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Market Power in an Emerging Economy: Evidence from South African Listed Nonfinancial Firms

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ABSTRACT
This study examines market power dynamics in South Africa, an emerging market and developing economy, by estimating firm-level markups for listed nonfinancial corporations and assessing their variation across time, sectors, firm size, profitability, and macroeconomic conditions. Design Using annual financial statement data for 215 Johannesburg Stock Exchange-listed nonfinancial firms across 16 sectors from 2004 to 2022, the study applies a production-based markup estimation method following De Loecker and Warzynski. Sales-weighted aggregate markups, sectoral distribution analysis, and fixed-effects panel regressions are used to evaluate markup movements and their relationship with firm performance and macroeconomic variables. The results show an average aggregate markup of 1.78, indicating market power, but no consistent upward trend as commonly observed in advanced economies. South African markups are volatile, rising during the commodity boom, declining during the global financial crisis and COVID-19 shock, and recovering by 2022. High markups are concentrated among large firms and in technology, real estate, and telecommunications, while transportation, oil and gas, and retail record lower markups. Markups are positively associated with profitability but negatively associated with interest rates and exchange rate depreciation. The study provides novel firm-level evidence on market power in an underexplored emerging economy and shows that markup dynamics in such contexts are shaped strongly by macroeconomic instability and commodity cycles. Policymakers should target dominant firms and high-markup sectors through stronger competition enforcement. The study is limited to listed firms; future research should include unlisted firms and causal macroeconomic modelling.

Keywords: Emerging Market and Developing Economies, Market Power, Markup, South Africa, Production-Based Method

INTRODUCTION

In South Africa, debates on competition policy have intensified because, competition among firms must be encouraged. However, weak competitive environments abound, allowing firms to obtain market power and set prices to the detriment of consumers. While market power can yield benefits like cost efficiencies and incentivise investments and innovation (Cavalleri et al., 2019)(Díez et al., 2021), its potential societal costs, including reduced consumer welfare, stifled innovation and investment, rent-seeking behaviour, and inefficient resource allocation (Cavalleri et al., 2019)(De Loecker et al., 2020), necessitate government intervention. To promote a more equitable wealth distribution and address the welfare implications of decreasing competition due to rising market power, government must institute policies that curb its undesirable effects on efficiency and resource allocation.

Market power allows firms to price above their marginal cost, typically expressed in higher markups (i.e., the ratio of price to marginal cost). Markups indicate a firm's pricing discretion, deviating from perfect competition where markup equals one. Undoubtedly, knowledge of markup trends at the firm and industry level is valuable in helping formulate competition policies. At the macroeconomic level markup plays an important role in the monetary transmission mechanism and how the economy responds to aggregate demand shocks. This is because firms make pricing or production decisions based on how these shocks affect their profit-maximising markups. The challenge for industrial organisation researchers is to develop measures of aggregate markups for the whole economy from micro-data (Olley & Pakes, 1996).

The rising market power of corporations recently observed in AEs is a concern of policymakers because of its implications on their economies' wellbeing. Recent cross-country studies at the International Monetary Fund (IMF) (Díez et al., 2019) show an upward trend of market power in selected AEs and EMDEs. Several country studies, like those for Belgium and the United Kingdom, show varying rates of increase in markups over time (De Loecker & Eeckhout, 2018) reported an increasing trend in the sales-weighted average markup

rate for firms in the United States (US) from 1.21 in 1980 to 1.61 in 2016. This was after a steady decline from an average of 1.34 in the 1960s. This notable shift in trend over time appears to show the evolution of market structures towards less competition in these economies (Syverson, 2019).

The analysis of markups in EMDEs has typically been within the context of broader multi-country studies, except for a study on Poland (Gradzewicz & Mućk, 2019) and Pakistan (Jamil et al., 2023). As of this writing, there appears to be little or no evidence of a prevalent rising pattern of movement in markup rates in EMDEs. In fact, the Poland study shows declining markup rates, which the authors attribute to globalisation and the emergence of global value chains (Gradzewicz & Mućk, 2019). The Pakistan study, meanwhile, shows that firm level markup in its textile sector remained unchanged with changes in trade policies, because its exports are homogeneous, low differentiated products (Jamil et al., 2023).

Studies in AEs attribute the upward trend in markups mainly to the technological prowess of firms and the birth of a few dominant ones resulting from mergers and acquisitions over time (Akcigit et al., 2021). It is unlikely that the factors driving markup trends in EMDEs are identical to those in AEs, simply because the technological skills of the AEs' workforce are largely lacking in EMDE labour markets. Discoveries and innovations, resulting from research and development (R&D) activities by firms in AEs, allow the creation of new products and confer temporary monopoly power to the innovating firms.

In EMDEs, however, R&D activities are not normally pursued by domestic firms, and innovation can hardly be a cause of markup trend movements in most of these countries. Changes in the economic environment due to several factors other than technological advances are arguably a more plausible explanation for the movement of markups in EMDEs. Prior studies suggest several reasons for the general markup movement, with little agreement, such as rising fixed and sunk costs, growing value of network effects and intangibles, expanding globalisation and international linkages, and the like.

A glaring difference between AEs and most EMDEs is the presence of weak institutional structures that fail to support market stability and encourage competition in EMDEs. As such, reasons like rising monopsony power, particularly in labour markets, increasing rent-seeking through such actions as price discrimination and lobbying, growing anticompetitive product market regulations, and weakening antitrust enforcement seem more plausible explanations for the markup movement in EMDEs.

Given the significant gap in the existing literature, this study examines market power in the lesser-studied EMDEs and offers a novel institutional context, South Africa. South Africa is a modestly sized upper-middle income and growing EMDE, with nominal gross domestic product of approximately USD 405 billion as of 2022, and an average GDP growth rate of approximately 1.5% since the turn of the century until before the COVID-19 pandemic hit (W. Bank, 2023). Unlike the Philippines and other faster-growing EMDEs, South Africa's growth trajectory has been constrained by structural unemployment, persistent energy supply disruptions, and governance challenges associated with state-owned enterprises. The country embraced comprehensive trade liberalisation following the end of apartheid and democratic transition in 1994, but prior decades of protectionism, state-directed industrial policy, and import substitution had already entrenched high levels of industry concentration in key sectors (Roberts et al., 2019). Prior industrial economics studies confirmed these patterns, with findings of high concentration and market power particularly across the banking, telecommunications, retail, and mining industries (Das Nair & Mondliwa, 2023).

The high level of wealth and resources concentrated in a few large conglomerates and business groups, coupled with a prevalence of cross-shareholdings and interlocking directorships among historically dominant enterprises, does not necessarily encourage a competitive environment. South Africa's Competition Act 89 of 1998 established the Competition Commission, Competition Tribunal, and Competition Appeal Court. Prior to the full operationalisation of these institutions, comprehensive competition policy was non-existent, and sector-specific regulations were fragmented across multiple government bodies. Additional legislative interventions have since been enacted, including amendments to the Competition Act to address market concentration, excessive pricing, and the participation of small firms and historically disadvantaged individuals in the economy (Africa, 2023). These are ongoing developments, and a thorough assessment of their cumulative impact on market power dynamics remains necessary.

Employing a production-based methodology pioneered by (De Loecker & Eeckhout, 2018), this study investigates market power trends at the aggregate and sectoral levels using financial statement data from non-financial South African publicly listed corporations (PLCs) spanning. The analysis reveals an average aggregate markup of 1.78, with upward and downward movements over this period, the global commodity boom and bottoming out in 2020 during the COVID-19 pandemic. The aggregate markup trend exhibits substantial

volatility, shaped by commodity price cycles, exchange rate movements, and shifting monetary policy conditions. This volatility may be attributed to the heightened sensitivity of South African firms to macroeconomic fluctuations, as evidenced by the negative co-movement between markups and macroeconomic variables (i.e., interest rates and exchange rates). Meanwhile, consistent with findings from AEs, this study observes: a positive relationship between firm size and markups, as well as markups and profitability (measured as economic profit rate and return on assets (ROA)), the substantial role larger firms play in markup movements, and the significant inter-sectoral variation in markups. Furthermore, the analysis indicates a shift towards a greater proportion of high-markup firms in 2022 compared to 2004.

This study significantly contributes to the empirical study of imperfect competition using the most recent methodological approach to market power, production-based estimation of markups using firm level data. It expands the limited body of literature on market power in EMDEs, by offering a novel institutional context, South Africa. It updates and broadens existing research on markups and competition in South Africa by (De Loecker & Eeckhout, 2018), by providing South African baseline estimates of market power and markup trends at the aggregate and sectoral level. It also goes beyond markup evolution by being one of the few studies in EMDEs, and to this study's knowledge the first in South Africa, that compares markups with other performance indicators, providing a more nuanced understanding of the relationship between markups and profitability, and with macroeconomic indicators, acknowledging that firm pricing decisions to preserve markups can largely be influenced by a country's macroeconomic environment. This study's findings provide crucial foundations for policymakers to develop and implement effective competition policies and antitrust regulations at the sectoral/industry level to help promote industry competition.

METHODOLOGY

Production-based Estimates of Markup

This study employs (De Loecker et al., 2020) production-based approach to estimate the output elasticity of the variable input used in the calculation of firm level markup rates. This methodology assumes that an input's share to total revenue is equal to its output elasticity only when the output price equals marginal cost. That is, the firm operates under competitive conditions, where price equals marginal cost. Deviation from marginal cost pricing indicates non-competitive firm behaviour (Peters, 2020).

To fix ideas, assume a cost-minimising firm produces output, q_{it}, using a variable input, v_{it}, and fixed capital, k_{it}. The Lagrange for this problem is:

$$L = w_{it} v_{it} + r_{it} k_{it} + \lambda_{it} [\bar{q}_{it} - q_{it}(v_{it}, k_{it})] \quad (1)$$

$\bar{q}_{it}$ is the given output level, while w_{it} and r_{it} are the price of the variable input and the user cost of capital, respectively. The firm chooses the variable input given the capital stock to minimise cost. The first order condition for the variable input, $w_{it} - \lambda_{it}(\partial q_{it}/\partial v_{it}) = 0$, can be multiplied through by v_{it}/q_{it} and rearranged to obtain an expression for the output elasticity of the variable input, θ^{v}_{it}:

$$\frac{\partial q_{it}}{\partial v_{it}} \times \left(\frac{v_{it}}{q_{it}}\right) = \left(\frac{w_{it}}{\lambda_{it}}\right) \times \left(\frac{v_{it}}{q_{it}}\right) = \theta^{v}_{it} \quad (2)$$

Where λ_{it} is the marginal cost.[1] Next, define the markup as the ratio of the output price, p_{it}, to marginal cost, $\mu_{it} \equiv p_{it}/\lambda_{it}$. Using (2) in this expression, the markup can be calculated as (Liu et al., 2022):

$$\mu_{it} = \theta^{v}_{it} \times \frac{p_{(it)q_{it}}}{w_{(it)v_{it}}} = \frac{\theta^{v}_{it}}{\alpha^{v}_{it}} \quad (3)$$

Where $\alpha^{v}_{it} \equiv w_{it} v_{it}/(p_{it} q_{it})$ is the share of the variable input cost to the total value of output. It is clear that $\mu_{it} = 1$ under perfect competition because of marginal cost pricing, that is, $p_{it} = \lambda_{it}$. In this case, the output elasticity in equation (3) is equal to the input's revenue share, $\theta^{v}_{it} = \alpha^{v}_{it}$. This is no longer true under imperfect competition because the markup drives a wedge between the price and marginal cost and therefore, $\theta^{v}_{it} \neq \alpha^{v}_{it}$.

Numerically calculating a firm's markup requires information on three variables: (1) total sales, (2) the cost of its variable input to calculate the revenue share of this input, and (3) the output elasticity, which can be derived by econometrically estimating the parameters of its production function. De Loecker and Warzynski (2012) estimate the production function parameters using a two-step procedure originally due to (Haldane et al., 2018). The method is designed to account for the effects of unobservable productivity shocks on the firm's

demand for inputs, and thus addresses the endogeneity issue. The idea is that large positive productivity shocks induce firms to demand more inputs, and hence ordinary least squares (OLS) estimation is inappropriate, for it will produce biased estimates (Levinsohn & Petrin, 2003).

Consider a Cobb-Douglas production function in logs:

$$q_t = \beta_0 + \beta_l l_t + \beta_k k_t + \varepsilon_t = \beta_0 + \beta_l l_t + \beta_k k_t + \omega_t + \varepsilon_t \quad (4)$$

Where ε_t is an unobservable shock to production that can represent potentially serially correlated measurement errors and/or unexpected occurrence of events affecting the firm's production. ω_t is the unobservable productivity shock that can be predicted by the firm when it makes its input decision. [2] If ω_t can be predicted or partially observed by the firm, the decision to hire inputs then partly depends on ω_t. Thus, OLS parameter estimates of (4) will be inconsistent (Grullon et al., 2019)(Gradzewicz & Mućk, 2019).

The OP method proposes an investment policy function, $i_t = f_t(k_t, \omega_t)$, that can be used to proxy for productivity shock. Under the assumption of a strict monotonically increasing relationship between productivity shock and investment, one can invert the policy function, $\omega_t = f_t^{-1}(k_t, i_t)$, which can be used in (4):

$$q_t = \beta_l l_t + \varphi_t(k_t, i_t) + \varepsilon_t \quad (5)$$

where $\varphi_t(k_t, i_t) = \beta_0 + \beta_k k_t + f_t^{-1}(k_t, i_t)$ is treated non-parametrically.

This in effect replaces the unobservable shock, and the investment function is essentially used to control for unobserved productivity. In the first stage of OP, estimates of β_l and φ_t are derived from (4) using generalised methods of moments (GMM) and the moment condition is:

$$E(\varepsilon_t \mid l_t) = E[q_t - \beta_l l_t - \varphi_t(k_t, i_t) \mid l_t] = 0 \quad (6)$$

It is assumed that the productivity shock follows a first order Markov process, $\omega_t = g(\omega_{t-1}) + \xi_t$. Using this in (4) and the estimated parameters from the first stage, one obtains:

$$E(\varepsilon_t \mid l_t) = E[q_t - \beta_l l_t - \varphi_t(k_t, i_t) \mid l_t] = 0 \quad (7)$$

From this, the moment condition used in the second stage estimation is obtained:[3]

$$E(\xi_t + \varepsilon_t \mid l_t) = E[q_t - (\beta_0 + \beta_l l_t + \beta_k k_t + g(\varphi_{t-1}(k_{t-1}, i_{t-1}) - \beta_0 - \beta_k k_{t-1})) \mid l_t] = 0 \quad (8)$$

Several modifications to the original OP methods have been proposed (Levinsohn & Petrin, 2003) (LP), which also uses a two-stage process, replace the investment function with the firm's intermediate input demand function, which when inverted yields the function to control for productivity: $\omega_t = f_t^{-1}(k_t, m_t)$. The concern of this study is based more on data availability, since many firms report no investment at all, unlike intermediate inputs where a vast majority report usage. Wooldridge's (2009) algorithm, adopted in this study, reworks the OP and LP methodologies to estimate the parameters more efficiently and to make the calculation of standard errors easier. His method uses the moment conditions derived from equations (4) and (5) to jointly estimate their parameters by GMM and does away with the two-step process. This method also avoids the functional dependence problems identified by (Ackerberg et al., 2015) in the OP and LP methodologies. (Wooldridge, 2009) method, as implemented by (Rovigatti & Mollisi, 2018), is used in this study with investment as the proxy.

Sources of Data

Annual financial statement data of 268 non-financial PLCs from 2004 to 2022 are sourced from Refinitiv Datastream/LSEG. The data is limited to the pre-2023 period to ensure data completeness across all sample firms and to capture a full 19-year panel that predates the most recent annual reporting cycle; the data was collected for analysis purposes in 2024. There is a high probability that the input-output relationships observed during the COVID-19 period differ markedly from those observed in non-pandemic periods. However, since South Africa's severe lockdown measures were largely concentrated in 2020, this year is retained in the sample to allow for analysis of the pandemic's effect on markup dynamics rather than excluded entirely, consistent with the objective of capturing the full macroeconomic sensitivity of firm-level markups.

Two hundred forty-two firms remain in the dataset after eliminating firms with less than three years of observations. The number of firms is further reduced to 215 after removing redundant entries and holding companies, as they do not engage in the production of goods or services. The financial statement variables used in the estimation of output elasticities and the calculation of the markups are the firm's sales, cost of goods sold (COGS), capital expenditures (CAPEX), and gross property, plant and equipment (PPEG).[4] These are

converted to real terms by deflating them with price deflators from the national income accounts. These prices are obtained from Statistics South Africa (Stats SA) and include sectoral implicit price deflators, the producer price index, and the implicit price index for gross fixed capital formation. Some financial statement variables used in this study are winsorised to remove outliers, and values identified as errors are removed (e.g., negative COGS). This study's final dataset covers a 19-year period from 2004 to 2022, with 215 firms classified into 16 sectors. The sector classification is based on the South African Standard Industrial Classification (SASIC), a classification system patterned after the International Standard Industrial Classification issued by the United Nations Statistics Division (Aghion et al., 2008).

One criticism of using data from PLCs is that small and medium scale firms, abundant in EMDEs, are not adequately represented in the dataset. Indeed, PLCs represent the largest firms in South Africa, with total JSE market capitalisation equivalent to approximately 72% of the country's GDP as of 2022. However, this concentration does not hinder the analysis of market power, as these firms are most likely to possess it.

The sectoral prices used to convert nominal magnitudes to real are based on the sectoral categories of the national accounts constructed by Stats SA. The macroeconomic and financial data used in this study, interest rates on government bonds and exchange rates (ZAR/USD), are obtained from the South African Reserve Bank (SARB).

Markup Calculations

Since firm markup is calculated as the ratio of the output elasticity of the variable input to its share in total sales, the Cobb-Douglas output elasticities are estimated for each of the 16 sectors. The estimates are obtained following (S. A. R. Bank, 2024) simplification of the two-step econometric OP method (1996). The one-step implementation of this procedure uses the Stata code from (Rovigatti & Mollisi, 2018). Table 1 shows the estimated coefficients of the variable input (Traina, 2018).

To view the general pattern of movements of the markup, the aggregate markup μ_t is calculated as the sales-weighted average of firm level markups:

$$E(\xi_t + \varepsilon_t \mid l_t) = E[q_t - (\beta_0 + \beta_l l_t + \beta_k k_t + g(\varphi_{t-1}(k_{t-1}, i_{t-1}) - \beta_0 - \beta_k k_{t-1})) \mid l_t] = 0 \quad (9)$$

where $m_{it} = s_{it} / \Sigma_i s_{it}$ is the share of firm i sales in total sales in period t.

Table 1. Cobb-Douglas Parameter Estimates

Sector	θ*	Standard error
Basic materials	0.828	0.030
Chemical products	0.845	0.028
Construction	0.855	0.026
Consumer goods	0.884	0.018
Financial services	0.441	0.042
Healthcare	0.685	0.036
Media	0.801	0.058
Mining	0.652	0.051
Not elsewhere classified (NEC)**	0.764	0.029
Oil and gas	0.928	0.034
Real estate	0.843	0.021
Retail	0.914	0.015
Technology products and services	0.645	0.056
Telecommunications	0.568	0.047
Transportation	0.698	0.043
Utilities	0.692	0.039

Notes: * θ = Variable input. ** NEC is a catch-all category used for companies that do not fit existing categories or for companies with no peers, making industry markups impractical.

Mean and Standard Deviations of Markup

Table 2 presents the means and Table 3 the standard deviations of the dataset used in this study for the aggregate and individual sectors. Both tables present financial and performance metrics, revealing significant inter-sectoral variations in these indicators. By focusing on sectors with extreme performance (highest and lowest) during the period 2004 to 2022 and comparing them to their respective standard deviations, insights are gained into sector-level stability and variability. For instance, the financial services sector has the highest π rate (M = 35.12) with moderate variability (SD = 22.45), indicating strong and relatively stable profitability. In contrast, the oil and gas sector demonstrates the lowest π rate (M = -46.25) coupled with high volatility (SD = 218.42), reflecting the sector's dependence on commodity price cycles and global crude oil dynamics. Similarly, the financial services sector displays the highest ROA (M = 17.48, SD = 13.85), suggesting efficient asset utilisation, while the retail sector exhibits the lowest ROA (M = 3.15, SD = 6.12), indicating less efficient asset utilisation consistent with the high-volume, low-margin nature of retail operations. Finally, the technology products and services sector exhibits the highest markup (M = 3.18) with moderate variability (SD = 0.88), implying strong market power, while the transportation sector displays the lowest markup (M = 1.05, SD = 0.12), suggesting weaker market power consistent with the competitive and regulation-intensive nature of transport operations in South Africa.

Further exploring the relationships between π rate and markup, as well as ROA and markup, reveals how market power moves with overall profitability and asset efficiency across different sectors. A positive relationship generally exists between π rate and markup, as exemplified by the financial services sector with both high π rate (M = 35.12) and high markup (M = 2.48), and conversely, the oil and gas sector with a very low profit rate (M = -46.25) and low markup (M = 1.08). However, exceptions exist, such as the real estate sector, which despite a high markup (M = 2.94), exhibits a negative π rate (M = -12.15). This may suggest that despite strong market power, the sector faces profitability challenges, potentially due to factors like high property development costs, asset write-downs related to load-shedding impacts on property values, and significant capital investments that do not immediately translate into profits.

A positive relationship is generally observed between ROA and markup, with the financial services sector demonstrating high ROA (M = 17.48) and high markup (M= 2.48), and the oil and gas sector exhibiting comparatively lower ROA (M= 6.85) and low markup (M= 1.08). However, the mining sector, with a high markup (M= 2.82), exhibits a negative ROA (M= -3.85) over the full period, indicating that despite market power, the sector's cyclicality and elevated capital requirements reduce overall asset returns. These countervailing examples underscore the fact that a high markup does not invariably translate into high profitability or efficient asset utilisation. Various factors, such as operational costs, commodity price cycles, market conditions, and asset management practices, play crucial roles.

Table 2. Means of Markup

Sector	Sales (ZAR mn)	COGS (ZAR mn)	CAPEX (ZAR mn)	PPEG (ZAR mn)	Total Assets (ZAR mn)	π[1] (ZAR mn)	π Rate[2] (%)	ROA[3] (%)	Mark up[4]
Economy-wide	19,845.12	13,012.48	2,185.32	26,418.25	36,215.48	3,542.18	2.48	8.15	1.78
Basic materials	4,218.42	2,644.85	382.15	3,815.62	6,128.45	445.32	4.25	4.85	1.31
Chemical products	2,812.18	1,857.42	228.45	3,104.18	4,388.25	385.12	3.78	4.15	1.30
Construction	14,818.25	9,319.82	1,488.42	20,218.15	26,815.42	4,125.18	2.18	6.88	1.36
Consumer goods	22,418.48	15,856.12	1,125.35	12,218.42	20,818.25	2,985.45	5.85	7.25	1.25
Financial services	2,115.25	376.42	172.18	1,218.45	8,518.12	1,485.35	35.12	17.48	2.48
Healthcare	11,518.42	4,780.25	1,385.18	10,942.35	14,782.48	2,985.12	13.15	12.42	1.65
Media	9,818.15	4,182.48	985.25	13,942.18	17,218.35	3,815.42	21.85	17.25	1.88
Mining	52,218.35	12,042.15	8,852.48	97,825.42	113,418.25	−9,418.15	−18.25	−3.85	2.82
NEC	13,518.12	7,279.42	818.25	6,082.15	14,882.35	2,715.48	8.52	4.85	1.42
Oil and gas	58,218.48	50,022.15	3,495.42	32,018.25	41,818.12	3,215.35	−46.25	6.85	1.08
Real estate	6,518.25	1,869.42	1,435.18	14,318.48	38,025.35	2,815.12	−12.15	12.85	2.94
Retail	35,218.42	28,578.15	1,755.35	19,282.48	29,818.25	1,285.18	1.92	3.15	1.12

Technology	36,218.15	7,352.42	9,018.25	153,218.48	87,218.35	12,418.12	−10.15	3.82	3.18
Telecommunications	30,218.42	5,892.15	6,618.35	54,618.12	70,518.48	8,215.25	15.15	9.82	2.92
Transportation	29,518.35	19,628.42	5,025.18	56,682.25	47,818.15	1,625.48	10.52	6.45	1.05
Utilities	51,218.12	30,032.48	6,128.15	79,128.35	99,518.42	9,855.25	19.52	6.82	1.18

Notes: [1] Economic profit, see equation 10; [2] Profit rate, see equation 11; [3] Return on assets = Economic profit/Total assets; [4] Markup, see equation 3. NEC = Not elsewhere classified.

Table 3. Standard Deviations of Markups

Sector	Sales (ZAR mn)	COGS (ZAR mn)	CAPEX (ZAR mn)	PPEG (ZAR mn)	Total Assets (ZAR mn)	π[1] (ZAR mn)	π Rate[2] (%)	ROA[3] (%)	Mark up[4]
Basic materials	3,215.42	2,412.18	325.35	2,918.25	4,215.48	412.15	28.15	6.12	0.12
Chemical products	2,415.18	1,815.42	252.25	2,685.35	3,218.12	382.48	25.85	5.85	0.11
Construction	18,215.35	11,215.48	2,815.12	25,215.18	38,215.42	6,215.25	72.15	18.15	0.14
Consumer goods	38,215.12	26,215.35	2,915.48	22,815.25	38,215.18	5,815.42	15.15	14.25	0.07
Financial services	2,815.48	1,715.12	325.18	1,018.42	9,218.35	1,215.25	22.45	13.85	1.15
Healthcare	16,218.25	6,512.48	2,218.35	12,815.12	18,215.42	3,215.18	18.15	10.12	0.68
Media	12,215.42	5,815.18	1,618.25	16,215.35	21,215.48	1,715.12	9.85	9.25	0.18
Mining	82,215.18	38,215.42	15,215.35	182,215.12	215,215.48	25,215.25	74.85	16.25	0.42
NEC	26,215.35	22,215.12	1,118.48	7,215.42	26,215.18	4,815.25	35.15	11.15	0.25
Oil and gas	128,215.12	118,215.48	7,215.25	62,215.18	88,215.35	7,215.42	218.42	12.15	0.05
Real estate	18,215.48	8,215.25	5,615.12	45,215.42	88,215.18	7,815.35	248.15	195.15	0.62
Retail	58,215.25	54,215.18	2,215.42	22,215.35	32,215.12	1,215.48	3.15	6.25	0.04
Technology	62,215.18	24,215.42	16,215.25	215,215.35	142,215.12	22,215.48	80.15	28.15	0.88
Telecommunications	15,215.42	5,815.25	2,615.18	22,215.12	52,215.48	8,215.35	22.15	16.15	0.48
Transportation	45,215.18	38,215.35	7,215.42	68,215.25	66,215.12	3,715.48	9.85	5.65	0.12
Utilities	82,215.35	48,215.12	8,215.48	88,215.42	118,215.25	10,215.18	20.15	7.15	0.14

Notes: [1] Economic profit, see equation 10; [2] Profit rate, see equation 11; [3] Return on assets = Economic profit/Total assets; [4] Markup, see equation 3. NEC = Not elsewhere classified.

Markup Evolution

The aggregate markup for the period 2004 to 2022 shown in Figure 1 ranges from 1.52 to 2.08 in 2020 and 2007, respectively. The average for the 19-year period is 1.78. There is an upward trend from the beginning of the sample period until 2007, driven largely by the global commodity boom that substantially benefited South Africa's resource-intensive economy, with rising mineral export revenues flowing through to higher pricing power across linked industries. the global financial crisis period around 2007–2009, is one of the reasons for the succeeding downward slide. After a partial recovery in 2010 and 2011, a sustained decline that bottomed out in 2015 is observed, coinciding with the global commodity downturn, declining investor confidence, rising political uncertainty, and widening current account deficits in South Africa. A modest recovery followed from 2016 to 2019 before a precipitous decline in 2020, attributable to the COVID-19 pandemic and the resulting severe economic lockdowns implemented across South Africa. From this point on, a recovery trend is observed, with the 2022 level reaching 1.88. The period can be divided into two subperiods. The average markup from 2004 to 2012 is 1.88. From 2013 onward, the average markup falls to 1.68, suggesting a structural moderation in aggregate market power coinciding with the post-commodity-boom era and the increased enforcement activity of the Competition Commission.

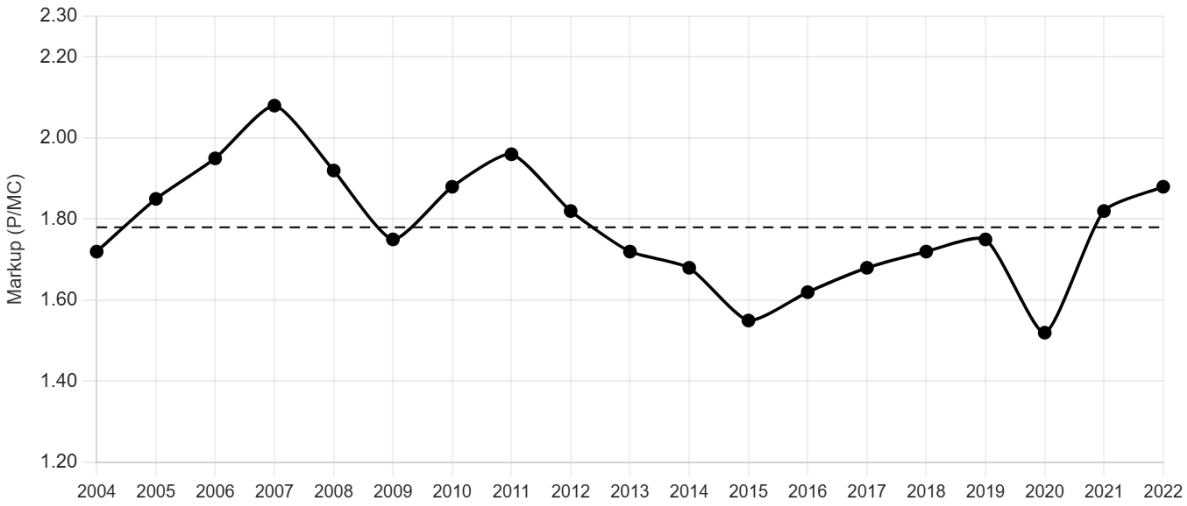

Figure 1. Sales-Weighted Aggregate Markup of Non-Financial South African PLCs

Markup Distribution

Breaking down the aggregate markup into various distributions can provide valuable insights that are not apparent from the aggregate result alone. It can highlight variations in data by firm size and sector, as well as identify patterns and trends by time and deciles.

(a) Distribution by firm size. Figure 2 shows the direct relationship between the markup and firm size, as measured by total asset holdings. The mean and median markup of the largest 20% of firms (quintile 5) are 2.42 and 1.72, respectively, while the lowest 20% of firms (quintile 1) has a mean and median of 1.58 and 1.15, respectively. This pattern is consistent with findings from AEs (De Loecker et al., 2020; Díez et al., 2021), where larger firms consistently extract greater markups. In the South African context, this is attributable to the historically entrenched concentration of economic activity among a small number of large conglomerates and business groups, which leverage their scale advantages to maintain pricing power.

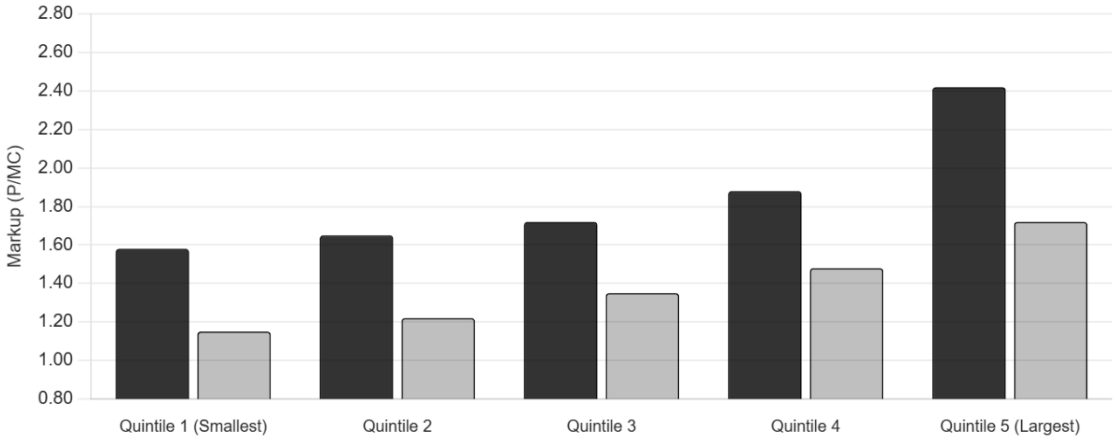

Figure 2. Average and Median Firm Markup By Firm Size (Total Assets)

(b) Distribution by sector. Figure 3 shows the 19-year average markup, while Figure 4 depicts the markup movement of the 16 sectors. The technology products and services sector has the highest 19-year average markup of 3.18, followed closely by the real estate sector at 2.94 and the telecommunications sector at 2.92. The technology sector encompasses a range of JSE-listed entities spanning software, digital media, financial technology, and data services. Their high markups reflect strong network effects, high customer switching costs, and significant intangible asset bases. The telecommunications sector's high markup mirrors the highly concentrated structure of South Africa's mobile telecommunications market, dominated by a small number of large operators, with network infrastructure constraints serving as an effective barrier to entry. The transportation sector, meanwhile, has a 19-year average markup of only 1.05, reflecting the competitive and regulation-intensive nature of South African transportation industries, particularly freight and logistics. The oil

and gas sector's low markup of 1.08 reflects the high and volatile cost of crude inputs relative to downstream selling prices, compressing margins throughout the sample period.

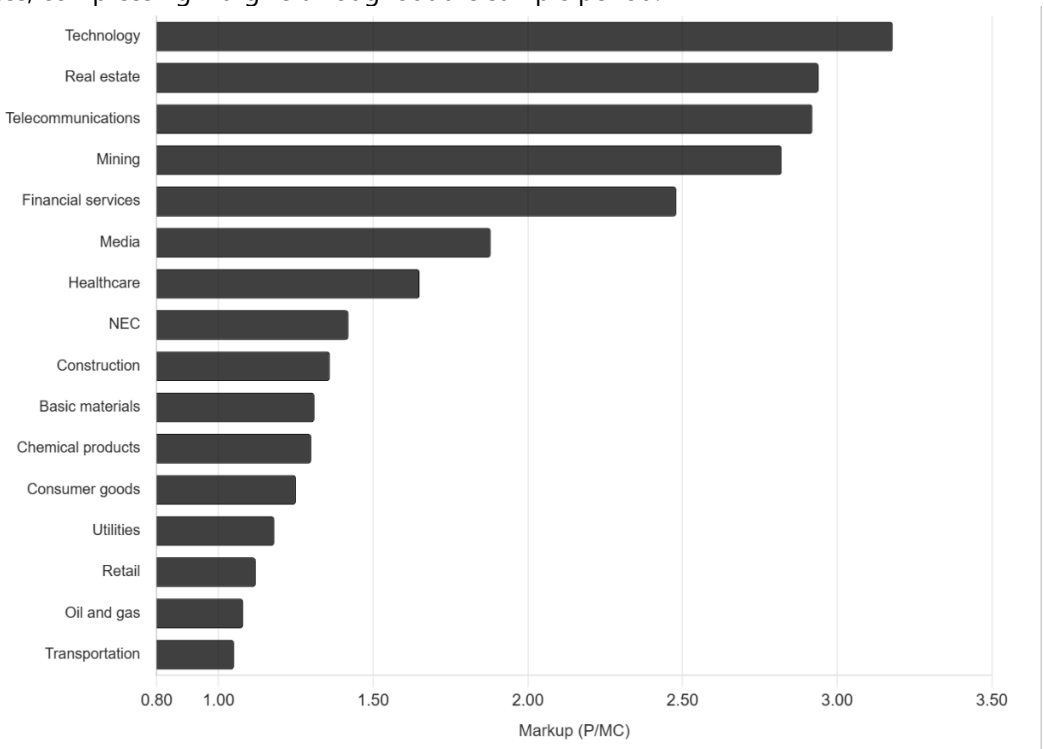

Figure 3. 19-Year Average Sectoral Markup

Figure 4 reveals the time-varying nature of sectoral markups across the 16 sectors. Several sectors, including mining, telecommunications, and technology, exhibit pronounced cyclicality, with peaks broadly coinciding with the commodity boom of 2006 to 2008. The mining sector in particular shows the widest fluctuations, reflecting the well-documented sensitivity of South African mining firms to global commodity prices, which feed through to pricing power and cost structures. The financial services sector demonstrates comparatively stable high markups throughout the period, while the oil and gas and retail sectors maintain relatively flat and low markups with limited movement.

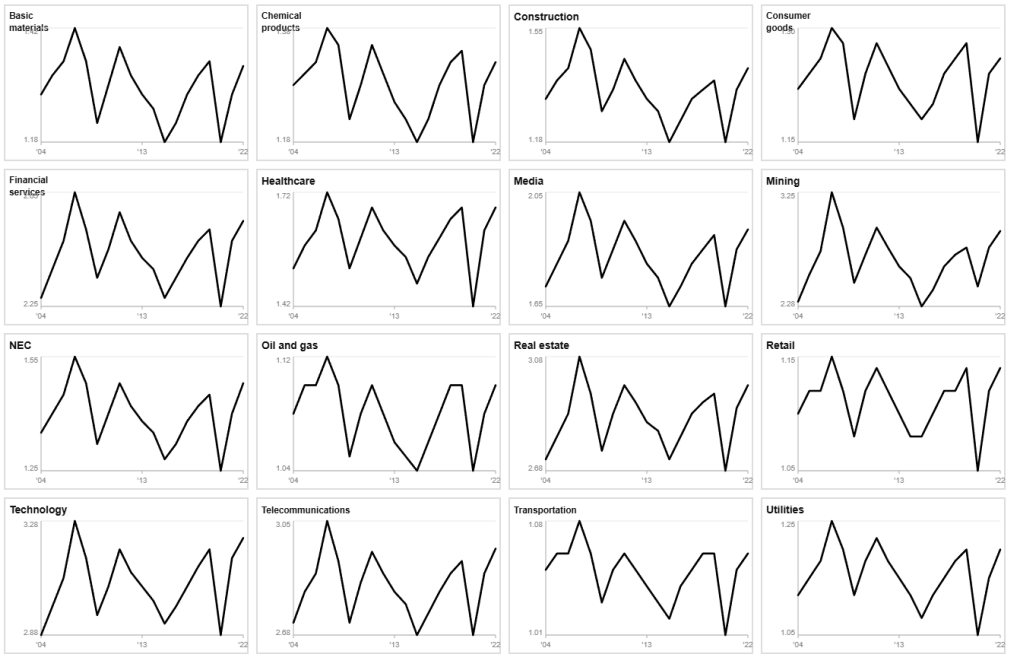

Figure 4. Sectoral Markup Trends

(c) Distribution by time**.** Following De Loecker et al. (2020), Figure 5 maps the markup distribution at the beginning (2004) and end (2022) of the sample period. It is clear from the kernel density plot that the 2022 distribution is flatter and has a thicker upper tail, indicating an increase in the proportion of high-markup firms compared to the beginning of the sample period. The 2022 distribution also shows a slightly lower modal value, suggesting that while high-markup firms have gained prominence, the median firm has not necessarily experienced a sustained rise in market power over the period. This pattern is broadly consistent with findings in AEs where increases in average markups are largely driven by firms at the top of the markup distribution rather than broad-based increases across all firms (Calligaris et al., 2018; De Loecker et al., 2020).

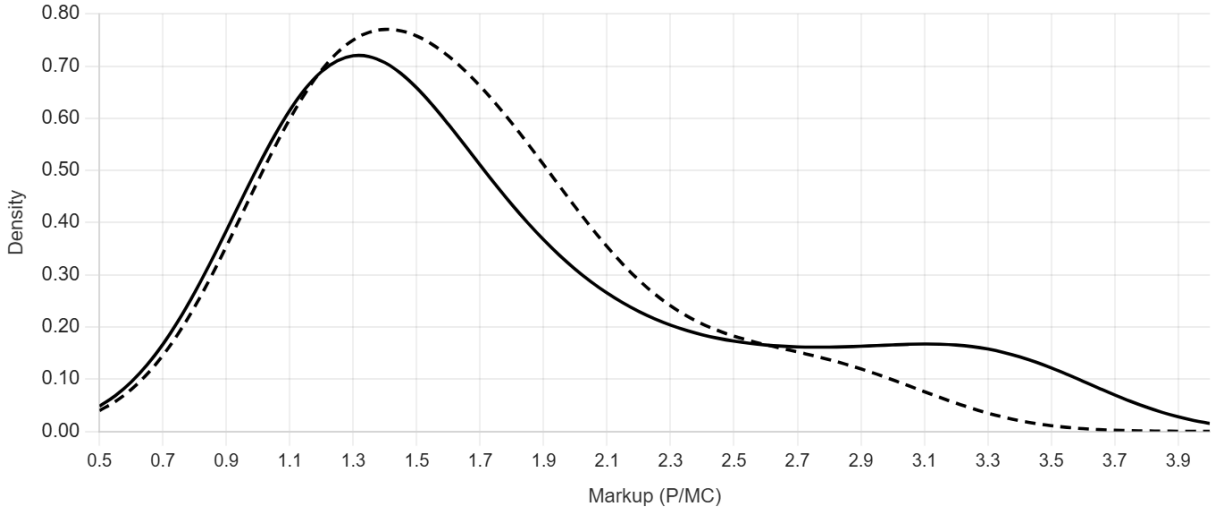

Figure 5. Figure 5. Markup Distribution in 2004 and 2022

(d) Distribution by decile. Using sales weights on the aggregate markup yields a clearer picture of the markup distribution. For comparability with the aggregate markup, firms are ranked based on percentiles derived from firm markups weighted by their market share over the entire sample period. Figure 6 graphically displays the calculated moments of the distribution. It reveals that the aggregate markup movement is largely driven by firms in the top decile of the markup distribution. This category also exhibits higher volatility than other decile groups. Conversely, the median remains relatively stable, indicating markups in the lower half of the distribution experience minimal fluctuations. This finding carries important policy implications: it suggests that competition policy interventions targeting a relatively small number of high-markup, large-market-share firms may have a disproportionately large impact on reducing aggregate market power in South Africa.

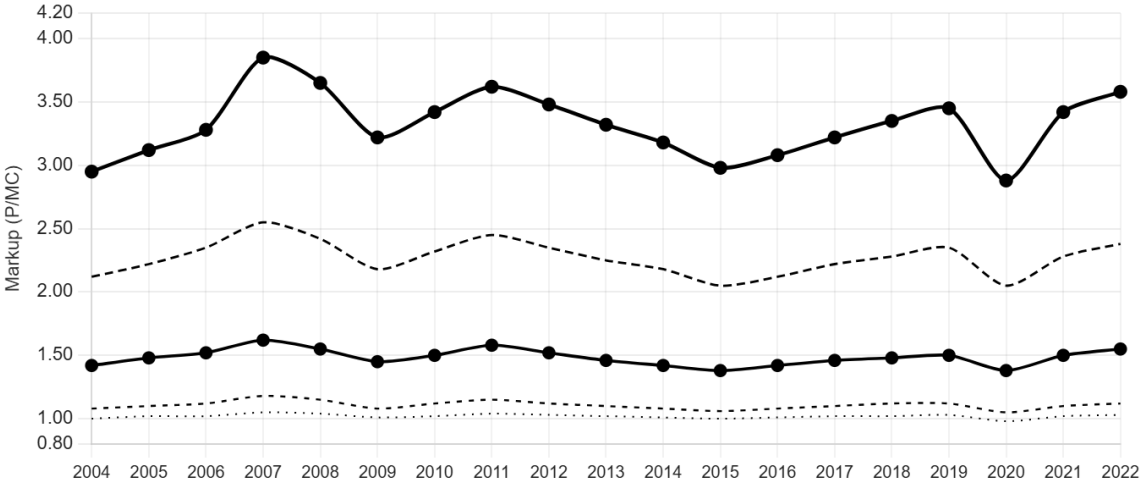

Figure 6. Sales-Weighted Markup Distribution (P10, P25, Median, P75, P90)

ESTIMATION RESULTS

This section explores the relationship between markups and other key variables. Regressions are conducted to assess the association between markups and firm performance indicators (i.e., π rate and ROA), as well as markups and macroeconomic indicators (i.e., interest rates and exchange rates).

Markup in Relation to Firm Performance

Economic profit can be written as:

$$\Pi_{it} = \text{SALES}_{it} - \text{COGS}_{it} - \text{SGA}_{it} - r_{it}\, k_{it} \quad (10)$$

Where SGA refers to selling, general and administrative expenses, and the last term is the user cost of capital, r, multiplied by the capital stock, k (i.e., PPEG). The π rate, also referred to as the economic profit rate, is the ratio of economic profit to total sales:

$$\pi \text{ rate}_{it} = \frac{\Pi_{it}}{\text{SALES}_{it}} = 1 - \frac{\text{COGS}_{it}}{\text{SALES}_{it}} - \frac{\text{SGA}_{it}}{\text{SALES}_{it}} - \frac{r_{(it)k_{it}}}{\text{SALES}_{it}} \quad (11)$$

Meanwhile, the ROA is the ratio of economic profit to total assets.

The profitability measures are presented in Figure 7, which shows both the π rate and ROA alongside the markup for selected years, underscoring the general alignment between high-markup sectors and superior profitability outcomes. Financial services, media, and telecommunications consistently appear at the upper end of both the profitability and markup distributions. Transportation, oil and gas, and retail remain at the lower ends of both dimensions throughout the sample.

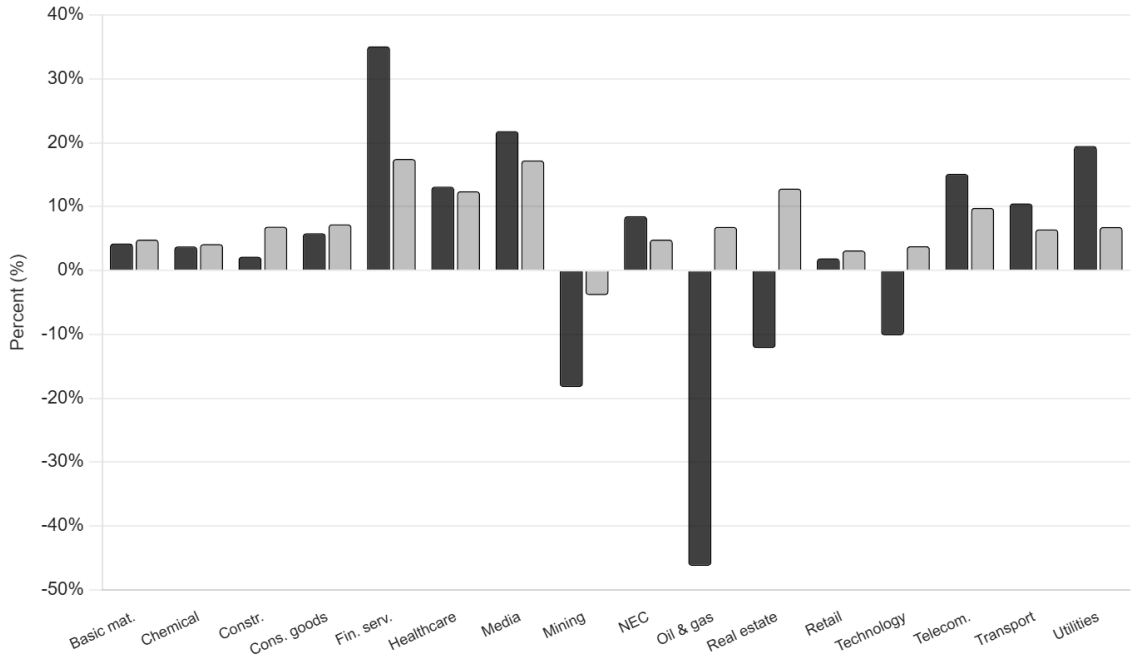

Figure 7. Economic Profit Rate (π rate) and ROA By Sector, Period Averages

Table 4 presents firm level fixed effects panel regressions of the π rate and ROA against the markup and market share. The market share is calculated as the share of the firm's sales to total sectoral sales. All the variables are in logarithms. The markup coefficient is significantly different from zero but is not significantly different from 1. This shows a unit elastic relationship between the π rate and ROA versus the markup, meaning that a 1% increase in markup is associated with approximately a 1% increase in profitability measures. This result corroborates findings for AEs, where the positive association between markups and profitability has been consistently documented (De Loecker et al., 2020). Market share carries a positive and significant coefficient when included, indicating that firms with greater sectoral market share capture additional profitability beyond what is explained by markup alone, consistent with the notion that market share confers bargaining advantages and cost efficiencies (Edmond et al., 2023).

Table 4. Fixed Effects Panel Regression Results: Markup And Firm Performance

Variables	π rate	π rate	π rate	ROA	ROA	ROA
	-1	-2	-3	-4	-5	-6
Markup	0.985***	1.012***	0.958***	0.912***	0.955***	0.888***
	(0.168)	(0.166)	(0.158)	(0.172)	(0.168)	(0.170)

Market share		0.282***	0.225***		0.458***	0.378***
		(0.057)	(0.061)		(0.106)	(0.110)
Time effects	Yes	Yes	No	Yes	Yes	No
F-statistic	5.48	6.12	—	4.02	5.52	—
(p-value)	(0.00)	(0.00)	—	(0.00)	(0.00)	—
Observations	1,428	1,428	1,428	1,428	1,428	1,428
Firms	165	165	165	165	165	165

Notes: Dependent variables are the π rate (columns 1 to 3) and ROA (columns 4 to 6). All variables in logarithms. Robust standard errors in parentheses. *** p < 0.01. Smaller sample of 165 firms due to availability of SGA data required to compute economic profit.

Markup in Relation to the Macroeconomic Environment

The aggregate markup derived from microeconomic estimates can be related to selected macroeconomic variables. Graphical representations of the relationship of the aggregate markup with interest rates and exchange rates in Figures 8 and 9, respectively, appear to show a general co-movement of the aggregate markup and these macro variables. The South African repo rate, which is the primary policy instrument of the SARB, follows a broad counter-cyclical pattern over the sample period, rising during inflationary episodes and easing during downturns. The ZAR/USD exchange rate has trended towards sustained depreciation over the sample period, reflecting persistent current account deficits, political risk, and episodes of capital outflow.

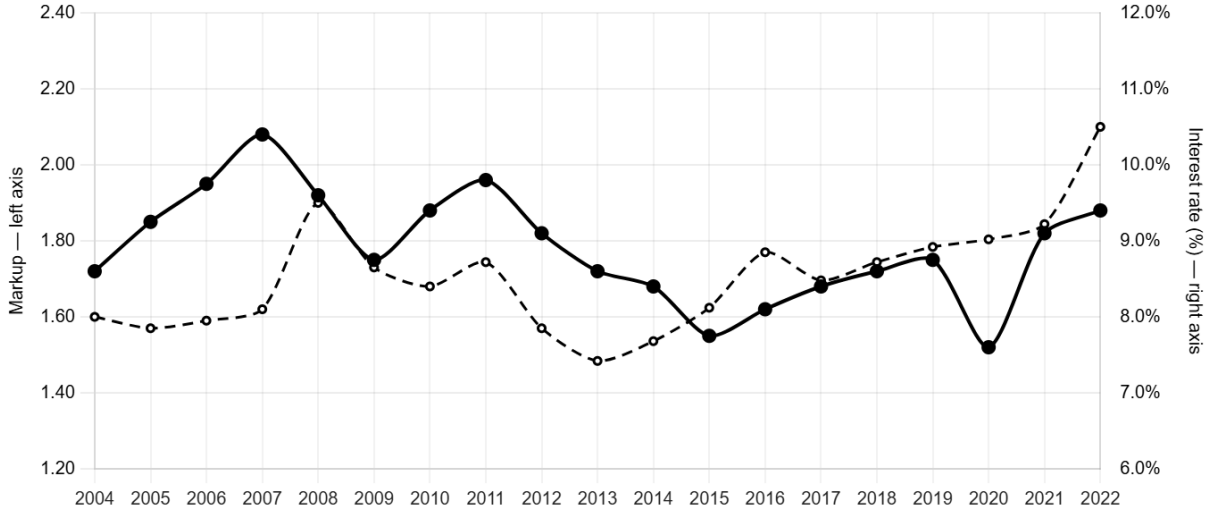

Figure 8. Aggregate Markup and Interest Rates (10-year government bond yield)

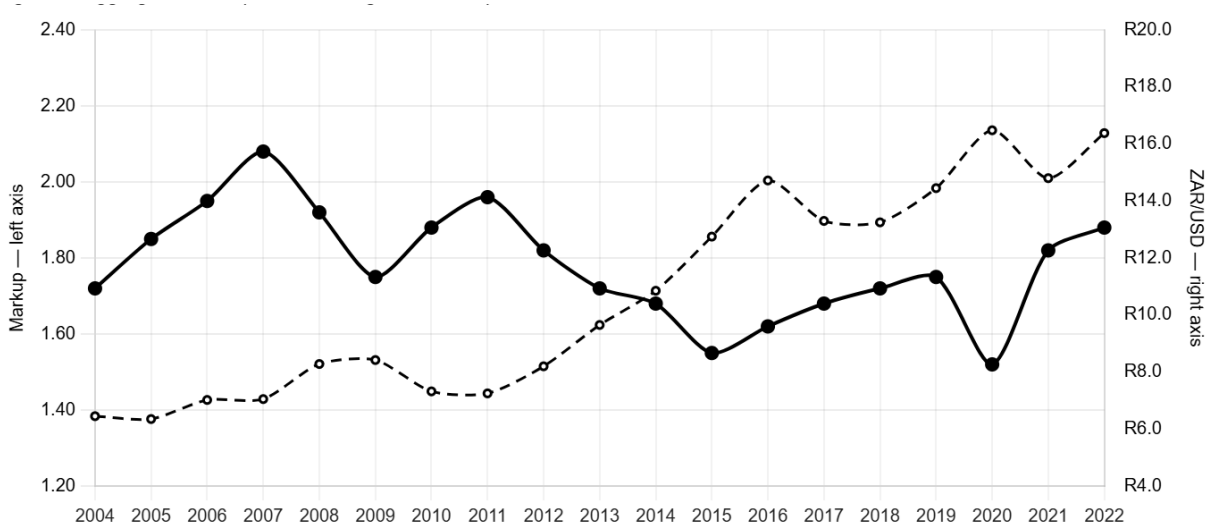

Figure 9. Aggregate Markup And Exchange Rate (ZAR per USD)

Probing deeper into the relationship, fixed effects panel regressions in Table 5 show statistically significant effects of the macro variables on firm level markup movements. All variables are in logarithms. The

total assets variable is an explanatory variable accounting for firm size, and exchange rates and interest rates are used separately as control variables in Models 2 and 3, respectively (Mncayi & Dunga, 2022).

The positive and significant coefficient on total assets in all three models confirms the earlier finding that larger firms maintain higher markups, even after controlling for macroeconomic conditions. The negative coefficients on both interest rates and exchange rates indicate that rising interest rates and a depreciating rand compress firm markups in South Africa. The interest rate finding is consistent with standard theoretical predictions: higher borrowing costs raise the cost of capital, reduce investment, and curtail the ability of firms to expand and sustain market power. The negative exchange rate effect reflects the import-dependent input structure of many JSE-listed South African firms, whereby ZAR depreciation raises variable input costs faster than output prices can be raised, squeezing markup. This finding is broadly aligned with the evidence from other open EMDE economies where exchange rate fluctuations materially affect pricing behaviour (Gradzewicz & Mućk, 2019) (Díez et al., 2021).

It is clear that the aggregate markup movements in South Africa do not follow the global trend of rising markups reported by (Díez et al., 2019)(Church & Ware, 2000). Based on Figures 8 and 9, the South African aggregate markup movement appears to be influenced significantly by macroeconomic events, with rising interest rates and rand depreciation associated with declining markups. However, causation can go in the opposite direction, which means macro variables should be endogenously determined. This, however, requires a broader macroeconomic modelling framework, and is another area for further study.

Table 5. Fixed Effects Panel Regression Results: Markup and Macroeconomic Environment

Variables	Markup	Markup	Markup
	Model 1	Model 2	Model 3
Total assets	0.082***	0.075**	0.080***
	(0.028)	(0.030)	(0.028)
Interest rates		-0.065***	
		(0.021)	
Exchange rates (ZAR/USD)			-0.715***
			(0.208)
Constant	-38.215	-22.415	218.215***
Standard error	-31.248	-29.852	-72.148
Observations	2,850	2,850	2,850
Firms	215	215	215

Notes: Dependent variable is the firm-level markup. All variables in logarithms. Robust standard errors in parentheses. ** $p < 0.05$, *** $p < 0.01$.

CONCLUSION

This study examined market power trends among non-financial publicly listed corporations in South Africa as an emerging market and developing economy by estimating firm-level markups using a production-based methodology. Based on financial statement data from 215 JSE-listed firms across 16 sectors during 2004–2022, the study provides granular evidence on the evolution, distribution, and determinants of markup dynamics in South Africa. The findings show that the average aggregate markup was 1.78 over the sample period, indicating the presence of market power among listed nonfinancial firms. The persistent upward trend documented in many advanced economies, South Africa's markup movement was more volatile and cyclical. Markups increased during the mid-2000s commodity boom, declined during the global financial crisis and subsequent commodity downturn, fell sharply during the COVID-19 shock, and partially recovered by 2022. The lower average markup in 2013–2022 compared with 2004–2012 suggests a moderation of aggregate market power, influenced by the end of the commodity boom, may be associated with, and macroeconomic pressures. At the sectoral level, market power was unevenly distributed. Technology products and services, real estate, and telecommunications recorded the highest markups, while transportation, oil and gas, and retail showed the lowest. The study also confirms that larger firms tend to command higher markups, with the top decile playing a disproportionate role in aggregate markup movements. Furthermore, markups were positively

associated with profitability, as measured by economic profit rate and return on assets, but negatively associated with interest rates and rand depreciation.

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