 Sample

The population consisted of JSE-listed firms in the retail and mining sectors; according to List Corp (2021), there were 114 such firms as at 31 December 2021. We first visited the official websites of the 114 firms and downloaded their annual reports between 2012 and 2021. Upon scrutiny, we learnt that there were firms that were individually listed while they were also subsidiaries of other listed firms. We removed 12 such firms to avoid redundancy in the data. Of the remaining firms, 26 were further eliminated because they lacked more than 80% of the required data, despite having met the other sampling criteria. These eliminations resulted in a final sample of approximately 674 pay gap observations from 76 JSE-listed firms in the retail and mining sectors. Data from firms that reported in foreign currencies were converted into rand at year-end dates; conversion ratios were sourced from FXtop currency converter [1].

3.2 Model specification

To test the hypotheses, the two-step generalised method of moments (GMM) was implemented to regress EEPGs and their interaction with leverage on the performance of the firms in a panel data model. The choice of the two-step GMM was based on its robustness and its strength to deal with possible endogeneity issues that may be associated with a study of this nature (Gete and Gomez, 2017). GMM is assumed to be identical and independent distribution by design, indicating that issues of cross-sectional dependence can be overcome. Moreover, the approach helps to cope with the unbalanced nature of the panel, including missing data (Roodman, 2006). In addition, this study surmounted insufficient data with latitude for more variability, rarer collinearity problems and controlled heterogeneity within individual data sets (Baltagi, 2007). The general form of the linear dynamic panel model can be expressed as follows:

$$\varphi_{it} = \pi_i + \rho_i \varphi_{i,t-1} + \delta'_i \rho + \epsilon_{it} \quad (1)$$

where $t = \tau + 1, \dots, T$ and ϵ_{it} is assumed to be serially uncorrelated. The estimating regression models are derived in equations (2 and 3) and are written as follows:

$$perf_{it} = \pi_{it} + \rho_{it} perf_{it-1} + \delta_{it} eepg_{it} + levr_{it} + \theta_{it} contvar_{it} + \epsilon_{it} \quad (2)$$

$$perf_{it} = \pi_{it} + \rho_{it} perf_{it-1} + \delta_{it} eepg_{it} * levr_{it} + \theta_{it} contvar_{it} + \epsilon_{it} \quad (3)$$

where the subscripts it signify firms and time, respectively; $perf$ stands for performance measures; $eepg$ represents pay gap surrogates, while $levr$ for leverage and $contvar$ were the selected control variables for the study. π is the intercept, while ρ , δ and θ are the slopes of the regression models, with ϵ as the error term.

3.3 Variable definition, measurement and data extraction

We believe that among other business approaches, firms ought to target a desirable pay gap and then implement suitable strategies to achieve it while working towards maximum shareholder wealth. Hence EEPG is an independent variable and firm performance is a dependent variable; this is consistent with the literature. We used Excel spreadsheets to incorporate all the necessary inputs and then applied the formula (Average executive pay) ÷ (average employee pay) to determine EEPG. We primarily used annual reports to collect fixed and total executive pay (with options payouts) data for each firm. In the case where the data were not available, we supplemented it with IRESS database to obtain total executive pay data, as IRESS does not separately report fixed executive pay. During this exercise, we also noted the number of executive directors in each firm in each year studied. This was among the necessary inputs for determining average executive pay, which was the quotient of executive pay and the number of executives.

The denominator required several inputs, most of which were obtained from the annual reports. Firstly, the number of employees was extracted, followed by the annual salary/wage bill per firm. Both inputs were primarily obtained from the annual reports. Total executive pay was then subtracted from the wage bill to determine the net employee costs before further computations. In the case where the data were not found in the annual reports, IRESS database was used. The number of executive directors was also subtracted from the number of employees to obtain the net employee size before further computations. The denominator was then calculated by dividing the net employee cost by the net employee size; this resulted in the average employee pay. Unfortunately, not all the sampled firms disclosed all the inputs needed to determine EEPG (Urson, 2016). The pay gap was then calculated using *fixed pay* (EEPG1) and *total executive pay* as the numerator (EEPG2).

For firm performance measures, HEPS; ROA; EBITDA; and RSP were selected. These variables are popular in different ways. HEPS is the most preferred executive KPI among JSE-listed firms, followed by EBITDA, despite being vulnerable to manipulation through share repurchases (Steenkamp *et al.*, 2023). ROA frequently features as a measure of firm performance in the literature (Akande *et al.*, 2018). HEPS and ROA are featured in many similar studies and mixed results were reported. RSP (Ilhan *et al.*, 2021) a market performance measure and EBITDA (Zang, 2012) served to meet the concerns of various stakeholders while accounting for the robustness of the results. These variables were primarily extracted from IRESS database, and the annual reports were used as a supplementary source. No manual calculations were done to determine HEPS, EBITDA and RSP, as the data were mostly readily available. In a few instances where ROA could not be obtained from IRESS and annual reports, calculations were done by dividing operating profit by total assets.

Leverage (Levg) as the moderator variable was measured by long-term debt divided by total assets (DeAngelo *et al.*, 2011). The data were primarily extracted from IRESS database and manually computed in a few instances where it was unavailable.

3.4 Control variables

We controlled for *board independence* (%IND), as King IV requires boards to be dominated by independent directors. At the same time, the literature evidenced that the magnitude of this variable influences both executive pay and firm performance. However, the direction of the influence contradicts. Firms' boards were scrutinised to determine board size and the extent of independence. %IND was determined by dividing the number of independent directors by the board size. We also controlled for *board size* (BS), as Palaniappan (2017) in a Canadian study proved it has a negative influence on executive pay, while Larmou and Vafeas (2010) witnessed a positive effect in the USA. Sewpersadh (2019) reported mixed results in South Africa.

Firm size (REVSIZ), measured by revenue and *Tobin's Q* (TBQ) are among the variables that have been linked to executive pay and firm performance either directly or indirectly (Akram *et al.*, 2019), hence they were also controlled. IRESS database was primarily used to source the data for both variables, and the data were supplemented by the annual reports for revenue where necessary.

4. Results and discussion

Two hypotheses were proposed for this study, which captured a one-tailed test of the effects of EEPGs on performance and the role of leverage to reflect whether a new agency problem exists in South Africa. To test these hypotheses, we present in Table 2 the descriptive statistics of the data collected for analysis.

The EEPGs showed means of 50.20 and 112.83 for EEPG1 and EEPG2, respectively. The EEPGs mean indicated that it would take ordinary workers approximately 50 and 112 times of their total salary to earn an executive's fixed salary and total executive pay, respectively. Alan *et al.* (2021) reported a mean of 202 in S&P 1500 firms in the USA, Luo *et al.* (2020) reported a mean of 274 in China, Cheng *et al.* (2017) reported means of 103–145 in the and Banker *et al.* (2016) reported a mean of six in China. These results indicated that, on average, pay gaps in the South African retail and mining sectors are not extreme compared to firms in other countries. Maximum pay gaps were 6 317 times for EEPG1 and 16,419 times for EEPG2 over the research period. This is more extreme than expected and indicates that some South African firms have excessive levels of income inequality. Alan *et al.* (2021) reported a much lower maximum pay gap of 1795. Pay gaps clearly vary from firm to firm, indicating a need for stringent regulation. A staggered look at firm performance revealed that HEPS had a

Variable	Obs	Mean	Std. dev	Min	Max	Meaning
HEPS	632	8.50	29.96	-20.16	580.32	Headline earnings per share
ROA	661	0.10	0.19	-1.69	2.39	Return on assets
EBITDA	564	9.28	0.90	5.67	11.73	Earnings before interest, tax, depreciation and amortisation
RSP	569	0.13	0.64	-1	7.08	Return on stock price
EEPG1	643	50.20	259.32	-0.019	6317.42	Executive-employee pay gap 1
EEPG2	657	112.83	650.91	-0.019	16,419.10	Executive-employee pay gap 2
LEVG	664	0.43	0.32	0	2.67	Leverage
BS	641	10.83	3.00	1	21	Board size
INDPERCENT	641	0.52	0.21	0	0.93	Independent board percentage
TBQ	556	1.71	1.57	0.12	11.96	Tobin's Q
REVSIZE	637	17.5	28.2	0	170.0	Revenue size

Note(s): NB: All variables are in ratio/percentage values, except for EEPGs in thousand rand and revenue size in million rand

Source(s): Authors' estimation, 2023

Table 2.
Summary statistics

mean of R8.50, ROA a mean of 10%, EBITDA a mean of R9.28 and RSP a mean of 13%, implying that on average, firms in the two sectors reported a profit of approximately R8.50 per share, 10% ROA and 13% RSP between 2012 and 2022. The highest figures were R580.32 for HEPS, 239% for HEPS, R11.73 for EBITDA and 708% for RSP, while -R20.16 for HEPS, -168.39% for ROA, R5.67 for EBITDA and -100% RSP were the lowest figures, alluding to the varying performance of firms over the research period. With leverage, the mean was 42.48%, indicating that, on average, firms had long-term liabilities of slightly below 50% of their assets over the research period.

With further exploration of the data, the leverage series clustered at low leverage levels for the various performance–page gap relations, hence it was intuitively classified according to three leverage states: low level (below 0.25 leverage), moderate level (between 0.25 and 0.5 leverage, both end-inclusive) and high leverage (above 0.5 leverage). The arrangement was made to ensure that sufficient data were accommodated at the different states and to prevent likely skewness bias among the considered leverage states. Table 3 presents the summary of the four performance indicators at the different leverages. Appendix 1 (A–D) depict the graphs of the relationships between the four measures of performance, HEPS, RSP, ROA and EBITDA, and the pay gaps, EEPG1 and EEPG2, at the considered leverage levels. Visibly, the evidence identifies that for Pay Gap 1, the performance seems higher at the low (dotted grey line) leverage state for three of the considered earnings indicators, HEPS, RSP and ROA. EBITDA does not support this position, as it, at least visibly, shows that performance at Pay Gap 1 seems to be higher at the high (black unbroken line) leverage state. Not surprisingly, similar positions were established for the different performance indicators at Pay Gap 2. This visualised moderating potential of leverage was put to the test in the data analysis.

Table 4 shows the pairwise correlation results given the above analysis of the summary statistics. Both EEPGs indicated a negligible and insignificant positive association with the performance measures, HEPS, ROA, RSP and EBITDA, as the correlations were less than 5%, implying that firm performance should increase when pay gaps increase, although to a lesser extent. This association is consistent with the study's first hypothesis of a positive relationship between pay gaps and firm performance and tournament theory, which suggests that pursuing the highest pay gaps drives productivity. However, the insignificant association is less likely to have a noticeable effect, suggesting no impact of high pay gaps on firm performance.

Leverage level → Variable ↓	Low leverage $0 \leq \text{leverage} < 0.25$			Moderate leverage $0.25 < \text{leverage} \leq 0.5$			High leverage ($N = 216$) $0.5 < \text{leverage} \leq 2.67$					
	Mean	Max	Min	S.D.	Mean	Max	Min	S.D.	Mean	Max	Min	S.D.
1	8.14	580	-20.2	41.3	7.45	151	-13.4	15.1	8.35	219	-8.23	24.0
2	0.16	7.08	-0.85	0.83	0.13	2.58	-0.84	0.41	0.05	2.69	-1.00	0.41
3	0.06	2.39	-1.68	0.26	0.13	0.72	-0.33	0.14	0.11	0.47	-0.22	0.10
4	6.53	11.50	0.00	4.10	8.14	11.7	0.00	3.21	8.74	11.48	0.00	2.67
5	38.8	597	0.00	77.0	66.6	6317	0.00	430	38.4	262	-0.02	41.5
6	53.4	778	0.00	94.7	83.8	6317	0.00	436	54.2	381	-0.02	55.8
7	0.15	0.25	0.00	0.07	0.37	0.50	0.26	0.07	0.78	2.67	0.51	0.32

Note(s): SD = standard deviation
* Implies information is for only the un-winsorised (see [Figure 1, Panel A](#))
Source(s): Authors' estimation, 2023

Table 3.
Variable statistics*
(different leverage
levels)

International studies reported contradictory results. For instance, [Sanchez-Marin and Baixauli-Soler \(2015\)](#) reported a positive coefficient of 0.15–0.19 between 2004 and 2012 in Spain. [Banker et al. \(2016\)](#) observed a positive correlation between 0.03 and 0.29 in China between 2000 and 2009, while [Luo et al. \(2020\)](#) reported a negative correlation of 0.096 in China between 2008 and 2012. Not all these studies used the featured performance measures, meaning that the choice of performance measures may have a bearing on these results. What makes this study’s performance measures superior, especially the HEPS and EBITDA, is that according to our observation, the two performance measures were the most dominant KPIs among JSE-listed firms. However, it is important also to note that HEPS can easily be manipulated through share repurchases ([Steenkamp et al., 2023](#)).

The two-step GMM was used to model the relationships in focus. The merit of this estimating technique was motivated in [section 3.2](#). The high variability of some of the data noted in the summary statistics poses the threat of the effects of outliers on the study analysis. We transformed the variables using the inverse hyperbolic sine (IHS) transformation ([Friedline et al., 2015](#)) to overcome the log transformation challenges of data with zeros and negatives. Although the IHS transformation may not altogether remove the impact of outliers, it can reduce its impact and skewness, as it compresses the scale on which the observations are measured, thereby reducing the variability in the data and pulling its extreme values ([Osborne, 2002](#)). [Table 5](#) below depicts the regression results.

For the relationships between HEPS and EEPGs in models 1 and 4 in [Table 5](#), the dynamic panel results indicated that previous performance has a significant and positive impact at 1% on current performance in both sectors for both EEPGs models. EEPG1, based on executives’ fixed pay, and EEPG 2, based on total executive pay, had a negative and significant connection with HEPS at 1%. This suggests that increasing pay gaps are detrimental to firm performance, since performance declines as pay gaps increase in South African retail and mining firms. This finding contradicts those of international studies like [Alan et al. \(2021\)](#) who reported a positive influence of pay gaps on performance. Tournament theory, which promotes high pay gaps, was not supported by any of the pay gap measures in relation to HEPS. We did not find support for the first hypothesis of this study with HEPS even as the preferred executive KPI for JSE-listed firms. The reason for the nature of the result and the impact it could have on firms’ pay and productivity decisions are unclear. However, we found consistency with the study by [Byun \(2014\)](#), who reported a negative connection in the USA. The results were largely in favour of advancing laws to decrease pay gaps. This assertion may be sector- and country-specific, as it may change where different sectors or countries are considered.

In terms of ROA and EEPGs in models 2 and 5 in [Table 5](#), the dynamic model showed that previous performance had negative significant impacts on the current performance.

Table 4.
Pairwise correlation analysis

Variables	1	2	3	4	5	6	7	8	9	10	11
1 HEPS	1.00										
2 ROA	0.06	1.00									
3 EBITDA	0.32***	0.08*	1.00								
4 RSP	0.03	0.08**	0.07*	1.00							
5 EEPG1	0.01	0.01	0.05	0.02	1.00						
6 EEPG2	0.00	0.00	0.02	0.01	0.99***	1.00					
7 LEVG	0.09**	0.16***	0.28	0.10**	0.01	0.01	1.00				
8 BS	0.30***	0.07*	0.51***	0.03	0.03	0.03	0.05	1.00			
9 INDPERCENT	0.07*	0.13***	0.11***	0.01	0.05	0.02	0.03	-0.04	1.00		
10 TBQ	0.16***	0.55***	0.24***	0.10**	0.03	0.02	0.28**	0.14***	-0.10**	1.00	
11 REVSIZ	0.02	0.04	0.22***	0.00	0.00	0.00	0.24***	0.23***	0.16***	0.03	1.00

Variables	Model 1 HEPS	Model 2 ROA	Model 3 EBITDA	Model 4 HEPS	Model 5 ROA	Model 6 EBITDA	Leverage and the impact of pay gaps
L.HEPS	0.79*** (0.01)			0.62*** (0.02)			
EEPG1	-2.29*** (0.21)	-0.06*** (0.01)	-0.04*** (0.01)				
LEVG	-7.54*** (0.40)	-0.05*** (0.01)	0.08** (0.04)	-9.81*** (0.79)	-0.05*** (0.01)	0.15*** (0.05)	
BS	1.85*** (0.10)	0.01*** (0.00)	0.03*** (0.01)	2.46*** (0.18)	-0.00** (0.00)	0.02*** (0.01)	
INDPERCENT	2.56 (1.93)	-0.18*** (0.02)	0.11** (0.05)	8.99*** (3.03)	-0.14*** (0.03)	0.25*** (0.05)	
TBQ	0.82*** (0.11)	0.07*** (0.00)	-0.01** (0.00)	0.89*** (0.16)	0.06*** (0.00)	-0.05*** (0.01)	
REVSIZE	-0.55*** (0.13)	0.00 (0.00)	0.01** (0.00)	-0.34*** (0.07)	-0.00 (0.00)	0.00 (0.00)	
L.ROA		-0.03* (0.02)			0.15*** (0.02)		
LEBITDA			0.79*** (0.02)			0.79*** (0.02)	
EEPG2				-0.42* (0.21)	-0.04*** (0.00)	0.06** (0.02)	
Constant	-1.26 (2.02)	0.26*** (0.02)	1.60*** (0.21)	-17.95*** (1.12)	0.27*** (0.02)	1.36*** (0.24)	
Number of groups	67	66	61	69	68	64	
Number of instruments	56	56	56	56	56	56	
Wald stat. prob	0.00	0.00	0.00	0.00	0.00	0.00	
AR2	0.15	0.08	0.60	0.12	0.46	0.35	
Hansen J stats	0.61	0.77	0.95	0.56	0.61	0.88	

Note(s): NB: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Authors' estimation, 2023

Table 5.
GMM regression model

Similarly, EEG1 was negative and significant at 1% to explain ROA. Similar results were replicated for EEG2 and ROA. Again, we did not find conformity with the study's first hypothesis, as the relationships of EEG measures to ROA are consistent with those experienced with HEPS.

Models 3 and 6 of Table 5 indicate that the previous performance of EBITDA had a significant and positive impact on current performance at 1% for both EEGs. Simultaneously, EEG1 showed a negative and significant relationship at 1% with EBITDA, while EEG2 was positive and significant at 5% with EBITDA. The results are mixed, as the first hypothesis was only supported with EEG2, aligning with tournament theory. The results are consistent with those of Alan *et al.* (2021), who found that an increase in pay gap increases firm performance, and support the assertion that the measures of performance could be a significant consideration in a relationship of this nature. The effect of EEG1 on EBITDA supports decreasing pay gaps, favouring policies seeking to constrain pay gaps.

4.1 Moderation results

Agency theory presupposes the moderating effects of leverage in the relationship between pay gaps and firms' performance, which permitted the testing of the second hypothesis of this study. Table 6 [2] depicts the results of the moderation estimation. Firstly, the relationship

Variables	Model 7 HEPS	Model 8 ROA	Model 9 EBITDA	Model 10 HEPS	Model 11 ROA	Model 12 EBITDA
L.HEPS	0.79*** (0.01)			0.61*** (0.01)		
EEPG1	-3.43*** (1.00)	-0.11*** (0.01)	0.02 (0.02)			
LEVG	-19.42*** (6.41)	-0.48*** (0.07)	0.36*** (0.14)	11.81*** (4.03)	0.04 (0.08)	1.87*** (0.30)
C.EEPG1#C.LEVG	3.43* (1.92)	0.13*** (0.02)	-0.09** (0.04)			
BS	1.81*** (0.13)	0.00 (0.00)	0.03*** (0.01)	2.37*** (0.12)	-0.00*** (0.00)	0.04*** (0.01)
INDPERCENT	0.73 (3.03)	-0.15*** (0.02)	0.05 (0.04)	9.00*** (3.38)	-0.14*** (0.03)	0.22*** (0.06)
TBQ	0.74*** (0.09)	0.08*** (0.00)	-0.02*** (0.01)	0.84*** (0.20)	0.06*** (0.00)	-0.03*** (0.01)
REVSZIE	-0.53*** (0.15)	-0.00 (0.00)	0.01*** (0.00)	-0.47*** (0.11)	-0.00 (0.00)	0.01*** (0.00)
L.ROA		-0.05 (0.03)			0.16*** (0.02)	
L.EBITDA			0.85*** (0.03)			0.86*** (0.03)
EEPG2				2.12*** (0.38)	-0.02* (0.01)	0.17*** (0.04)
C.EEPG2#C.LEVG				-4.76*** (1.02)	-0.02 (0.02)	-0.43*** (0.08)
Constant	4.29 (3.99)	0.45*** (0.03)	0.83*** (0.27)	-26.11*** (1.84)	0.24*** (0.03)	-0.05 (0.23)
Number of ID	67	66	62	69	68	64
Number of instruments	56	56	56	56	56	56
Wald stat. prob	0.00	0.00	0.00	0.00	0.00	0.00
AR2	0.14	0.14	0.83	0.11	0.45	0.37
Hansen J stats	0.44	0.53	0.92	0.56	0.63	0.93

Table 6.
Moderation analysis

Note(s): Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Authors' estimation, 2023

between HEPS and EEPGs shown in models 7 and 10 suggests that HEPS remained negatively significant at 1% in response to EEPG1 (built on fixed pay only), similar to the results before the moderation effect. The interaction of leverage with the EEPGs shows that HEPS responded positively with weak significance to EEPG1. The failure of the relationship to respond to leverage is justified by the nature of fixed pay versus the fact that the effect of leverage on executive pay is built on agency theory, which is centred around variable pay. Another interpretation may be that fixed pay fails to represent the full picture of pay gaps, as variable pay is not yet considered. The results also indicate that HEPS moved to positive and strongly significant at 1% in response to EEPG2 as against the results before moderation. Although negative when interacted with leverage. The results suggest that while EEPG2 influences HEPS positively in a moderation analysis, its interaction with leverage provides a negative effect. Implying that the measure of pay gap has a role to play in the moderating effects of leverage in the relationship between pay gap and performance measured by HEPS. These results partly align with this study's second hypothesis, implying that a firm's performance can be enhanced while employing leverage to close pay gaps. Agency theory presupposes that the disciplinary effect of debt will reduce executive pay, while bolstering

performance. This has significant implications for policy advocacy towards pay gap reduction, especially in South Africa.

The EEPGs and ROA in models 8 and 11 showed consistent results before the moderation process, as both EEPGs remained negative and significant to predict ROA. When the EEPGs interacted with leverage, ROA returned positive and statistically significant in reaction to EEPG1, while it negative but insignificantly responded to EEPG2. The interaction of LEVG with EEPG1 makes this assertion apparent and supports the second hypothesis of this study. Studies that have used ROA as a proxy of performance reported contradictory results: [Ferry et al. \(2021\)](#) observed a U-shaped relation in Thailand; [Cheng et al. \(2017\)](#) supported tournament theory with a positive connection in China; while [Byun \(2014\)](#) supported agency theory with a negative connection in the USA. No known study has utilised HEPS as a performance measure.

The connection between the EEPGs and EBITDA depicted by models 9 and 12 revealed both positive relationships with EBITDA, except that the relationship was insignificant with EEPG1 while significant at 1% with EEPG2. Both connections improved, as it was negative and significant at 1% with EEPG1 and positive and significant at 5% with EEPG2 pre-moderation. This is consistent with the second hypothesis and the post-moderation results of HEPS, which confirmed expectations, as HEPS and EBITDA are the most preferred KPIs in the selected sectors. The response of EBITDA to the interaction of pay gaps and leverage became negative and strongly significant with both EEPGs.

The inference from the moderated results suggests that, in the instances where the relationships are positive and significant in explaining the performance measures, leverage has the potential to lower pay gap while still ensuring that the firm's performance can be sustained, providing support for agency theory. This result gives an indication of policy support in reducing pay gaps without hurting the performance of the firms. On the other hand, we also found support for tournament theory after featuring leverage on EEPG2 and KPI-aligned performance measures, which promotes significant pay gaps to improve firm performance. This could be inferred to have proved the theory that enhancing pay gaps is consistent with firm performance improvement. Given the dominance of the statistically significant relationships and focussing only on KPI-aligned performance measures, H_2 was therefore satisfied.

These findings have two fundamental revelations. Firstly, KPI-aligned performance measures confirmed agency theory regarding the impact of leverage on constraining executive opportunistic behaviour. These results align with expectations, and this study is the first to have consciously observed KPI-aligned and non-KPI-aligned measures. Secondly, it was unveiled that leverage is essential in managing pay gaps, especially in South Africa, where pay gaps are extreme. This has implications for policies in South Africa, where the government is pursuing an agenda to address income disparities, which must be done without compromising the sustainability of firms. South Africa is among the countries with the highest Gini index in the world (see [The World Bank, 2022](#)).

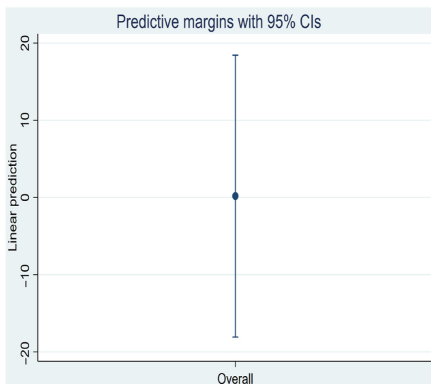
Given the above results and the summary in [Table 7](#), we attempted to graphically show the effect of pay gap on performance at different leverage levels. We provided the post estimation graphs for the main EEPG to indicate the predicted performance level at certain leverage levels using margin plots. The overall margin prediction for EEPG1, [Figure 1](#), shows predictive margins for HEPS, revealing that without interacting leverage and pay gaps (Panel A), the prediction for performance appears slightly higher, although within a smaller range of intervals as compared to when the variables are interacted (Panel B), which identifies a marginally lower prediction for HEPS, but covering a larger interval, hence accommodating more precision for predictions. Specifically, Panels C (D) depicts the predictive value of HEPS at three different leverages for EEPG1 when it is not interacted (interacted) with leverage. As observed (Panel C), the linear depiction of performance does not intercept due to the non-moderation of pay gap and leverage. Performance identifies only one convergence point for

Table 7.
Summary of the
regression results

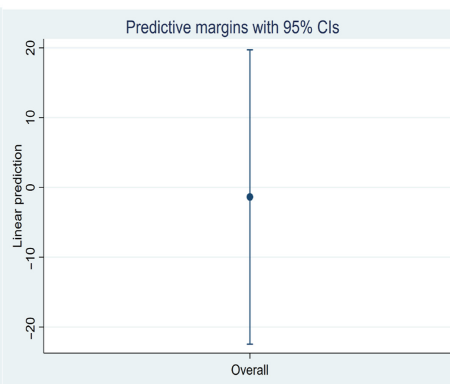
	Predictions without moderating effects			Predictions with moderating effects			Moderating		
	HEPS	ROA	EBITDA	HEPS	ROA	EBITDA	HEPS	ROA	EBITDA
<i>EFIG1</i>									
EFIG1	Negative***	Negative***	Negative***	Negative***	Negative***	Positive	N/A	N/A	N/A
Leverage	Negative***	Negative***	Positive**	Negative***	Negative***	Positive***	N/A	N/A	N/A
Pay gap* leverage	N/A	N/A	N/A	N/A	N/A	N/A	Positive*	Positive***	Negative**
<i>EFIG2</i>									
EFIG2	Negative*	Negative***	Positive**	Positive***	Negative*	Positive***	N/A	N/A	N/A
Leverage	Negative***	Negative***	Positive***	Positive***	Positive	Positive***	N/A	N/A	N/A
Pay gap* leverage	N/A	N/A	N/A	N/A	N/A	N/A	Negative***	Negative	Negative***

Source(s): Authors' estimation, 2023

Panel A (without interaction)

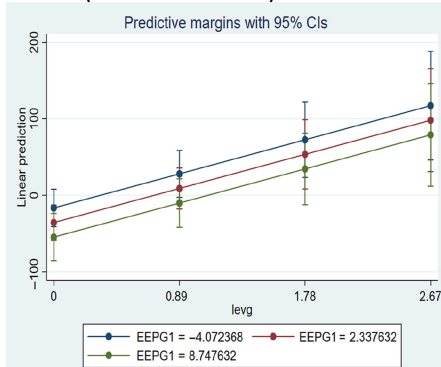


Panel B (with interaction)

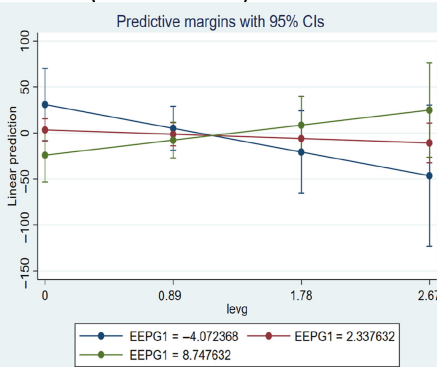


Overall prediction plots, HEPS

Panel C (without interaction)



Panel D (with interaction)



Prediction plots for HEPS at identified pay gap for different leverages

Source(s): Authors' estimation, (2023)

Leverage and the impact of pay gaps

Figure 1. Predictive margins, HEPS

predicting HEPS in Panel D due to the interactions (same as the point identified in Panel B). This suggests that the

Interaction of the variables at the minimum level of leverage, the predicted performance value by pay gap increases from negative to positive, intersecting at around 0.40, depicting the point at which moderation has taken place. The opposite scenario played out for the interactions at the maximum level of leverage. This is different for ROA and EBITDA in Figures 2 and 3 (Panel Ds), indicating a higher level of leverage being consistent with increasing performance predicted by pay gap. The main conclusion from the experiment reveals that leverage has a significant influence in moderating the effects of pay gaps on performance, but the influence differs with performance measures. The ramification is fundamental for capital structure and productivity decisions.

4.2 Further robustness analysis

Table 8 shows the robustness of using RSP, a market-based measure, in addition to the robustness of the accounting-based measure of performance used in the prior analyses. We provided a further

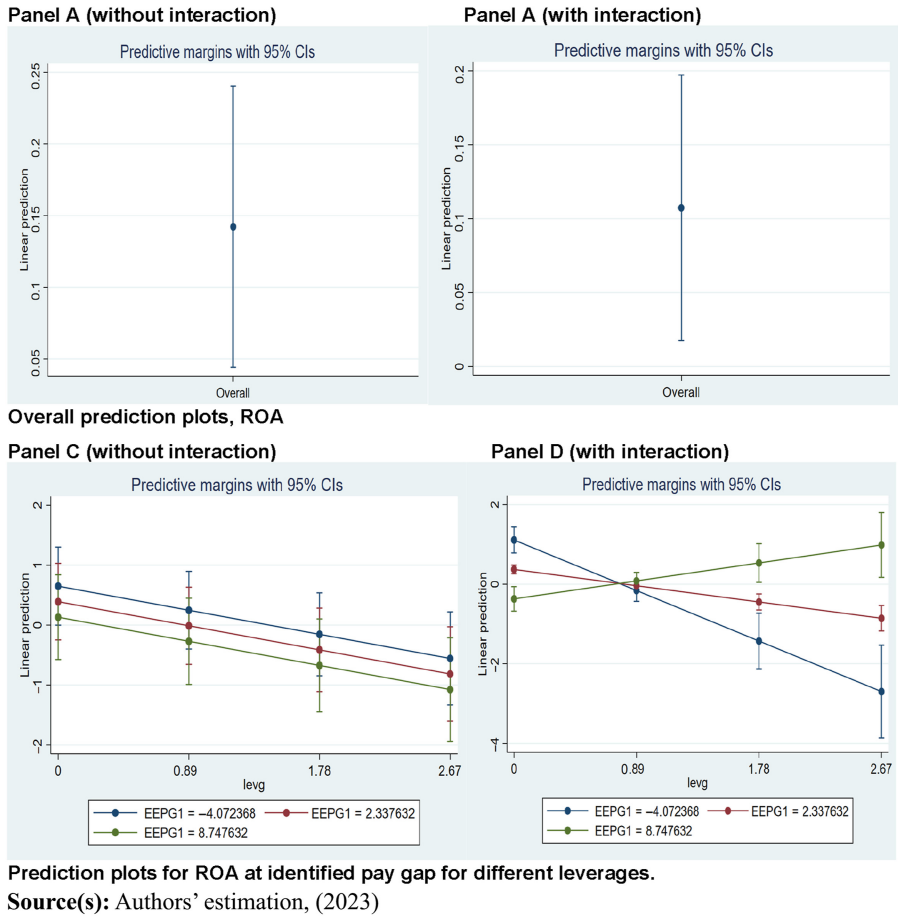
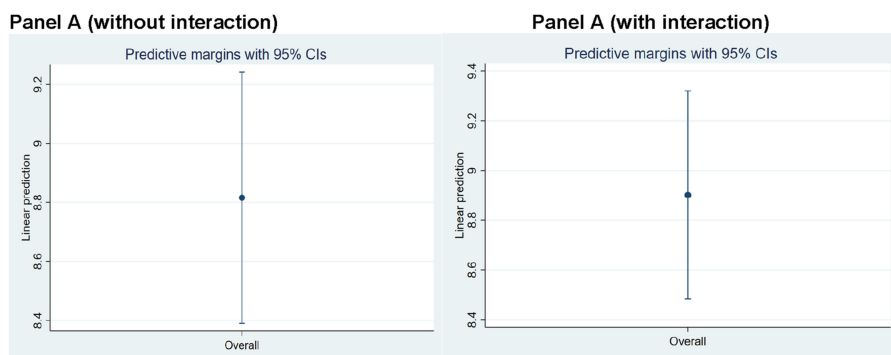


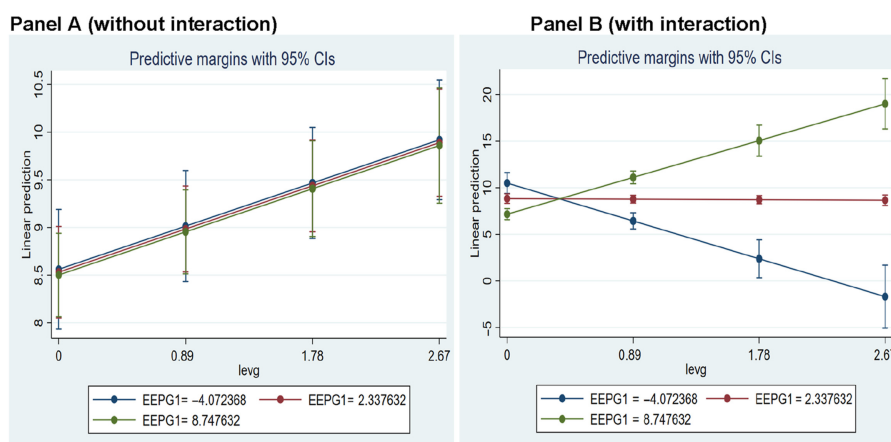
Figure 2.
 Predictive margins, ROA

robustness analysis using methods that compared the outcomes of the relationships (HEPS, ROA and EBITDA) measured in POLS, panel fixed and random effects models in [Appendix 2 Table A1](#). We show all the results of the panel modes side by side in [Table 8](#), but focused on interpreting the GMM results as the main model with the predicted values of the moderation shown in [Figure 4](#). Again, as the study's main contribution is in the influence of leverage in moderating the impact of pay gap on performance, we only show the results as indicated in models 16 and 17. The response of RSP to both pay gap measures is negative and significant. This confirms the relationship between pay gap and ROA, which is unsurprising, as ROA and RSP are not KPI-aligned performance measures. When leverage interacted with the pay gap measures, both pay gaps became positive and statistically significant. We found the results consistent with the relationship between the interaction of LEVG and EEGP1 with HEPS and ROA. The result further confirms that leverage can lower the pay gap with the possibility of raising firms' performance, which is rooted in agency theory. This contrasts with tournament theory, which advocates for only high pay gaps in favour of firm performance. It therefore provides support for the crusade to lower pay gaps in South Africa, which can be pursued with proper use of debt while firms remain sustainable through improved performance.

Leverage and the impact of pay gaps



Predictive margins (Overall prediction plots, EBITDA)



Prediction plots for EBITDA at identified pay-gap for different leverages.

Source(s): Authors' estimation, (2023)

Figure 3.
Predictive margins,
EBITDA

Finally, pay gaps are not the only predictors of firms' performance in the sectors considered in South Africa, given the various signs and the significant levels of the control variables (see Tables 4-6). The negative relationships between leverage and performance measures are worth noting, some of which are consistent with the Modigliani and Miller with no tax theory. The caveat is to be conscious of the optimal use of debt to maximise the benefits for the results obtained in favour of it lowering pay gaps in this study. Further, on robustness, the regression model (two-step GMM) results were valid and reliable. As all the models showed that the number of instruments is fewer than the number of panels, Wald stats probability was significant at 1% and Hanen J stats non-significant. AR2s, which measure serial correlation, were not significant. Therefore, the diagnostic results were accepted as reliable and valid.

HEPS and EBITDA are the top executive KPIs for JSE's listed companies, whereas ROA is least favoured. It is plausible that HEPS and EBITDA reflect what impacts executive behaviours and choices, as executives aim to enhance these KPIs. It was also revealed that the moderating effects of leverage in pay gap and performance relationship is mixed depending on variable measurements. Leverage was found to positively and significantly moderates the relationships between one of the pay gap measures and firm performance measures,

Variables	Mode 13 (POLS) RSP	Mode 14 (FE) RSP	Mode 15 (RE) RSP	Mode 16 (GMM) RSP	Mode 17 (GMM) RSP
L.RSP				-0.03 (0.15)	0.02 (0.13)
EEPG1	-0.05 (0.04)	-0.00 (0.05)	-0.04 (0.04)	-0.64** (0.28)	
LEVG	-0.16** (0.07)	-0.08 (0.15)	-0.18** (0.08)	-5.10** (2.09)	-4.91** (2.36)
C.EEPG1#C.LEVG				1.51** (0.65)	
BS	-0.01 (0.01)	0.01 (0.02)	-0.00 (0.01)	0.06 (0.07)	0.03 (0.07)
INDPERCENT	-0.05 (0.13)	0.16 (0.22)	-0.02 (0.14)	6.01* (3.65)	5.06* (2.83)
TBQ	0.03** (0.02)	0.12*** (0.03)	0.04** (0.02)	0.20*** (0.07)	0.12** (0.05)
REVSIZ				-0.23*** (0.08)	-0.13** (0.06)
EEPG2	0.10** (0.05)	0.05 (0.06)	0.09* (0.05)		-0.45** (0.22)
REVSIZ	0.00 (0.00)	-0.00* (0.00)	0.00 (0.00)		
C.EEPG2#C.LEVG					1.15** (0.57)
Constant	-0.05 (0.15)	-0.38 (0.30)	-0.10 (0.17)	1.37 (2.17)	0.55 (1.59)
R-squared	0.04	0.07			
Number of groups		60	60	60	62
Number of instruments				23	23
Wald stats prob				0.00	0.00
AR2				0.69	0.60
Hansen J stats				0.44	0.10

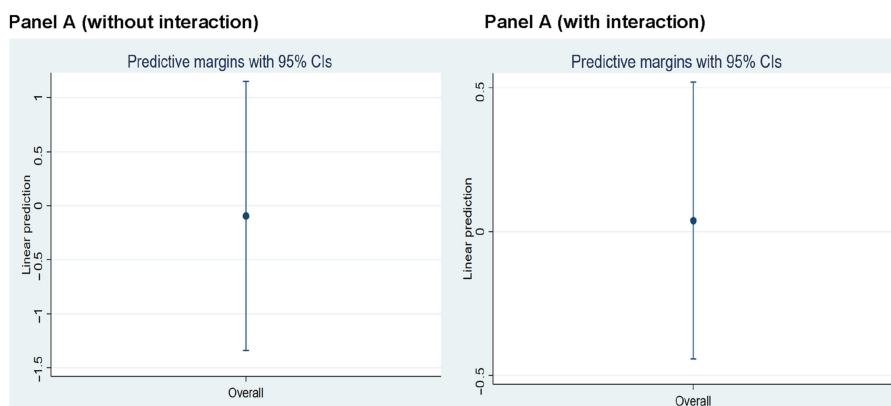
Table 8. Robustness analysis

Note(s): Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Authors' estimation, 2023

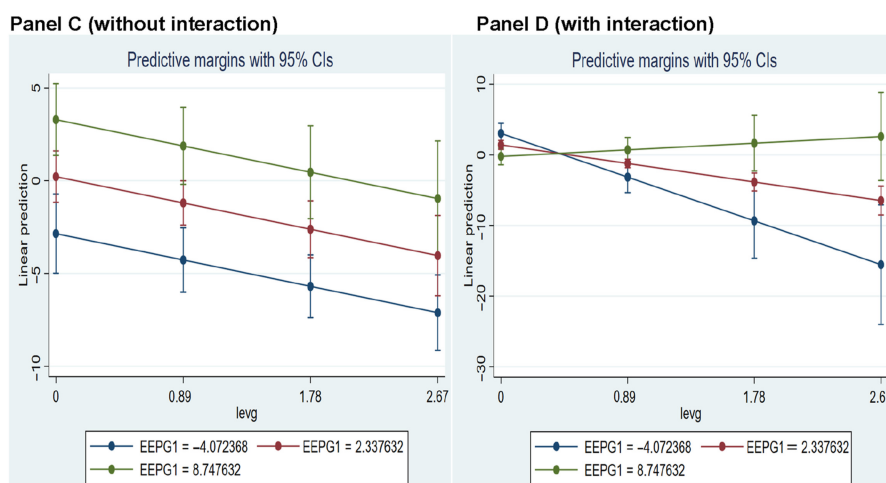
confirming the potential influence of leverage in the relationship, such that reducing pay gaps that emanate from high executive pay becomes harmless to firms' wealth. This favours agency theory, which proposes that leverage can improve firm performance while lowering pay gaps, germane to the South African policy agitation. Tournament theory is also partly supported in some results, promoting a significant pay gap for higher firm performance.

5. Summary and conclusions

The study's main aim was to investigate whether leverage influences the relationship between pay gap and firm performance. We relied on agency theory and tournament theory to explain the phenomena in listed firms in the retail and mining sectors in South Africa. We measured firm performance with HEPS, ROA, EBITDA and RSP. EEPG1 was proxied with a measurement reflecting executives' fixed pay, while EEPG2 with total executive pay. The two-step GMM was employed to analyse the effects of EEPGs and their interaction with leverage on firms' performance. This study contributes to the literature in three ways. Firstly, we provide evidence to show that it is possible to lower EEPGs without compromising



Predictive margins (overall prediction plots, EBITDA)



Predictive margins (prediction plots for RSP at identified pay-gap for different leverages)

Source(s): Authors' estimation, (2023)

Figure 4. Predictive margins, EBITDA

performance through capital structure, despite the compelling argument in the literature suggesting otherwise. Secondly, we demonstrate the importance of KPI-aligned performance measures to test agency theory. This is crucial to produce research that better aligns to practice. Lastly, this study provides specific literature for the retail and mining sector, which is known for high EEPGs in South Africa over and above the lack of literature in the domain in the country.

The information is useful to firms in making pay and productivity decisions. The conclusion was that there is a hybrid implication of pay gap for performance in the retail and mining sectors of South Africa. This depends on careful selection of performance measures providing the ability to minimise the gaps without compromising the performance of firms. This is particularly crucial to policy custodians, and as far as we could determine, this study was the first to find this result. It is recommended that regulators define EEPGs or the elements and levels of executive pay that should be considered in determining fair EEPGs.

Regulators can also consider regulating leverage to manage pay gaps (Gete and Gomez, 2017). The study was limited in generalisation, as findings may be sensitive to industry, country contexts and measures used.

These results have several practical implications, especially for debt management and executive compensation policies, including regulatory reforms. The significant influence of leverage on the effect of pay gaps on firm performance calls for firms in the sectors to revisit their capital structure decisions. They should potentially design policies to manage their debt levels effectively, thereby reducing their susceptibility to the negative impacts of pay gap on performance. Given that we found results that showed that pay gaps negatively impact firm performance, especially with the summary statistics indicating firms in the sector to be highly levered, firms might need to reassess their executive pay policies. They should strive for a more equitable compensation structure, reducing pay disparities to enhance firm performance. Finally, as the study revealed that pay gaps in firms with high leverage have significant positive effects on performance, policymakers need to do more to intervene. This could strengthen existing regulatory reforms in executive compensation and corporate governance, with the Department of Labour and The Dti gathering the requisite political will to pursue its pay gaps agenda. Such is likely to have the effect of promoting transparency and fairness in executive remuneration.

The implications of the study's findings do not preclude the theoretical implications of leverage usage as postulated in Modigliani and Miller's theory and empirically tested in several literature. The optimum usage of debt is fundamental to extracting the most of its moderating effects in the relationship between executive pay and performance, as the gain would otherwise be eroded where a firm becomes bankrupt resulting from the consequent burden of reckless use of leverage.

Notes

1. <https://fxtop.com/en/historical-currency-converter.php?A=100&C1=USD&C2=ZAR&DD=31&MM=12&YYYY=2011&B=1&P=&I=1&btnOK=Go%21>
2. Table 7 is also included to summarise the results of the main variables for the sake of comparison and clarity.

References

- Abudy, M., Amiram, D., Rozenbaum, O. and Shust, E. (2020), "Do executive compensation contracts maximise firm value? Indications from a quasi-natural experiment", *Journal of Banking and Finance*, Vol. 114, pp. 1-16.
- Akande, J.O., Kwenda, F. and Ehalaiye, D. (2018), "Competition and commercial banks risk-taking: evidence from Sub-Saharan Africa region", *Applied Economics*, Vol. 50 No. 44, pp. 4774-4787, doi: [10.1080/00036846.2018.1466995](https://doi.org/10.1080/00036846.2018.1466995).
- Akram, F., Ul Haq, M.A. and Umrani, W.A. (2019), "Assessing the effect of managerial power on firm performance through the perceptual lens of executive remuneration", *Pertanika Journal of Social Sciences and Humanities*, Vol. 27 No. 1, pp. 293-309.
- Alan, N.S., Bardos, K.S. and Shelkova, N.Y. (2021), "CEO-to-employee pay ratio and CEO diversity", *Managerial Finance*, Vol. 47 No. 3, pp. 356-382, doi: [10.1108/mf-03-2020-0107](https://doi.org/10.1108/mf-03-2020-0107).
- Albert, M. and Robinson, D. (2013), *Executive Compensation and Firm Leverage*, Graduate School of Duke University, Durham.
- Backman, J. (1957), "Why wages are lower in retailing", *Southern Economic Journal*, Vol. 23 No. 3, pp. 295-305, doi: [10.2307/1054219](https://doi.org/10.2307/1054219).
- Baltagi, B.H. (2007), *Forecasting with Panel Data*, Centre for Policy Research, Maxwell School of Citizenship and Public Affairs Syracuse University, New York, NY.

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- Banker, R.D., Bu, D. and Mehta, M.N. (2016), "Pay gap and performance in China", *Abacus*, Vol. 52 No. 3, pp. 501-531, doi: [10.1111/abac.12082](https://doi.org/10.1111/abac.12082).
- Bao, M.X., Cheng, X., Smith, D. and Tanyi, P. (2021), "CEO pay ratios and financial reporting quality", *Global Finance Journal*, Vol. 47, pp. 1-17, doi: [10.1016/j.gfj.2019.100506](https://doi.org/10.1016/j.gfj.2019.100506).
- Benedetti, A.H. and Chen, S. (2018), "High CEO-to-worker pay ratios negatively impact consumer and employee perceptions of companies", *Journal of Experimental Social Psychology*, Vol. 79, pp. 378-393, doi: [10.1016/j.jesp.2018.09.003](https://doi.org/10.1016/j.jesp.2018.09.003).
- Brick, I.E., Palmon, O. and Wald, J.K. (2006), "CEO compensation, director compensation, and firm performance: evidence of cronyism?", *Journal of Corporate Finance*, Vol. 12 No. 3, pp. 403-423, doi: [10.1016/j.jcorpfin.2005.08.005](https://doi.org/10.1016/j.jcorpfin.2005.08.005).
- Brockman, P., Martin, X. and Unlu, E. (2010), "Executive compensation and the maturity structure of corporate debt", *Journal of Finance*, Vol. 65 No. 3, pp. 1123-1161, doi: [10.1111/j.1540-6261.2010.01563](https://doi.org/10.1111/j.1540-6261.2010.01563).
- Business Tech (2022), "How much money cashiers, trolley collectors and other shop workers are paid in South Africa", available at: <https://businesstech.co.za/news/business/560312/how-much-money-cashiers-trolley-collectors-and-other-shop-workers-are-paid-in-south-africa/> (accessed 1 July 2023).
- Byun, S. (2014), "The effects of abnormal executive pay dispersion: evidence from firm performance and executive turnover", *Asia-Pacific Journal of Financial Studies*, Vol. 43 No. 5, pp. 621-648, doi: [10.1111/ajfs.12062](https://doi.org/10.1111/ajfs.12062).
- Cheng, Q., Ranasinghe, T. and Zhao, S. (2017), "Do high CEO pay ratios destroy firm value?", *2016 AAA-FARS mid-year conference*, California, pp. 1-50.
- Crawford, S.S., Nelson, K.K. and Rountree, B.R. (2021), "Mind the gap: CEO-employee pay ratios and shareholder say-on-pay votes", *Journal of Business Finance and Accounting*, Vol. 48 Nos 1-2, pp. 308-337, doi: [10.1111/jbfa.12500](https://doi.org/10.1111/jbfa.12500).
- Dai, Y., Kong, D. and Xu, J. (2017), "Does fairness breed efficiency? Pay gap and firm productivity in China", *International Review of Economics and Finance*, Vol. 48, pp. 406-422, doi: [10.1016/j.iref.2017.01.003](https://doi.org/10.1016/j.iref.2017.01.003).
- DeAngelo, H., DeAngelo, L. and Whited, T.M. (2011), "Capital structure dynamics and transitory debt", *Journal of Financial Economics*, Vol. 99 No. 2, pp. 235-261, doi: [10.1016/j.jfineco.2010.09.005](https://doi.org/10.1016/j.jfineco.2010.09.005).
- Dobbelstein, T., Heidig, W., Jooste, M.W. and Mason, R.B. (2016/20), "Project 2016/20: the retail industry in South Africa as employer of first choice for young talent", available at: https://scholar.google.co.za/scholar?q=The+retail+industry+in+South+Africa+as+career+of+first+choice+for+young+talent+A+SUMMARY&hl=en&as_sdt=0,5 (accessed 21 March 2024).
- Economic Policy Institute (2021), "Company wage tracker", available at: <https://www.epi.org/company-wage-tracker/> (accessed 8 June 2023).
- Ferry, L., He, G. and Yang, C. (2021), "How do executive pay and its gap with employee pay influence corporate performance? Evidence from Thailand tourism listed companies", *Journal of Hospitality and Tourism Insights*, Vol. 6 No. 1, pp. 362-381, doi: [10.1108/jhti-03-2021-0061](https://doi.org/10.1108/jhti-03-2021-0061).
- Friedline, T., Masa, R.D. and Chowa, G.A. (2015), "Transforming wealth: using the inverse hyperbolic sine (IHS) and splines to predict youth's math achievement", *Social Science Research*, Vol. 49, pp. 264-287, doi: [10.1016/j.ssresearch.2014.08.018](https://doi.org/10.1016/j.ssresearch.2014.08.018).
- Gete, P. and Gomez, J.-P. (2017), "Executive compensation and firm leverage. A policy Oriented survey", *SSRN Electronic Journal*, doi: [10.2139/ssrn.2992766](https://doi.org/10.2139/ssrn.2992766).
- Guo, T. (2019), "Does the regional sense of social fairness really narrow the executive-employee pay gap?", *Modern Economy*, Vol. 10 No. 06, pp. 1558-1580, doi: [10.4236/me.2019.106103](https://doi.org/10.4236/me.2019.106103).
- Hughen, L., Malik, M. and Shim, E.D. (2019), "The impact of sarbanes-oxley and dodd-frank on executive compensation", *Journal of Applied Accounting Research*, Vol. 20 No. 3, pp. 243-266, doi: [10.1108/jaar-01-2018-0015](https://doi.org/10.1108/jaar-01-2018-0015).

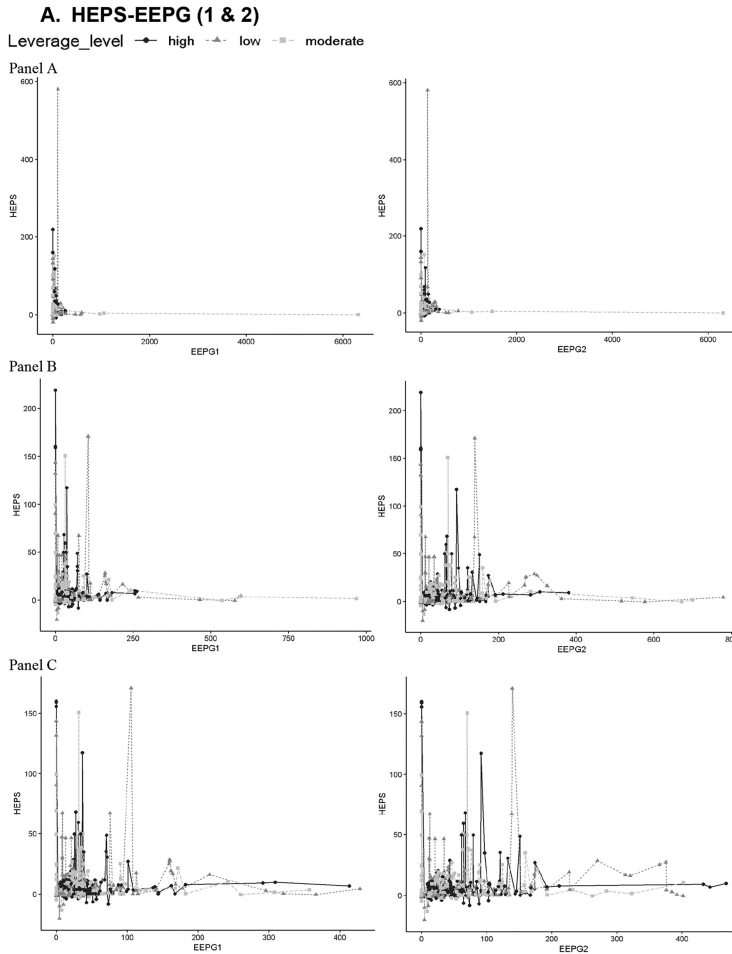
-
- Ilhan, E., Sautner, Z. and Vilkov, G. (2021), "Carbon tail risk", *The Review of Financial Studies*, Vol. 34 No. 3, pp. 1540-1571, doi: [10.1093/rfs/hhaa071](https://doi.org/10.1093/rfs/hhaa071).
- IoDSA (Institute of Directors South Africa) (2016), "King IV: report on corporate governance for South Africa 2016", available at: <https://www.iodsa.co.za/page/king-iv> (accessed 6 January 2021).
- Jensen, M.C. (1986), "Agency costs of free cash flow, corporate finance, and takeovers", *The American Economic Review*, Vol. 76 No. 2, pp. 323-329.
- Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: managerial behaviour, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360, doi: [10.1016/0304-405x\(76\)90026-x](https://doi.org/10.1016/0304-405x(76)90026-x).
- Johnson, T.B. (2018), "Disclosure regulation and firm behavior: the effects of the mandated disclosure of ceo-to-employee pay ratios on CEO pay", Doctoral dissertation, The Florida State University.
- Kelly, K. and Seow, J.L. (2016), "Investor reactions to company disclosure of high CEO pay and high CEO-to-employee pay ratio: an experimental investigation", *Journal of Management Accounting Research*, Vol. 28 No. 1, pp. 107-125, doi: [10.2308/jmar-51392](https://doi.org/10.2308/jmar-51392).
- Kenny, B. (2003), "Labour market flexibility in the retail sector: possibilities for resistance", in Bramble, T. and Barchiesi, F. (Eds), *Rethinking the Labour Movement in the 'New South Africa'*, Routledge, London, pp. 168-183.
- Kew, J. and Alex, W. (2017), *Financial Accounting: an Introduction*, Oxford University Press, Cape Town.
- Kim, S.Y., Lee, K.R. and Shin, H.H. (2017), "The enhanced disclosure of executive compensation in Korea", *Pacific Basin Finance Journal*, Vol. 43, pp. 72-83, doi: [10.1016/j.pacfin.2017.02.005](https://doi.org/10.1016/j.pacfin.2017.02.005).
- Labour Research Service (2021a), "Mining sector report", available at: <https://www.lrs.org.za/wp-content/uploads/2022/01/Mining-Sector-Report-2021.docx.pdf> (accessed 3 November 2022).
- Labour Research Service (2021b), "Retail sector report", available at: <https://www.parliament.uk/documents/commons-committees/Exiting-the-European-Union/17-19/SectoralAnalyses/31-Retail-Report.pdf%0Ahttp://www.pbit.gov.pk/eng/system/files/retail-sector-report.pdf> (accessed 3 November 2022).
- Larmou, S. and Vafeas, N. (2010), "The relation between board size and firm performance in firms with a history of poor operating performance", *Journal of Management and Governance*, Vol. 14 No. 1, pp. 61-85, doi: [10.1007/s10997-009-9091-z](https://doi.org/10.1007/s10997-009-9091-z).
- Lin, Y.F., Yeh, Y.M.C. and Shih, Y.T. (2013), "Tournament theory's perspective of executive pay gaps", *Journal of Business Research*, Vol. 66 No. 5, pp. 585-592, doi: [10.1016/j.jbusres.2012.04.003](https://doi.org/10.1016/j.jbusres.2012.04.003).
- List Corp (2021), "JSE listed firms: main exchange", available at: <https://www.listcorp.com/jse/> (accessed 31 December 2021).
- Lonmin Company (2012), *Case no.17: Massacre of Workers at the Marikana Mine*, Rustenburg, available at: <https://rightsindvelopment.org/wp-content/uploads/2019/05/CASE-17-Lonmin-Company-ENG.pdf>
- Luo, J., Xiang, Y. and Zhu, R. (2020), "When are pay gaps good or bad for firm performance? Evidence from China", *Management and Organization Review*, Vol. 16 No. 5, pp. 1-27, doi: [10.1017/mor.2019.42](https://doi.org/10.1017/mor.2019.42).
- Mafoea-Nkalai, P. and Tambani, S. (2017), *Mining Sector Wage Structuring: Literature Review*, Sam Tambani Research Institute, Johannesburg.
- Mdingi, N.D. (2017), "A comparative study of the provisions regarding the remuneration of directors in terms of the companies act of 2008", Masters Dissertation, University of Johannesburg.
- Nalarreason, K.M., Sutrisno, T. and Mardiati, E. (2019), "Impact of leverage and firm size on earnings management in Indonesia", *International Journal of Multicultural and Multireligious Understanding*, Vol. 6 No. 1, pp. 19-24, doi: [10.18415/ijmmu.v6i1.473](https://doi.org/10.18415/ijmmu.v6i1.473).
- Norman, C.S., Rose, A.M., Rose, J.M. and Suh, I. (2020), "An investigation of corporate directors' responses to CEO pay ratio disclosures and say-on-pay votes", *Human Resource Management*, Vol. 60 No. 3, pp. 1-20, doi: [10.1002/hrm.22034](https://doi.org/10.1002/hrm.22034).

- Osborne, J. (2002), "Notes on the use of data transformations: practical assessment", *Practical Assessment, Research and Evaluation*, Vol. 8 No. 6, pp. 1-8.
- Oxfam South Africa (2020), "Reclaiming power: women's work and income inequality in South Africa", in *Labour Market Dynamics Report*, available at: https://www.oxfam.org.za/wp-content/uploads/2020/11/0124_oxfam_inequality-booklet_english_20201123_spreads.pdf (accessed 12 August 2022).
- Palaniappan, G. (2017), "Determinants of corporate financial performance relating to board characteristics of corporate governance in Indian manufacturing industry: an empirical study", *European Journal of Management and Business Economics*, Vol. 26 No. 1, pp. 67-85, doi: [10.1108/ejmbe-07-2017-005](https://doi.org/10.1108/ejmbe-07-2017-005).
- Pissaris, S., Jeffus, W. and Gleason, K.C. (2010), "The joint impact of executive pay disparity and corporate governance on corporate performance", *Journal of Managerial Issues*, Vol. 22 No. 3, pp. 306-329.
- Pryce, A., Kakabadse, N.K. and Lloyd, T. (2011), "Income differentials and corporate performance", *Corporate Governance*, Vol. 11 No. 5, pp. 587-600, doi: [10.1108/14720701111176993](https://doi.org/10.1108/14720701111176993).
- PwC (Price Waterhouse Coopers) (2021), "Practices and remuneration trends: executive directors", available at: <https://www.pwc.co.za/en/publications/executive-directors-report.html> (accessed 5 January 2022).
- Raithatha, M. and Komera, S. (2016), "Executive compensation and firm performance: evidence from Indian firms", *IIMB Management Review*, Vol. 28 No. 3, pp. 160-169, doi: [10.1016/j.iimb.2016.07.002](https://doi.org/10.1016/j.iimb.2016.07.002).
- Reaser, J. (1999), "CEO and average employee pay during 1980s: firm level determinants, developments and effects", Dissertation, Michigan State University.
- Roodman, D. (2006), "How to do xtabond2", available at: <https://ideas.repec.org/p/boc/asug06/8.html> (accessed 12 August 2022).
- Rouen, E. (2020), "Rethinking measurement of pay disparity and its relation to firm performance", *The Accounting Review*, Vol. 95 No. 1, pp. 343-378, doi: [10.2308/accr-52440](https://doi.org/10.2308/accr-52440).
- Sanchez-Marin, G. and Baixauli-Soler, S. (2015), "TMT pay dispersion and firm performance: the moderating role of organisational governance effectiveness", *Journal of Management and Organization*, Vol. 21 No. 4, pp. 436-459, doi: [10.1017/jmo.2014.87](https://doi.org/10.1017/jmo.2014.87).
- Sewpersadh, N.S. (2019), "A theoretical and econometric evaluation of corporate governance and capital structure in JSE-listed companies", *Corporate Governance*, Vol. 19 No. 5, pp. 1063-1081, doi: [10.1108/CG-08-2018-0272](https://doi.org/10.1108/CG-08-2018-0272).
- Smulowitz, S., Becerra, M. and Mayo, M. (2019), "Racial diversity and its asymmetry within and across hierarchical levels: the effects on financial performance", *Human Relations*, Vol. 72 No. 10, pp. 1671-1696, doi: [10.1177/0018726718812602](https://doi.org/10.1177/0018726718812602).
- Statista (2022), "Number of people employed in South Africa in Q3 2022, by industry", available at: <https://www.statista.com/statistics/1129815/number-of-people-employed-in-south-africa-by-industry/> (accessed 15 August 2022).
- Steenkamp, G., Wesson, N. and Smit, E.v. d. M. (2023), "Camouflaged compensation: do South African Executives increase their pay through share repurchases?", *Journal of Risk and Financial Management*, Vol. 16 No. 3, p. 177, doi: [10.3390/jrfm16030177](https://doi.org/10.3390/jrfm16030177).
- Talavera, O., Yin, S. and Zhang, M. (2018), "Tournament incentives, age diversity and firm performance: evidence from China", *SSRN Electronic Journal*, Vol. 44, pp. 1-59, doi: [10.2139/ssrn.3190278](https://doi.org/10.2139/ssrn.3190278).
- The World Bank (2018), "Overcoming poverty and inequality in South Africa", available at: https://www.statssa.gov.za/wp-content/themes/umkhanyakude/documents/South_Africa_Poverty_and_Inequality_Assessment_Report_2018.pdf (accessed 13 August 2022).

- The World Bank (2022), "Inequality in southern Africa: an assessment of the Southern African customs union", available at: <http://documents.worldbank.org/curated/en/099125303072236903/P1649270c02a1f06b0a3ae02e57eadd7a82> (accessed 2 August 2022).
- Tröger, T.H. and Walz, U. (2019), "Does say on pay matter? Evidence from Germany", *European Company and Financial Law Review*, Vol. 16 No. 3, pp. 381-413, doi: [10.1515/ecfr-2019-0014](https://doi.org/10.1515/ecfr-2019-0014).
- Urson, M. (2016), "CEO pay ratios and company performance: a study of JSE listed consumer goods and services companies", Master's Dissertation, University of Cape Town.
- Van Klaveren, M. (2010), *Low Wages in the Retail Industry in the Netherlands*, Amsterdam Institute for Advanced Labour Studies, available at: http://uva-aias.net/uploaded_files/publications/WP100-VanKlaveren.pdf%0AGeneral (accessed 11 June 2023).
- Zang, A.Y. (2012), "Evidence on the trade-off between real activities manipulation and accrual-based earnings management", *The Accounting Review*, Vol. 87 No. 2, pp. 675-703, doi: [10.2308/accr-10196](https://doi.org/10.2308/accr-10196).
- Zhu, J., Gao, J. and Tan, H. (2020), "Data of CEO power, chair-CEO age dissimilarity and pay gap of Chinese listed firms", *Data in Brief*, Vol. 32, pp. 106-158, doi: [10.1016/j.dib.2020.106158](https://doi.org/10.1016/j.dib.2020.106158).

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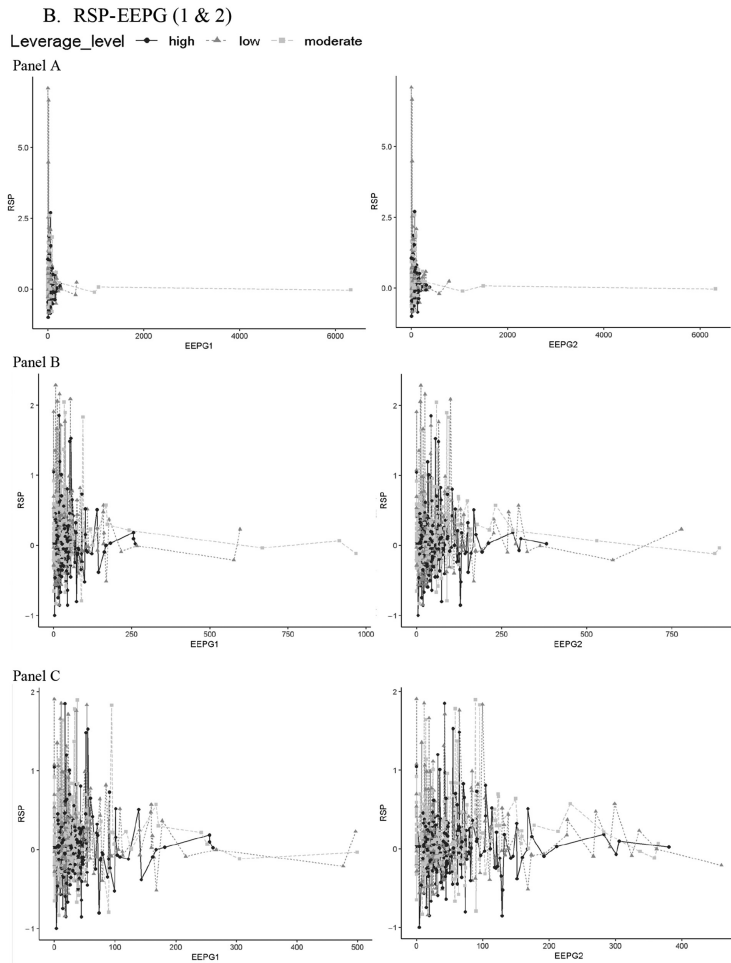
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Note(s): The figures show the relationship between HEPS and EEGP (1 & 2) at three considered leverage levels according to the classifications: low leverage level (below 0.25), moderate leverage level (between 0.25 and 0.5) and high leverage (above 0.5), as identified by the indicator lines: The different panel indicative of when the series, HEPS, EEGP1 & EEGP2, are not winsorised (Panel A) and winsorised based on randomised trim of outliers below (Panel B) and above (Panel C) mean precisions, in order to appropriate the series visualisations

Source(s): Authors' estimation, 2023

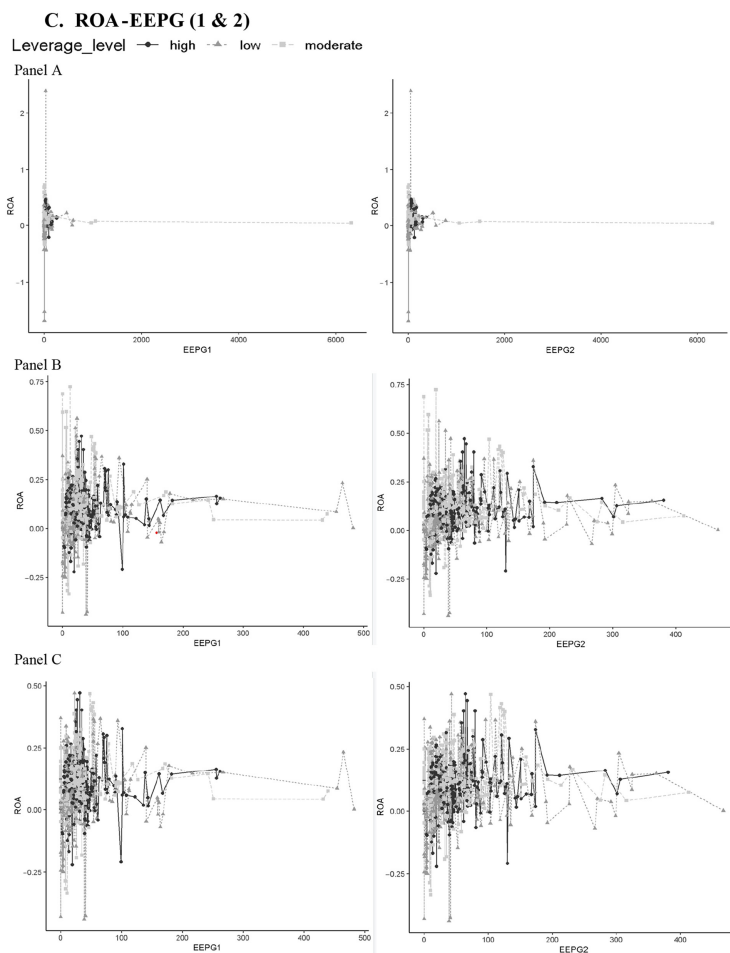
Figure A1.
HEPS – EEGP (1 &
2) plots



Note(s): The Figures show the relationship between RSP and EEG (1 & 2) at three considered leverage levels. According to the classifications: low leverage level (or below 0.25), moderate leverage level (between 0.25 and 0.5) and high leverage (above 0.5), as identified by the indicator lines: The different panel indicative of when the series – RSP, EEG1, & EEG2, are not winsorised (Panel A), and winsorised based on randomized trim of outliers below (panel B) and above (panel C) mean precisions, in order to appropriate the series Visualisations

Source(s): Authors' estimation, 2023

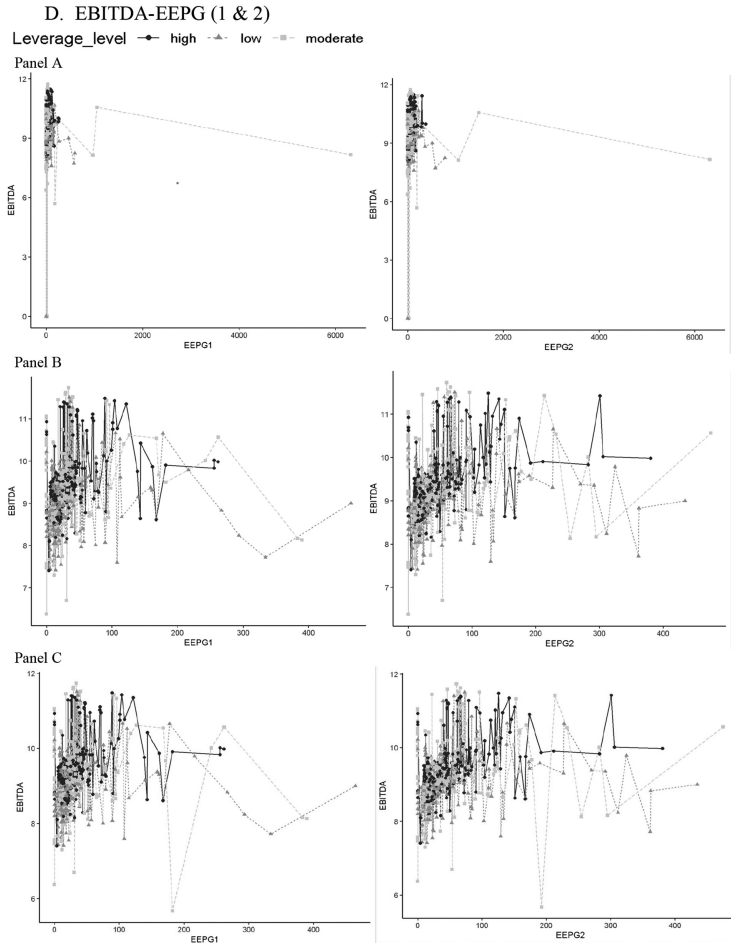
Figure A2.
RSP – EEG (1 & 2) plots



Note(s): The Figures show the relationship between ROA and EEGP (1 & 2) at three considered leverage levels. According to the classifications: low leverage level (or below 0.25), moderate leverage level (between 0.25 and 0.5) and high leverage (above 0.5), as identified by the indicator lines: The different panel indicative of when the series – ROA, EEGP1, & EEGP2, are not winsorised (Panel A), and winsorised based on randomized trim of outliers below (panel B) and above (panel C) mean precisions, in order to appropriate the series Visualisations

Source(s): Authors' estimation, 2023

Figure A3.
ROA – EEGP (1 &
2) plots



Note(s): The Figures show the relationship between EBITDA and EEGP (1 & 2) at three considered leverage levels. According to the classifications: low leverage level (or below 0.25), moderate leverage level (between 0.25 and 0.5) and high leverage (above 0.5), as identified by the indicator lines: The different panel indicative of when the series – EBITDA, EEGP1, & EEGP2, are not winsorised (Panel A), and winsorised based on randomized trim of outliers below (panel B) and above (panel C) mean precisions, in order to appropriate the series Visualisations

Source(s): Authors' estimation, 2023

Figure A4.
EBITDA – EEGP (1 & 2) plots

Variables	Model 18 (POLS) HEPS	Model 19 (FE) HEPS	Model 20 (RE) HEPS	Model 20 (POLS) ROA	Model 21 (FE) ROA	Model 22 (RE) ROA	Model 23 (POLS) EBITDA	Model 24 (FE) EBITDA	Model 25 RFE) EBITDA
EEPG1	-0.0903*** (0.0252)	-0.0187 (0.0223)	-0.0375* (0.0213)	-0.000113 (0.000182)	-6.72e-05 (0.000240)	-0.000111 (0.000189)	-0.00193*** (0.000850)	-0.000299 (0.000509)	-0.000290 (0.000507)
EEPG2	0.0348*** (0.00988)	0.00690 (0.00857)	0.0142* (0.00823)	4.35e-05 (7.14e-05)	2.47e-05 (9.25e-05)	4.24e-05 (7.36e-05)	0.000713*** (0.000333)	0.000120 (0.000196)	0.000116 (0.000195)
LEVG	8.342*** (2.868)	12.88*** (3.896)	10.40*** (3.311)	-0.0302 (0.0207)	-0.0881** (0.0421)	-0.0376 (0.0231)	0.678*** (0.0988)	0.242*** (0.0926)	0.319*** (0.0884)
BS	2.830*** (0.350)	0.866** (0.425)	1.149*** (0.374)	-0.00822*** (0.00253)	-0.00208 (0.00459)	-0.00731 *** (0.00276)	0.117*** (0.0125)	0.0279*** (0.00987)	0.0390*** (0.00958)
INDPERCENT	2.383 (5.318)	13.01** (5.780)	10.69** (5.363)	0.0155 (0.0377)	0.0416 (0.0616)	0.0165 (0.0412)	-0.379** (0.183)	-0.0196 (0.136)	-0.0472 (0.134)
TBQ	1.860*** (0.575)	3.021 *** (0.752)	2.383*** (0.646)	0.0593*** (0.00415)	0.0561*** (0.00812)	0.0591 *** (0.00459)	0.0243 (0.0198)	-0.00694 (0.0173)	0.00351 (0.0166)
REVSIZ	-1.09e-07*** (3.36e-08)	2.23e-07*** (6.78e-08)	4.25e-08 (4.75e-08)	2.01e-10 (2.44e-10)	1.54e-09** (7.51e-10)	2.89e-10 (2.79e-10)	4.77e-09*** (1.17e-09)	7.26e-09*** (1.59e-09)	7.83e-09*** (1.41e-09)
Constant	-27.60*** (5.283)	-23.11*** (6.701)	-19.84*** (5.869)	0.105*** (0.0380)	0.0330 (0.0722)	0.0963** (0.0417)	7.720*** (0.187)	8.687*** (0.156)	8.473*** (0.166)
Observations	496	496	496	498	498	498	453	453	453
R-squared	0.187	0.091	0.091	0.301	0.127	0.127	0.346	0.095	0.095
Number of ID	69	69	69	69	69	69	66	66	66

Note(s): Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Source(s): Authors' estimation, 2023

Table A1.
Further robustness
analysis