

**Internal value distribution and financial performance:
An empirical study of JSE-listed companies
in the Industrials sector**

24080757

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Abstract

This study examined whether internal value distribution, operationalised via the Marx Ratio, was associated with organisational financial performance in JSE-listed Industrials over the period 2014–2023. Using audited organisational data and multivariate analysis, the study examined asset-use efficiency and operating outcomes in a governance environment shaped by the King IV code. The evidence indicates a clear positive association between internal value distribution and efficiency outcomes, with a smaller but still positive association for operating performance. No credible non-linearity was detected in the dispersion range observed. When interpreted through agency and tournament mechanisms, and read with an institutional work lens, the findings suggest that credibly justified internal differentials are compatible with stronger asset utilisation in capital-intensive, interdependent production settings. The study contributes sector-specific evidence from a large emerging-market context, positions the Marx Ratio as a transparent, decision-useful complement to remuneration disclosure, and clarifies boundary conditions for practice. Limitations reflect the observational design and scope, and the study outlines directions for future research on dynamics, causal identification, and alternative distributional measures.

Keywords

Internal value distribution; Marx Ratio; Internal pay dispersion; Corporate governance; South African Industrials

Plagiarism Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I furthermore declare that I have obtained the necessary authorisation and consent to carry out this research.

24080757

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List of Abbreviations

EBITDA	Earnings before interest, tax, depreciation, and amortisation
GIBS	Gordon Institute of Business Science
ICB	Industry Classification Benchmark
IVD	Internal value distribution
IFRS	International Financial Reporting Standards
IoDSA	Institute of Directors in Southern Africa
JSE	Johannesburg Stock Exchange
LOESS	Locally estimated scatterplot smoothing
NPAT	Net profit after tax
OLS	Ordinary least squares
QQ	Quantile–quantile
ROA	Return on assets
ROE	Return on equity
SOE	State-owned entity
USD	United States dollar
ZAR	South African rand

Chapter 1: Introduction

1.1 Purpose

In South Africa, inequality is not background noise; it is the soundtrack of organisational life. With income dispersion hovering close to 0.66 on the Gini coefficient scale, the highest globally, the way organisations create value and capture it internally becomes part of the production function and shapes incentives, cohesion and, ultimately, performance (Statistics South Africa, 2025; World Bank, 2023a). Furthermore, the emphasis of the King IV code on fair and responsible remuneration moves the issue of internal value distribution (IVD) from ethics to governance, by asking boards to design distribution as deliberately as strategy (Chawarura et al., 2025; Institute of Directors in Southern Africa [IoDSA], 2016). This study tackles that design problem head-on by operationalising and testing its association with financial performance in the context of listed South African organisations.

The purpose of this study was to examine the relationship between IVD and organisational financial performance in the Johannesburg Stock Exchange (JSE) Industrials super-sector in South Africa. This focus reflects growing international and domestic concern about the fairness, sustainability and strategic implications of the way value is distributed in organisations (Amis et al., 2021; Bapuji et al., 2019; Develay et al., 2023; Matemane et al., 2024). Despite the debate being global, it is increasingly salient in South Africa, where inequality is among the highest globally and unemployment remains persistently elevated, which intensifies scrutiny of remuneration practices and their corresponding links to performance (Statistics South Africa, 2025; World Bank, 2023a).

This study uses the Marx Ratio, which is calculated by dividing profit per employee by the compensation per employee, as a transparent indicator of the surplus-to-wage split in organisations (Irwin, 2018). Unlike broad societal inequality measures, the Marx Ratio focuses on organisational value distribution, by indicating how surplus is split between profits and wages. The ratio, therefore, offers a direct lens on whether differences in value allocation are associated with variation in operating and financial outcomes.

This study evaluated financial performance using two widely applied financial indicators, namely return on assets (ROA) and earnings before interest, tax, depreciation, and amortisation (EBITDA). ROA reflects how effectively an organisation utilises its assets to generate revenue, which provides insight into both efficiency and profitability (Carlson & Bussin, 2020). EBITDA focuses on core operating performance and offers a clearer

picture of an organisation's underlying earning capacity (Bouwens et al., 2019). Both measures are used throughout academic research and industry practice, which enables meaningful comparisons across organisations of different sizes and structures.

This study analyses 10 years of data of JSE-listed organisations within the Industrials super-sector. Limiting the scope to publicly listed organisations ensured access to consistent, audited remuneration and financial data, in line with corporate governance requirements as set out in the King IV code (Chawarura et al., 2025).

Accordingly, the study's purpose was not only to test whether a statistical association exists between IVD and organisational financial performance in South Africa's Industrials super-sector, but also to contribute to the ongoing debate on equitable value distribution, corporate governance and organisational effectiveness. Using evidence from the South African context, this study aimed to deepen academic understanding and support practical decisions on remuneration strategies and governance policies.

1.2 Study Context

The JSE Industrials super-sector comprises a heterogeneous set of listed organisations spanning capital- and labour-intensive activities. Classification follows the Industry Classification Benchmark (ICB) used by the JSE, with specified sector and subsector definitions (FTSE Russell, 2024). According to the ICB, the sector includes subsectors such as Chemicals; Construction & Materials; Electronic & Electrical Equipment; Industrial Engineering; Industrial Transportation; and Support Services. This diversity provides meaningful cross-sectional variation in cost structures, labour–capital mixes and competitive environments, while the shared listed-entity context ensures broadly comparable disclosure and governance under the King IV code (IoDSA, 2016). Therefore, Industrials offers a suitable setting for examining whether differences in IVD are associated with variation in operating and financial outcomes.

Operating conditions of South African industrial organisations have been shaped by well-documented macro pressures, including energy and logistics constraints, input-cost volatility and ongoing digitalisation, all against a backdrop of competitive product markets in many subsectors (National Treasury South Africa, 2024; Statistics South Africa, 2024; World Bank, 2023b). These features increase managerial and stakeholder interest in the way value generated by organisations is allocated between profits and wages, and whether that allocation relates systematically to indicators such as ROA and EBITDA.

For Industrials, specifically, the case for examining IVD is primarily operational. Labour–capital mixes, contracting arrangements and the extent to which costs can be passed through to customers vary widely across subsectors (South African Reserve Bank, 2025). As a result, the surplus-to-wage split may correlate with organisational efficiency and resilience (Amis et al., 2021; Bapuji et al., 2019). Analysing IVD against ROA and EBITDA offers a focused way to assess whether patterns of value allocation are associated with differences in performance of listed organisations (Carlson & Bussin, 2020).

Against this backdrop, this study situated the Marx Ratio as an organisation-level indicator of surplus-to-wage allocation and tested its association with ROA and EBITDA for JSE Industrials over a 10-year window. The sector’s mix of business models, coupled with consistent, audited disclosures, provides an appropriate context for drawing inferences about how IVD relates to performance of South African listed organisations.

1.2.1 Existing Research

International findings on IVD and performance are mixed. Certain studies, grounded in tournament and agency perspectives, suggest that wider dispersion can help attract, sort and motivate scarce managerial talent, sharpen effort and potentially improve outcomes (Chung et al., 2024; Jensen & Murphy, 1990; Lazear & Rosen, 1981). Other studies, which drew on equity and fairness theories, caution that large internal gaps can undermine morale and erode trust and cooperation, and result in elevated turnover intentions, ultimately weakening productivity and profitability (Adams, 1965; Bamberger & Belogolovsky, 2010; Bamberger et al., 2021). A further set of studies reports null or context-dependent effects, by often attributing differences to context, construct choice and identification strategy (Amis et al., 2021; Bapuji et al., 2019). Recent work also points to possible non-linearity, with an inverted U relation that peaks only at very wide dispersion and is typically absent for ROA, which suggests that any curvature, if present for IVD, would likely emerge only at extreme distributions (Chung et al., 2024).

Three methodological issues surface repeatedly in the literature. First, the constructs differ because many studies operationalise dispersion using CEO–worker disparities, whereas the Marx Ratio captures the surplus-to-wage split at the organisation level, and shifting the focus from executive pay to overall IVD (Irwin, 2018). Second, performance lenses differ across studies, which use different measures (market versus accounting) and horizons (short versus long), which can alter both the sign and magnitude of the estimated

relationship (Rouen, 2020). Third, identification and scope conditions matter, as stronger performance may lead organisations to adjust their value-allocation later (reverse causality), and any non-linearity is likely to emerge only at very wide dispersion levels (Chung et al., 2024).

Research exploring this relationship in South Africa is still relatively limited and provides mixed findings. Studies on listed organisations often emphasise executive remuneration levels and governance rather than organisation-wide value distribution, and findings are sensitive to measurement choice and sample period (Matemane et al., 2024; Naik, et al., 2020). Specific research focused on state-owned entities (SOEs) found largely inconclusive links across accounting measures (Carlson & Bussin, 2020). Overall, evidence specific to JSE Industrials and to IVD constructs remains sparse, leaving limited insight into how distribution and performance intersect in a sector that is both a key economic driver and a socially sensitive area of the economy (Matemane et al., 2024).

This study addressed these gaps by applying the Marx Ratio over a 10-year period to a clearly defined population of JSE-listed organisations in the Industrials super-sector. By combining this measure with two complementary financial performance indicators – ROA and EBITDA – it sought to provide a focused test of whether IVD is associated with differences in organisational outcomes in the uniquely challenging South African context.

1.3 Problem Statement

Given South Africa's extreme inequality and persistently elevated unemployment, stakeholders increasingly question the way value is distributed inside organisations, specifically the split between wages and profits (Statistics South Africa, 2025; World Bank, 2023a). In this context, listed organisations in the JSE Industrials super-sector operate under consistent governance and disclosure expectations, yet there is limited evidence of whether IVD is associated with differences in financial performance.

International studies on the link between distribution and organisation performance present mixed and often contradictory findings. Tournament and agency perspectives predict benefits from wider dispersion, such as stronger sorting and effort (Jensen & Murphy, 1990; Lazear & Rosen, 1981). In contrast, equity and fairness views highlight potential costs to morale, cooperation and productivity when internal gaps widen (Adams, 1965; Bamberger & Belogolovsky, 2010). Finally, studies suggest possible non-linearity, with effects emerging at very wide dispersions (Chung et al., 2024).

In South Africa, the empirical evidence remains limited and heterogeneous. Studies on listed entities tend to focus on remuneration at the executive level and governance rather than organisation-wide distribution, and reported associations vary by measurement choice and sample period (Carlson & Bussin, 2020; Matemane et al., 2024; Naik, et al., 2020). There is little sector-specific, longitudinal research that applies an organisation-level IVD measure, especially in the JSE Industrials sector, and using accounting-based outcomes (Amis et al., 2021; Bapuji et al., 2019).

This lack of sector-focused, longitudinal research leaves boards, policymakers and other stakeholders without a clear evidence base for assessing how IVD relates to organisation performance in South Africa. This study seeks to address that gap by investigating whether IVD, measured via the Marx Ratio, is statistically associated with key financial performance indicators of JSE-listed organisations in the Industrials super-sector over a 10-year period.

1.4 Study Significance

1.4.1 Theoretical Need

Despite extensive global work on pay and performance, theory and evidence remain fragmented, with much of the literature either on focused economy-wide inequality or on absolute executive pay levels, rather than how value is distributed within organisations (Bapuji et al., 2019; Bebchuk & Fried, 2006; Conyon, 2014). This leaves a clear theoretical gap in understanding whether IVD relates to accounting outcomes in specific sectors.

The Marx Ratio provides a clear indicator of value distribution in organisations, thereby shifting attention from executive-centric disparities to overall internal allocation (Irwin, 2018). While such metrics have begun to feature in global discussions, they are seldom applied in South African research, particularly in studies focused on specific sectors (Li et al., 2024). Furthermore, research often relies on single financial performance indicators, thereby limiting theoretical insight into the multidimensional nature of organisation performance (Bezuidenhout et al., 2018; Carlson & Bussin, 2020).

Addressing these gaps responds to calls for more context-sensitive and sector-focused research that integrates nuanced measures of both inequality and performance (Bamberger & Belogolovsky, 2010; Naik et al., 2020). Such studies are vital for advancing the mechanisms through which IVD affects organisational effectiveness, particularly in economies characterised by high inequality, strong unionisation and structural challenges (PricewaterhouseCoopers [PwC], 2024; Statistics South Africa, 2025).

1.4.2 Business Need

For both remuneration committees and senior executives in the Industrials sector, the findings of this study may have practical implications for remuneration strategies and corporate governance. Understanding whether, and in what ways, IVD influences financial performance can help decision-makers weigh the risks and advantages of different remuneration architectures and calibrate internal relativities (PwC, 2024). This insight is especially important for wage negotiations and budgeting, where tight operating margins and competitive pressures heighten sensitivity to the way value is shared by the organisation (National Treasury South Africa, 2024; World Bank, 2023b).

These insights may also guide how organisations approach stakeholder engagement. At the same time, investors are placing increasing emphasis on environmental, social, and governance issues, therefore, remuneration structures and fairness have become a focus area of reporting frameworks (Chawarura et al., 2025). Furthermore, the King IV code calls for fair and responsible remuneration, while the second code for responsible investing in South Africa (CRISA 2) outlines stewardship expectations for investors, with a strong emphasis on transparent outcomes (CRISA Committee, 2022; IoDSA, 2016). A clear, evidence-based understanding of the link between internal allocations and performance enables organisations to present remuneration policies more convincingly to shareholders, employees and regulators, to strengthen both trust and legitimacy.

1.4.3 South African Context

In South Africa, the relevance of this research extends far beyond individual organisations. Deep-seated inequality, high levels of unemployment and subdued economic growth have brought questions relating to pay fairness and value allocation to the forefront of public and policy debate (Statistics South Africa, 2025; World Bank, 2023a). In this environment, JSE-listed organisations face sustained scrutiny of remuneration practices and their links to competitiveness and long-term value creation (Hamann & Bertels, 2018).

This study contributes by providing empirical evidence of the way IVD relates to organisation performance. The results can guide the development of labour policy and inform improvements to wage-setting practices. Furthermore, the findings can assist industrial relations strategy. Accordingly, various parties, such as policymakers, trade unions and industry bodies, can use the findings to support balanced approaches to organisational value distribution – approaches that preserve competitiveness while addressing the societal imperative to reduce inequality (Bapuji et al., 2019).

1.5 Delimitations

This study was intentionally scoped to include only organisations listed on the JSE that met the inclusion criteria outlined in Section 4.3. This focus was chosen to ensure the availability of high-quality, comparable data, which is available because listed organisations are required to comply with corporate governance and disclosure standards, including the transparent reporting of remuneration structures, as required under the King IV code (Chawarura et al., 2025). The study focused on South Africa, to explore the relationship between IVD and organisational financial performance in the country's unique economic, social and regulatory context.

The research period spans 2014 to 2023, to provide a contemporary perspective while also allowing for the capturing of trends over time. As a secondary source of data, publicly available data were used, and any qualitative insights of internal stakeholders were excluded. The study was, furthermore, delimited to the use of the Marx Ratio as the measure of IVD, and both ROA and EBITDA as the indicators of financial performance, in line with other quantitative research (Irwin, 2018; Naik et al., 2020). These boundaries were necessary to limit the scope of the study and to ensure consistency and robustness throughout the methodology and analysis.

1.6 Definition of Terms

Key terms are explained to ensure that they are interpreted clearly and consistently throughout the study:

- **IVD:** IVD stands for internal value distribution, which reflects the organisation-level allocation of value between profits and wages and highlights the surplus-to-wage split (Irwin, 2018).
- **Marx Ratio:** An index used as a proxy for IVD and calculated by dividing profit per employee by the compensation per employee (Irwin, 2018).
- **ROA:** Short for return on assets, this measure is determined by dividing an organisation's net income by its total assets. It provides insight into how effectively the organisation is using its resources to generate profit (Carlson & Bussin, 2020).
- **EBITDA:** Short for earnings before interest, taxes, depreciation and amortisation, this measure offers a view of the organisation's underlying operational profitability, excluding the effects of financing decisions and accounting practices (Carlson & Bussin, 2020).

- **JSE Industrials super-sector:** The population focus of this study, defined according to the ICB used by the JSE. It includes subsectors such as Chemicals, Construction & Materials, Electronic and Electrical Equipment, Industrial Engineering, Industrial Transportation, and Support Services (FTSE Russell, 2024).
- **Loss year:** A financial year in which profit is negative. The Marx Ratio reflects this transparently, using a negative numerator, instead of censoring or reclassifying loss years (Irwin, 2018).
- **Organisation–year:** A unit of analysis, representing a single listed organisation observed in a specific financial year (in this case, 2014 to 2023).

1.7 Assumptions

This study made several key assumptions that underpin its design, data and analysis. It assumed that audited annual and sustainability reports, together with data obtained from reputable financial databases such as Refinitiv and IRESS, accurately reflect each organisation’s remuneration and financial performance for the years observed. It also assumed that organisations were correctly classified in the JSE’s ICB framework throughout the period 2014–2023, with no material reclassification that would alter sector membership. Furthermore, it was assumed that listed entities complied with applicable governance and disclosure requirements, such that staff-cost and headcount data were sufficiently complete and comparable for the purposes of this study.

For measurement, the study assumed that the Marx Ratio is a valid and meaningful proxy for IVD in the South African JSE Industrials context. It also assumed that the worker-pay component reported by organisations was consistently defined across entities and over time. Finally, it was assumed that ROA and EBITDA are reliable indicators of financial performance and are comparable across listed organisations of differing size and business models.

1.8 Research Structure

This research report is organised into six additional chapters that each address a distinct aspect and collectively guides the reader from theoretical background to practical conclusions.

- **Chapter 2: Theory and Literature Review:** Provides a comprehensive review of the theoretical and empirical literature relevant to IVD and organisation performance. It identifies key constructs, theoretical frameworks and findings from research, and highlights the gaps this study aimed to address.
- **Chapter 3: Research Questions:** Sets out the specific research questions and hypotheses that guided the empirical investigation. It also ensures that each research objective is clearly aligned with the constructs and gaps identified in Chapter 2.
- **Chapter 4: Research Methodology:** Details the research philosophy, design, data sources, measurement approaches and analytical techniques employed in the study. It also addresses ethical considerations, quality controls, limitations and inferences associated with the methodology.
- **Chapter 5: Analysis of Results:** Presents the results of the statistical analyses, including descriptive data, bivariate associations and regression outputs. Robustness and sensitivity checks are also considered.
- **Chapter 6: Discussion of Results:** Interprets the results in relation to the research questions and the literature, by indicating where findings confirm, extend or challenge existing theory.
- **Chapter 7: Conclusions and Recommendations:** Integrates the findings into clear conclusions that address the research questions, while discussing the implications of the findings for theory, practice and policy. It also proposes avenues for future research and makes relevant recommendations.

This structure ensures a clear progression, from identifying the problem and establishing the theoretical frameworks, to conducting the empirical analysis and offering practical recommendations. Doing so ensured that the research objectives remained aligned with the final conclusions. The next chapter builds on this foundation by critically examining the theories and evidence that inform the research questions and hypotheses of the study.

Chapter 2: Theory and Literature Review

2.1 Introduction

The distribution of value in organisations has significant implications for legitimacy, cooperation and long-term organisational financial sustainability (Bamberger et al., 2021; Cobb, 2016). How realised surplus is allocated between labour and capital in any period shapes stakeholder perceptions of fairness, accountability and strategic intent, particularly where high standards are set for disclosure and scrutiny (Amis et al., 2021; Bapuji et al., 2019). These concerns are especially valid in South Africa – a society characterised by extreme socio-economic inequality and weak enforcement of governance frameworks in both public and private sectors (Bapuji et al., 2019). Distribution choices can either reinforce trust and productive coordination or, poorly explained decisions can create resistance and divert focus from everyday execution and value creation (Hamann & Bertels, 2018; IoDSA, 2016).

From a theoretical standpoint, IVD is positioned at the intersection of efficiency, incentives and fairness. Agency and rent-sharing perspectives propose that, under credible governance, increases in organisational surplus can support both remuneration and reinvestment without sacrificing performance (Jensen & Meckling, 1976). Tournament and internal labour-market views add that well-structured reward differentials may enhance effort and selection, while excessive or poorly justified gaps risk undermining collaboration (Lazear & Rosen, 1981). Equity theory suggests that perceptions of distributive and procedural justice sustain cooperation and effort: When distribution is seen as unfair, engagement, coordination and retention deteriorate, and has knock-on effects on performance (Adams, 1965). Stakeholder theory holds that distributional choices are judged by constituencies whose support confers resources and legitimacy; when these choices are credibly linked to long-term value, support is maintained, while weakly justified allocations invite scrutiny and risk (Donaldson & Preston, 1995; Freeman, 1984). Contemporary research on organisational inequality and institutional work examines how remuneration routines, grading architectures and disclosure narratives produce and stabilise these distributions (Amis et al., 2021; Hamann & Bertels, 2018).

Broader structural forces condition IVD further. Technological change, capital deepening and market concentration have shifted the balance between labour compensation and the share of value accruing to capital, thereby altering the amount of surplus created per

employee and the parameters within which organisations allocate it (Autor et al., 2020; Karabarbounis & Neiman, 2014). Management quality and governance practices interact with these forces by shaping the productivity with which resources are employed and the credibility of distributional narratives offered to stakeholders (Bloom et al., 2016; IoDSA, 2016). Together, these dynamics underscore the need for clear, interpretable approaches to tracking internal distribution alongside indicators of efficiency and performance, while recognising that institutional context mediates observed relationships.

Against this backdrop, the purpose of this chapter is to critically examine existing theoretical and empirical research that is relevant to IVD and organisational financial performance. The review starts by outlining the principal theoretical frameworks that inform this relationship and discussing the key constructs central to the study. It then examines empirical evidence from both international and South African contexts, by examining research that focuses on the links between distribution, efficiency and performance. The chapter concludes by bringing together key insights from the literature and highlighting the gaps this study aimed to address. In doing so, the review not only draws together what is already known but also positions the research firmly in a well-defined academic and practical context.

2.2 Theoretical Perspectives

The relationship between IVD and organisational outcomes has been examined with multiple theoretical lenses, with each providing a different interpretation of how distributional choices shape behaviour, legitimacy and performance. For this study, five key frameworks are particularly relevant, namely agency theory, tournament theory, equity theory, stakeholder theory and organisational inequality and institutional work. Each theory provides valuable insights, though their limitations must be considered, particularly in South Africa's socio-economic and institutional context.

2.2.1 Agency Theory

Agency theory remains a central lens for understanding how IVD is shaped by incentive alignment and governance (Jensen & Meckling, 1976; Kweh et al., 2022). The theory is based on the principal–agent problem, which arises when the interests of shareholders (principals) and managers (agents) are misaligned. Managers may pursue personal objectives, such as wealth accumulation or entrenchment, that do not maximise shareholder value, thereby creating agency costs. In the context of IVD, these frictions

can surface as wage growth, variable pay pools or retained earnings decisions that are weakly tied to fundamentals, or as under-investment in productivity-enhancing capabilities that would otherwise expand the surplus available to labour and capital (Ladika & Sautner, 2020).

To mitigate these costs, agency theory emphasises contract design, monitoring and disclosure. Performance-sensitive contracts, robust performance metrics and transparent reporting align decision rights with value creation by linking surplus-sharing and allocation decisions to organisational success. In environments with strong governance, such as those with independent boards and high-quality disclosures, distributional decisions are more likely to reinforce effort and prudent risk-taking and allow remuneration and reinvestment to rise together as surplus increases (Bebchuk & Fried, 2006; Rouen, 2020). IVD need not be a zero-sum game: When productivity improves and capital discipline is maintained, both labour compensation and retained earnings can increase without sacrificing performance.

However, the theory has been criticised in contexts with weak governance oversight, as distribution can decouple from underlying performance, to enable rent extraction or gaming of metrics (Bebchuk & Fried, 2006). Over-reliance on short-term financial indicators may also create short-termism, which limits investment in capabilities that sustain long-term value and stable internal splits (Thakor, 2020). Additionally, the strong focus of agency theory on shareholder value may overlook the needs of all stakeholders – a problematic shortcoming in highly unequal societies, where legitimacy is more vulnerable (Amis et al., 2021).

2.2.2 Tournament Theory

Tournament theory views IVD through the lens of relative rewards in internal labour markets (Lazear & Rosen, 1981). Clear, attainable differentials can motivate effort and sorting, provided progression pathways are transparent, and rewards reflect contribution. Under these conditions, well-structured reward steps may foster innovation and individual performance, with potential for improved organisational outcomes (Develay et al., 2023).

However, these same mechanisms may produce non-linear effects. As gaps widen, marginal benefits may fade, giving way to lower morale, weaker collaboration and less knowledge sharing. These dynamics may undermine team efficiency and workplace cohesion (Chung et al., 2024). Wide disparities may erode customer-focused cultures and

harm profitability over time, despite providing a temporary performance boost (Bamberger et al., 2021). Optimal dispersion is context-dependent, with outcomes being dependent on the design, communication and experience of differentials (Bapuji et al., 2019).

Additionally, institutional context conditions tournament effects. Where wages are set through collective arrangements or tightly governed internal frameworks, dispersion is naturally compressed, which can mute tournament effects at certain levels while preserving them at key promotion points. Perceptions of legitimacy also matter, because when differentials are poorly justified or applied inconsistently, resistance and coordination costs rise and erode intended incentive benefits (Hamann & Bertels, 2018). Overall, tournament theory is conditional, because reward differentials can aid performance when credible and proportionate, but may become counterproductive when vague, excessive or misaligned.

2.2.3 Equity Theory

Equity theory shifts the focus from competition to fairness (Adams, 1965). The theory suggests that individuals assess the fairness of their outcomes, such as pay and recognition, by comparing their inputs, such as effort and skills, against that of others in similar positions. When employees perceive inequity, particularly unfavourable inequity where outcomes seem disproportionately low relative to effort, they may respond negatively. This dissatisfaction becomes evident through workplace disengagement, reduced productivity, active resistance, or total withdrawal from the organisation (Develay et al., 2023).

Perceptions matter as much as the numbers. Fairness judgements rest on distributive justice (whether outcomes fit contribution) and procedural justice (whether the process is consistent, accurate and transparent). When distribution is credibly linked to contribution and explained through clear, consistent rules, cooperation is easier to sustain. When differentials are vague or appear arbitrarily applied, coordination costs and resistance increases (Amis et al., 2021; Hamann & Bertels, 2018; Zhang et al., 2023). Accordingly, equity theory positions IVD as both a quantitative split and a narrative task; similar distributions can yield very different organisational outcomes depending on how they are designed, justified and understood.

2.2.4 Stakeholder Theory

Stakeholder theory provides the broadest conceptual lens. It defines the purpose of an organisation as the creation of value for all its stakeholders, not only shareholders (Freeman, 1984). Based on this perspective, distribution is judged not only by financial outcomes but also by how credibly it is linked to long-term value, responsible conduct and the organisation's stated purpose. Clear rationales, consistent processes and transparent disclosure help maintain support, whereas weakly justified arrangements increase reputational and coordination risks (Amis et al., 2021; Hamann & Bertels, 2018).

Context is critical and, in South Africa, the historical legacies of inequality and apartheid place businesses under increased scrutiny (Bapuji et al., 2019). Where distribution policies align with credible governance standards and are explained through accessible, comparable reporting, trust is easier to sustain (IoDSA, 2016). Conversely, vague or inconsistently applied rules invite stakeholder challenges and can disrupt collaboration and strategic execution. Stakeholder theory, therefore, positions IVD as a strategic choice, and proportionate, well-governed and clearly explained allocations are more likely to secure stakeholder support that underpins performance.

2.2.5 Organisational Inequality and Institutional Work

This theoretical lens treats IVD as something that is produced and stabilised through organisational practices and narratives, not merely as a by-product of markets or technology. Remuneration practices, grading systems, evaluation criteria and disclosure formats shape the institution by setting categories and boundaries, normalising differentials and making certain splits appear legitimate, while casting others as problematic (Amis et al., 2020; Bapuji et al., 2019).

Three levers are central to this theory. First, rule-making determines the formal scaffolding (bands, eligibility, progression). Second, framing supplies the narratives that link differentials to productivity, risk or long-term value. Third, boundary work determines who is counted or compared (contractors, subsidiaries, geographies). Together, these levers shape fairness judgements and external legitimacy, by amplifying or dampening the incentive, cooperation and performance effects identified by the other theoretical lenses (Amis et al., 2021; Hamann & Bertels, 2018; Zhang et al., 2023).

Ultimately, outcomes are context-dependant. Similar distributions can have markedly different effects depending on how they are designed, explained and enforced. When

practices are consistent, logical and credibly governed, acceptance and coordination are easier to sustain. When practices are vague or applied selectively, they invite resistance and drive-up coordination costs (Amis et al., 2021; Hamann & Bertels, 2018).

2.2.6 Theory Integration

Considered together, these theories offer complementary but conditional predictions around IVD and organisational outcomes. Agency and tournament theories suggest that well-designed reward differentials can support effort, selection and capital discipline, whereas equity and stakeholder theories, by contrast, warn that vague or weakly justified gaps erode cooperation and legitimacy. The organisational inequality and institutional work theory explains why effects vary across settings, by showing how rules, narratives and boundary choices shape the way distributions are produced and received.

In a context such as South Africa, where structural inequality, union dynamics and historical labour segmentation shape organisational realities, the applicability of these frameworks cannot be presumed without empirical validation. Incentive benefits depend on credible design and explanation, while fairness and legitimacy costs increase when processes lack consistency or clarity. Accordingly, this study focused on the Industrials super-sector to assess the relevance and limits of each framework in this context.

2.3 Key Constructs

This study focused on two primary constructs, namely IVD and financial performance, and examined their relationship in South Africa's Industrials super-sector. These constructs build on the theoretical perspectives outlined in Section 2.2 and are defined in a way that allows for empirical testing.

2.3.1 Internal Value Distribution

IVD refers to the split of realised surplus between capital and labour in an organisation over a given period. Unlike broader measures at a national or sector levels, this measure focuses specifically on differences that exist in organisations (Bamberger et al., 2021).

To assess IVD in organisations, this study adopted the Marx Ratio, which is an organisation-level measure that compares the surplus generated per employee with the compensation of the median employee. The ratio is mathematically defined as follows:

$$\text{Marx Ratio} = \frac{\text{Profit per Employee}}{\text{Median Employee Remuneration}}$$

The term Marx Ratio was first introduced by journalist Neil Irwin in *The New York Times* as a method of highlighting the distribution of economic value in organisations by comparing an organisation's profit per employee to median worker remuneration, to highlight imbalances between capital returns and labour compensation (Irwin, 2018). Although the term itself does not appear in peer-reviewed academic literature, the concept aligns closely with established distribution measures, such as labour share and pay-structure indicators, which are widely applied in organisation research (Bamberger et al., 2021).

Similar metrics have gained prominence in both academic and policy debates to summarise internal distribution in a clear, communicable form, although application discretion can materially shift reported pay-ratio levels without real changes in inequality (Alam et al., 2025; Bapuji et al., 2019). By expressing profit per employee as a multiple of worker pay, the Marx Ratio facilitates comparisons across organisations, sectors and geographies, while enabling researchers to test for possible thresholds or non-linear effects, such as whether very high levels of dispersion are associated with adverse outcomes (Bapuji et al., 2019; Chung et al., 2024; Pan et al., 2022).

In this study, the Marx Ratio was used as the primary indicator of IVD. It is interpreted alongside organisational characteristics and governance quality. As it links realised surplus with typical employee pay, the Marx Ratio was expected to track asset efficiency and capital intensity, and to move with changes in profitability and pay policy over time. Its value lies in simplicity, as it provides a single, auditable index that is comparable across organisations and years, and it retains information in loss periods through negative values (Irwin, 2018). The ratio is treated as a distributional barometer rather than a welfare score, and institutional conditions shape how similar values translate into outcomes (Amis et al., 2021; Bapuji et al., 2019).

2.3.2 Financial Performance

Financial performance is a multidimensional construct that reflects the extent to which an organisation meets its economic objectives. This study was conceptualised to include both accounting-based and market-based measures, to provide a balanced assessment of both short- and long-term performance.

Accounting-based indicators such as ROA, return on equity (ROE) and EBITDA provide valuable insights into the efficiency and profitability of organisations (Carlson & Bussin,

2020). From an IVD perspective, these measures are particularly useful because they map closely to the components of the Marx Ratio and are less sensitive than market prices to short-run, market-wide shocks that are unrelated to organisation-specific distributional choices (Bezuidenhout et al., 2018; Pan et al., 2022; Rouen, 2020).

Market-based measures such as share price appreciation and total shareholder return capture investor perceptions of organisational value and long-term strategic positioning (Bussin et al., 2023). While such measures are more common in publicly traded organisations, they may have limited applicability in certain South African contexts where organisations are privately held or not listed on the JSE. For this study, financial performance metrics were chosen because of their availability and their relevance to the industrial sector.

Accordingly, the analysis centres on ROA and EBITDA as the primary measures of performance, with ROE and market-based signals used selectively for context. These accounting measures align closely with surplus generation in the Marx Ratio and are less prone than prices to transient, market-wide shocks, which supports cleaner cross-organisation comparisons in the Industrials super-sector (Bezuidenhout et al., 2018; Rouen, 2020). Therefore, this configuration provided a consistent basis to test and analyse how IVD relates to organisational economic outcomes over time.

2.3.3 Contextual Factors

Both constructs must be interpreted within the socio-economic and institutional realities of South Africa's Industrials super-sector. The sector operates under a combination of global competitive pressures, domestic cost constraints and complex labour relations shaped by strong union influence. Wage-bargaining structures, statutory minimum wages and broad-based black economic empowerment (B-BBEE) requirements create an environment in which IVD choices are not only economic decisions but also political and social acts (Hamann & Bertels, 2018).

In this context, the Marx Ratio carries added significance as a signal of organisational priorities and governance standards. Financial performance is scrutinised not only by investors but also by employees, unions, policymakers and the public. Given this interplay between economic performance and distributive fairness, it is essential to interpret both constructs alongside prevailing governance expectations, by drawing on both theoretical perspectives and empirical evidence (IoDSA, 2016).

2.4 International Empirical Literature

Evidence from outside South Africa points to two contrasting forces that link IVD to organisational financial performance. Incentive and selection mechanisms imply that some dispersion can raise effort, sort talent and increase productivity, to improve accounting or market outcomes (Lazear & Rosen, 1981). In contrast, equity and coordination concerns predict that steep differentials may undermine cooperation and service quality, particularly when governance is weak (Adams, 1965; Amis et al., 2021). These tensions make non-linear effects possible. Macro–micro evidence shows that when the labour share shifts and surplus per employee is created, profitability and markups tend to follow. This underscores how the division of value in organisations can relate to performance but remains sensitive to market power and technology (Barkai, 2020; De Loecker et al., 2020). Therefore, global research offers useful insight into mechanisms and boundary conditions, while highlighting the need for context-specific studies, especially in countries with distinctive socio-economic conditions, such as South Africa.

2.4.1 Studies Reporting Positive Relationships

Performance gains are most evident when internal dispersion is disciplined and credibly designed. Tournament theory suggests that steeper internal reward gradients, where a greater share of value results in higher responsibility roles, can increase effort and aid in sorting talent (Lazear & Rosen, 1981). Empirical work suggests that wider differentials, particularly within senior teams, are linked to stronger subsequent outcomes in competitive or innovation-intensive contexts (Kale et al., 2009). Measurement also matters. When the economically explained component of pay structures, such as differences warranted by role, skills or markets, is separated from residual dispersion, the explained component is typically positively associated with future performance. This points to incentive effects rather than rent extraction (Grabner & Martin, 2020; Rouen, 2020; Tenhiälä et al., 2023).

However, even studies that report positive relationships often find that the outcome depends on the amount of dispersion. Several studies, both locally and abroad, report inverted U patterns, where moderate gaps are associated with better productivity or profitability, but very steep gaps erode cooperation and mute the incentive effect (Rasoava, 2019; Shaw, 2014). Within top management teams similar inversions appear when fairness and coordination costs rise at high gaps (Wang et al., 2022). Together,

positive associations are most plausible when dispersion is justified, transparent and aligned with governance and context. However, beyond a certain point, the benefits taper.

2.4.2 Studies Reporting Negative Relationships

In contrast, studies report that steep internal value concentration can harm performance. As internal differences widen, equity concerns and coordination costs rise and weaken cooperation, knowledge sharing and service quality. This is especially evident when governance is weak and fairness norms are salient (Adams, 1965; Amis et al., 2021). In essence, the same dispersion that sharpens incentives can, beyond a point, erode the collaborative inputs many organisations rely on.

Findings of several studies show consistency with this pattern. In high-technology settings, larger differentials within senior teams have been linked to poorer product quality and reduced innovation output (Siegel & Hambrick, 2005). Classic evidence on broader workforces, similarly, associates wider internal gaps with lower product quality and customer satisfaction, which is consistent with strained cooperation in production and service (Cowherd & Levine, 1992). More recent studies report that, when stakeholders attend closely to fairness, reputational and legitimacy penalties can spill over into market outcomes and dampen growth and profitability. Additionally, the findings highlight that, in sectors where brand reputation and customer relationships are critical, perceptions of fairness and legitimacy play a role in performance (Bamberger et al., 2021; Shaw, 2014).

2.4.3 Studies Reporting no Significant Relationship

A third group of studies reports no clear association between IVD and organisational financial performance once design features, industry mix and governance controls are considered. In several instances, dispersion measures lose significance once economically explained differences (role, skills, market conditions) have been separated from residual variation, or when accounting rather than market outcomes is used (Rouen, 2020; Shaw, 2014).

Additionally, meta-analytic and review evidence reaches a similar conclusion. Pay structures alone are weak predictors, and results are heavily shaped by context and both dispersion and outcomes are measured (Shaw, 2014; Zhang et al., 2023). Taken together, these findings reinforce that any distribution–performance link is conditional, because the link depends on how dispersion is constructed, how performance is measured, and the institutional setting in which organisations operate.

2.4.4 Moderators and Design Contingencies

Differences in context and organisational design help explain the diversity of findings. The credibility of distributional choices depends on governance quality and disclosure. Transparent, well-justified allocations are easier to defend and more likely to support long-term value, whereas weak oversight increases rent-seeking and coordination costs (Amis et al., 2021; Bapuji et al., 2019). Technology and capital intensity influence how much surplus each employee generates and how it is divided, while shifts in competition and market power change the shape of labour and determine how IVD translates into margins and returns (Barkai, 2020; De Loecker et al., 2020). Cultural norms and collective bargaining also matter, especially in settings where equity, equality or need norms are relevant or where unions compress pay structures. Additionally, wide internal gaps are more likely to create legitimacy concerns and affect incentives (Adamovic, 2023; Adams, 1965; Shaw, 2014).

Considered together, these moderators make non-linear responses plausible. Moderate dispersion can support effort and selection but, beyond context-specific levels, collaboration costs and reputational penalties increase and weaken performance (Amis et al., 2021; Shaw, 2014).

2.4.5 Implications

International evidence shows that the link between IVD and financial performance is complex, potentially non-linear and highly context dependent. Positive associations are more likely when dispersion is justified, transparent and credibly governed, particularly in competitive or innovation-intensive contexts. In contrast, negative patterns are more common when fairness norms, stakeholder scrutiny or coordination demands dominate (Adams, 1965; Amis et al., 2021; Shaw, 2014). These patterns reinforce the need to examine the phenomenon in South Africa's Industrials setting, where structural inequality, strong union representation and industrial policy frameworks create conditions that may intensify or moderate effects observed in other countries (Bezuidenhout et al., 2018).

2.5 Empirical Literature in South Africa

South Africa offers a distinctive setting for examining IVD and organisational financial performance; the setting is characterised by high structural inequality, strong and institutionalised collective bargaining and mature governance requirements for listed organisations (King IV). These factors shape the way surplus is divided and how those

decisions are scrutinised (Amis et al., 2021; Carlson & Bussin, 2020; IoDSA, 2016). In this environment, evidence on listed organisations, particularly in the Industrials sector, addresses the way labour-share dynamics, wage-bill behaviour and internal dispersion relate to profitability and performance.

While SOEs feature prominently in the literature, their main value for this study is comparative. SOEs illuminate governance, legitimacy and disclosure dynamics that also affect listed organisations, though they differ materially in mandates and political oversight (Department of Public Enterprises South Africa, 2020). Accordingly, this section emphasises evidence from the JSE and draws on SOEs only where such information could clarify governance contrasts.

2.5.1 Listed Organisations

For South Africa's listed organisations, empirical outcomes linking internal distribution to performance are mixed. Sectoral evidence shows that the link between remuneration and accounting outcomes differs by industry and metric, and heterogeneity is highlighted from the outset (Bussin & Blair, 2015). Once contextual factors are considered, studies of pay structures in JSE organisations often report weak or inconsistent associations with accounting outcomes, which suggest that dispersion effects are contingent on governance and market setting rather than being universal (Kweh et al., 2022; Maloa & Bussin, 2016). Other empirical findings focused on within-organisation gaps and also found limited or fragile relationships with profitability, alongside increased reputational exposure where fairness concerns were salient (Mnyaka-Rulwa & Akande, 2024; Siwendu et al., 2024). Viewed through a governance lens, remuneration disclosure requirements of the King IV code increase scrutiny and may constrain rent extraction, but it does not guarantee a straightforward positive link between sharper internal differentials and performance (Chowdhury & Doukas, 2025; IoDSA, 2016).

In this context, SOEs are useful primarily for comparative purposes. Evidence from South African SOEs shows remuneration–performance links that are weak or inconsistent, thereby highlighting how political oversight and mandate complexity can decouple remuneration structures from financial outcomes (Bezuidenhout et al., 2018; Carlson & Bussin, 2020). This contrast reinforces the focus on listed organisations and highlights that where governance is stronger and disclosure is tighter, distribution–performance associations remain heterogeneous, which points to the importance of organisational design and sector context rather than a single direction of effect.

2.5.2 Internal Distribution and Organisational Outcomes

South African studies show that wide internal differences can strain day-to-day cooperation and trust, with knock-on effects for service quality, industrial relations and, ultimately, performance. In highly unionised sectors, disputes over how value is divided tend to escalate quickly, which reflects the country's inequality legacy and dense collective bargaining landscape (Hamann & Bertels, 2018). The 2014 platinum-sector strike illustrates this dynamic, for which distributional grievances fed into prolonged industrial action with substantial operational and reputational costs (Bohlmann et al., 2014).

In listed organisations, stakeholder-related findings are consistent with this pattern. Where fairness concerns are salient, organisations face heightened reputational exposure even when direct links to profitability are weak or context-sensitive (Mnyaka-Rulwa & Akande, 2024). Taken together, these findings suggest that, in South Africa, the distribution–performance connection often operates through coordination and legitimacy channels to shape cooperation, labour peace and stakeholder perceptions, rather than incentives alone (Ehlers, 2020; Mabaso & Mdluli, 2025).

2.5.3 Industrials Context

The Industrials super-sector is heterogeneous and spans capital-intensive engineering and construction, logistics and transport, and service-heavy support activities. This diversity is important for IVD. In more capital-intensive subsectors, feasible surplus per employee is higher and more volatile, and margins are sensitive to investment cycles and exchange rates. However, in service-heavy sectors, value creation leans on coordination and client-facing quality, which makes wide internal gaps prone to legitimacy and cooperation costs (De Loecker et al., 2020). While union coverage is uneven, it is generally robust in engineering, metals and transport, where collective bargaining compresses pay at certain bands and heightens the salience of fairness norms; this is critical in shaping how dispersion is perceived and contested in daily operations (Bassier, 2023; Bezuidenhout et al., 2018).

Additionally, remuneration governance and disclosure also shape how these patterns play out. The King IV code strengthened transparency and stakeholder scrutiny among listed organisations, which can discipline rent extraction, though it also raises reputational stakes when distribution choices appear to be unfair (IoDSA, 2016). Finally, industrial policy, such as localisation and supplier development, add variation across subsectors

and influence cost structures and feasible employee surplus (Department of Trade, Industry and Competition South Africa, 2022). Considered together, identical levels of dispersion can have different effects in different subsectors, because where technology and capital deepening dominate, incentive channels may prevail. Where coordination and customer quality are central, fairness and legitimacy channels are likely to prevail.

2.5.4 Implications

The South African literature broadly mirrors the international findings, according to which the link between IVD and performance is heterogeneous and context-dependent. In listed organisations, especially within the Industrials super-sector, associations with accounting outcomes are often weak or mixed, while coordination and legitimacy effects are more visible through stakeholder perceptions and industrial relations dynamics (Bohlmann et al., 2014; Mnyaka-Rulwa & Akande, 2024). Consistent with this, sectoral analysis shows that the pay–performance relationship varies by industry and according to the accounting indicators are used (Bussin & Blair, 2015). In South Africa, three moderators are especially relevant. First, governance and disclosure under the King IV code increase scrutiny and can discipline rent extraction, but do not guarantee a simple positive link between sharper internal differentials and performance (IoDSA, 2016, Republic of South Africa, 2024). Second, union coverage and collective bargaining often compress pay structures and bring fairness concerns to the fore, thereby shaping how dispersion is contested operationally (Bezuidenhout et al., 2018). Third, capital intensity and technology vary widely across subsectors, and affect feasible surplus per employee and the channels through which IVD translates into margins and returns. Accordingly, the empirical strategy of this study focused on the level effects of IVD in the South African JSE Industrials super-sector, while treating potential non-linearities as scope conditions and interpreting results through governance and context lenses.

2.6 Critical Analysis

The literature reviewed in Sections 2.2 to 2.5 points to two competing forces that link IVD and organisation performance. Incentive and selection mechanisms predict gains when internal reward gradients are steeper, while equity, coordination and legitimacy concerns caution that large gaps can undermine team cooperation and stakeholder support (Adams, 1965; Amis et al., 2021; Lazear & Rosen, 1981). This relationship makes non-linear effects possible – moderate dispersion may help, but very wide gaps often undermine performance (Shaw, 2014).

From the international evidence, it is evident that no single side dominates. Results vary according to organisational design and context. First, governance quality and disclosure shape credibility and rent-extraction risk. Second, capital intensity and technology influence feasible surplus per employee and how IVD translates into financial margins. Third, market power and competition reallocate the division of value added between labour and capital. Greater market power typically compresses the share of labour, whereas stronger competition can raise it, thereby altering how a given IVD translates into financial performance pay-offs (Amis et al., 2021; Barkai, 2020; De Loecker et al., 2020). These contingencies help explain mixed international findings, even when the various constructs are aligned (Tenhiälä et al., 2023; Zhang et al., 2023).

In South Africa, the evidence broadly mirrors this pattern, but with certain differences. For listed organisations, especially within the Industrials super-sector, associations with accounting outcomes are often weak or mixed, whereas coordination and legitimacy effects are visible through stakeholder perceptions and industrial relations dynamics (Bohlmann et al., 2014; Mnyaka-Rulwa & Akande, 2024). SOE studies reinforce the role of institutional context, because political oversight and mandate complexity can decouple remuneration design from financial outcomes (Bezuidenhout et al., 2018; Carlson & Bussin, 2020). While the King IV code increased scrutiny and may discipline rent extraction, it does not guarantee a straightforward positive link between sharper internal differentials and performance (IoDSA, 2016).

Measurement choices are also critical in this context. Studies that separate economically explained differences (role, skills, market conditions) from residual dispersion tend to find that the explained component relates more positively to subsequent outcomes, consistent with incentive rather than appropriation effects (Rouen, 2020). Aligned with this, dispersion effects are more evident on productivity-based outcomes than on scale measures, particularly in capital-intensive settings (Li et al., 2024; Przychodzen & Gómez-Bezares, 2021). At the same time, macro–micro evidence on labour’s share underscores that the way surplus per employee is divided can track profitability and markups but remains sensitive to technology and market structure (Barkai, 2020; De Loecker et al., 2020).

Finally, international research frequently reports inverted U patterns, which is consistent with theory that states that benefits at moderate dispersion give way to coordination and fairness costs at high levels. In this study, such non-linearity is acknowledged as a scope

condition, while the empirical analysis of this study concentrates on level effects (Shaw, 2014). While non-linear relationships are theoretically plausible, the primary specification is linear in levels for transparency and comparability. Potential curvature is, therefore, treated as an interpretive consideration; if the empirical patterns ultimately suggest it, non-linearity can be probed as robustness without altering the core design (Adams, 1965; Lazear & Rosen, 1981).

Overall, the literature converges on three points. First, the IVD–performance link should be treated as context-dependent rather than universal. Second, governance, capital intensity, market power and labour relations are first-order moderators for interpretation. Third, using construct-aligned measures that separate justified from residual dispersion provides a clearer test of incentive than legitimacy channels. Together, this suggests that any association between IVD and performance is institution dependent. These conclusions set the stage to identify a targeted research gap, which is done in Section 2.7.

2.7 Research Gap

The literature provides a substantial foundation for understanding the theoretical underpinnings and empirical patterns linking IVD and organisational financial performance. However, it also reveals important gaps that limit the applicability of current knowledge to the South African Industrials sector.

First, while research in countries other than South Africa offers valuable insights, much of it is conducted in developed economies with markedly different governance systems, labour-market structures, and socio-economic conditions (Bamberger et al., 2021; Chung et al., 2024). The generalisability of these findings to the South African context is uncertain, particularly given the country's extreme income inequality, historically embedded labour hierarchies, and strong trade union presence (Hamann & Bertels, 2018). These structural and institutional features may moderate or fundamentally alter the relationship between IVD and performance.

Second, regarding South African evidence, many studies centred on SOEs or isolated executive pay levels in broad cross-sector samples. This leaves relatively little organisation-level evidence for within-organisation value division, especially the way surplus per employee is shared across different roles (Carlson & Bussin, 2020; Maloa & Bussin, 2016). Given the distinct competition dynamics, capital intensity and trade exposure of Industrials, findings from SOEs or other sectors do not necessarily translate,

making it difficult to draw sector-specific conclusions on the link between internal distribution and accounting outcomes (Bezuidenhout et al., 2018). Furthermore, the governance and performance challenges typical of SOEs, including political influence and structural inefficiencies, are not necessarily representative of private, listed organisations.

Third, few research studies have operationalised IVD through an organisation–year construct that directly relates surplus per employee to typical employee pay. The Marx Ratio operationalises this relationship and handles loss years transparently. It also avoids building the same outcome variables into both sides of the comparison, thereby reducing redundancy. Much of the research concentrated on executive pay levels or dispersion proxies that do not cleanly capture the internal division of value.

Finally, theory and evidence frequently anticipate non-linear (inverted U) patterns, with potential benefits at moderate dispersion, but diminishing or even reversing performance with large gaps. When data do not support threshold tests, South African studies seldom acknowledge this as a scope condition. Clear articulation of this limitation is needed to interpret level-based estimates appropriately (Shaw, 2014).

To integrate these concepts, Figure 2.1 presents the study’s conceptual model. IVD, proxied by the Marx Ratio, is proposed to relate to organisation performance (ROA, EBITDA) through countervailing mechanisms. Tournament and selection incentives are considered positive, whereas equity, coordination and legitimacy concerns are considered negative. The net effect is expected to be institution-dependent, varying with governance quality and disclosure, capital and technology intensity, market power, and labour-relations regimes. Potential non-linearity is acknowledged as a scope condition, while primary tests focus on level effects for transparency and comparability.

Organisational Inequality and Institutional-work Lens

(Production, justification, and maintenance of pay differentials)

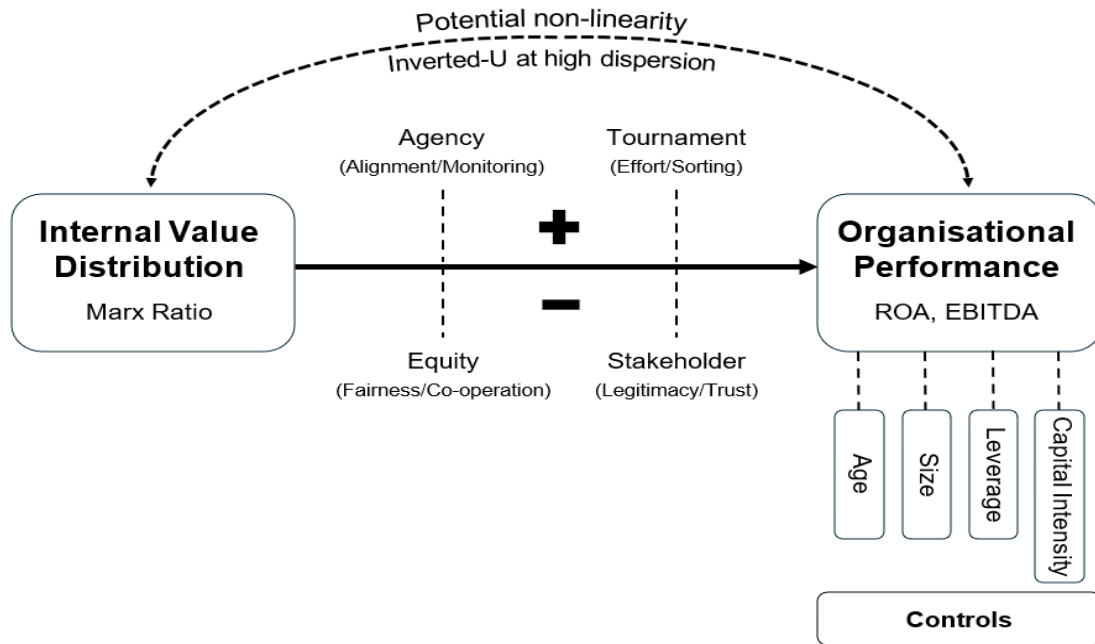


Figure 2.1: Conceptual Model Linking IVD to Organisation Performance

Adapted from Adams (1965), Amis et al. (2021), Bapuji et al. (2019), Freeman, (1984), Hamann and Bertels (2018), Jensen & Meckling (1976), Lazear and Rosen (1981), Shaw, (2014)

Addressing the above gaps is important for both academic and practical reasons. Academically, it would enable the testing of established theories in a unique and under-researched institutional setting, thereby contributing to the global debate on IVD and performance. Practically, research insights can inform remuneration governance, labour-relations strategies and investor oversight in a sector central to South Africa's competitiveness.

This study responds to these needs by examining the relationship between IVD, measured via the Marx Ratio, and financial performance in the South African Industrial sector. In doing so, it seeks to determine whether internal distribution is associated with measurable differences in accounting performance, and whether the nature of this relationship supports or challenges prevailing theoretical perspectives. The next chapter, therefore, sets out the research questions and hypotheses that guided the study, to ensure that each is directly linked to the constructs and relationships identified in the problem statement, objectives and literature review.

Chapter 3: Research Questions and Hypotheses

Chapter 2 highlighted a clear gap in the literature on the link between IVD and financial performance of organisations in South Africa's Industrials super-sector. Agency theory and tournament theory suggest that some dispersion may motivate effort and aid talent selection, whereas equity theory and stakeholder theory caution that excessive differences may undermine cohesion, damage legitimacy and erode stakeholder trust. Evidence from abroad on the subject is mixed, while local research has predominantly focused on SOEs, leaving the Industrials sector overlooked in comparison.

This chapter addresses that gap by setting out the specific research questions and hypotheses that guided the study, which are directly informed by the constructs and relationships outlined in the title, problem statement and literature review, to ensure consistency throughout the research. The focus is the Marx Ratio, which is calculated as the profits per employee relative to employee pay, and financial performance, assessed through two prominent indicators, namely ROA and EBITDA.

3.1 Research Questions

RQ1: What is the relationship between the Marx Ratio and organisational financial performance, measured by ROA and EBITDA, in organisations within the JSE Industrials super-sector?

RQ2: If a relationship exists, does its direction align more closely with agency and tournament theories (predicting a positive association) or with equity and stakeholder theories (predicting a negative association)?

3.2 Hypotheses

Drawing on the literature reviewed in Chapter 2, the following hypotheses are proposed:

H₁: There is a statistically significant relationship between the Marx Ratio and ROA.

H₂: There is a statistically significant relationship between the Marx Ratio and EBITDA.

H₃: Where a relationship exists, it will be positive: a higher Marx Ratio is associated with higher ROA and EBITDA, consistent with agency and tournament theory arguments.

H₄: Where a relationship exists, it will be negative: a higher Marx Ratio is associated with lower ROA and EBITDA, consistent with equity and stakeholder theory concerns.

Table 3.1: Consistency Matrix: Research Questions and Hypotheses

Research question/hypothesis	Constructs	Theoretical basis	Supporting literature
RQ1 / H ₁ –H ₂	Internal value distribution (Marx Ratio); financial performance (ROA, EBITDA)	Organisational inequality and institutional work; agency theory; tournament theory; equity theory; stakeholder theory	Adams (1965); Amis et al. (2021); Bamberger et al. (2021); Cobb (2016); Hamann and Bertels (2018); Irwin (2018); Jensen and Meckling (1976); Lazear and Rosen (1981)
RQ2 / H ₃ –H ₄	Direction of association and alignment with theory	Positive: Agency theory; tournament theory Negative: Equity theory; stakeholder theory; organisational inequality and institutional work	Adams (1965); Amis et al. (2021); Bamberger et al. (2021); Cobb (2016); Hamann and Bertels (2018); Jensen and Meckling (1976); Lazear and Rosen (1981)

These research questions and hypotheses provide a clear and focused framework for empirical testing. Each question and hypothesis is linked directly to the constructs identified in the problem statement and literature review, thereby ensuring alignment.

The next chapter sets out the research methodology by describing the overall design, the approach to data collection, the sampling methods, the measures used for each variable and the techniques applied in the analysis. This detailed approach ensured that the empirical investigation was both rigorous and contextually relevant, which enabled robust testing of the proposed hypotheses within the South African Industrials super-sector.

Chapter 4: Research Methodology

4.1 Research Design

This study adopted a descriptive-explanatory quantitative research design underpinned by a positivist research philosophy (Saunders & Lewis, 2018). The design combined descriptive analyses to summarise and present data alongside explanatory analyses to investigate relationships between variables and constructs. This approach provided a comprehensive understanding of the research constructs while ensuring clarity in both data interpretation and presentation. The descriptive component offered insights into trends, distributions and patterns between IVD and organisation performance, while the explanatory component enabled a deeper examination of statistical associations between key variables, thereby addressing the research objectives (Snyder, 2019).

The quantitative approach was appropriate because it allowed the research questions to be addressed through statistical analysis of numerical data, to facilitate objectivity, replicability and generalisability of findings (Creswell & Creswell, 2023). The study followed a mono-method quantitative approach by relying solely on numerical data and adopted an archival research strategy using secondary data from audited annual reports and established financial databases. A correlational design was applied to examine the associations between the independent and dependent variables. This approach is consistent with established quantitative practice for organisation-level studies using audited accounting data and with recent work linking value distribution/inequality constructs to organisation outcomes (Amis et al., 2021; Hair et al., 2025).

The study was conducted within a panel dataset with a repeated cross-sectional time horizon; data of multiple years were analysed. While the dataset included repeated observations for the same organisation over time, each year recorded was treated as an independent observation – patterns were examined at specific points in time, rather than longitudinal change being modelled (Saunders & Lewis, 2018). This strengthened comparability across years but did not identify within-organisation dynamics. Accordingly, inferences should be read as cross-year associations rather than within-unit responses.

The reliance on archival secondary data ensured consistency in measurement, reliability of financial reporting and efficiency in terms of time and cost (Bamberger & Belogolovsky, 2010; Carlson & Bussin, 2020). Data were drawn exclusively from publicly available audited reports, which reduced risks of bias and ensured compliance with ethical

requirements. All data collection and analysis procedures were conducted in accordance with established research methodology principles (Saunders & Lewis, 2018).

The design enabled the exploration of associations between IVD, measured through the Marx Ratio, and financial performance indicators such as ROA and EBITDA. By integrating established measures and analytical techniques from empirical studies, the research design supports both theoretical testing and practical relevance for the South African Industrials super-sector (Carlson & Bussin, 2020; Chung et al., 2024). With the research design established, the next step was to define the study population.

4.2 Population

This study focused on organisations listed on the JSE and operating within the South African Industrials super-sector between 2014 and 2023. A 10-year period was chosen to capture annual observations per organisation, thereby ensuring sufficient variation to analyse the relationship between IVD and organisational financial performance.

To keep the analytical frame coherent and comparable, the study scope was limited to the Industrials super-sector. This sector offers a broadly similar operating context for all constituents and a balanced mix of labour and capital intensity, to generate informative variation in staff costs, headcount and operating profit – these being the core components needed to construct the Marx Ratio and related performance measures (Syverson, 2011). Additionally, product–market dynamics associated with productivity and profitability dispersion are well documented in this sector and are theoretically linked to movements in the income share of labour. This made the Industrials super-sector a suitable setting for examining IVD (Autor et al., 2020; Karabarbounis & Neiman, 2014). Finally, focusing on a single super-sector limited cross-sector noise, such as prudential rules in financials or commodity-cycle effects in resources, thereby improving the interpretability of estimated relationships (Autor et al., 2020; FTSE Russell, 2024).

The target population was limited to publicly listed organisations, for three reasons. First, JSE-listed organisations publish audited, annual and integrated reports that are IFRS (International Financial Reporting Standards) compliant and that provide consistent disclosure of staff costs, headcount, profit and balance-sheet items required to construct the Marx Ratio and performance variables (International Accounting Standards Board [IASB], 2023). Second, disclosure practices are reinforced by the King IV Report’s apply-and-explain approach, which strengthens transparency around remuneration governance

and workforce-related information, thereby supporting reliable measurement (IoDSA, 2016). Third, the availability of longitudinal archival data for listed entities is substantially greater than for private organisations, which enabled robust statistical analysis (Carlson & Bussin, 2020).

This definition of the population ensured that every unit met the inclusion criteria of operating within the Industrials super-sector, being listed on the JSE, and having the requisite data available for the entire study period. Organisations outside the Industrials super-sector, those not listed on the JSE, and those with incomplete staff costs, headcount or financial performance disclosures for the study period were excluded. Defining the population in this manner enabled the selection of an appropriate sampling method, as described in Section 4.3.

4.3 Sampling Method and Size

A purposive census sampling approach was adopted for this study. The aim was to include all South African industrial organisations listed on the JSE that met the defined inclusion criteria for the period 2014–2023. A purposive census was appropriate because the total number of eligible organisations within the defined population was relatively small, which made it both feasible and desirable to analyse the entire accessible population rather than selecting a subset. This approach ensured comprehensive coverage of the sector, reduced the risk of selection bias and strengthened the external validity of the findings within the industrial context (Saunders & Lewis, 2018).

Applying the inclusion and exclusion criteria, as outlined in Sections 4.1 and 4.2, resulted in a final sample that ensured consistency and comparability across the study period. This approach reduced the risk of bias that could be introduced by incomplete data or sector reclassification, while maintaining representation across the Industrials super-sector as specified by the JSE. Specifically, organisations that were delisted, had changed primary industry classification, or had missing data for either value distribution or performance metrics for any of the years in the scope were excluded from the sample.

The final sample comprised 40 distinct organisations, generating 400 organisation–year data points over the 10-year period. This dataset size was sufficient to permit the application of correlational and regression analyses, while maintaining adequate statistical power (Hair et al., 2025). The use of a multi-year dataset increased the robustness of the analysis by enabling the inclusion of temporal variation in both value distribution and

performance measures (Carlson & Bussin, 2020). With the sample determined, the unit of analysis for the study was then specified.

4.4 Unit of Analysis

In this study, the organisation was the unit of analysis, and each data point reflected a single year of recorded information for that organisation. This means that, for each organisation included in the sample, IVD and financial performance metrics were recorded and analysed for each year in which complete data were available for the period 2014–2023. This approach aligns with the two main constructs of the research, namely IVD, measured through the Marx Ratio, and organisation financial performance. Both main financial constructs were measured in monetary terms, specifically South African rands (ZAR) (Marimuthu & Kwenda, 2019). Defining each organisation as the primary unit of analysis is consistent with the research objective, because it enables examination of the relationship between value distribution and financial performance at the organisational level, as opposed to micro or macro levels.

This choice is consistent with organisation-level empirical research that relied on audited financial statements and related disclosures to study performance dispersion, the income share of labour, and management practices over time. Research documents substantial within-sector variation in productivity and profitability across organisations (Syverson, 2011). In turn, this literature often links changes in the share of labour to competitive dynamics and profitability, which indicates that management practices measured at the organisation level co-vary with performance outcomes (Autor et al., 2020; Bloom et al., 2016; Karabarbounis & Neiman, 2014). By focusing on organisation-level observations, the analysis ensured that variations in IVD and performance were assessed in the context of each organisation's operational and governance environment, while enabling meaningful statistical comparisons across organisations and over time. The definition of the unit of analysis informed the measurement of variables, as outlined in Section 4.5.

4.5 Measurement of Variables

This study measured both independent and dependent variables using established quantitative indicators drawn from audited financial statements and remuneration disclosures of JSE-listed industrial organisations. All variables were operationalised in accordance with empirical research results to ensure consistency, comparability and validity across the 2014–2023 period.

The independent variable, IVD, was measured using the Marx Ratio. The Marx Ratio is defined as the ratio of profits per employee to the median annual remuneration of the employees of the organisation (Irwin, 2018). Profit was taken as net profit after tax (NPAT) from ongoing operations. Median employee pay was proxied as mean employee pay, and was calculated from total employee remuneration, excluding executive directors' costs, divided by the total number of employees (Bezuidenhout et al., 2018; Carlson & Bussin, 2020). As JSE integrated reports do not consistently disclose the median, the analysis followed established practice and used average employee remuneration as a practical proxy. At the organisation level, this is a widely adopted measure in inequality and labour-share research when micro-wage distributions are unavailable, and it reliably captures the central tendency of pay across organisations (Bamberger et al., 2021; Karabarbounis & Neiman, 2014). This captures the internal distribution of value added between capital (residual profit) and labour (wage bill) at the organisation level (Amis et al., 2021; Bamberger et al., 2021).

Two measures of financial performance were selected to capture both accounting-based and profitability-focused outcomes. ROA was calculated as NPAT divided by total assets, which provided an indication of how efficiently an organisation uses its assets to generate earnings (Carlson & Bussin, 2020). EBITDA was defined as earnings before interest, tax, depreciation, and amortisation, and reflects operational profitability independent of capital structure and tax effects (Carlson & Bussin, 2020). Where organisations disclosed EBITDA together with a reconciliation, that figure was retained. Where it was not disclosed, EBITDA was calculated by adding back depreciation and amortisation to operating profit (EBIT). This operationalisation is consistent with common practice in South African integrated reports (reconciling non-IFRS subtotals to audited line items) and with prior accounting-based performance research (Carlson & Bussin, 2020; IASB, 2023).

To isolate the relationship between IVD and financial performance, four control variables were included. Organisation size was measured, consistent with prior studies, as the natural logarithm of total assets (Bezuidenhout et al., 2018). Leverage was calculated as total debt divided by total assets to capture capital structure effects (Carlson & Bussin, 2020). Capital intensity was measured as total assets per employee, by capturing the stock of assets deployed per unit of labour and reflecting the capital–labour mix that co-moves with productivity and profitability (Karabarbounis & Neiman, 2014; Syverson,

2011). Organisation age was measured as years since JSE listing at year-end, which captured organisation maturity and lifecycle effects (Coad, 2009).

All value distribution and financial data were sourced from audited annual reports, sustainability reports, and financial databases such as Refinitiv and IRESS. Using audited and publicly available disclosures ensured reliability and reduced the risk of measurement error (Carlson & Bussin, 2020). Calculations for each metric followed standard accounting definitions. Once the variables had been defined, the data were collected following the procedures described in Section 4.6.

4.6 Data Collection

Data for this study were obtained from publicly available, audited annual reports and sustainability reports of JSE-listed industrial organisations, supplemented by reputable financial databases such as Refinitiv and IRESS. Access to these databases was obtained using library subscriptions of the Gordon Institute of Business Science (GIBS). These sources were chosen for their ability to provide consistent, verified and comparable data for organisations, thereby ensuring both reliability and validity of measurement (Bamberger et al., 2021). The collection process was carefully designed to be systematic in nature, and repeatable, so that other researchers could follow the same process and obtain comparable results.

The data collection process started with the identification of all industrial organisations listed on the JSE that met the criteria outlined in Section 4.2. To ensure reliability, data capture followed a standardised two-step sequence. Annual reports and remuneration disclosures were retrieved from organisational investor relations websites and the online company information repository of the JSE. Where possible, the figures were verified against Refinitiv and IRESS, and any discrepancies were resolved by referring to the original audited reports. For each organisation and year in the study period, data were recorded for the Marx Ratio inputs (NPAT, staff costs and employee headcounts), financial performance metrics (ROA and EBITDA) and control variables including total assets, total debt and organisation age. Additional fields such as revenue, EBITDA margin, ROE and equity were also recorded, solely for robustness and validation checks.

To ensure data integrity, all figures were entered into a centralised dataset and subjected to multiple layers of verification. After the initial entry, a validation process flagged outliers or inconsistencies, such as implausible ratios or missing values in key variables (Hair et

al., 2025). Flagged cases were reviewed manually against the original source documents, to correct errors. A final audit confirmed that all entries adhered to the operational definitions established in Section 4.5 and that the dataset was complete for all included yearly data points.

Drawing on multiple sources and applying cross-verification reduced the likelihood of transcription errors and helped address variations in reporting practices across organisations. Using only publicly available, audited information ensured compliance with ethical standards, eliminated the requirement for organisational consent, and enhanced the transparency and replicability of the research (Saunders & Lewis, 2018). After data collection, statistical analyses were conducted, as detailed in Section 4.7.

4.7 Data Analysis

The analysis of the collected data was conducted using R (Version 4.5.0) as the primary statistical software. R was selected for its reproducibility, extensive diagnostics for linear models and strong support for panel-style datasets and data visualisation (Fox & Weisberg, 2024). All statistical tests were two-tailed and conducted at a 5% significance level, with a 95% confidence interval to ensure an appropriate balance between minimising Type I errors and maintaining statistical power (Hair et al., 2025).

The analysis commenced with descriptive statistics to summarise the key characteristics of the dataset, including measures of central tendency, dispersion and distribution for all variables. This provided an initial understanding of the data and enabled the identification of potential anomalies or extreme values (Saunders & Lewis, 2018). Exploratory bivariate patterns were then examined visually using scatter plots with locally estimated scatterplot smoothing (LOESS) smoothers, density plots and grouped boxplots, which provided a transparent view of direction and form, without relying on correlation coefficients. Consistent with Section 4.5, EBITDA was analysed in ZAR and log-transformed for inference to mitigate skewness and scale effects.

To test the research hypotheses, ordinary least squares (OLS) models were estimated, which enabled an examination of the relationship between the independent variable (Marx Ratio) and the dependent variables (ROA and EBITDA), while controlling for organisation size, leverage, capital intensity and age. This approach helped to reduce omitted variable bias and improve model accuracy (Snyder, 2019). To absorb common shocks and any reporting changes, year and subsector indicator variables were evaluated; however, they

did not improve Akaike Information Criterion (AIC) or R^2 and were, therefore, reported only as robustness checks. Inference used heteroskedasticity-robust standard errors clustered by organisation to address non-constant variance and within-organisation correlation typical of data panels (Hair et al., 2025).

Prior to interpretation, standard model diagnostics were conducted. First, residual-versus-fitted plots were used to assess homoscedasticity and functional form. Second, Q–Q plots were used to test for residual normality. Third, Cook’s distance influence checks were used to identify observations with disproportionate impact (Cook, 2000). Finally, stability was assessed by comparing specifications and confirming that key coefficients were not unduly sensitive to reasonable model choices.

Finally, a focused set of robustness checks was conducted. Models were re-estimated through inclusion of a 2020 COVID-19 indicator (relative to baseline), and the removal of influential observations flagged by a narrower Cook’s distance. Functional form was also probed using partial-residual plots and simple alternatives, and finally, metric substitution was used to verify that conclusions were not reliant on a single metric definition.

Following this approach ensured that the statistical techniques were rigorous and well-suited to the collected data. The analysis combined descriptive profiling, visual bivariate exploration and OLS regression with cluster-robust standard errors. Year and subsector effects were evaluated, and the corresponding results were reported as robustness checks. This design provides a strong foundation for addressing the research questions and testing the proposed hypotheses. Additionally, this approach also ensured consistency with established best practices in quantitative research (Saunders & Lewis, 2018). While the analysis was rigorous, certain limitations must be acknowledged, as explained in Section 4.8.

4.8 Limitations

While the research design and methodology were developed to ensure rigour, there were several limitations to consider.

This study relied solely on secondary data drawn from audited annual reports, sustainability disclosures and recognised financial databases. While these sources are reliable and publicly available, differences in reporting practices between organisations, especially regarding the disclosure of staff costs and headcounts, could be possible. Even

with meticulous cross-checking, variations in accounting standards and formatting approaches may have introduced inconsistencies that could not be eliminated entirely.

Second, the analysis was limited to organisations classified as belonging to the JSE Industrials super-sector. This focus helped ensure high quality, comparable data, but means the findings may not be applicable to unlisted or smaller organisations, or to other sectors of the South African economy. Furthermore, the relevance to other countries is uncertain, because various elements, such as corporate governance, differing pay practices, and unique industry conditions, can differ considerably in different countries (Bamberger et al., 2021).

Third, IVD was measured using a single variable, namely the Marx Ratio, which prioritises parsimony over breadth. Other dimensions of inequality within organisations, such as within-workforce dispersion or percentile pay ratios, may, therefore, not be reflected. Similarly, the chosen financial performance measures offer only a partial view and omitted other indicators. Other indicators, such as share price returns or total shareholder return, could add valuable context or even reveal a contrasting perspective.

Fourth, several economically important features could not be recorded consistently from public disclosures and were, therefore, omitted. These features include workforce composition (skill mix, temporary labour), ownership and governance arrangements (board independence, remuneration committee practices) and temporal shocks beyond broad subsector or year indicators. As these factors may correlate with both IVD and performance, coefficients should be considered with this caveat in mind. While year and subsector dummy variables were assessed during modelling, the absence of granular workforce and governance measures remains a limitation.

Finally, although the dataset spans 10 years, the analysis uses repeated annual cross-sections with observations treated as independent. This design supports cross-year comparability but does not identify within-organisation dynamics, and it cannot rule out simultaneity or reverse causality. Therefore, the results should be interpreted as associations rather than conclusive proof of cause and effect.

4.9 Reliability and Validity

Reliability and validity were addressed throughout the research process to ensure the accuracy, consistency and credibility of the findings. Reliability was strengthened by sourcing all data from audited annual reports, sustainability reports and established financial databases, which provide verified and standardised information across organisations. Using publicly available data reduced the risk of measurement errors and ensured consistent application of the variable definitions outlined in Section 4.5. Cross-verifying data from multiple sources, including Refinitiv and IRESS, strengthened reliability further by identifying and resolving discrepancies before analysis (Saunders & Lewis, 2018). Where discrepancies arose, the audited annual report was treated as the source of record, as indicated in Section 4.6, and integrity checks as detailed in Section 5.2 ensured that those corrections flowed through to the data analysis.

Validity was supported through the careful operationalisation of variables based on definitions and measurement approaches widely adopted in other academic research. The independent and dependent variables, as well as the control variables, were defined using established metrics from peer-reviewed studies on value allocation and financial performance, thereby ensuring both construct validity and alignment with established literature (Amis et al., 2021; Bamberger et al., 2021). Content validity was reinforced by selecting indicators that capture the principal dimensions required for the research questions within a coherent sectoral frame. Statistical conclusion validity was supported by employing appropriate estimation and inference procedures, and by conducting standard diagnostics before interpretation (Fox & Weisberg, 2024; Hair et al., 2025).

Procedural validity was strengthened by following a systematic and transparent data collection process, as detailed in Section 4.6, which was designed to be repeatable by other researchers. Statistical validity was addressed by using appropriate analytical techniques, as described in Section 4.7, and by conducting diagnostic tests to confirm that the underlying assumptions were met. Together, these measures ensured that the results are both credible and replicable, thereby providing confidence in the study conclusions.

4.10 Ethical Considerations

This study adhered to all the ethical standards and guidelines set by GIBS, to ensure that the research process was conducted with integrity and in accordance with all applicable ethical principles. As the study relied exclusively on secondary data obtained from publicly available, audited annual reports, sustainability reports and reputable financial databases, no direct involvement of human participants was required. As a result, no issues pertaining to informed consent or potential harm to individuals arose. However, ethical considerations were a central part of the research process, especially regarding the accurate and responsible use of data.

Confidentiality was preserved by using only publicly disclosed organisational data, without reference to any non-public or sensitive internal information. All data were handled in a manner that avoided misrepresentation, selective reporting or manipulation of findings. The integrity of the research was reinforced by accurately acknowledging all sources of data and ensuring that the operationalisation of variables remained consistent with their original definitions and contexts.

In accordance with institutional and academic requirements, all datasets and codes compiled for this research will be securely stored for a minimum period of 10 years after the completion of the study. The data will be kept in password-protected electronic storage, with restricted access limited to the researcher and approved supervisor. This ensures the dataset is available for future verification, replication or further academic research, while ensuring compliance with data management and retention requirements.

Chapter 5: Analysis of Results

This chapter presents the empirical results of the quantitative analyses conducted on organisations in the JSE Industrials super-sector over the period 2014–2023. The primary objective was to test whether variations in the Marx Ratio can be statistically explained by standard performance and structural covariates. In line with the study aims, the Marx Ratio was examined against the performance indicators ROA and EBITDA, alongside structural controls for size, leverage, capital intensity and organisation age. The Marx Ratio is analysed in levels to preserve the complete distribution of observed values. The analyses were designed to address the study hypotheses (H_1 – H_4) concerning these relationships.

The purpose of this chapter is to present the empirical results in a clear, methodical manner, without interpreting the results. Estimates are reported transparently with concise and clear model specifications, variable scaling, and diagnostic checks undertaken before and after modelling. Unless stated otherwise, models used linear specifications with appropriate controls and robust standard errors.

The chapter starts with a concise description of the sample and data preparation, followed by descriptive statistics and correlations. The chapter then proceeds to the testing of the core hypotheses underpinning the study. To verify stability, robustness and ancillary checks assessed the sensitivity of the results to alternative specifications and data treatments, to ensure they were not driven by modelling choices. The chapter closes with a summary of the principal empirical outcomes, which serves as a bridge to Chapter 6, where the results are interpreted in relation to theory, the literature and sectoral implications for JSE Industrials.

5.1 Sample Description

This study analysed organisations listed in the JSE Industrials super-sector over the period 2014 to 2023, with the unit of analysis as the organisation–year. This resulted in a dataset spanning 40 organisations in the principal Industrial subsector and providing a total of 400 organisation–year data points. General Industrials, and Construction and Materials each account for nine organisations (23%), followed by Industrial Metals and Mining with six (15%), Industrial Support Services, and Industrial Transport with four (10%) each, and Chemicals, and Electronic and Electrical Equipment with three (7.5%) each and, finally, Industrial Materials contributes two organisations (5%). This sectoral mix is shown in Figure 5.1.

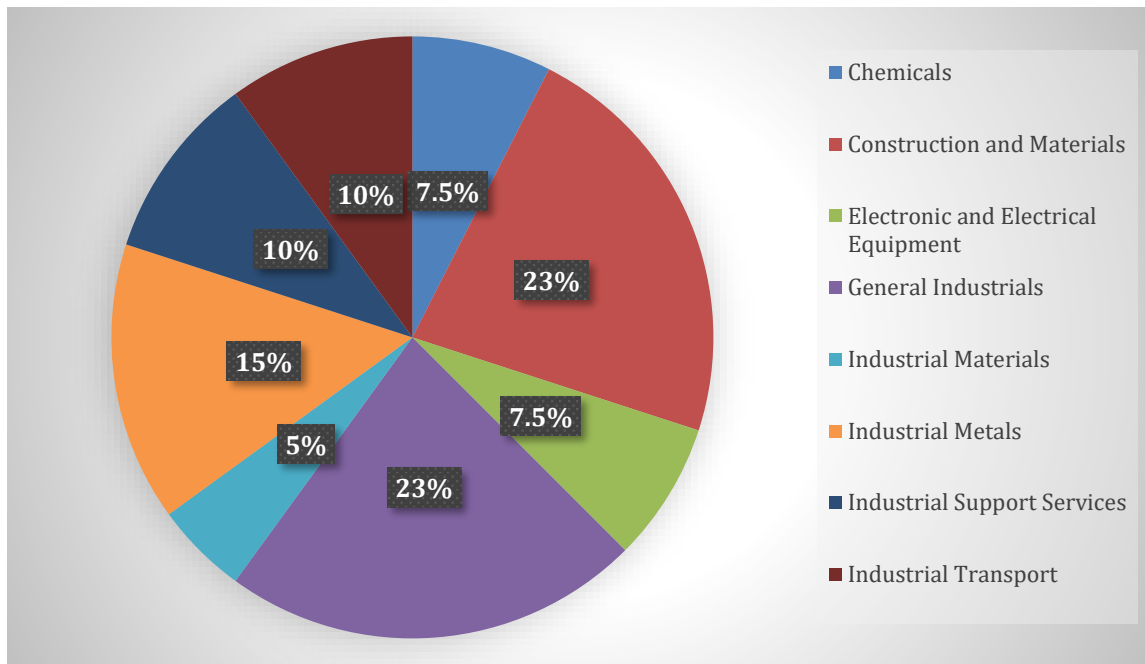


Figure 5.1: JSE Industrial Subsector Composition

For context, Table 5.1 presents the distribution of key variables at the most recent year available (2023). The median ROA is 0.05 (Q1 0.01, Q3 0.08). EBITDA (ZAR) has a median of 776 014 (Q1 224 406; Q3 1 840 667). The Marx Ratio has a median of 0.28 (Q1 0.07; Q3 0.47). Firm size, proxied through the natural log of assets, centres at 15.97 (Q1 14.92; Q3 16.50). Leverage has a median of 0.49 (Q1 0.39; Q3 0.66). Capital intensity has a median of 2 220 (Q1 1 417; Q3 3 756). Organisation age shows a median age of 29 years since listing (Q1 16; Q3 44). These values provide an informative baseline ahead of the panel-wide descriptive statistics and correlation analysis presented from Section 5.2 onwards.

Table 5.1: Summary Statistics of Organisations (2023)

Characteristic	N = 40 ¹
Marx Ratio (Profit per employee / mean worker pay)	0.28 (0.07, 0.47)
EBITDA (ZAR)	776,014 (224,406, 1,840,667)
Return on assets (ROA)	0.05 (0.01, 0.08)
Return on equity (ROE)	0.11 (0.03, 0.15)
Firm size (log(assets))	15.97 (14.92, 16.50)
Leverage (debt/assets)	0.49 (0.39, 0.66)
Capital Intensity (assets/employees)	2,220 (1,417, 3,756)
Firm age (years since listing)	29 (16, 44)
Subsector (ICB)	
Chemicals	3 (7.5%)
Construction & Materials	9 (23%)
Electronic and Electrical Equipment	3 (7.5%)
General Industrials	9 (23%)
Industrial Materials	2 (5.0%)
Industrial Metals & Mining	6 (15%)
Industrial Support Services	4 (10%)
Industrial Transport	4 (10%)

Note. ¹Median (Q1, Q3); n (%)

5.2 Data Screening and Transformations

Data screening was applied to the balanced panel and proceeded in three stages: integrity checks, scale harmonisation and diagnostic testing.

First, integrity checks were conducted by collecting data from both the Refinitiv Workspace and IRESS Research databases, which were overlaid to compare the values obtained. In the event of variance, the relevant audited annual report was retrieved from the organisation's website, and the final data table was updated with the value contained in the annual report. This step operationalised the two-stage reliability protocol set out in Section 4.6 and ensured that audited disclosures took precedence when database extracts diverged. This process resulted in a final dataset of a balanced panel of 40 organisations, observed in each of the 10 years and yielding 400 organisation–year observations. This constant coverage supports comparability over time and avoids composition effects associated with entries and exits.

The final organisation–year observations were broken down into the categories and sections listed in Figure 5.2. This categorisation ensured consistency across all 40 organisations, and the final quality control check highlighted the database comparison against the organisation's annual financial statements.

		Cleaned Data	
		Number of companies:	40
Identifiers	Company Name		
	JSE Ticker		
	ISIN		
	Sub-sector (SIC/GICS)		
	Year of Incorporation		
	Year of Listing		
Marx Ratio Input	Net Profit After Tax (ZAR) ('000)		
	EBIT (ZAR)		
	Total Employees		
	Total Staff Costs (ZAR)		
	Mean Worker Pay (= Staff Costs ÷ Employees)		
Marx Ratio	Profit per Employee (= NPAT ÷ Employees)		
	Marx Ratio (Profit/Emp ÷ Mean Pay)		
Performance Metrics	Total Revenue (ZAR)		
	EBITDA (ZAR)		
	Total Assets (ZAR)		
	Shareholder Equity (ZAR)		
	Total Debt (ZAR)		
	ROA (= NPAT ÷ Assets)		
	ROE (= NPAT ÷ Equity)		
	EBITDA Margin (= EBITDA ÷ Revenue)		
Controls	Firm Size (Ln Assets)		
	Leverage (= Debt ÷ Assets)		
	Capital Intensity (= Assets ÷ Employees)		
	Firm Age (Years since Listing)		
QC	Checked Missing Data Against AFS		

Figure 5.2: Final Data Capturing Format

During data collection, only a single company was excluded to preserve the balanced panel. Motus Holdings became a separately listed entity in 2018, after its unbundling from Imperial Holdings (Imperial Holdings Limited, 2018). Despite Motus being part of Imperial Holdings, it was not possible to ascertain its financials separately from the larger group. Therefore, data would not provide accurate and reliable information for Motus, the decision was taken to exclude the organisation from the dataset.

Additionally, two organisations contained in the panel, namely Sappi and Master Drilling, both presented their consolidated financial statements in United States dollars (USD), not ZAR. For these two instances, the relevant IFRS/IAS 21 accounting principles were followed to ensure a consistent and reliable conversion from USD to ZAR (International Accounting Standards Board, 2024). In accordance with IAS 21, assets and liabilities are converted at the closing (spot) rate at the date of reporting. All income and expense items were converted using the average rate for the period. These conventions underpin the use of average rates for the income statement and cash flows and closing rates for the statement of financial position. They also ensured a consistent and reliable conversion from USD to ZAR across the income statement, statement of cash flows and statement of financial position.

Second, scale harmonisation focused on bringing variables onto comparable and statistically relevant scales. ROA and ROE are both expressed in percentage points (values multiplied by 100). EBITDA is expressed in ZAR millions and transformed as $\log(\text{EBITDA}/1\,000\,000)$, meaning that a one-unit change corresponds to a 2.7-fold change in EBITDA. Size is measured as $\log(\text{total assets})$. Leverage is expressed in percentage points (values multiplied by 100). Capital intensity is measured as $\log(\text{assets per employee}/1\,000)$ – assets per employee in thousands before applying the natural log. Organisation age is measured in years since listing at each observation year. The Marx Ratio is calculated as profit per employee divided by mean worker remuneration. These rescalings aid interpretation and numerical stability, meaning that they do not affect inference beyond coefficient units (Wooldridge, 2010). Throughout, $\log(x)$ denotes the natural logarithm (base e). A one-unit increase in $\log x$ corresponds to multiplying x by e (≈ 2.718), meaning effects can be interpreted as 2.7-fold changes in the underlying variable for each one-unit change in its log.

Third, diagnostic testing assessed whether model assumptions were acceptable. Normality was assessed using Shapiro-Wilk and a maximum-likelihood-like (Box-Cox) check, alongside histograms and quantile–quantile (QQ) plots. Linearity was reviewed using partial-residual diagnostics. While bivariate visuals suggest curvature for EBITDA, restricted-spline specifications and a mixed-effects model with year did not improve the AIC or R^2 , leading to a simple OLS linear model being retained for treating observations as independent for clarity. Residuals-vs-fitted and QQ plots did not indicate any material violations, thereby ensuring that the sample size could be maintained.

Finally, outliers are not transformed in any way before modelling. Instead, potential influence was checked during estimation using Cook's distance, with $D > 1$ used as the flag (Cook, 2000). Any flagged cases were reviewed and, if needed, the models were re-run without these flagged values to confirm that results are not driven by single observations. If there was no material influence, the full balanced panel of 400 organisation–years was retained.

Collectively, these procedures produced a coherent, comparable dataset with stable estimation properties. Variables are on interpretable scales, extreme values are tempered without sacrificing panel balance, and model assumptions are supported by standard diagnostics.

5.3 Bivariate Relationships and Context

Building on the screening and scaling decisions above, this section describes the simple, unadjusted patterns in the data that set up the multivariate analysis.

For transparency, the modelling sample excludes 2020, because of the COVID-19 pandemic. This was done because all organisations returned a negative Marx Ratio for this period. Such a system-wide inversion is not simply a marginal outlier, but rather a structural shift that compresses the dependent variable at (or below) zero. This inversion collapses cross-sectional variance and makes parameter estimates from a pooled model difficult to interpret as ‘typical’ or ‘standard’ relationships. Standard empirical practice when confronted with such an exception is to either estimate models by subperiod or to omit the affected year so that coefficients reflect behaviour in the dataset (Perron, 1989). Given that only one year is affected, coinciding with well-documented global dislocations in corporate cashflows, profitability and labour markets, the latter approach was followed to remove 2020 (Baker et al., 2020; Ramelli & Wagner, 2020).

In 2020, profitability metrics are notably weaker and leverage somewhat higher than in other years. This is highlighted in Table 5.2, with a summary of the data from the 40 excluded organisation–year data points.

Table 5.2: Summary Statistics of Excluded Data Points

Characteristic	N = 40 ¹
Marx Ratio (profit per employee/mean worker pay)	-0.04 (-0.54, 0.14)
EBITDA (ZAR)	231,483 (28,100, 1,033,080)
Return on assets (ROA)	0.000 (0.000, 0.020)
Return on equity (ROE)	-0.01 (-0.18, 0.04)
Firm size (ln(Assets))	15.90 (14.84, 16.81)
Leverage (debt/assets)	0.55 (0.39, 0.70)
Capital intensity (assets/employees)	1,958 (1,121, 3,383)
Firm age (years since listing)	26 (13, 41)
Subsector (ICB)	
Chemicals	3 (7.5%)
Construction & Materials	9 (23%)
Electronic and Electrical Equipment	3 (7.5%)
General Industrials	9 (23%)
Industrial Materials	2 (5.0%)
Industrial Metals & Mining	6 (15%)
Industrial Support Services	4 (10%)
Industrial Transport	4 (10%)
Year of observation	
2020	40 (100%)

Note. ¹ Median (Q1, Q3); n (%)

In addition to 2020, there were other instances when the Marx Ratio was negative. These values capture economically meaningful loss periods – times when profit per employee fell below employee costs. Removing or recoding these observations would amount to outcome-based sample selection and would narrow the evidence precisely where the distribution is most informative. Accordingly, the Marx Ratio is analysed in levels, with outlier treatment applied as described in Section 5.2.

Two time-series visuals position the cross-sectional analysis. Figure 5.3 traces the Marx Ratio by subsector and reveals broadly stable trajectories with expected between-sector differences.

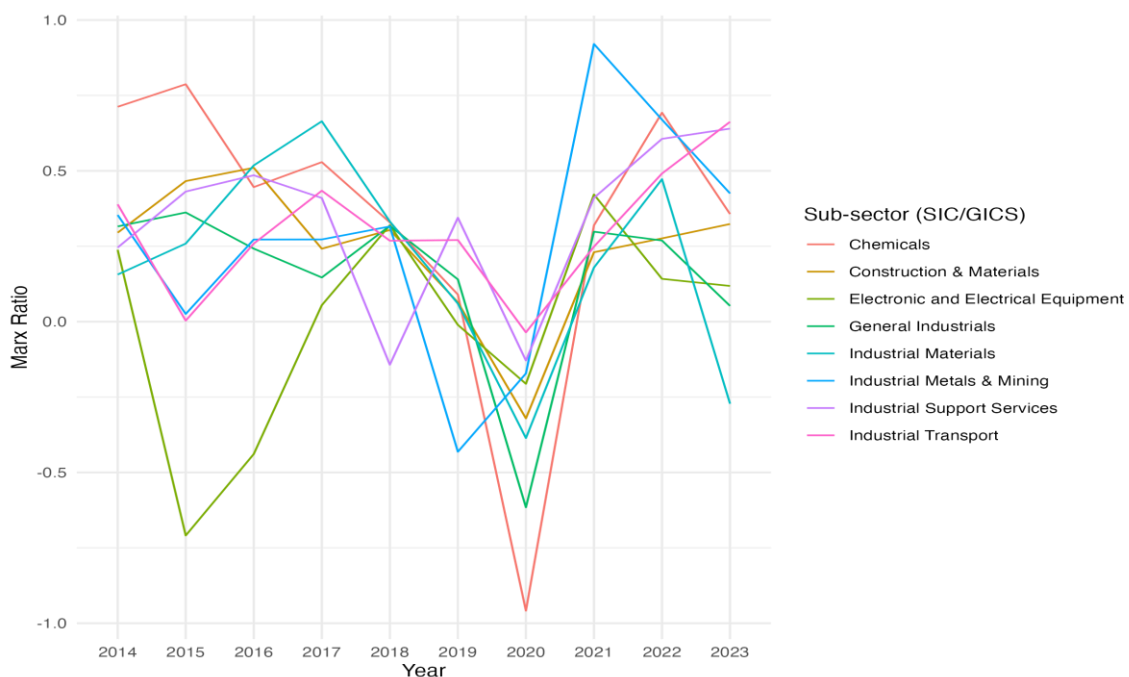


Figure 5.3: Marx Ratio over Time by Subsector (ICB)

Figure 5.4 displays a set of scaled variables of interest through time, excluding 2020, and shows that the broad movements are sufficiently steady to support a pooled cross-sectional treatment in the analysis.

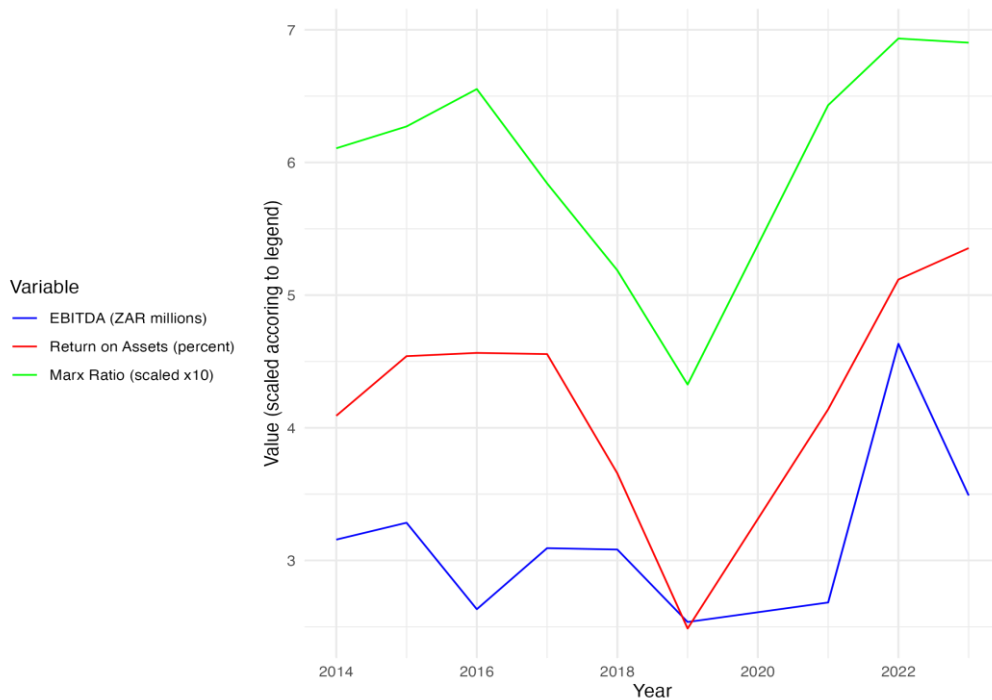


Figure 5.4: Marx Ratio Scaled Values Over Time, Excluding 2020

For the bivariate relationships, the scatter between efficiency and surplus per worker is the most striking. The Marx Ratio increases with ROA, and the LOESS smooth fit closely tracks the straight-line fit, which signals a robust positive association in simple comparisons (Figure 5.5).

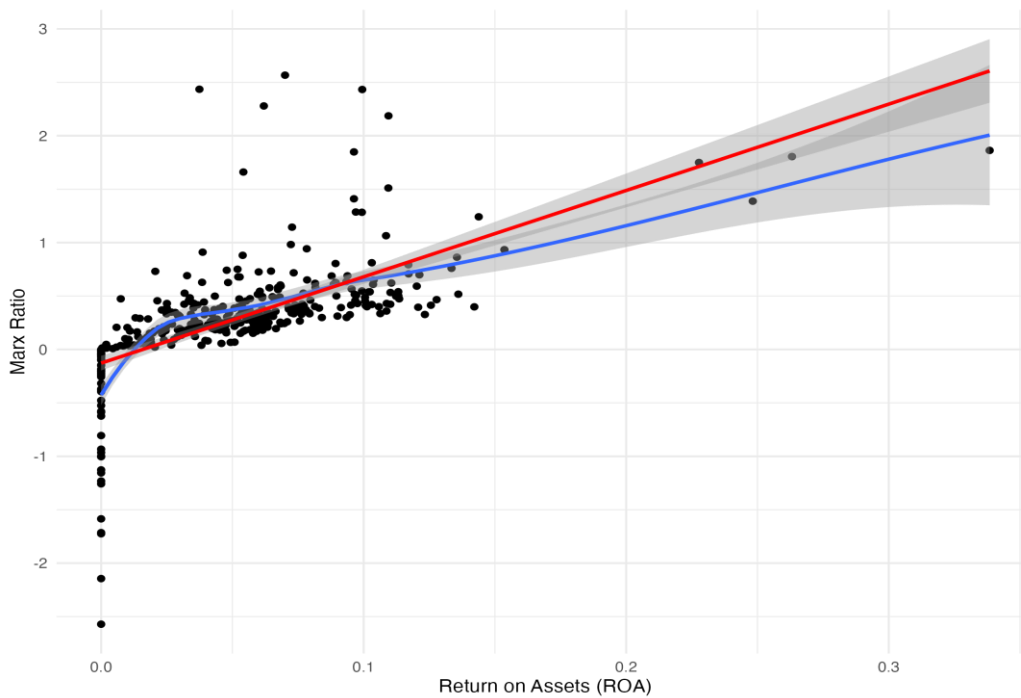


Figure 5.5: Relationship Between Marx Ratio and ROA

By contrast, scale on its own provides a weaker contrast. When the Marx Ratio is plotted against EBITDA, the cloud is more dispersed, and the LOESS smooth fit is comparatively flat. This suggests that being larger does not, by itself, result in a larger Marx Ratio (Figure 5.6).

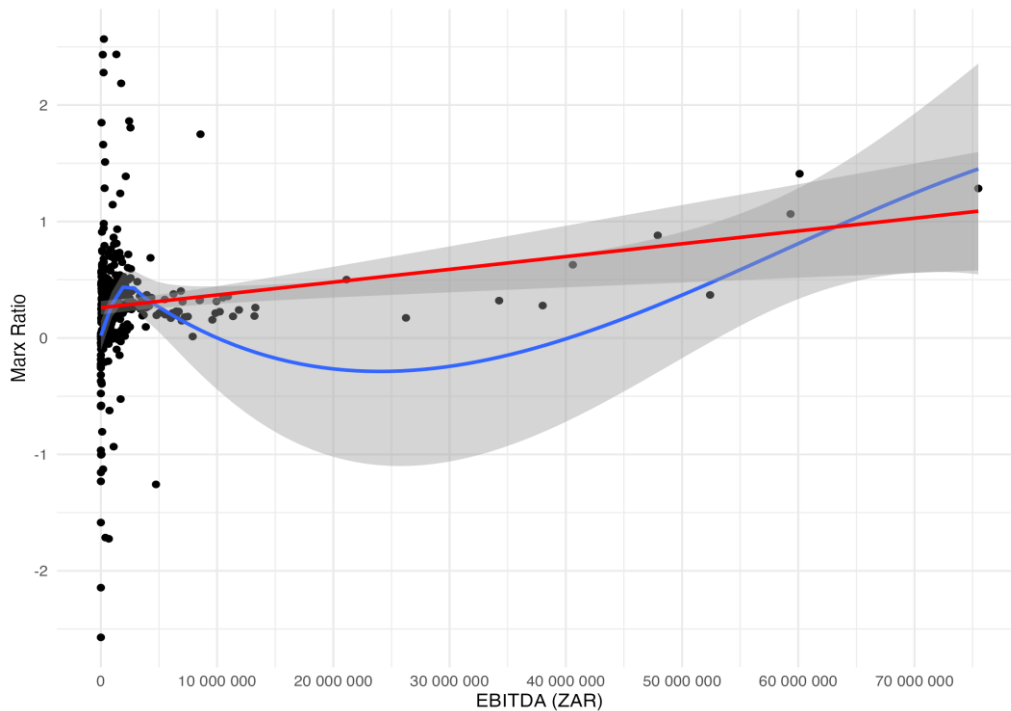


Figure 5.6: Relationship Between Marx Ratio and EBITDA

A companion plot shows that ROA and EBITDA are themselves meaningfully correlated – data that matters specifically when partial effects in the multivariate model are interpreted (Figure 5.7).

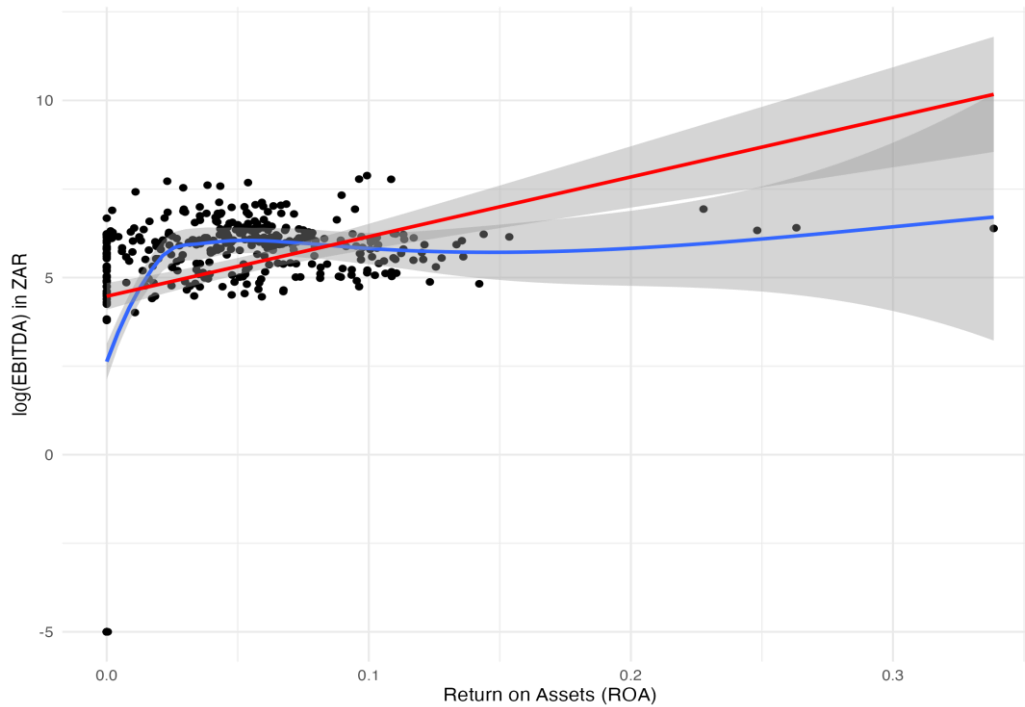


Figure 5.7: Relationship Between ROA and EBITDA

The simple regression model aligns with the visuals. In one-variable OLS models, ROA and EBITDA both exhibit statistically significant positive associations with the Marx Ratio. The ROA coefficient is largest in magnitude, and EBITDA comparatively modest, as highlighted in Table 5.3. The adjusted R^2 value is 0.468:

Table 5.3: Simple Linear Regression Results

Characteristic	Beta	95% CI	p-value
log(EBITDA (ZAR millions))	0.03	0.02, 0.03	<0.001
Return on Assets (ROA)	7.0	6.0, 8.0	<0.001
R^2	0.471		
Adjusted R^2	0.468		
Sigma	0.397		
Statistic	159		
p-value	<0.001		
df	2		
Log-likelihood	-177		
AIC	362		
BIC	378		
Deviance	56.4		
Residual df	357		
No. Obs.	360		

Note. Abbreviation: BIC = Bayesian information criterion; CI = Confidence interval

In summary, efficiency (ROA) is positively associated with surplus per worker, while scale (EBITDA) on its own, although positively related, is weak in isolation. As these bivariate results do not adjust for overlap between predictors (ROA and EBITDA are correlated), the next step was to quantify the conditional relationships using a multivariate framework.

5.4 Model Specification

The multivariate analysis quantified the conditional relationships between the Marx Ratio, the performance constructs of ROA and EBITDA, and the structural controls of capital intensity, size, leverage and age, on harmonised scales. As explained in Section 5.3, the modelling sample excludes 2020, while all other observations are retained.

An OLS linear model was estimated, with observations treated as independent and the specification kept deliberately simple, consistent with the diagnostics in Section 5.2 and the bivariate patterns in Section 5.3. Therefore, the baseline equation was as follows:

$$Marx_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 \log(EBITDA_{it}) + \beta_3 \log(CapInt_{it}) + \beta_4 \log(Assets_{it}) + \beta_5 Leverage_{it} + \beta_6 Age_{it} + \varepsilon_{it}$$

All coefficients are reported with 95% confidence intervals and p -values. Alternative specifications, such as restricted splines for EBITDA and a mixed-effects model with year, were also assessed during diagnostics. Although broad subsector and year dummies were evaluated, granular moderators such as workforce composition and ownership/governance were not consistently observed across organisations and years. However, the alternative specifications did not improve AIC or R^2 , resulting in the OLS specification being retained. Finally, to limit collinearity, predictors were chosen to avoid overlap; ROA was not included alongside ROE, and ROA was retained as the efficiency measure.

5.5 Multivariate Results

This section presents the estimates from the baseline OLS specification as detailed in Section 5.4, with 2020 excluded and all other observations retained. Using the baseline OLS specification (Section 5.4) and the sample excluding 2020, the Marx Ratio is analysed in levels, and the model in Table 5.4 outputs an adjusted R^2 of 0.549, which indicates that covariates together account for a statistically significant portion of the observed variation in the Marx Ratio.

Table 5.4: Multivariable Linear Regression Results

Characteristic	Descriptive comparison			N	Univariate models			Multivariate model		
	Low Marx N = 14 ¹	High Marx N = 17 ¹	p-value ²		Beta	95% CI	p-value	Beta	95% CI	p-value
log(EBITDA in ZAR millions) [scaled: log(/1 000 000)]	-0.39 (-2.34, 1.30)	-0.06 (-1.35, 0.36)	0.8	360	0.04	0.03, 0.05	<0.001	0.03	0.02, 0.04	<0.001
Return on assets (percent) [scaled: *100]	1.8 (0.0, 4.4)	7.4 (6.7, 10.9)	<0.001	360	0.08	0.07, 0.09	<0.001	0.07	0.06, 0.08	<0.001
Return on equity (percent) [scaled: *100]	3 (-12, 10)	15 (12, 20)	<0.001	360	0.00	0.00, 0.00	0.8			
log(total assets)	16.31 (15.26, 17.19)	15.63 (14.59, 16.24)	0.2	360	-0.01	-0.05, 0.02	0.5	-0.08	-0.11, -0.05	<0.001
Leverage (percent) [scaled: *100]	57 (40, 73)	46 (38, 56)	0.2	360	-0.01	-0.01, 0.00	<0.001			
log(capital intensity (assets per employee, in 1,000s)) [scaled: log(/1000)]	0.80 (0.30, 1.29)	0.88 (0.39, 1.47)	0.6	360	0.13	0.06, 0.20	<0.001	0.21	0.16, 0.27	<0.001
Firm age (years since listing)	34 (16, 57)	29 (16, 36)	0.5	360	0.00	0.00, 0.00	>0.9			
(Intercept)								1.1	0.62, 1.6	<0.001
<i>R</i> ²								0.554		
Adjusted <i>R</i> ²								0.549		
Sigma								0.366		
Statistic								110		
p-value								<0.001		
df								4		
Log-likelihood								-147		
AIC								305		
BIC								328		
Deviance								47.6		
Residual df								355		
No. Obs.								360		

Note. ¹ Median (Q1, Q3); ² Wilcoxon rank sum exact test; Wilcoxon rank sum test; BIC = Bayesian information criterion; CI = Confidence interval

These results point, first, to the central role of efficiency. ROA is positively and precisely associated with the Marx Ratio. Organisations that turn assets into profits more effectively register higher surplus per worker relative to pay. This translates to a one percentage-point increase in ROA being associated with an approximately 0.07 unit increase in the Marx Ratio, other factors held constant. This pattern is visually evident in the partial effect plot in Figure 5.8, where the fitted line rises steadily across the observed ROA range and the confidence band remains narrow.

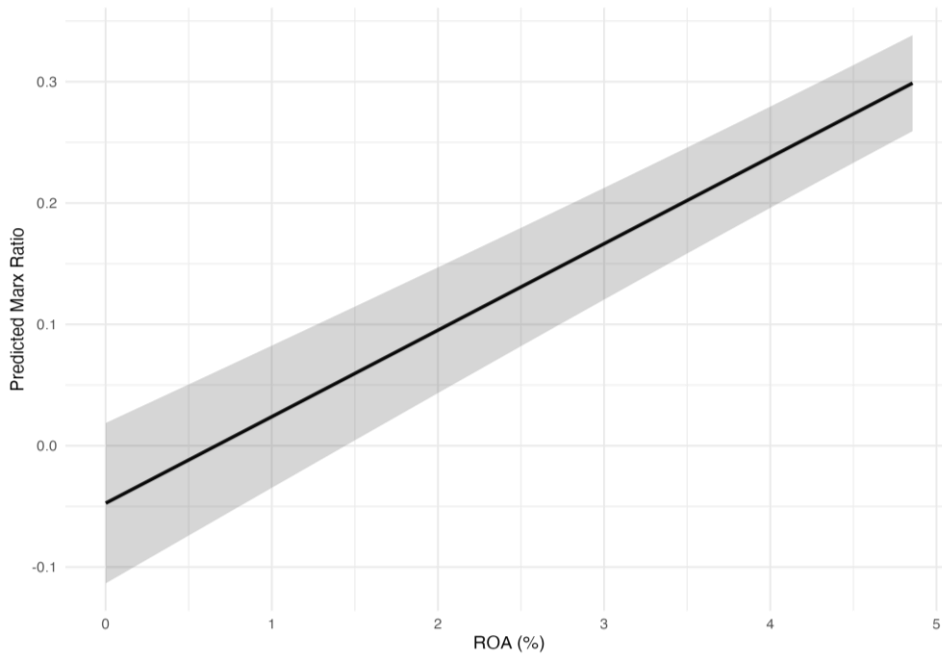


Figure 5.8: Partial Effect of ROA on the Marx Ratio

Second, capital intensity also shows a clear positive relationship to the Marx Ratio. After accounting for scale and efficiency, a deeper asset base per worker aligns with greater surplus extraction relative to wages. A one-unit increase in capital intensity translates to an approximately 2.7-fold increase in assets per employee, which is associated with roughly a 0.21 unit increase in the Marx Ratio. The corresponding partial-effect figure in Figure 5.9 complements the coefficient by showing a consistently upward profile.

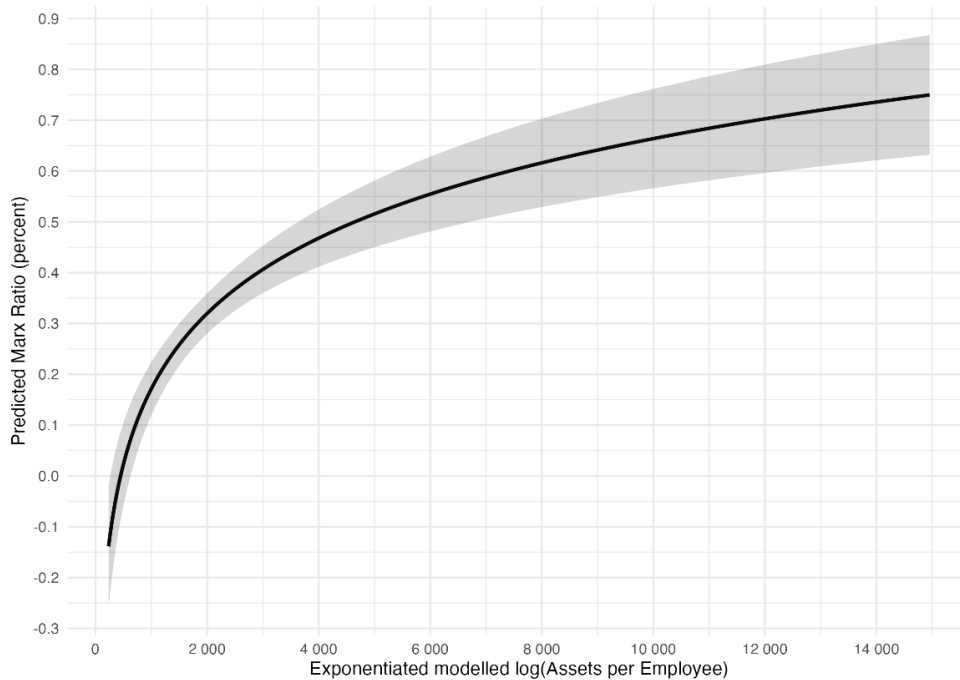


Figure 5.9: Partial Effect of Capital Intensity on the Marx Ratio

Third, by contrast, scale, proxied through $\log(\text{EBITDA in ZAR millions})$, is positive but modest in size relative to both ROA and capital intensity. A 2.7-fold increase in EBITDA is associated with an approximately 0.03 unit increase in the Marx Ratio. Read conditionally, organisations that are equally efficient and equally capital-intensive and which operate at greater EBITDA scale are linked to a minimal increase in surplus per worker. The partial-effect curve in Figure 5.10 mirrors this, with the fitted line sloping gently upwards, at a comparatively shallow gradient.

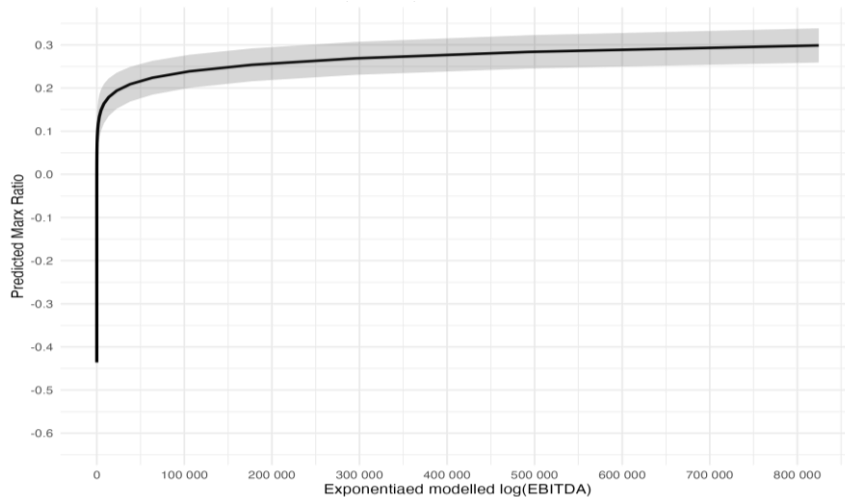


Figure 5.10: Partial Effect of EBITDA on the Marx Ratio

Finally, turning to the other controls, size (\log of total assets) is negative and statistically significant, which suggests that, conditional to efficiency, scale and capital intensity, larger organisations tend to exhibit a slightly lower Marx Ratio. Both leverage and organisation age were excluded from the multivariate. For completeness, and to aid interpretation of the negative size coefficient, the partial-effect plot for size is included in Figure 5.11.

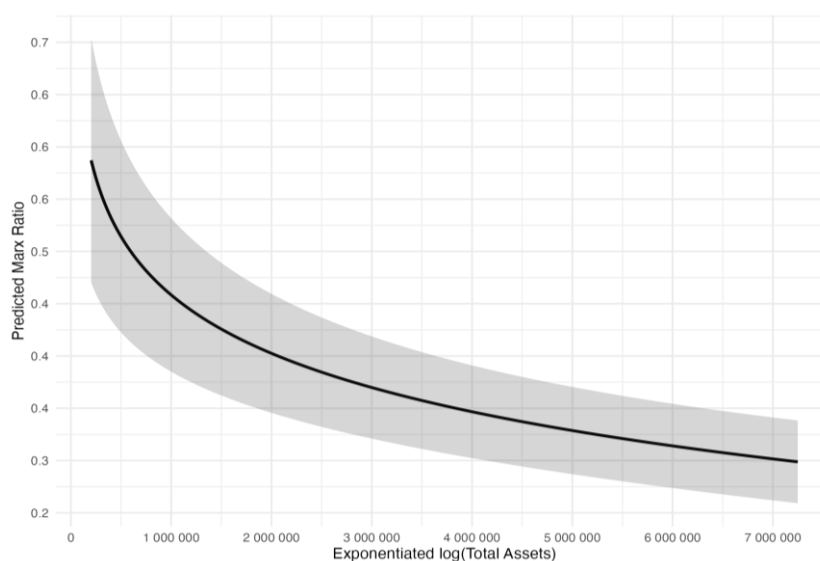


Figure 5.11: Partial Effect of Total Assets on the Marx Ratio

Taken together, the multivariate results reinforce the descriptive and bivariate patterns but make the comparison clearer. Efficiency (ROA) and capital deepening emerge as the main correlates of surplus per worker, while scale (EBITDA) is positive but comparatively small when other factors are held constant. Practically, simply expanding activity delivers only modest gains in the Marx Ratio, unless it is accompanied by improvements in ROA or capital intensity. In contrast, raising efficiency and deepening capital are associated with more substantial increases.

Before moving to interpretation, it is useful to ensure that the model underpinning these results behaved as expected. Section 5.6 presents a brief set of diagnostics, namely overall fit, residual patterns, and influence (Cook's distance), to confirm that the linear specification is adequate and that the findings are not driven by a handful of observations.

5.6 Model Presentation and Diagnostics

This section presents standard diagnostics for the baseline OLS reported in Section 5.5. The aim is to show how well the model captures the observed variation in the Marx Ratio and to determine whether the residuals and influence patterns are consistent with the assumptions underlying a linear specification.

Overall, the model fit is reassuring. A plot of predicted versus actual values (Figure 5.12) shows central clustering, with only moderate dispersion as the fitted values increase. Clustering around the 45-degree line, together with an adjusted R^2 of 0.549, indicates that the model explains a substantive share of cross-sectional variation in the Marx Ratio on these scales.

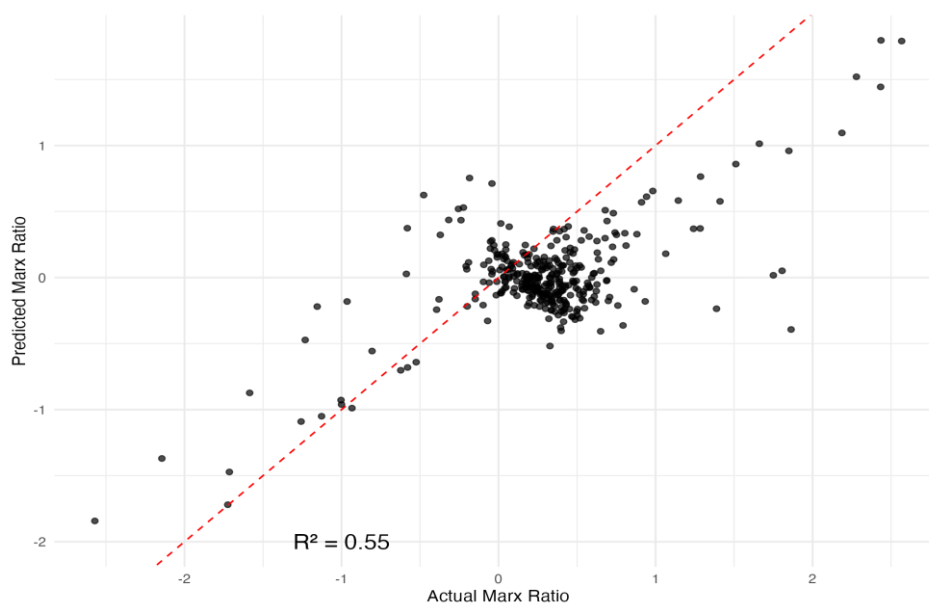


Figure 5.12: Actual vs Predicted Marx Ratio

Upon inspection, the residual behaviour appears acceptable. The residuals-versus-fitted plot shows no obvious structure, with no funnel shape nor significant curvature being evident (Figure 5.13). This suggests that the variance is broadly stable across the fitted range and that a simple linear form is adequate. The normal QQ plot (Figure 5.14) shows only mild tail departures, typical for financial data of this type, and not large enough to alter the substantive conclusions. For completeness, robust standard errors are reported throughout.

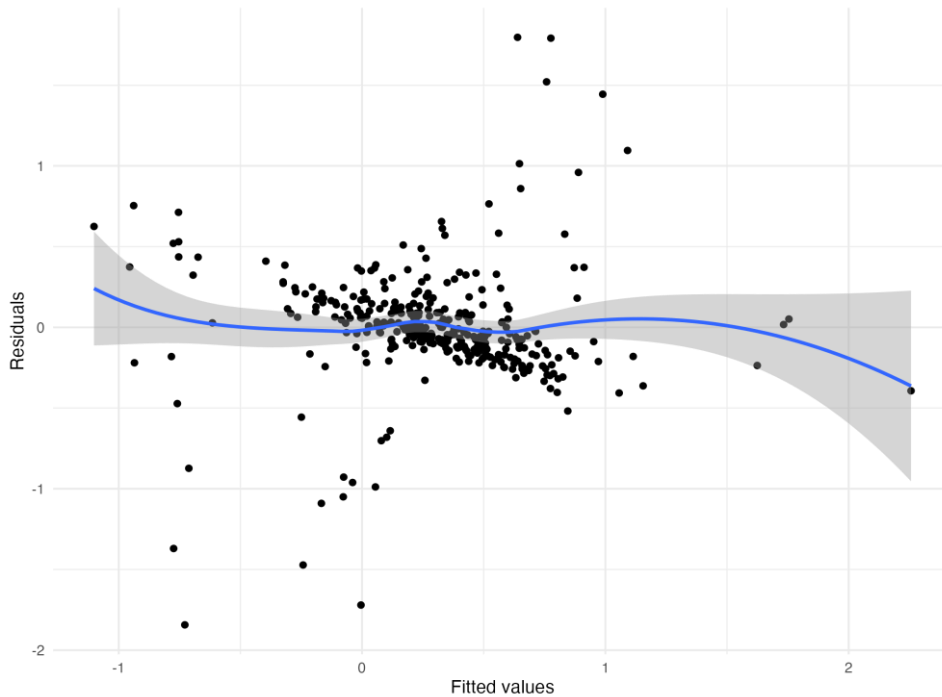


Figure 5.13: Residuals-vs-Fitted Plot of the Final Multivariable Linear Model

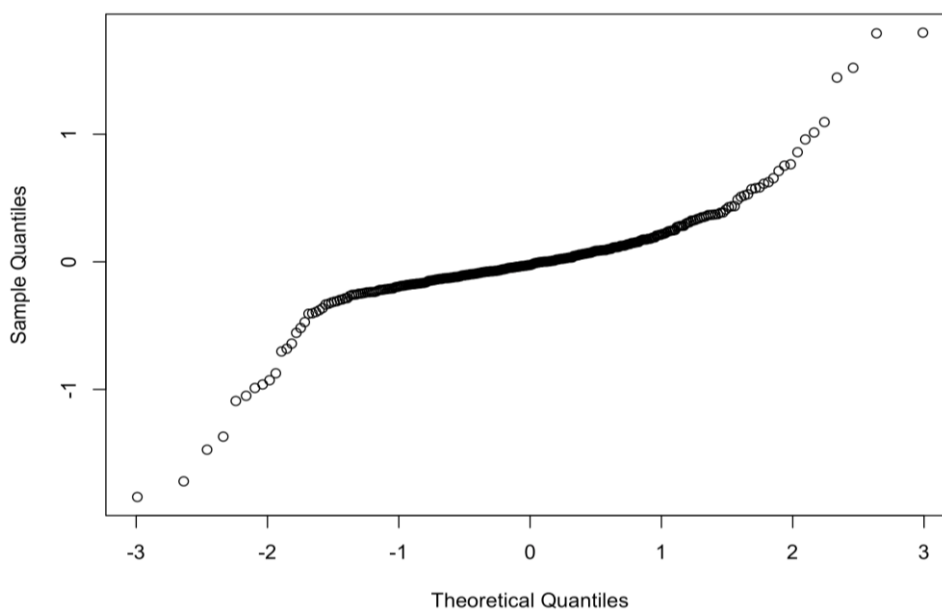


Figure 5.14: Normal QQ Plot of Residuals

Finally, influence is limited. Cook's distance was used to screen for observations with disproportionate leverage on the estimates (Cook, 2000). No case exceeds the conventional $D > 1$ flag (Figure 5.15), and re-estimating after temporarily omitting the few largest D values leaves coefficients and fit essentially unchanged. This supports the decision to retain the full balanced panel in the main results.

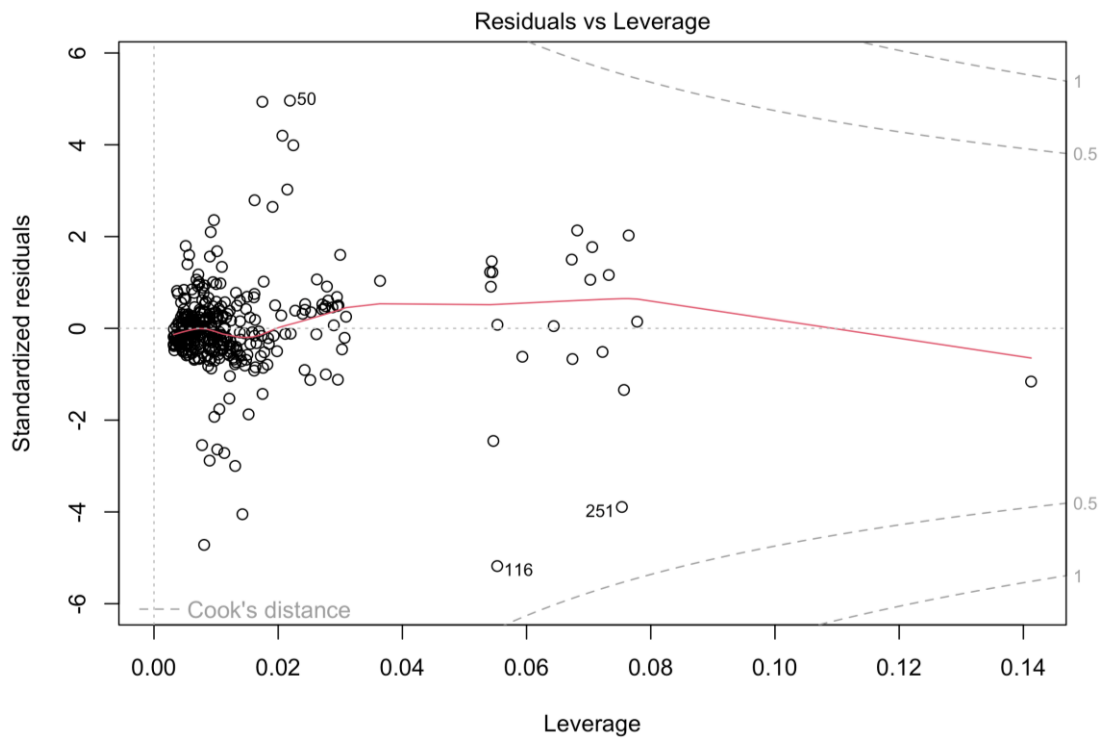


Figure 5.15: Cook's Distance Plot (Includes COVID-19 Covariate)

Together, these diagnostics support the adequacy of the model used in Section 5.5. The fit is strong for this application, residual patterns are benign, and it is evident that the results are not driven by single observations.

5.7 Robustness Checks

This section assesses whether the principal findings are sensitive to reasonable variations in sample and specification. Comparative estimates across all checks are collated first, with targeted diagnostics and profiles addressed in the subsequent sections. This is captured in Table 5.5.

Table 5.5: Multivariable Linear Regression Model Comparison with and Without Influential Points Removed

Characteristic	COVID-19 Model N = 400			Without COVID-19, includes influential points n = 360			Without Influential Points n = 332			With Robust SE n = 360		
	Beta	95% CI	p- value	Beta	95% CI	p- value	Beta	95% CI	p- value	Beta	95% CI	p- value
(Intercept)	1.1	0.58, 1.7	< 0.001	1.1	0.62, 1.6	< 0.001	0.54	0.24, 0.85	< 0.001	1.1	0.51, 1.7	< 0.001
log(EBITDA in ZAR millions) [scaled: log(/1 000 000)]	0.03	0.02, 0.04	< 0.001	0.03	0.02, 0.04	< 0.001	0.03	0.02, 0.04	< 0.001	0.03	0.01, 0.05	< 0.001
Return on assets (percent) [scaled: *100]	0.07	0.06, 0.08	< 0.001	0.07	0.06, 0.08	< 0.001	0.06	0.06, 0.07	< 0.001	0.07	0.06, 0.08	< 0.001
log(capital intensity (assets per employee, in 1 000s)) [scaled: log(/1000)]	0.17	0.10, 0.23	< 0.001	0.21	0.16, 0.27	< 0.001	0.11	0.08, 0.14	< 0.001	0.21	0.13, 0.29	< 0.001
log(total assets)	-0.08	-0.12, -0.05	< 0.001	-0.08	-0.11, -0.05	< 0.001	-0.04	-0.06, -0.02	< 0.001	-0.08	-0.12, -0.04	< 0.001
COVID19 (2020)												
FALSE	—	—										
TRUE	-0.32	-0.47, -0.17	< 0.001									
R^2	0.498			0.554			0.668					
Adjusted R^2	0.492			0.549			0.664					
Sigma	0.448			0.366			0.196					
Statistic	78.1			110			165					
p-value	< 0.001			< 0.001			< 0.001					
df	5			4			4					
Log-likelihood	-243			-147			72.3					
AIC	501			305			-133					
BIC	529			328			-110					
Deviance	79.1			47.6			12.6					
Residual df	394			355			327					
No. Obs.	400			360			332					

Note. Abbreviation: BIC = Bayesian information criterion; CI = Confidence interval

5.7.1 COVID-19 Inclusion

The baseline specification excluded 2020 because of well-documented operational shock in this year. As a sensitivity check, the model was re-estimated on the full panel with a dummy variable for 2020. The COVID-included column in Table 5.5 shows that coefficient signs and relative magnitudes for the covariates remain stable, with only modest movements in standard errors, indicating an unchanged substantive interpretation. Furthermore, the model diagnostics for the COVID-included specification (residuals versus fitted and normal Q–Q) are acceptable and do not indicate misspecification, as can be seen in Figure 5.16 and Figure 5.17.

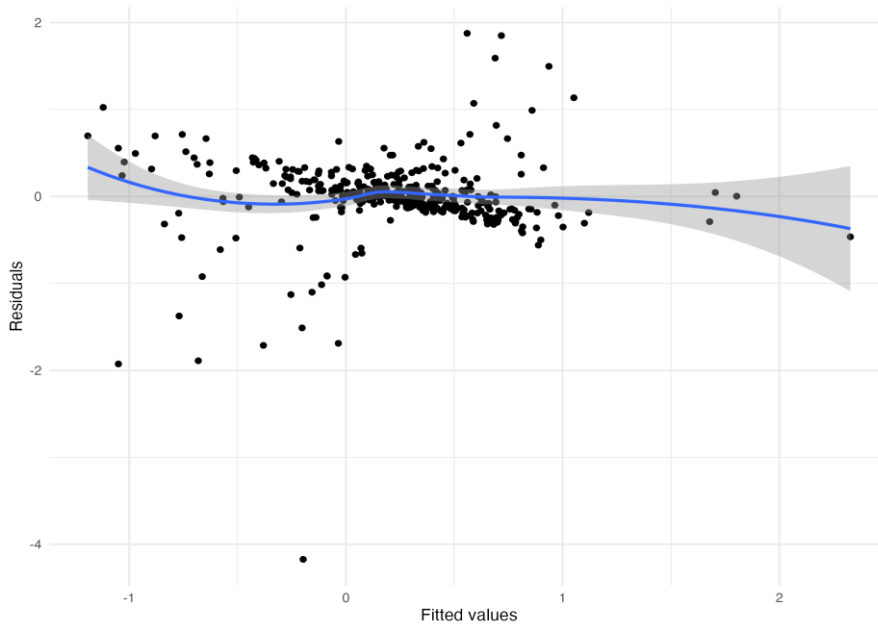


Figure 5.16: Residuals-vs-Fitted Plot (2020 Included)

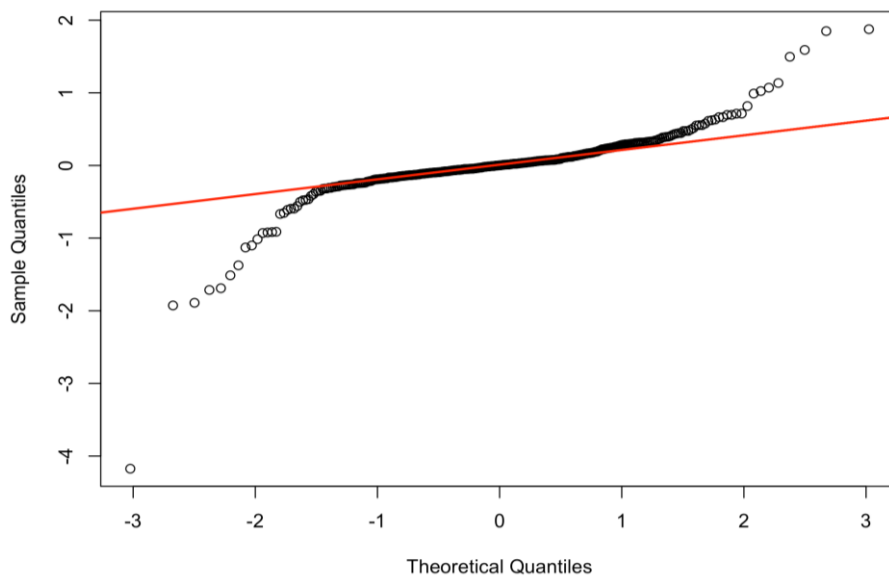


Figure 5.17: QQ Plot of Residuals (2020 Included)

For completeness, a simple mixed-effects variant allowing the intercept to vary by year was also estimated. Subsequently, the relevant information criteria do not improve meaningfully, and the estimated effects track the OLS results closely. Therefore, the more transparent OLS with subsector and year dummies was retained.

5.7.2 Influential Observations

In Section 5.6 above, influence diagnostics indicated no cases above the conventional Cook's distance flag of $D > 1$. As a stricter, pre-specified sensitivity check, observations with Cook's $D > 4/n$ were temporarily removed and the model re-estimated (Table 5.5). The removed cases are not concentrated in any subsector or year. Removing cases with Cook's $D > 4/n$ increases R^2 , as seen in Table 5.6, because the model fits a cleaner subset more tightly; it does not make that specification 'truer'. The study, therefore, retains the full balanced panel (excluding 2020) and treats the reduced-sample estimates as a robustness check.

Table 5.6: Profile of Observations Exceeding Cook's Distance $D > 4/n$

Characteristic	N = 28 ¹
Year	
2014	3 (11%)
2015	5 (18%)
2016	4 (14%)
2017	4 (14%)
2018	2 (7.1%)
2019	4 (14%)
2021	1 (3.6%)
2022	1 (3.6%)
2023	4 (14%)
Marx Ratio	-0.25 (-1.18, 1.75)
log(EBITDA in ZAR millions) [scaled: log(/1 000 000)]	-3 (-25, -1)
Return on assets (percent) [scaled: *100]	0.0 (0.0, 5.8)
Return on equity (percent) [scaled: *100]	-19 (-45, 15)
log(total assets)	15.16 (14.37, 16.94)
Leverage (percent) [scaled: *100]	59 (49, 69)
log(capital intensity (assets per employee, in 1,000s)) [scaled: log(/1000)]	1.19 (0.10, 1.73)
Firm age (years since listing)	20 (9, 28)

Note. ¹ n (%); Median (Q1, Q3)

The corresponding estimates shown in Table 5.5 remain materially unchanged in sign, magnitude and statistical significance, which indicates that the main results are not driven by a small number of atypical observations.

5.7.3 Functional Form

Functional form was assessed using partial-effect and partial-residual plots, alongside a few low-order alternatives. Logged covariates (total assets, capital intensity and EBITDA) all display approximately linear relationships on these scales. Introducing mild flexibility, such as a simple quadratic on $\log(\text{total assets})$, neither improves information criteria nor alters the relevant conclusions. Heteroskedasticity-robust standard errors are reported throughout and re-estimating with classical standard errors leaves qualitative inferences unchanged (see Table 5.5).

5.7.4 Metric Substitution

ROE was documented during data collection but is not reported alongside ROA in any specification. This choice avoids collinearity between closely related profitability measures, which would inflate standard errors and add redundancy without improving the fit of the model or interpretation (Wooldridge, 2010).

However, as a substitution check, ROE was entered instead of ROA in the baseline model. Coefficient signs, magnitudes and statistical significance for the main covariates were essentially unchanged, and overall fit was similar. Collinearity diagnostics indicated high overlap between ROA and ROE, while variance inflation for the retained covariates remained within common thresholds. ROA was, therefore, retained for interpretability, and substituting ROE did not change conclusions about the model.

Together, these checks show that the positive associations for efficiency (ROA) and capital deepening, and the smaller positive association for scale, are robust to the inclusion of 2020, alternative functional forms and influence removal. The negative coefficient on size (\log of total assets) and the near-zero effect of age, likewise, persist across specifications. In short, the stability of estimates across a range of reasonable alternatives strengthens confidence in the main results.

5.8 Summary

This chapter set out the empirical results for the JSE Industrials panel and tested the study hypotheses. In the multivariate models, efficiency (ROA) and capital deepening stand out as the strongest correlates of the Marx Ratio, while scale, proxied by $\log(\text{EBITDA})$, is positive but comparatively minor, with other factors held constant. Among the controls, size (log of total assets) is negative conditional to efficiency and capital intensity. Model diagnostics indicate a good fit on these scales and sample, with well-behaved residual patterns and no undue influence from single observations.

Evaluated together, the results are consistent with the descriptive and bivariate evidence but sharpen the comparison. Increases in the Marx Ratio are most closely associated with improvements in ROA and deeper capital per worker, rather than simply scale alone. The robustness checks confirm that these conclusions are stable under reasonable changes to the sample and specification, with no material differences to the results.

The following chapter turns to interpretation of these findings, by situating them within the relevant theory and literature, and drawing out implications for organisations in the JSE Industrials super-sector.

Chapter 6: Discussion of Results

This chapter interprets the empirical results reported in Chapter 5 through the lens of IVD, operationalised by the Marx Ratio, for organisations within the JSE Industrials super-sector. It explains the observed relationships between the Marx Ratio and organisational financial performance (ROA and EBITDA) and discusses the conceptual meaning and practical implications for value allocation in organisations. Furthermore, it integrates the incentives/efficiency, fairness/stakeholders, and institutional work lenses to explain when any IVD aligns with performance. The discussion also assesses the extent to which the findings align with the theoretical anchors and stated hypotheses of the study.

Three perspectives form the basis of the discussion. First, incentive-based views associated with agency and tournament theories propose that greater internal reward structures can raise effort, aid sorting, strengthen accountability and, ultimately, improve performance (Lazear & Rosen, 1981). Second, fairness- and stakeholder-oriented views caution that perceived inequity in reward distribution may undermine cooperation, morale, knowledge sharing and productivity (Adams, 1965). Third, the organisational inequality and institutional work perspective emphasises how organisational remuneration routines, grading architectures, disclosure practices and justificatory narratives create, sustain or contest distributional arrangements over time, by shaping how dispersion is experienced and how it translates into outcomes (Amis et al., 2021; Bapuji et al., 2019; Hamann & Bertels, 2018). Together, these lenses enable interpretation that is sensitive to both economic incentives and to the social and institutional processes that ground them in the South African Industrials context (Bussin et al., 2023; Matemane et al., 2024).

The chapter is structured such that the interpretation can be followed clearly. First, it summarises the key findings and then recentres the Marx Ratio as an index of IVD by clarifying how sectoral features (capital intensity and fluctuations in operating conditions) could condition its relationship with ROA and EBITDA. Section 6.3 interprets the core patterns through IVD. Section 6.4 discusses each research question and hypothesis (H_1 – H_4) in turn, by explicitly evaluating whether the observed directions and magnitudes are more consistent with incentive or fairness logics, and how organisational inequality and institutional work may mediate these effects. Subsequent sections reflect on the meaning of the robustness checks and their interpretation, followed by the theoretical implications across the three perspectives. Finally, the chapter sets out the relevant

principal boundary conditions before closing by answering the two research questions proposed in Chapter 3.

6.1 Key Findings

Together, the results in Chapter 5 highlight three central elements for interpretation. First, steeper IVD, captured by a higher Marx Ratio, is more closely associated with asset efficiency (ROA) than with operating scale (EBITDA). This finding aligns with research that reports that distributional structures tend to matter most when organisations convert assets into value, as opposed to simply expanding throughput (Przychodzen & Gómez-Bezares, 2021; Rouen, 2020). Stated differently, the Marx ratio appears to track how value is produced, rather than how much is produced. Second, capital intensity is positively associated with steeper internal distribution, whereas organisation size shows no meaningful association. This suggests that the way value is produced (technology and asset base) matters more than the size of the organisation (Autor et al., 2020). Practically, this means that an increased asset base per worker co-moves with higher surplus per worker, even after accounting for organisation size. Third, these relationships are robust across reasonable checks, which shifts the focus from statistical fragility to mechanisms that generate them plausibly. Scholars indicate that these mechanisms can pull in opposing directions; steeper gradients may bolster incentives, effort and sorting, yet also elevate equity concerns and coordination costs that blunt scale effects, unless credibly designed and justified (Adams, 1965; Bamberger et al., 2021; Lazear & Rosen, 1981; Zhang et al., 2023).

The remainder of this chapter interprets these patterns through incentive, fairness, stakeholder, and organisational inequality and institutional work perspectives; by paying attention to the way these dynamics manifest in the JSE Industrials context.

6.2 Recentring the Marx Ratio

In this study, the Marx Ratio was treated as a practical index of IVD: it indicates how value created in an organisation is shared between labour (wage bill per worker) and the residual surplus retained for capital (profit per worker). The ratio should be read descriptively rather than normatively, as a means of inferring the structure of distribution, not for judging absolute pay levels (Irwin, 2018; Rouen, 2020). A higher ratio indicates that the internal split tilts further away from labour and more towards surplus, whereas a lower ratio indicates the opposite. Losses are retained transparently, which avoids truncation or re-scaling of the ratio, that could potentially mask distributional shifts (Bapuji et al., 2019; Irwin, 2018).

Two features of the Industrials sector shape how the ratio should be interpreted:

Capital intensity: Performance depends heavily on how effectively assets are deployed. When organisations deepen capital and improve asset efficiency, surplus per worker can rise faster than wages per worker, which steepens the internal split, even in the absence of explicit policy changes (Autor et al., 2020; Rouen, 2020).

Exposure to business cycles and operating frictions: Demand swings, input–cost shifts and logistics constraints can move utilisation and value added per head more quickly than headcount or pay policies can adjust. As headcount often adjusts slowly, changes in utilisation and investment can shift the internal split, even when headline pay policies remain stable (Amis et al., 2021; World Bank, 2023b).

Framed in this manner, the results in Chapter 5 are not treated as isolated coefficients but, rather, as evidence of the internal value split co-moving with asset efficiency and operating conditions in the Industrials sector. Interpreting these co-movements requires attention to the organisational channels through which distributional structures take effect. Incentive/selection forces can raise effort and sorting under steeper gradients, whereas fairness/coordination forces can elevate equity concerns and cooperation costs unless dispersion is credibly designed and explained (Adams, 1965; Bamberger et al., 2021; Lazear & Rosen, 1981). Which tendency dominates is contingent on institutional work, namely the routines, grading architectures, and justificatory narratives that shape the way distribution is experienced internally (Amis et al., 2021; Hamann & Bertels, 2018). Interpretation is shaped further by the South African disclosure and governance context, given the evolving debate on remuneration transparency and its organisational consequences (Bussin et al., 2023; Matemane et al., 2024).

6.3 Internal Value Distribution

Interpreted through the lens of IVD, the patterns indicate that the way value is produced matters more than how much is produced. The consistently positive association between the Marx Ratio and ROA suggests that, when assets are used more efficiently, the internal split tilts further towards surplus retained for capital relative to wages. Practically, stronger asset productivity travels with a steeper distribution. In contrast, the far weaker link with EBITDA implies that expanding scale alone does little to shift the internal split unless it is accompanied by both efficiency and discipline. This finding aligns with evidence that dispersion can be associated with higher productivity when processes are disciplined but,

beyond certain thresholds, dispersion may undermine cooperation and downstream performance (Przychodzen & Gómez-Bezares, 2021; Zhang et al., 2023).

The positive correlation with capital intensity highlights a production–technology channel because, when larger asset bases are well utilised, residual surplus can outpace the wage bill and steepen the internal split even without explicit changes in pay (Autor et al., 2020; Rouen, 2020). Conversely, the negative relationship with size suggests that larger organisations, while holding efficiency and capital intensity constant, diffuse surplus across layers, compliance and governance and yield a slightly flatter split (Bamberger et al., 2021). Together with the exclusion of leverage and organisational age from the final specification, owing to limited explanatory power, these patterns indicate that distributional steepness is shaped primarily by production technology and asset use rather than by financing structure or organisational history.

These patterns can be understood through three complementary lenses. From an incentive/selection perspective, higher ROA coincides with a steeper distribution if reward structures and performance-related rewards raise effort, aid sorting and strengthen capital discipline (Lazear & Rosen, 1981; Rouen, 2020). From a fairness and stakeholder perspective, a steeper split, if it is perceived as inequitable, especially when task interdependence is high, risks eroding cooperation, discretionary effort and knowledge sharing (Adams, 1965; Bamberger et al., 2021; Zhang et al., 2023). The organisational inequality and institutional work lens helps to explain variation across organisations. Remuneration routines, job-grading structures and the narratives used to justify reward structures all shape how employees interpret disparity and, in turn, how disparity feeds back into performance (Amis et al., 2021; Bapuji et al., 2019; Hamann & Bertels, 2018). In the Industrials setting, where headcount tends to adjust slowly while utilisation moves quickly, managers could legitimise distributional outcomes as the by-product of capital commitments and market conditions. Such narratives can stabilise steeper internal splits in good years and buffer them during lean years, even without large formal pay changes (Bussin et al., 2023; Matemane et al., 2024).

In summary, within South Africa's Industrials super-sector, a higher Marx Ratio is most closely associated with asset efficiency and capital deepening, not scale alone. Whether that steepness ultimately reinforces or erodes performance depends on the mix of incentive systems, perceptions of fairness and the institutional work that produces and justifies distributional arrangements.

6.4 Addressing the Research Questions and Hypotheses

This section links the empirical findings to the study's research questions and hypotheses. For each hypothesis, the outcome is stated clearly and then interpreted through the three lenses of incentives, fairness and stakeholders, and organisational inequality and institutional work.

6.4.1 RQ1/H1

H₁: There is a statistically significant relationship between the Marx Ratio and ROA

Chapter 5 reports a clear, statistically significant positive association between the Marx Ratio and ROA in the JSE Industrials super-sector. This finding suggests that stronger asset productivity tends to align with a steeper internal split, resulting in more surplus being retained for capital relative to wages. This finding is consistent with an incentive/selection view, whereby steeper internal reward gradients and performance-linked remuneration can raise effort, aid sorting and strengthen accountability, which, in turn, improves asset utilisation (Lazear & Rosen, 1981; Kweh et al., 2022). A complementary production–technology explanation is also plausible in a capital-intensive setting, namely that, when assets are well deployed, residual surplus per worker can outpace wage growth, even without explicit changes to pay policy. This, again, links distributional steepness to asset efficiency rather than to scale alone (Autor et al., 2020; Rouen, 2020).

Similarly, fairness and stakeholder considerations caution against assuming that 'more is always better'. In settings with high task interdependence, very steep internal splits can reduce cooperation and discretionary effort (Adams, 1965; Bamberger et al., 2021; Zhang et al., 2023). No turning point was detected in the observed range, but recent literature suggests that, at very high levels of dispersion, the balance between incentive gains and cooperation costs may shift. The overall ROA-centred pattern aligns with research reporting that distributional structures matter most when organisations convert assets into value rather than simply expanding throughput (Przychodzen & Gómez-Bezares, 2021; Rouen, 2020). Furthermore, the pattern also indicates that dispersion tracks how value is produced, rather than how much is produced. This sets up a useful contrast with EBITDA as an operating-scale lens.

6.4.2 RQ1/H2

H₂: There is a statistically significant relationship between the Marx Ratio and EBITDA

When moving from asset productivity to operating scale, there is a statistically significant positive relationship between EBITDA and the Marx Ratio; however, the association is notably weaker when efficiency and capital intensity are considered. As EBITDA reflects operating scale rather than asset productivity, this suggests that scale alone does little to shift the internal split unless it is accompanied by disciplined utilisation and cost control. This pattern is consistent with evidence showing that dispersion is more tightly connected to process discipline and productivity than with volume growth alone (Przychodzen & Gómez-Bezares, 2021; Rouen, 2020). It also fits the Industrials context, where exposure to business cycles means utilisation and value added per head can move faster than headcount or pay policy, thereby making distributional shifts more sensitive to efficiency than to gross throughput (World Bank, 2023b).

From a fairness and stakeholder perspective, the modest EBITDA association aligns with the theory. When growth widens dispersion without a clear and credible rationale, coordination can suffer, especially when tasks are highly interdependent and perceptions of inequity can prevent scale from translating into performance, unless dispersion is both well designed and governed (Adams, 1965; Bamberger et al., 2021; Zhang et al., 2023). Accordingly, the EBITDA result highlights that design and governance condition whether scale translates into performance, which is a matter directly addressed in 6.4.3.

6.4.3 RQ2/H3 and H4

H₃: Where a relationship exists, it will be positive: a higher Marx Ratio is associated with higher ROA and EBITDA (agency/tournament).

H₄: Where a relationship exists, it will be negative: a higher Marx ratio is associated with lower ROA and EBITDA (equity/stakeholder).

Read together, the findings support Hypothesis 3 over Hypothesis 4. Within the observed range, the relationships are positive for both ROA and EBITDA, although the EBITDA association is comparatively modest once efficiency and capital intensity are considered. This suggests that, on average, incentive and selection effects outweigh cooperation costs in South Africa's Industrials super-sector (Lazear & Rosen, 1981; Rouen, 2020). Furthermore, the correlation with steepness points to a production–technology channel. Capital intensity co-moves with a higher Marx Ratio, whereas organisational size is

negatively related once controls are included, suggesting that asset deployment, rather than scale, conditions the observed direction and strength relationships (Autor, et al., 2020; Bamberger et al., 2021; Rouen, 2020). In short, the incentive/selection and production–technology channels dominate within this setting, yet the question that remains is whether organisations can sustain these gains under the fairness and legitimacy demands that accompany steeper internal splits.

The strength and durability of these associations are, however, mediated by organisational and institutional factors. The organisational inequality and institutional work lens highlights how remuneration routines, grading structures, disclosure practices and justificatory narratives shape whether a given distribution is experienced as legitimate and motivating, or as something requiring realignment (Amis et al., 2021; Bapuji et al., 2019; Hamann & Bertels, 2018). Where this institutional work is weak, fairness and coordination concerns may surface more strongly, particularly under high task interdependence, potentially flattening or reversing the association at higher levels of dispersion (Adams, 1965; Zhang et al., 2023).

In summary, Hypothesis 3 is supported by both ROA and EBITDA, whereas Hypothesis 4 is not supported in the baseline specifications. The direction of effects is, therefore, more consistent with agency/tournament theory expectations, though their size and durability depend on sectoral conditions and the quality of distribution-shaping practices in organisations.

6.5 Implications of Robustness Checks

The robustness checks in Chapter 5 shift the focus from whether the results hold, to what they mean. Across alternative specifications, such as influence diagnostics and explicit treatment of the 2020 shock year, the direction and relative size of the key associations remain intact. Furthermore, as year and subsector effects did not improve AIC or R^2 , they are discussed as robustness checks instead of being included in the core model. Substantively, this stability suggests that the links are not artefacts of modelling choices but, rather, that they reflect underlying mechanisms consistent with the narrative developed in Sections 6.1-6.3. This finding reflects that distributional steepness co-moves with asset efficiency and capital deepening, not with operating scale alone (Autor et al., 2020; Przychodzen & Gómez-Bezares, 2021; Rouen, 2020).

First, the stronger ROA relationship relative to EBITDA after re-specification reinforces the view that the Marx Ratio tracks how value is produced, rather than how much is produced. If the result had been sensitive to functional form or specific controls, a measurement story would be more plausible. Instead, the pattern holds under reasonable changes and supports an efficiency-channel explanation and the idea that incentive and selection effects are most evident when processes and assets are tightly managed (Kweh et al., 2022; Li et al., 2024; Przychodzen & Gómez-Bezares, 2021).

Second, addressing the 2020 shock year clarifies scope rather than altering the conclusion. Whether 2020 is excluded in the baseline or included with a shock indicator, the outcome is similar. This implies that the observed relationships are not driven by crisis-era compression but rather by ordinary co-movement in utilisation and surplus generation within the Industrials sector (Baker et al., 2020; World Bank, 2023b). The interpretative focus should, therefore, be on a steady-state mechanism, such as governance of reward structures, process discipline or capital deployment, rather than on temporary dislocations.

Third, the absence of leverage and organisational age from the final specification after model selection, alongside stable coefficients once influential observations are removed, supports a narrow theoretical claim. Within the JSE Industrials super-sector, distributional steepness appears to be a function of production technology and asset use rather than financing structure or age, which is consistent with recent work linking technology, concentration and labour share (Autor et al., 2020). However, this does not rule out a role for financing elsewhere; it indicates that, in this sample, adding leverage and age provides little additional insight once efficiency, capital intensity and size are considered.

Finally, the robustness results help bound the theory. There is no clear evidence of non-linear turning points in the observed range, because the ROA association is consistently positive. Regardless, the literature cautions that cooperation costs can increase as dispersion steepens (Bamberger et al., 2021; Zhang et al., 2023). The absence of curvature, therefore, narrows the claim to the range covered by the data and shifts attention to boundary conditions, such as governance quality and legitimating narratives that may delay or hasten any tipping point, as developed in Chapters 6.6 and 6.7 (Amis et al., 2021; Bapuji et al., 2019; Bussin et al., 2023; Matemane et al., 2024).

In summary, the robustness checks strengthen an interpretive, not merely statistical, conclusion. Within South Africa's Industrials super-sector, the Marx Ratio behaves as a

distributional barometer of asset productivity and capital deepening. This pattern holds across reasonable modelling choices. That durability suggests prioritising the mechanisms emphasised in this chapter, namely incentives, fairness and stakeholders, and the institutional work that produces and legitimises internal value splits, over explanations based on temporary shocks or model fragility.

6.6 Theoretical Implications

Considered collectively, the evidence positions dispersion as performance-compatible in a capital-intensive setting when it is credibly tied to productivity (incentive/selection and production–technology lenses). However, this claim is not always valid, as fairness and stakeholder demands impose coordination costs that governance must anticipate and manage. This pattern suggests that dispersion is most consequential when organisations convert assets into value, rather than merely expanding throughput (Przychodzen & Gómez-Bezares, 2021; Rouen, 2020). This pattern also links organisational-level distribution to technological drivers, as highlighted in recent work on rising capital intensity and changing labour shares (Autor et al., 2020).

For incentive-based views (agency/tournament), the findings extend the argument beyond executive pay to the organisation-wide distributional structure captured by the Marx Ratio. The stronger, stable association with ROA is consistent with selection and effort effects that materialising when processes and assets are tightly managed – dispersion appears to operate through productivity rather than scale (Przychodzen & Gómez-Bezares, 2021). Recent evidence that remuneration structures track improvements in investment quality and labour allocation efficiency reinforces this interpretation (Kweh et al., 2022; Li et al., 2024). The evidence suggests that, furthermore, in capital-intensive industries, performance gains arise through asset utilisation, and reward structures are most effective when they discipline how plant, equipment and working capital are used.

Classic predictions of an inverted U relationship remain plausible, but no inflection was detected within the range of this sample. Evidence of curvature elsewhere typically arises at very high spreads and rarely for ROA. Practically, the implication is that any threshold is governance-contingent rather than mechanically determined by the ratio level (Chung et al., 2024). From fairness- and stakeholder-oriented perspectives, the results, therefore, temper any simple ‘dispersion helps’ narrative. When perceived as unfair, wider gaps can undermine cooperation, discretionary effort and customer-facing outcomes (Bamberger et al., 2021; Zhang et al., 2023). Consistent with this finding, the weaker EBITDA link and

negative partial association with size suggest that coordination and governance demands may dampen performance effects as organisations scale.

The organisational inequality and institutional work lens explains why similar levels of dispersion can produce different outcomes in different organisations. Remuneration and grading structures, disclosure practices and the narratives that justify them shape whether an internal split is experienced as legitimate and purpose-consistent, or as a breach of distributive norms (Amis et al., 2021; Bapuji et al., 2019). In South Africa, evolving remuneration governance and transparency heighten this interpretive layer (Bussin et al., 2023; Matemane et al., 2024). The theoretical implication is that the effects of dispersion are institutionally mediated. When governance is credible and narratives link distribution to productivity and long-term value, incentive channels are more likely to dominate, whereas, when legitimacy is weak, fairness concerns may surface sooner and dampen, or even reverse any benefits.

In South Africa, legacies of extractive labour institutions and high inequality heighten legitimacy sensitivity (Hamann & Bertels, 2018). Empirical work in SOEs shows mixed remuneration–performance links, while contemporary governance places strong weight on remuneration justification and disclosure (Bezuidenhout et al., 2018; IoDSA, 2016). These features assist in explaining why similar numerical ratios may produce different performance–perception balances in different organisations.

Overall, this chapter confirms the incentive predictions within the observed range (positive association with ROA), qualifies them with fairness-related boundary conditions (scale and coordination can erode gains), and adds institutional mediation as the mechanism that translates a structural ratio into organisational practice. Conceptually, this positions the Marx Ratio as a distributional barometer of productive efficiency under capital intensity and suggests that theory should align more closely to the way technology, governance quality, and legitimacy determine when dispersion helps, when it harms, and how quickly the balance tips (Amis et al., 2021; Autor et al., 2020; Bapuji et al., 2019).

For boards in the Industrials sector, the positive ROA association suggests that dispersion mechanisms can be performance-compatible when they are credibly linked to productivity and long-term value. Therefore, the consequence is straightforward: dispersion works when the purpose (why) is transparent and tied to process discipline, whereas, when the purpose is absent, the same numbers can erode legitimacy and coordination. Governing

bodies should, therefore, emphasise transparent rationale and coherence between distribution and performance (IoDSA, 2016).

6.7 Boundary Conditions

The interpretations offered here are strongest in the setting studied and they should be read with several clear boundaries in mind. First, the pooled cross-sections do not recover within-organisation dynamics, meaning that the patterns reported are associations across organisation–years rather than causal responses within a given organisation over time. Sectoral scope matters. Industrials are comparatively capital-intensive and asset-driven, so the finding that the Marx Ratio tracks how value is produced (ROA) more than how much is produced (EBITDA) may not carry over to service-heavy or innovation-led settings where intangible assets, team production and client interaction dominate (Autor et al., 2020). Listing status also matters. The disclosure discipline and governance scrutiny associated with the JSE can shape both distribution and its justification – conditions that may not apply to unlisted entities. Hence, external validity is best understood as sector- and market-conditional, rather than universal (Bussin et al., 2023; Matemane et al., 2024).

Time and shocks are a second boundary. The period includes the 2020 disruption; however, treating that year explicitly does not change signs or relative magnitudes, though it does underline how quickly distribution can compress or widen under demand and logistics stresses. The core claims are, therefore, local to ‘normal times’ dynamics of utilisation and surplus generation, rather than to crisis transmission mechanisms. Relatedly, no clear non-linear turning points are detected in the observed range. That absence is not necessarily proof that thresholds do not exist, only that the available data did not identify them. The literature remains clear that cooperation costs can increase as dispersion steepens, particularly when task interdependence is high; any tipping point may lie beyond the sample window or become salient under different governance conditions (Bamberger et al., 2021; Zhang et al., 2023).

Measurement and modelling constitute a third boundary. The Marx Ratio is used as a distributional index, and the study emphasises interpretation of patterns rather than normative judgements pertaining to fairness. The empirical work controls for key fundamentals and uses clustered, heteroskedasticity-robust inference, with influence checks and alternative specifications. Additionally, year and subsector effects were evaluated but did not improve AIC or R^2 , resulting in their inclusion for a discussion of robustness checks rather than being included in the core model. Despite these steps,

residual concerns about simultaneity remain plausible. Stronger ROA may enable governance choices that subsequently steepen the internal split, just as a steeper split might, in some instances, raise ROA. Without quasi-experimentation, the results should be read as robust associations rather than causal effects (Wooldridge, 2010). Accounting choices also matter, as ROA and EBITDA respond differently to depreciation, impairment and consolidation decisions, and these differences can change the way distribution maps to performance at the margin. None of these points negate the patterns, though they do narrow their causal reach and, therefore, caution is recommended in treating the Marx Ratio as anything more than an informative barometer in this context (Przychodzen & Gómez-Bezares, 2021; Rouen, 2020).

Finally, institutional mediation is a boundary in its own right. The organisational inequality and institutional work lens suggests that similar numerical ratios can land differently across organisations, depending on remuneration routines, grading architectures, disclosure practices and the narratives that justify them. When governance is credible and explanations link distribution to productivity and long-term value, incentive channels are more likely to dominate. When legitimacy is weak, fairness concerns may surface earlier and blunt the association. This does not contradict the positive ROA link observed; rather, it qualifies it as institution-dependent and sensitive to the way distribution is produced and defended inside organisations (Amis et al., 2021; Bapuji et al., 2019; Bussin et al., 2023; Matemane et al., 2024).

6.8 Conclusion

This chapter interpreted the results through the lens of IVD, using the Marx Ratio as the organising frame for the JSE Industrials super-sector. The evidence shows that a higher Marx Ratio co-moves most clearly with asset efficiency (ROA) and capital deepening, and only weakly with operating scale (EBITDA), once fundamentals are held constant.

Accordingly, Research Question 1 is addressed because, within this sector, steeper internal distributions are positively associated with stronger asset productivity (ROA), not with scale alone (EBITDA). The association is robust across reasonable checks and is not sensitive to alternative specifications. Capital intensity co-moves with steeper distribution, organisational size is negatively related once controls are included, and leverage and age add little explanatory value.

Research Question 2 is also addressed because, within the observed range, the direction of association aligns more closely with agency/tournament expectations than with equity/stakeholder predictions, while remaining sensitive to institutional mediation. Governance routines, grading architectures, disclosure practices and justificatory narratives condition whether dispersion is experienced as legitimate and performance-compatible, or as requiring realignment.

Together, the chapter concludes that the Marx Ratio behaves as a distributional barometer of productive efficiency under capital intensity within the JSE Industrials super-sector. These conclusions set the stage for Chapter 7, which synthesises the overall conclusions, theoretical and practical contributions, relevant implications and potential avenues for future research.

Chapter 7: Conclusion and Recommendations

This chapter closes the study by drawing together its purpose, context, evidence and implications. It restates the problem and context, relates the findings directly to the research questions and explains the study's scholarly, managerial practice and policy contributions. Then, it offers practical guidance for both boards and remuneration committees, acknowledges key limitations and identifies targeted avenues for future research. The chapter provides a clear, self-contained synthesis that completes the argument developed in Chapters 1 to 6 and indicates what should be done next from both theoretical and practical perspectives.

7.1 Purpose, Context and Significance

This section clarifies how IVD is used in this study, why the Marx Ratio is an appropriate lens for the JSE-listed Industrials context and why the selected outcomes (ROA and EBITDA) matter for interpretation. This section frames the motivation for the chapter conclusions, by considering incentive (agency and tournament), equity and stakeholder/legitimacy mechanisms in organisations, read through an institutional work lens (Adams, 1965; Freeman, 1984; Jensen & Meckling, 1976; Lazear & Rosen, 1981; Hamann & Bertels, 2018).

7.1.1 Study Focus and Significance

This study examined whether differences in IVD are associated with variation in financial performance of JSE-listed Industrials over the period 2014–2023. IVD was operationalised using the Marx Ratio, a production-side distributional index defined as profit per employee divided by remuneration per employee, thereby moving attention away from headline executive pay ratios to the relationship between value creation and value allocation by organisations (Irwin, 2018). Financial performance was assessed primarily via ROA and supported by EBITDA, to reflect operating outcomes. The research focus matters, because stronger alignment between the way value is created and the way it is distributed may influence effort, coordination and investment horizons, particularly in capital-intensive settings. Agency alignment and efficient risk-bearing can support performance, while steeper internal differentials could increase effort and aid sorting, when credibly designed. Conversely, perceived inequities can reduce cooperation and undermine performance if distributions are judged as unfair (Adams, 1965; Jensen & Meckling, 1976; Lazear & Rosen, 1981). By offering sector-specific, evidence-based insights, the study aims to inform both academic debate and board-level decision-making in South Africa.

7.1.2 Study Context and Salience

South Africa's Industrials operate under ongoing cost and infrastructure constraints, heightened disclosure expectations and evolving governance requirements – conditions that intensify interest in the way internal distributional choices relate to sustainable performance and legitimacy (Amis et al., 2021; IoDSA, 2016). The sector's diversity, spanning both labour- and capital-intensive activities, provides meaningful cross-sectional variation in cost structures, skill mixes and organisational designs. Furthermore, the listed-entity context ensures broadly comparable reporting and oversight. In this context, the Marx Ratio offers a transparent, repeatable lens for IVD that complements narrative disclosure and traditional remuneration metrics (Irwin, 2018). Viewed through an institutional work lens, remuneration design, disclosure practices and narrative framing are the mechanisms through which distributional arrangements are created, maintained or contested (Hamann & Bertels, 2018). Establishing whether, and how, the Marx Ratio relates to ROA and EBITDA in this setting is, therefore, practically important, because it can inform remuneration narratives, strengthen monitoring routines and support investment discussions. It could also help organisations balance incentive effects with perceptions of fairness, while pursuing productivity and growth (Bamberger et al., 2021; Cowherd & Levine, 1992; Shaw, 2014).

7.2 Methodology Overview

The study analysed a balanced panel of 40 JSE-listed organisations in the Industrials super-sector, observed annually from 2014–2023 (400 organisation–years). Organisation–year inputs (profit, staff costs, headcount, total assets) were compiled from both Refinitiv Workspace and IRESS databases. When variations existed, the audited integrated reports were treated as authoritative and the data were updated to maintain consistency across the panel (IoDSA, 2016). IVD was operationalised via the Marx Ratio, a production-side index that links value creation to value allocation (Irwin, 2018). Organisational financial performance was captured by ROA and EBITDA. Standard covariates included organisational size, leverage, capital intensity and age. Variables were kept on interpretable, comparable scales, and no data points were considered or excluded as outliers.

Estimation used multivariate OLS to relate the Marx Ratio to both ROA and EBITDA, controlling for the covariates noted above, while reporting heteroskedasticity-robust standard errors (Wooldridge, 2010). Influence was assessed via Cook's distance, with re-

estimation excluding flagged cases, resulting in the findings remaining substantively unchanged and ensuring the balanced panel was retained (Cook, 2000). However, the 2020 observation year (COVID-19) was excluded from the modelling sample because of the system-wide shock that generated negative Marx Ratios for all organisations (Baker et al., 2020). A robustness check was conducted that re-included 2020 via an indicator but yielded consistent inferences. Coefficients were interpreted as associations rather than causal effects, consistent with the cross-sectional OLS research design (Wooldridge, 2010).

7.3 Key Findings and Interpretation

This section presents the results in direct relation to the research questions and provides a brief interpretation anchored on the study's theoretical frame, read through an institutional work lens. The research questions are restated verbatim and followed by the corresponding findings and interpretation. Before turning to the questions, a short recap of what the literature reports, and where gaps remain frames how the results should be read.

The literature is theoretically indecisive and empirically mixed on whether internal dispersion enhances or harms performance. Tournament-based arguments predict effort and sorting gains from steeper internal gradients, whereas accounts based on equity and fairness warn that wide differentials may erode cooperation beyond a threshold (Adams, 1965; Lazear & Rosen, 1981). International evidence reports positive, null and inverted U associations, often contingent on measurement choices, governance quality and competitive context (Chung et al., 2024; Kale et al., 2009; Rouen, 2020). South African evidence is relatively thin and seldom sector-specific, with few studies aligning distributional measures to operating outcomes in listed Industrials (Bamberger et al., 2021; Rasoava, 2019). Against this backdrop, this study tested whether IVD co-moved with asset efficiency (ROA) and earnings capacity (EBITDA) in the JSE-listed Industrials sector, and whether any association persisted within the observed dispersion range under robustness checks.

7.3.1 RQ1

What is the relationship between the Marx Ratio and organisational financial performance, measured by ROA and EBITDA, in organisations within the JSE Industrials super-sector?

Across the full panel, the Marx Ratio is positively associated with ROA. The Marx Ratio coefficient in relation to ROA is positive and statistically significant and remained directionally stable under influence checks. Interpreted within the observed range, a one percentage-point increase in ROA is associated with an approximately 0.07 unit increase in the Marx Ratio, other factors held constant. This pattern is consistent with agency alignment and tournament incentives, whereby credibly justified internal differentials support effort, coordination and capital stewardship (Jensen & Meckling, 1976; Lazear & Rosen, 1981).

For EBITDA, the association with the Marx Ratio was also both positive and statistically significant, albeit much weaker than ROA. Interpreted within the observed range, with EBITDA modelled in log form, a 2.7-fold increase in EBITDA is associated with an approximately 0.03 unit increase in the Marx Ratio, other factors held constant. The weaker association is consistent with EBITDA's greater sensitivity to short-term operating conditions and scale effects, whereas ROA captures asset-use efficiency (Carlson & Bussin, 2020; Rouen, 2020).

From a production perspective, these results indicate that tighter alignment between value creation and value capture co-moved most clearly with asset efficiency (ROA), rather than with operating scale (EBITDA) alone. In the Industrials context, which is characterised by both capital intensity and interdependent tasks, dispersion appears to track process discipline and utilisation rather than simple volume expansion.

7.3.2 RQ2

If a relationship exists, does its direction align more closely with agency and tournament theories (predicting a positive association) or with equity and stakeholder theories (predicting a negative association)?

Both the positive ROA and EBITDA associations aligned more closely with agency and tournament theories than with equity or stakeholder/legitimacy perspectives that would predict performance erosion under perceived unfairness (Adams, 1965; Freeman, 1984; Jensen & Meckling, 1976; Lazear & Rosen, 1981). Furthermore, within the realised dispersion range, no statistically credible non-linearity was detected, suggesting that any equity-related tipping point, as noted by other studies, lies beyond the range of this study (Bamberger & Belogolovsky, 2010; Shaw, 2014). Read through an institutional work lens, this pattern is consistent with remuneration design, disclosure and narrative practices that

create and maintain distributional arrangements supportive of asset efficiency (Hamann & Bertels, 2018). This does not imply that fairness or legitimacy are irrelevant, but rather that performance compatibility was observed when dispersion was credibly justified by productivity, role requirements and governance safeguards.

7.3.3 Integrated Interpretation

The study provides sector-specific evidence from a large emerging-market setting by documenting how IVD, operationalised via a production-side index, the Marx Ratio, related to performance in JSE-listed Industrials over the period 2014–2023. Whereas much prior work prioritised executive–worker ratios and developed-market data, this analysis broadened the evidence base by using audited organisational aggregates in a context with distinctive governance, disclosure and labour-market features (Amis et al., 2021; Irwin, 2018). The results show that higher ROA and, to a lesser extent, higher EBITDA, were associated with a higher Marx Ratio, indicating closer alignment between value creation and value allocation. The finding could help reconcile mixed international findings by showing that relationships vary by outcome (efficiency vs scale) and by institutional setting (Bamberger & Belogolovsky, 2010; Carlson & Bussin, 2020).

Within the observed dispersion, the evidence aligned more with agency and tournament mechanisms than with broad predictions of performance erosion from equity or stakeholder/legitimacy accounts, while acknowledging boundary conditions at higher spreads (Adams, 1965; Freeman, 1984; Jensen & Meckling, 1976; Lazear & Rosen, 1981). The institutional work perspective clarifies how these mechanisms are enacted, whereby remuneration architecture, disclosure routines and narrative framing are the means through which distributional arrangements are created, maintained or contested, with consequences for asset efficiency (Amis et al., 2021; Hamann & Bertels, 2018).

Presenting the Marx Ratio as a transparent, repeatable index that links value creation to value allocation complements narrative disclosure and traditional remuneration metrics. As the metric reconciles to audited lines, it supports comparability across organisations and time and invites cumulative research using consistent definitions (Irwin, 2018). By distinguishing efficiency-linked outcomes (ROA) from scale-sensitive outcomes (EBITDA), the study also underscores the value of outcome-specific theorising when evaluating distributional designs.

Taken together, these findings and contributions position IVD as a decision-useful lens on how organisations convert value creation into sustained performance under the King IV code's governance expectations. Section 7.4 translates these insights into managerial and policy implications.

7.4 Managerial and Policy Implications

The findings indicate that, when value creation and value allocation are more closely aligned, organisations use assets more efficiently (ROA). Viewed through an institutional work lens, this underscores the practical role of remuneration design, disclosure and narrative in shaping the distributional arrangements that support performance (Hamann & Bertels, 2018). The recommendations that follow translate these insights into actions for the principal decision-makers by articulating the economic logic, monitoring IVD alongside ROA/EBITDA, and standardising definitions to strengthen credibility and comparability.

7.4.1 Recommendations for Boards and Remuneration Committees

Boards should treat internal dispersion as a deliberate governance design variable. In remuneration reports and board minutes, the economic logic for differentials must be explicit and must clearly articulate how, in the organisation's context, internal gradients are expected to improve capability, coordination and capital stewardship. This aligns the outcomes-oriented disclosure expectations of the King IV code and anticipates enhanced pay-gap reporting under the Companies Amendment framework (IoDSA, 2016; Republic of South Africa, 2024). This narrative should be supported by an IVD monitoring dashboard that tracks the Marx Ratio alongside ROA and EBITDA each reporting cycle, together with a worker-pay proxy and a concise 'fairness' indicator derived from employee surveys or grievance data (see Appendix A for dashboard example). Together, these measures assist in realising incentive and selection benefits while signalling when dispersion could begin to erode cooperation (Adams, 1965; Bamberger & Belogolovsky, 2010).

Boards should also commit to guardrails, triggers and definitional discipline. An acceptable band for the Marx Ratio, informed by a subsector and business model, should be finalised upfront. In the event of a ratio breach, a formal review would have to be established to document corrective actions, such as design changes, capability investments or targeted communication. Additionally, definitions must be standardised. Profit per employee and remuneration per employee should reconcile to audited line items in the integrated/annual

report to enhance comparability and credibility and to align with prospective statutory disclosures (Alam et al., 2025; IoDSA, 2016; Irwin, 2018). When dispersion is used to drive effort and sorting, it should be paired with investments in skills, technology and process discipline, so that incentives are anchored on real productivity levers rather than narrative alone (Jensen & Meckling, 1976; Lazear & Rosen, 1981).

7.4.2 Recommendations for Investors and Leadership Teams

Investors and executive leaders should request consistent IVD metrics and accompanying narratives, including clear definitions of the Marx Ratio, a three-year trend, and a brief explanation of how dispersion supports value creation and stakeholder fairness (Freeman, 1984; Irwin, 2018). In investor engagements, the ratio helps test whether remuneration architecture is credibly linked to asset efficiency rather than to short-term cost containment. Furthermore, it can be used to assess whether board guardrails, triggers and workforce investments are in place to sustain performance compatibility over time. Furthermore, as pay-ratio disclosures shape real policies (higher dividends, lower cash), IVD should be read alongside payout, investment and efficiency metrics (Chowdhury & Doukas, 2025; Li et al., 2024).

7.4.3 Recommendations for Policymakers and Standard-Setters

Where pay-gap reporting is introduced or enhanced, policymakers and standard-setters should promote standardised, decision-useful disclosures. This can be achieved by providing clear calculation guidance aligned with the King IV code and the Companies Amendment framework, which enable sector-appropriate benchmarking and emphasise reconciliation to audited statements. Concise narrative requirements should connect internal distribution to value creation and organisational outcomes, rather than headline ratios alone, thereby improving comparability and usefulness, and discouraging generic, non-substantive disclosure by listed entities (Alam et al., 2025; IoDSA, 2016; Irwin, 2018; Republic of South Africa, 2024).

These implications situate IVD as a governance lever that is actionable for boards, informative for investors, and implementable within policy frameworks. The next section acknowledges the study limitations and outlines targeted areas for future research.

7.5 Limitations and Future Research

This study is associational by design, as multivariate OLS estimates indicate correlations rather than causal effects. To move closer towards causality, future work should incorporate distributed lags of the Marx Ratio and key controls, and apply dynamic panel estimators, such as system generalised method of moments, to address endogeneity (including potential reverse causality) and organisation-specific effects. In parallel, using credible instruments, such as remuneration peer effects or exogenous governance or disclosure shocks, would strengthen causal inference further (Wooldridge, 2010).

Alongside identification, measurement limits what can be inferred. IVD is captured via the Marx Ratio, which is transparent and repeatable, but relies on audited aggregates and does not observe the within-organisation distributional detail (Irwin, 2018). Future studies could triangulate this measure with richer pay-structure data (mean vs median and distributional tails) to test alternative, theory-consistent indices of internal distribution.

These proposed methodological extensions could be situated beyond the setting of this study. The study scope and external validity are limited to JSE-listed Industrials in South Africa during the period 2014–2023, which is a specific context with distinctive governance and disclosure norms. Furthermore, replication across sectors, ownership forms and jurisdictions would test generalisability and institutional boundary conditions (Amis et al., 2021).

Finally, effects vary by outcome and form. Results are strongest for ROA and weaker for EBITDA, with no credible non-linearity appearing within the observed dispersion (Bamberger & Belogolovsky, 2010; Shaw, 2014). As the 2020 shock year was excluded, extensions could model shock–year dynamics explicitly (distributed lags, interactions) and verify stability under alternative inclusion rules, further consolidating the robustness of the findings (Wooldridge, 2010).

7.6 Conclusion

This chapter draws the study to a close by linking its purpose, context and evidence to clear implications. By using the Marx Ratio as a production-side indicator of IVD, the analysis shows that stronger asset efficiency (ROA) and, more modestly, operating earnings (EBITDA), are associated with a higher Marx Ratio. Viewed against the four theoretical lenses and through an institutional work perspective, the pattern is most consistent with incentive-aligned dispersion under credible remuneration design, while

fairness and legitimacy remain important boundary conditions. Practically, boards and remuneration committees should make the economic logic of internal differentials explicit, monitor IVD alongside ROA and EBITDA with disciplined definitions and reconciliations, and act when metrics move outside agreed guardrails. Theoretically, the findings motivate methods that strengthen causal inference and measures that triangulate the Marx Ratio with richer pay-structure data. Overall, the study positions IVD as a practical lens for understanding how organisations convert value creation into sustained performance in South Africa's Industrials sector.

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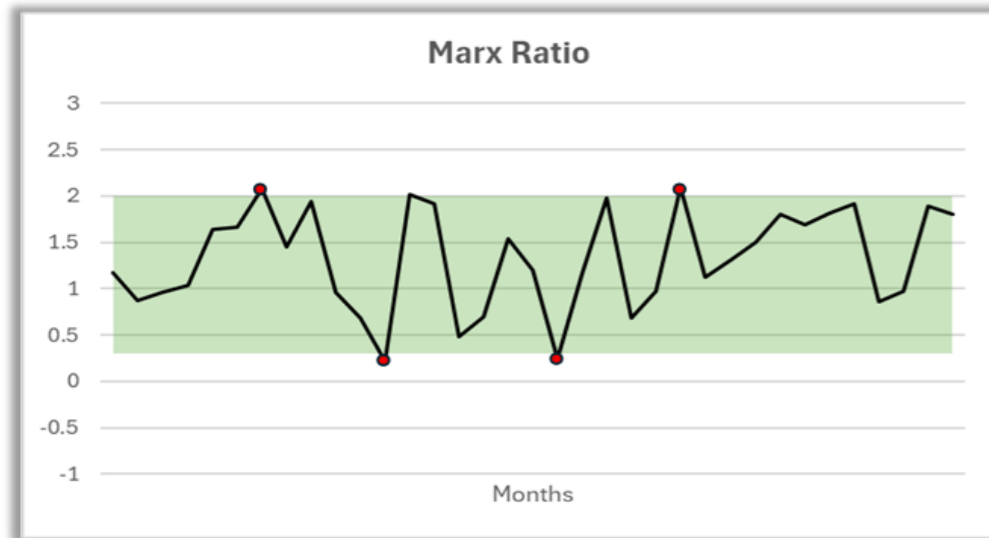
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Appendix A: IVD Monitoring Dashboard Example

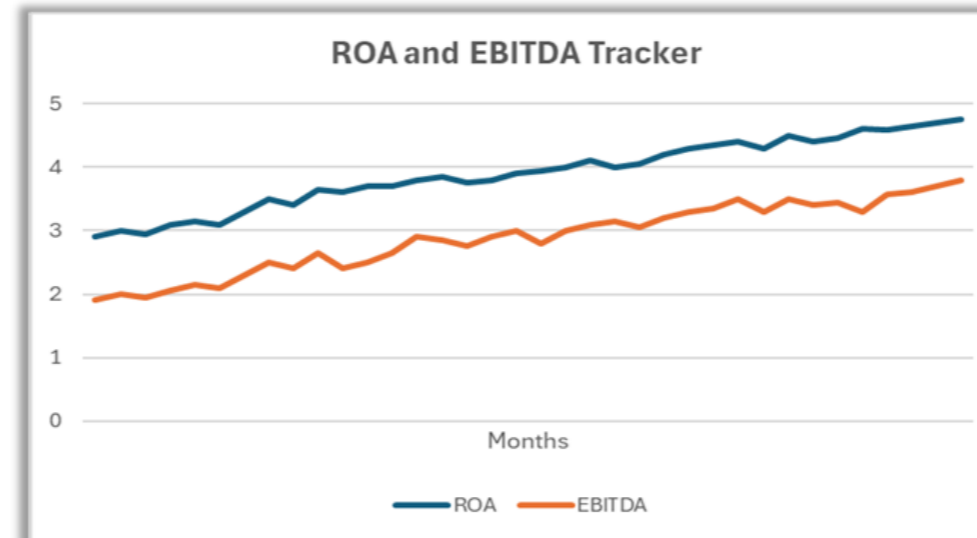


= Guardrail Area

= Trigger (Outside of acceptable range)

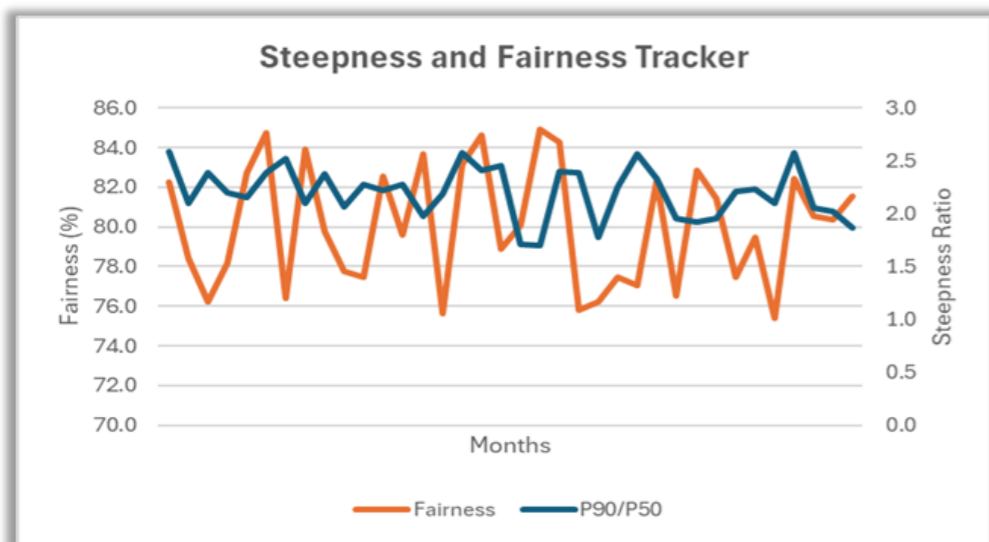
$$\text{Marx Ratio} = \frac{\text{Profit per employee}}{\text{Remuneration per employee}}$$

Purpose: Tracks the Marx Ratio over a period and highlights any deviations outside of the agreed guardrails



$$\text{ROA} = \frac{\text{NPAT}}{\text{Total Assets}}$$

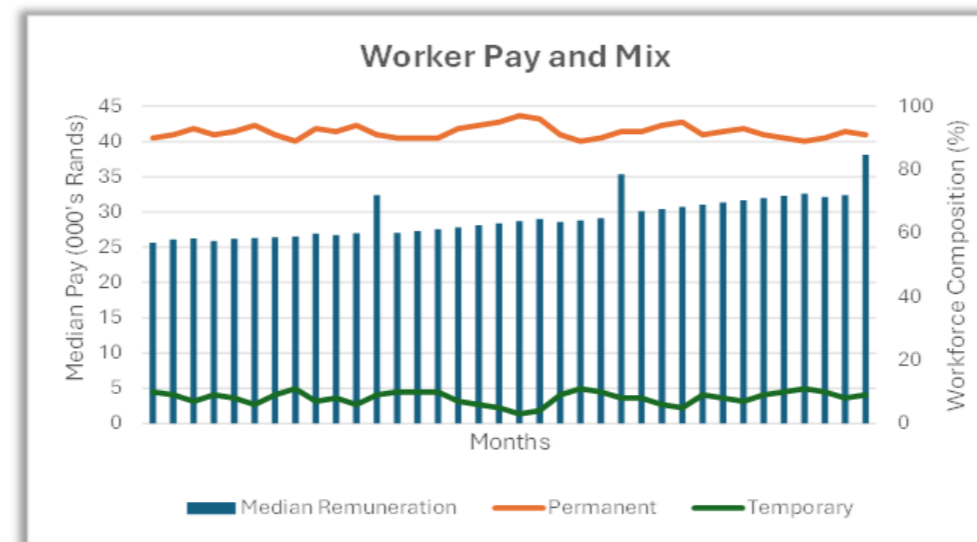
Purpose: If the Marx Ratio tracks with ROA and EBITDA changes, this suggests productivity/asset-efficiency gains rather than pay compression



$$\text{P90/P50} = \frac{\text{90th Percentile total cash pay}}{\text{50th Percentile (median) total cash pay}}$$

Fairness = Internal fairness survey (0 – 100)

Purpose: Tracks whether steeper splits are eroding perceived fairness



Purpose: Distinguishes genuine productivity changes (efficiency improvement vs decrease in pay or change in temporary staff)

Note: Values used are fictitious – the charts provide an overall sample of an IVD dashboard and do not reflect a specific organisation