MARKET CONCENTRATION: A SOUTH AFRICAN PERSPECTIVE

GRANT RODERICK BRANN

Submitted in part fulfilment of the requirements
for the degree Master of Commerce.

Department of Economics
University of Natal Pietermaritzburg
January 1992

EXCEPT FOR QUOTATIONS SPECIALLY INDICATED IN THE TEXT, AND
SUCH HELP AS I HAVE ACKNOWLEDGED, THIS THESIS IS WHOLLY MY
OWN WORK AND HAS NOT BEEN SUBMITTED FOR DEGREE PURPOSES AT
ANY OTHER UNIVERSITY.

G. R. BRANN,
JANUARY 1992

i

ABSTRACT:

The dissertation examines the effects which seller concentration has on allocative efficiency. At a theoretical level, the study examines the controversy surrounding seller concentration. This debate centres on whether high seller concentration represents a source of market power abuse, or constitutes evidence of greater efficiency. At an empirical level, the study adds to the local literature by first, updating Gini measures of seller concentration in South African manufacturing and second, testing for a positive linear relationship between concentration and economic profits. The results of the theoretical survey indicate that concentrated markets are not necessarily anticompetitive and the empirical results support this contention. Market concentration, the empirical results suggest, is a poor proxy for monopoly power in South African manufacturing industries.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

In the South African debate, political questions of industrial ownership and power have largely overshadowed the issue of seller concentration and allocative efficiency. With respect to the concentrated nature of the South African manufacturing sector, the local dehate bas centred on the link between ownership concentration and the desire to re-address past economic inequalities through redistribution. In a recent draft economic policy document (1990:6), the African National Congress (ANC) argue that a future government will "need to give serious attention to the implementation of policies which aim to restructure industry." Their call for state intervention and dismantling conglomerate power blocks largely rests on ideological grounds. The ANC argue that real and sustained economic growth can materialise only in the presence of a more equitable distribution of power and wealth. Little **empirical** consideration has, however, been given to the allocative or efficiency effects such interventions will incur on product or seller markets. Given the imperative for sustainable growth, the purpose of this study is to examine the effect 'high' seller concentration has on allocative efficiency.

Two elements are considered in the study: First, the extent of seller concentration in South African markets using Gini coefficients are measured. Second, the effects seller

1

concentration has on profitability. In its methodological approach, the study commits its method of analysis to the neoclassical paradigm.

Chapter One examines the theoretical controversy surrounding seller concentration and its implications on resource allocation. The chapter argues that the controversy largely stems from divergent opinions concerning the nature of those mechanisms responsible for the competitive process. Consideration is given to imperfect competition, workable competition and the concentration-profits controversy fuelled by the structuralist and efficiency schools. Comprehensive definitions of each school are problematic (see Smith 1991:5). The neoclassical literature may, however, be divided into structuralist and efficiency mainstreams, which focus on the central issue: Should concentration market structures be viewed as monopolistic or can they represent efficient solutions? The structuralist school believes that efficient solutions should be restricted to more deconcentrationary structures. Seller concentration facilitates collusion, denies the competitive forces associated with *large numbers* competition and hence provides an opportunity for market abuse. Concentration thus fosters collusion and monopoly pricing. Structure is perceived to be the key causative factor impairing market arbitrage and the ultimate determinant of market performance. Market abuse is likely to increase as concentration expands and hence seller concentration is the core element competition policy must deal with. The efficiency school, Smith (1991:5) argues, may be described as a broad collection of aligned approaches with the central motive of limiting the cost of economic organisation. The efficiency school believes that if market forces remain unimpaired, market structures will evolve towards efficient

2

solutions. Rather than a preoccupation with structure, the efficiency school focuses on the condition of market entry. Competition authorities, the efficiency school argues, can elucidate competition by preventing the government from imposing prohibitively high sunk cost barriers to entry. Markets, whether atomistic or concentrated, pose a threat to competition only when prohibitive and in, particular, regulatory barriers to entry exist.

Chapter Two reviews past studies that examine the concentrated nature of the South African manufacturing sector. The chapter updates other local studies which calculate concentration using Gini coefficients. Data from the 1985 manufacturing census will be used. Further, more consideration will given to those historical and contemporary factors encouraging seller concentration. The chapter concludes with a brief review of South African competition policy.

Chapter Three constructs a model through which the allocative implications of concentrated market structures can be assessed. The chapter discusses those problems which arise out of any attempt to measure and regress economic profits on seller concentration. The chapter concludes by determining empirically the extent to which seller concentration influenced profit levels during the 1985 census period.

In terms of the results derived from the study, Chapter Four, summarises and interprets the salient issues raised in the preceding empirical and theoretical debate. The chapter

concludes that structural intervention in South African manufacturing markets should be questioned on four counts.

CHAPTER ONE:

1.1 INTRODUCTION:

Controversy surrounds the competitive character of seller concentration in industrial economics. The debate has primarily focused on whether high seller concentration has monopolistic consequences or whether it can represent the attainment of superior efficiency. One approach to resolving the controversy is to highlight those mechanisms responsible for driving the competitive process. Controversy persists, however, over the form the primary competitive mechanism takes. The purpose of Chapter One is twofold. First, to consider why competition is beneficial. Second, to compare the different views concerning seller concentration.

1.2 COMPETITION AND ALLOCATIVE EFFICIENCY IN MARKETS:

Neoclassical economics argues that competition is the key factor responsible for ensuring efficient resource allocation. Motivated by self-interest and bound by scarcity, "it is competition which equates the margins, distributes resources so as to maximise utility and generally makes the whole scheme work" (Tregenna-Piggot 1976:67). Resource exploitation

is minimised in competitive markets because the prices sellers charge are effectively limited by the free option of the buyer to buy from a rival or numerous rival sellers. Sellers in competitive markets are forced in the interests of profit maximisation to allocate resources efficiently and to meet or exceed competing offers. In this respect, profits are gradually eroded and firms can expect to earn normal profits only. The exact form the price arbitrage takes evokes debate.

1.3　*A SPECTRUM OF MARKET STRUCTURES - LARGE NUMBERS COMPETITION:*

According to the earlier imperfect competition literature developed by Chamberlain (1933) and Robinson (1934), competition is best met in markets characterised by a large number of small sellers. Numerous and small sellers facilitate a form of competition whereby no firm has the power to dictate price or quantity. Any firm attempting to raise prices or restrain quantity will be driven from the market by countless competitive price bids. The self interest motive and *large numbers* competition, therefore, ensure that the prices in product markets are effectively reduced to the minimum points of respective industry long-run average cost curves. Firms bound by numerous and continuous competing price bids are unable to enjoy long term profit-making and allocative efficiency is ensured. *Large numbers* competition represents the single most important facet driving competition. It is price and non-price arbitrage, prevalent amongst numerous competitors, which ensures that firms minimise unit costs.

6

Concentrated markets or markets dominated by a limited number of sellers are perceived to be anticompetitive. In concentrated market structures, the distinction between individual firms comprising the market and the market itself becomes less obvious. The limited number of sellers implies that the absolute number of competing price bids will diminish and consequently the spectrum of price bids formerly available to consumers will decline. Consumer choice will therefore be limited and the balance of power in markets is likely to swing in favour of producers. Firms in concentrated markets are, therefore, more likely to possess the necessary latent market power with which to impair or disrupt the arbitrage process. In addition, the limited number of competitors increases the likelihood of collusion. With this lack of competition there is no guarantee that firms will be coerced to equate price with marginal cost and hence there is no guarantee that resources will be efficiently employed.

The imperfect competition literature proposes a **spectrum** of market structures, ranging from its atomistic ideal to the suboptimal monopoly. The label monopolistic reflects a market whose concentration and heterogeneity are at odds with perfect competition. These labels evoke emotive connotations. Atomistic or perfectly competitive markets carry overtones of approval; whilst concentrated or monopolistic markets smack of disapproval. Ultimately, it is a perfect competition's deconcentrated structure which drives competition and ensures allocative efficiency in markets.

1.4 *A RESPONSE TO IMPERFECT COMPETITION - THE WORKABLE ALTERNATIVE*

Whilst perfect competition displays no allocative, usage or distributive inefficiencies, its relevance is questioned by workable competition on two counts. Workable competition theory represents a movement away from theoretical market appraisal to practical market evaluation. Sosnick (1958:380) defines workable competition as an attempt to "indicate what **practically** attainable state of affairs are **socially desirable** in individual capitalistic markets" (emphasis added).

First workable competition regards perfect competition as an impractical market ideal or bench mark. Workable competition emphasises that markets are more complex than that assumed by perfect competition. In Perfect competition products are homogenous, suppliers employ the latest and best technology and act in the absence of any error or surprise. To the contrary, real markets are characterised by incorrect and inconsistent expectations, capital shortages, immobile excess capacity and cyclical fluctuations in consumer demand. Perfect competition may thus be viewed as an incomplete specification of market behaviour. The attempted imposition of an atomistic ideal to real world markets, will likely produce suboptimal solutions. The ultimate problem with the strict definition of perfect competition is that any deviation from its structure gives results which are less than ideal. However, once the limitations of perfect competition are recognised, its validity as a bench mark ideal weakens.

8

Second, workable theory doubts the premise that *large numbers* competition is the primary factor responsible for driving the competitive process. Clark (1940) and Sosnick (1956) argue that competition does not necessarily rely on the absolute number of firms operating in a market. Rather, optimal markets are those structures which best alleviate scarcity in terms of tbe welfare criteria set by workable theory. Optimal market structures are, therefore, not restricted to the atomistic ideal and can be concentrated. Sosnick questions the strict presumption made against concentrated structures. He proposes that seller concentration may be desirable to maximise the benefits accruing from scale economies (1958:40). Monopoly represents a problem only if it can be demonstrated that seller concentration results in socially suboptimal resource allocation, usage or distribution.

1.4.1 *THE METHODOLOGY OF WORKABLE COMPETITION:*

Sosnick (1958) develops a two-stage critical method of market appraisal:

First, market components are classified into structure, conduct and performance categories (S-C-P). *Structure* refers to the characteristics which constitute a market's pattern, status and composition. *Conduct* embraces the activities, tactics or dealings of a firm. *Performance* refers to how closely or loosely the firm or industry assimilates a normative standard, for instance the Pareto optimality ideal. Second, markets (defined in terms of S-C-P norms) are **assessed** against the 'public interest' test. Smith (1991:12) argues that the public interest test differs from the Pareto optimality test because it "attributes importance not only to a broader set of economic considerations, but also gives attention

to those political and sociological factors which effect distribution." The workability approach sets its objective function as:

$$W = f (S,C,P) \geq W^* = f (S^*,C^*,P^*)$$

where vectors S^*, C^*, P^* and W^* are accepted targeted Structure, Conduct, Performance or Welfare norms which satisfy the public interest. Any combination of S,C,P which equals or improves upon this measure is deemed workable, regardless of its structural composition. The critical evaluation of market structure thus moves away from strict Paretian criteria to an expression of what 'the reasonable public' may demand. Workable markets are regarded as practically attainable solutions, which satisfy the public interest norm. Implicit to workable competition is the belief that concentrated seller markets can perform just as efficiently, given certain market frictions,[1] as their perfectly competitive counterparts.

1.5 *THE CONCENTRATION-PROFITS DEBATE:*

Despite clear attempts to define *workable* market structures, the normative nature of the public interest test remains problematic. The concentration profits debate represents an attempt to test and substantiate the anticompetitive *performance* commonly associated with excessive seller concentration. The debate's empirical foundation may be traced back to Bain's (1951) seminal study. Bain's confirmation of a positive, but weak, linear relationship between concentration and profits initiated a theoretical controversy, which to date, remains

---

[1] Market constraints include: capital shortages; incorrect and inconsistent expectations or information imperfections; immobile excess capacity and barriers to entry.

10

unresolved. The theoretical debate centres on the different views proposed by the structuralist and efficiency schools. The structuralist approach argues that evidence of a positive relationship between concentration and profits supports the proposition that seller concentration fosters collusion and hence monopoly pricing. Economic profits and associated market abuse, they argue, are directly related to increasing concentration levels. Structural intervention is proposed to remedy any concentratory trend. The efficiency school challenges this belief, maintaining that markets display an inherent tendency towards forming efficient solutions. The positive relationship between concentration and profits is not a sign of market abuse, but of greater efficiency.

Initial tests (Bain 1951, Sherman 1964, Kilpatrick 1967) largely seek a linear relationship between concentration and profits. More recent tests focus on whether a *threshold* level of concentration exists which separates industries earning significantly different profit rates. The critical concentration level sub- hypothesis developed in accordance with the practical demands of policy prescription. Structuralist literature suggests that unregulated economies are essentially monopoly prone and there is an "inherent tendency for power concentrations and non-competitive conditions to develop." (Fourie 1987:347) Concentration, as a market phenomenon, can never be completely abolished. If, however, empirical tests can establish a critical level, above which concentration and associated profits become unacceptable, the implementation of competition policy can become more scientific and objectively based. Deconcentratory measures can be advocated to lower the extent of market concentration below the critical level, thereby limiting abnormal profits and hence market exploitation.

11

The need, in more recent years, to devise more precise policy parameters, has resulted in experimentation with different functional forms of the concentration-profits hypothesis. The remainder of this section will consider the empirical and theoretical debate.

1.5.1 *THE EMPIRICAL CONTROVERSY:*

In his seminal study, Bain (1951) tests whether a positive relationship between concentration and profits exists. He measures profit as:

$$\frac{\Pi - t}{E}$$

where Π = accounting profits

t = tax

N = net worth

Bain concludes (1951:313-14) that a weak linear relationship exists between industry concentration levels and profit rates - the observed correlation being a poor thirty three percent. However, he observes a distinct break in the average profit rate showing at the seventy percent concentration level. Profit rates for the twenty two industries wherein seventy percent or more of the value of product is controlled by the eight largest firms is 12.1 percent. For the twenty industries below the seventy percent concentration level, profits averaged only 6.9 percent. Using the Fisher z test, he further found that there is less than a one tenth percent chance that these profit differences occur due to random

12

influences.   A tentative conclusion, therefore, is that industries with an eight firm concentration ratio above seventy percent of gross output, "tended in 1936 - 40 at least, to have significantly higher average profits than those with a ratio below seventy percent." (Bain 1951:314)   Sherman (1964); Kilpatrick (1967); Collins and Preston (1970); and Kamerschen (1969), confirmed that concentration was positively related to economic profits and argued that a continuous relationship persisted.

Meehan and Duchesneau's result (1973:26) is similar to that derived by Bain. These authors define profit rates as:

$$\frac{Y + r}{W + D}$$

where: Y = net income after taxes

   r = interest on long term debt

   W = net worth

   D = long term debt

However, their findings indicated a discontinuous relationship: with the critical level of concentration appearing at fifty five percent for the four firm level, and at seventy percent for the eight firm level.   Meehan and Duchesneau note that any increase in concentration beyond the calculated critical level, does not appear to raise the level of profitability.

13

Dalton and Penn (1976:140) provide further empirical support for the notion of critical concentration level. These authors, however, maintained it is insufficient to employ the traditional bi-variate technique of testing for profit. The bi-variate approach excludes important determinants of profitability including: barriers to entry, industry growth rates and product differentiation. In an attempt to develop a more accurate regression model, Dalton and Penn employ a model which incorporates product differentiation. This is summarised using the proxy A/S (where A defines the total cost of advertising and S defines total sales). The empirical results from their study suggest a threshold exists when concentration exceeds forty five percent for the top four firms and sixty percent for the top eight. Like Meehan and Duchesneau, they suggest that changes in concentration above the specified levels have no significant impact on profits.

Stigler (1963) and Brozen (1971) dispute the validity of the positive relationship between concentration and profit. In fact, their results suggest that the relationship is neither positive nor negative. Brozen argues that the positive and significant relationship reported by other studies results from a too small sample size. Brozen concludes that when Bain's sample is expanded from 42 to 78 industries, no relationship between seller concentration and profitability exists. Stigler, tested for a positive relationship between concentration levels and rates of return. Using the rates of return on corporate assets after tax, Stigler concludes that the relationship between concentration profits is "somewhat ambiguous, but on the whole negative." (Collins and Preston 1970:36)

Demsetz (1973) argues that there is a need to distinguish between profits that are a consequence of efficiency and profits that result from monopolistic abuse. Demsetz differentiates between efficiency and monopoly using a two pronged approach: one for small firms and the other for larger firms. Demsetz proposes that small firms in a colluding industry should earn profits equivalent to those of larger firms (assuming small firms have similar cost structures to large firms). Demsetz argues that if this hypothesis does not hold, the results will suggest that large firms are more efficient than small firms and will thus earn higher profits. Demsetz's 1963 U.S. findings support the latter hypothesis. Reekie (1982) applies a similar method to South African data. However, Reekie's results contradict Demsetz's conclusion and provides support for the traditional structure-conduct-performance paradigm. Differentiating between smaller and larger firms on the basis of industry sales and employment levels, Reekie finds no significant difference in profit rates between large and small firms. Extending Reekie's study and employing Reekie's measure of profit, Leach (1991) confirms Demsetz's hypothesis. Large firms, Leach proposes, are more profitable and more efficient than smaller firms.

The empirical research is unresolved and ambiguous. First, controversy persists over the importance of concentration as a determinant profitability. Second, there is debate over whether the relationship is continuous or discrete. Third, there is a lack of consistency in the profit measure used. While Bain (1951) and Brozen (1971) use the post tax measures of net worth, Sherman (1964) and Weiss (1963) use the rate of return on equity after taxes, and Stigler (1963) and Fuchs (1961) use the rate of return on total assets after taxes.

15

Finally, there is controversy over whether a positive relationship between seller concentration and profits is indicative of market exploitation or the attainment of superior efficiency.

1.5.2 *THE THEORETICAL CONTROVERSY:*

The theoretical controversy surrounding the concentration-profits debate centres on the central notion - what form does price competition take? Structuralist literature proposes that abnormal profits are the result of a unidirectional flow of causality running through structure, conduct and performance. Market structure is the key factor explaining anticompetitive behaviour. The structuralist argument rests on collusive limit price models supported by adequate barriers to entry.

1.5.2.1 *SUCCESSFUL COLLUSION:*

Collusion eradicates "competition by replacing the independent profit motive with joint industry profit maximisation." (Smith 1991:18) Weiss (1963:242) maintains that successful collusion depends ultimately on how costly it is to police an agreement and discipline offenders. Collusion becomes "more effective as concentration increases". Collusion is not costless. It becomes rational for firms to collude only when the derived benefits exceed costs at the margin. Structuralists, Smith (1991:19) argues, believe that the net gains derived through collusion are greatest in concentrated markets. First, direct bargaining costs

16

associated with co-operative agreements are perceived to diminish as seller concentration increases. Second, higher seller concentration affords cartels relatively lower monitoring and policing costs. Third, the powers of coercion and retaliatory action seem greater in markets led by relatively few dominant players. Through collusion, firms may limit uncertainty, jointly 'ward -off' the threat of potential competition and further enhance profits through collective and anticompetitive action.

1.5.2.2 *BARRIERS TO ENTRY:*

Firms in concentrated markets are purported to raise entry barriers more effectively. Structuralists suggest that concentration inhibits competition amongst existing market participants, whilst large capital requirements, advertising, and predatory pricing provide an important deterrent to potential market participants. Barriers to entry, Bain (1968) claims, enable concentrated market incumbents to charge a limit price (that is a price in excess of the competitive price and yet just sufficient to deter market entry).

Algebraically, entry barriers may be represented by the equation:

$$E = \frac{Pl - Pc}{Pc}$$

where E = condition of entry

    Pc = competitive price = (min.long-run average cost curve.)

    Pl = limit price.

Rearranging the above formula: $Pl = Pc (1 + E)$ can be obtained. In this form, we see that the price limiting entry is determined by the competitive price (which equals the long run average cost of the most efficient firm) and the premium E which is the measure of the degree to which barriers to entry pertain. If entry is easy and barriers are non-existent (or negligible), then $E = 0$ and hence: $Pl = Pc = LAC$. If, however, barriers to entry exist and $Pl > Pc$, firms can charge a limit price.

Bain distinguishes between different types of entry barriers:

1) Product differentiation - including factors such as advertising and brand loyalty which aim to intensify the difference between a firm's product and the product of competitors.

2) Absolute cost advantages - following from amongst other things: efficient management, patents, control over the supply of key raw materials and lower costs as a result of exclusive arrangements.

3) Economies of scale - which can be real (those which reduce factor inputs per unit output) or pecuniary (those which result from paying a lower price per unit input).

4) Large capital requirements. Orthodox economics attributes little or no significance to capital markets and the effects of finance on firm size or market structure. Difficulties in

18

securing finance and initial capital requirements may act to create an absolute barrier to entry.

Bain maintains that barriers to entry are of particular importance in concentrated markets where firms supposedly have the resources and power with which to enhance the exclusionary nature of such impediments. For example, through intensive and expensive advertising campaigns powerful firms can enhance brand loyalty and effectively discourage market entry. Empirical surveys that suggest a positive relationship between concentration and profits provide evidence of the supposed ability of dominant firms to collude and raise entry barriers. The policy implications are that the government should play an active interventionist in promoting competition. Seller concentration is the key element with which regulators must deal, and a government which through competition policy can terminate or reduce monopoly power will improve allocative efficiency and performance in markets.

1.5.2.3   *AN EFFICIENCY RESPONSE:*

Subsequent theoretical research cautions against structural intervention in markets. The efficiency hypothesis dominated, in particular, by the Chicagoan School contests the structuralist belief that concentrated market structures necessarily evoke collusion and market power abuse. Market behaviour does not solely depend on market structure but also on a range of other factors such as: product homogeneity, market uncertainty, industry

19

profit levels, inter-firm cost structures and market entry conditions. The efficiency school challenges the structuralist framework on two fronts:

First, it is argued that even if the positive correlation between concentration and profits is accepted, this may not necessarily represent a welfare loss. Demsetz (1974:162) maintains that the negative connotations commonly associated with profit should be re-classified as a measure of market health. The "positive concentration-profit relationship may be evidence of the realisation of greater efficiency. Industries become concentrated for technological and efficiency reasons. The largest firms are the most efficient and thus earn the highest rate of return." Profitability is, therefore, not only the result of concentration but more often a result of factors including efficiency, risk, industry growth rates, innovation and product quality.

Second, the assumption that causality runs through structure, conduct and performance is questionable. Demsetz states that "it may make more sense to reason that efficient business organisations expand their market faster than less efficient rivals and that, therefore efficiency and profits tend to produce specific levels of concentration (rather than vice-versa)." (Armentano 1982:35) It is conceivable that an oligopolist may direct his conduct at attempting to achieve a change in market structure. By aggressive advertising, collusion and the threat of price wars, he might force rivals out of the market and thus promote an increase in structural concentration. Of equal acceptability, however, is the attempt by firms to attain performance goals. For example, using performance strategies such as

20

product innovation and quality improvements, firms may enhance market demand and thereby influence market structure. Firms may also oust other competitors and capture market share through innovative performance. Consequently markets should not be judged structurally, but rather in terms of **market entry conditions**. Unlike the structuralist view, the efficiency school denies that the absolute number of competitors has any bearing on the intensity of competition. It is rather entry conditions which pose the greatest threat to competition and allocative efficiency. At this point it is necessary to distinguish between 'mainstream' and 'die hard' Chicagoans. Smith (1991:16) argues that the 'die hard' approach fails to acknowledge the importance of entry barriers. 'Die hards' contend that abnormal profits cannot be **maintained** through the strategic attempt by incumbents to raise market entry conditions. Any evidence of excessive profits in industries will necessarily incur market entry and a neutralisation of such profits. Firms in concentrated markets which continue to earn abnormal profits are not purposefully manipulating or abusing market power, they are simply remaining ahead of competitors through innovative and efficient performance. 'Mainstream' Chicagoans, on the other hand, recognise that firms in concentrated markets may take advantage of market imperfections and raise significant sunk cost entry barriers. Efficiency or technologically induced barriers are not worthy of criticism. These innovations [1] should be applauded not punished. Regulatory or politically inspired barriers are, however, a serious cause for concern. Regulatory barriers undermine the competitive spirit of markets indefinitely and serve to prevent any materialisation of actual competition.

The efficiency school, unlike the imperfect competition and structuralist schools, therefore reveals no preference for any specific market configuration. "Rather, they endeavour to derive solutions which minimise the cost of economic organisation." (Smith 1991:17) The efficiency school cautions policy makers not to pay heed to the deterministic nature of structuralist thought; and rather than advising an active restructuring of industry, calls for a policy of less state intervention. Profits, they claim, will be of a long-term nature only if governments actively intervene in markets through a guise of protectionist policies.

1.6 *CONCLUSION:*

Imperfect competition theory and indeed structuralist thought contend that markets dominated by relatively few sellers are anticompetitive. Structurally concentrated markets are better suited to collude, to raise entry barriers and reap abnormal profits. On the other hand, efficiency market theory questions the deterministic nature commonly associated with seller concentration. These theorists question the plausibility of the strict Pareto optimality ideal as a practical policy bench mark; are unanimously critical of a prescriptive policy against seller concentration; and are united in the call for a more integrated approach to the issue of seller concentration. The prime reasons for such divergent opinions on concentration, this chapter highlights, largely arise from controversy surrounding the exact mechanisms responsible for driving the competitive process. Whilst imperfect competition and structural theory perceive *large numbers* competition to be an integral force ensuring competition and allocative efficiency, the workable, and efficiency schools disagree.

22

Competition, according to these latter schools, is not confined to atomistic structures and can operate effectively across a broad spectrum of market structures.

CHAPTER TWO:

2.1 INTRODUCTION:

Chapter One reviews the controversy surrounding the economic desirability of seller concentration. The chapter develops different arguments stressing different forms price competition takes. While many empirical studies suggest a positive relationship between concentration and profits, there are sufficient contradictory factors that keep the debate unresolved. The theoretical controversy waged between the structuralist and efficiency approaches were examined.

The purpose of Chapter Two is twofold: First, to review those studies which have attempted to measure the extent of seller concentration in the South African manufacturing sector. Second, to measure concentration in the manufacturing sector, using data from the latest manufacturing census (1985). The Chapter will also briefly review the Competition Board's attitude to concentration and structural intervention in the economy.

2.2   SELLER CONCENTRATION IN SOUTH AFRICAN MANUFACTURING:

The South African manufacturing sector is highly concentrated. The Mouton Commission (1977) notes that in 58 of the 181 manufacturing industries, the three largest firms account for at least 70 per cent of their respective industries' turnover (1971/72). The Commission further establishes, that 10 percent of the firms produce at least 75 percent of gross market turnover. In his comment on the Report, Spandau (1977:30) notes that "economic power is concentrated in relatively few hands and that by international comparisons, an exceptionally high degree of economic concentration prevailed."

Similar sentiments are expressed by Du Plessis (1977:250) when he observes that thirty percent of the ten largest firms at the three-digit level control at least 70 percent of market turnover. Du Plessis (1978:268) emphasises that those accountable for encouraging, supporting and reinforcing free and fair competition should be disturbed by the high degree of seller concentration. Using Gini coefficients as a relative indicator for concentration, Fourie and Smit (1989:244) calculate an average Gini coefficient of 0.816 for the 27 three-digit classified manufacturing industries in the 1982 census. These authors (1989:251) conclude that where economic concentration is substantial, the probability of questionable business practice cannot be ruled out.

A problem with the studies of Du Plessis (1978) and Fourie and Smit (1989), is that they allege that concentration is anticompetitive, but fail to develop any test to link it to

performance. Only two empirical studies, namely those of Reekie (1982) and Leach (1991) have attempted to make this link. A part purpose of this study is to measure concentration using the latest (1985) census data and to examine the welfare consequences associated with seller concentration in South Africa.

2.3 *POSSIBLE REASONS ENCOURAGING OR NECESSITATING CONCENTRATION IN SOUTH AFRICA:*

Seven factors are purported to explain the high degree of seller concentration which characterises South African manufacturing. These are:

1) Historically, the country's commercial economy was based largely on gold mining. Mouton and Lambrecht (1982:13) argue that the location and nature of the mineral deposits necessitated the employment of large amounts of capital. The large capital requirements made small prospecting uneconomical and contributed to the high degree of concentration in mining and associated industries.

2) South Africa has a comparatively small market and, as such, has limited effective demand. The extremely skewed income distribution of the past and present effectively serves further to restrict the size of potential markets. Existing markets permit the establishment of a limited number, range and diversity products or firms. This justification can be associated closely with contestable market theory, where consideration is given to the

cost of contemporary technology, the extent of market demand and the sustainable nature of industries.

3) Involvement by the State has contributed to the concentrated nature of South African industry. Mouton and Lambrecht (1982:14) argue that large scale investment by the State has led to parastatals dominating core industries in the economy. State intervention has not merely been confined to the provision of public goods, but has also extended into the semi-public and private sectors. In this respect, small scale entrepreneurs may have been *crowded-out* by state interference.

4) The Mouton Commission (1977:29) reports that the existence of relatively few but large buyers, particularly in mining and government related industries, necessitates or encourages the monopsonistic supply of manufactured and semi-manufactured products. The Mouton Commission argues that it is often difficult if not impossible for small firms to comply with the requirements of large buyers. (Small firms are not able to meet the requirements of such large purchasers - with regard to both volume, guarantee, quality and delivery time.[2])

5) Economic policies that have and continue to focus on the export of raw materials and the import of manufactured goods serve to limit South Africa's potential export for manufactures and thus provide little scope for the diversity of exports, spectrum of firms and the economies of scale associated with larger markets.

---

[2] This argument is questionable, given the competitive and efficient nature of the Japanese dual-structure economy.

6) The imposition of past discriminatory legislation including, the Group Areas Act, Land Act, Job Reservation, The Population Registration Act, Influx Control as well as inadequate informal sector credit facilities distort markets and provide little opportunity for Black entrepreneurial talent to develop and compete on level playing fields.

7) Contemporary economic and political facets including the effective damming of funds by exchange control, 'sanctions' cutting exports and the weaker Rand sending up the cost of capital investment have encouraged mergers and acquisitions. The late seventies and eighties were not particularly favourable years for the South African economy. The depressed state of the South African economy, it can be argued, necessitates mergers and take-overs to 'ward off' the crippling economic climate.

Whilst certain factors have encouraged or promoted seller concentration in South African manufacturing, this does not imply that these trends or patterns are desirable. The structuralist school maintains that there is an inherent tendency for markets to become progressively concentrated. These concentrations have distinctly anticompetitive consequences. Structuralists emphasise that governments cannot remain indifferent. Firms in concentrated industries exploit markets and reap abnormal profits. Governments world-wide should dismantle power concentrations and thereby actively promote competition.

2.4 *AN EMPIRICAL STUDY OF SELLER CONCENTRATION (MANUFACTURING 1979-1985)*

The concentration indices examined in this study are grouped according to the international Standard Industrial Classification for all Economic activity (SIC) and are calculated from the 1979-1985 Manufacturing Censes respectively. The SIC allows firms to be grouped under five categories (see Table 2.1). These categories are identified by a code, ranging from a one-digit to a five-digit number. The fewer/more digits there are in a specific code the more heterogeneous/homogenous are the firms grouped into that industry category.

TABLE 2.1: STANDARD INDUSTRIAL CLASSIFICATION OF INDUSTRY

INDUSTRY CODE NUMBER	CLASSIFICATION CONCEPT	TITLE OF CATEGORY	NUMBER OF MANUFACTURING INDUSTRIES
3	One-digit industry	Manufacturing	1
31	Two-digit industry	Manufacturing of food, beverages, tobacco	9
311	Three-digit industry	Food manufacturing	27
3112	Four-digit industry	Manufacture of dairy products	79
31120	Five-digit industry	Butter and cheese	181

For the purpose of the study concentration is analysed at the three-digit level. At the three-digit level twenty seven industries are listed.

2.4.1 *THE CHOICE OF CONCENTRATION MEASURES:*

Concentration measures can be absolute or relative. Absolute measures focus on the few largest firms in a particular industry and state their contribution to gross output, asset complement or employment holding. Relative measures of concentration deal with the size distribution or inequality of firms within an industry. Most foreign studies, in terms of concentration, have employed absolute measures of concentration (Bain 1951, Weiss 1963, Meehan and Duchesneau 1973, Dalton and Penn 1976). The advantage of the absolute measure is that the exact number of firms accounting for a pre-determined level of concentration can be identified. Absolute measures of concentration are, however, not publicly available in South Africa and only relative measures can be calculated.[3] The relative Gini measure to be used in this study is perhaps that most widely used in South Africa. (Du Plessis 1977, Fourie and Smit 1989)

2.4.2 *THE GINI COEFFICIENT DEFINED:*

The Gini co-efficient is simply a calculated ratio between zero and one. The Gini coefficient is the quantifiable indicator of the Lorenz curve and measures the area of

---

[3] For reasons of confidentiality, official concentration data does not disclose the individual contribution of firms to gross output.

inequality between the Lorenz curve and the egalitarian 45 degree line. If concentration measures are adequate proxies for monopoly power, then the Gini coefficient can be used as an empirical approximate of the distribution of power within an industry. Du Plessis (1977:124) states that the closer the Gini coefficient approximates unity, the greater the degree of inequality and hence the degree to which power is concentrated. Where the ratio tends towards zero, a highly deconcentrated (perfectly competitive) market exists.

2.4.2.1 *ADVANTAGES OF THE GINI MEASURE:*

Du Plessis (1977:123) notes that the Gini coefficient has three advantages:

1) All the firms operating in an industry are taken into account. This gives the analyst insight into the relative structure of a specific industry.

2) Comparisons of relative concentration can be made between industries.

3) It is easy to obtain the data required because relative concentration measures do not reveal the identity of individual firms.

2.4.2.2 *CRITICISM OF THE GINI COEFFICIENT:*

The Gini coefficient is often criticised on the grounds that it considers only the distribution of gross output between firms and not the strict number of firms accounting for a particular

31

inequality. Thus if one industry has five firms, each controlling twenty percent of gross output, and another industry has one hundred firms, each controlling one percent of gross output, then the Gini coefficient will be zero in both instances.

However, the use of other measures is equally problematic. Absolute measures, such as the C4 % concentration ratio, consider only the cumulative market share of the four largest firms and thus exclude the remaining firms which characterise the industry.[4] No indication of the overall structure and number of firms is thus provided by the measure. In addition, the abstract C4 %, C5 %, C6 % ... parameters chosen to indicate concentration are open to question. In an attempt to find an optimal concentration measure, Du Plessis (1977:168) calculates rank coefficients between absolute and relative measures of concentration. He concludes that both absolute and relative measures produce sufficiently similar results to draw common inferences.

The Gini coefficient is summarised as: (Cowell 1977:62)

$$J = \sum_{i=1}^{k} \int_{a_i}^{a_{i+1}} h(y) \, f(y) \, dy$$

---

[4] The common concentration ratio, describes the aggregate concentration of a chosen number of the largest firms in a particular industry. It can be indexed as a percentage or as a decimal fraction of 1.

32

where $f(y)$, is the proportion of the firm population that has an output in the interval y *to* $y + dy$ and where $h(y)$ is Theil's inequality measure:

$$[y/\bar{y}] \; \log(y/\bar{y})$$

Minimum (J_L) and maximum (J_U) Gini values can also be calculated. The lower limit J_L, is found by assuming that every firm in the first output class produces the average output in that class $R\mu_1$ and that every firm in the second output class produces the average output in that class, $R\mu_2$, and so on. Taking an example from the South African food industry using data available in the 1985 manufacturing census (Report No. 30-01-02:103), we see that the industry can be divided into 4 output classes: (see: Table 2.2)

TABLE 2.2 FOOD GROSS OUTPUT CLASSES

GROSS OUTPUT SIZE GROUP (RANDS)	NO OF FIRMS	GROSS OUTPUT IN RANDS
1 - 1999	11	8000
2000 - 3999	8	27000
4000 - 9999	48	331000
10000 - 19999	22	334000
20000 - 39999	40	1110000

33

In order to compute J_L it is assumed that there is no inequality within gross output classes. Thus, if the second (R2000-R4000) gross output class is considered, it can be assumed all eight firms produce the mean output (R27000/8) in that class. We therefore have:

$$J1 = \sum_{i=1}^{k} \frac{n_i}{n} h(\mu_i)$$

where n_i/n is the relative frequency for each output class $(a_i , a_i + i)$ and where μ_i, is the mean distribution of each output class. In contrast, the upper limit J_u is found by assuming that there is maximum inequality within each gross output class. Consequently, it is assumed that every firm in each output class either produces Ra_1 or Ra_2 but that no firm actually produces any intermediate output. Thus if *proportion,* $\lambda_1 = [a_2 - \mu_1] / [a_2 - a_1]$ of class 1 occupants produce at the lower gross output limit, Ra_1, and a proportion $1 - \lambda_i$ of class 1 occupants produce at the upper limit Ra_2, then the sought answer for average output $R\mu_i$ within each class is derived. Repeating the procedure for the other gross output classes and using the general definition: $\lambda_i = [a_{i+1} - \mu i]/[a_{i+1} - a_i]$ we may write:

$$Ju = \sum_{i=1}^{k} \frac{n_i}{n} [\lambda_i \ h(a_i) + (1-\lambda_i) \ h(a_i+_1)]$$

2.5 RESULTS FOR 3-DIGIT CLASSIFIED INDUSTRIES (1979-85)

Table 3 summarises the minimum and maximum Gini concentration indices for gross output of the manufacturing sector for different census years (see APPENDIX 1). Table 2.3, states

34

the compromise Gini coefficient value and considers the number of firms in respective industries.[5]

TABLE 2.3: GINI COEFFICIENTS (MANUFACTURING 1979-1985)

	1979		1982		1985	
	Comp Gini	Firm No.	Comp Gini	Firm No	Comp Gini	Firm No
FOOD	.855	1538	.859	1569	.857	1438
BEVERAGES	.756	229	.772	211	.789	185
TEXTILES	.819	607	.817	661	.817	643
WEARING APPAREL	.810	1287	.789	1291	.789	1219
LEATHER	.758	172	.758	184	.781	160
FOOTWEAR	.680	146	.716	150	.738	147
WOOD & CORK	.805	614	.812	645	.827	596
FURNITURE	.782	897	.775	1066	.779	1069·
PAPER	.748	191	.811	258	.850	222
PRINTING & PUBL	.800	1189	.803	1300	.804	1302
INDUSTRIAL CHEMICALS	.781	167	-	174	.763	189
OTHER CHEMICALS	.824	478	.850	524	.818	515
RUBBER	.824·	79	.873	80	.845	85
PLASTIC	.721	360	.774	450	.738	452
POTTERY	.833	59	.844	78	.853	77
GLASS	.873	36	.891	42	.788	49
NON-METAL MINERALS	.877	939	.701	943	.878	952
IRON & STEEL	.820	166	.870	220	.832	192
NON-FERROUS METAL	.591	112	.792	111	.777	104
FABRICATED METAL	.834	2642	.823	2954	.828	2865
MACHINERY	.632	1420	.811	1769	.796	1856
ELECTRICAL MACHINERY	.836	728	.845	828	.842	804
MOTOR VEHICLES	.884	734	.897	821	.903	808
TRANSPORT EQUIPMENT	.884	185	.872	223	.863	226
PROFESSIONAL,SCIENCE	.803	158	.785	226	.816	198
OTHER MANUFACTURING	.858	809	.832	901	.880	915
AVERAGE	.858		.862		.864	

---

[5] The compromise Gini (J), is determined by means of applying a lognormal distribution to industry gross output classes.

The published data for tobacco for 1979-1985 and industrial chemicals (1982) are presented in too few gross output categories for meaningful calculation and hence are omitted from the analysis. It is also not possible to calculate C5% concentration ratios because of the inconsistent 1985, data series. (Report No. 30-01-02:60)

2.5.1 DISCUSSION OF RESULTS:

Fourie and Smit (1989:244) claim that when used in the context of income distribution, a Gini coefficient above 0.6 represents a high degree of inequality. If this bench mark can be applied to industrial economics, the results of Table 2.3, clearly point to an extremely high degree of seller concentration in South African manufacturing between 1979-1985.

TABLE 2.4: THE DIVISION OF INDUSTRIES INTO GINI CATEGORIES:

Gini Level	1979		1982		1985	
	NO of Industries	%	NO of Industries	%	NO of Industries	%
0.9 - 1.00	0	0	0	0	1	4
0.8 - 0.89	17	65	16	64	15	58
0.7 - 0.79	6	23	9	36	10	38
0.6 - 0.69	2	8	0	0	0	0
0.0 - 0.59	1	4	0	0	0	0
Total No of Industries	26	100	25	100	26	100

36

Table 2.4 notes that the majority of manufacturing industries are concentrated in the 0.7 and upward Gini bracket. Given that a Gini coefficient of 1 implies that a single firm supplies the entire gross output of an industry, the high Gini coefficients serve to emphasise the extreme disparate distribution of production in the South African manufacturing sector. In terms of the upward trend in the data, TABLE 2.4 suggests that seller concentration has increased. The mean level of seller concentration rises from 0,858 to 0,864 between 1979 and 1985. Similar to the 1989 findings of Fourie and Smit, the study observes "the increasing clustering of industries" in the class with Gini coefficients above 0.7. In 1979 eighty-eight per cent of industries fell in this class; by 1985 this percentage had increased to one-hundred per cent. While most industries show a fluctuation in the degree of concentration overtime, approximately thirty per cent of the industries show a more or less persistent upward trend. These industries include: beverages, footwear, wood and cork, paper, printing and publishing, pottery and motor vehicles. Those industries which display a downward or constant trend include transport, textiles and wearing apparel. The results of the empirical analysis clearly confirm the highly concentrated results obtained by other researchers.

2.6 *SOUTH AFRICAN COMPETITION POLICY AND SELLER CONCENTRATION:*

South African competition policy is specified in the Promotion and Maintenance of the Competition Act 96/1979. Act 5 of 1986 authorises the Competition Board to structurally

intervene in markets.[6]   The Board is empowered to investigate and deal with existing monopoly situations and prospective mergers or acquisitions.

1) **Existing monopoly situations.** These are defined as "a situation where any person, or two or more persons with a substantial economic connection, control in the Republic or any part thereof, wholly or to a large extent the class of business in which he or they are engaged in respect of any commodity." (Competition Board 1989:12)

2) **Prospective Mergers or Acquisitions.** Parties to any acquisition or merger have two choices open to them: First, they can approach the Board with the reasons for the proposed acquisition and try to procure its consent. Alternatively, they can go ahead with the acquisition without prior consultation. If the parties follow the first course of action and obtain consent of the Board, then this consent will preclude the Minister from dissolving the merger at some later date. On the other hand, if parties go ahead without consulting the Board, or go ahead despite the Minister or a negative ruling from the Board, they will risk the Minister taking action to dissolve the merger or acquisition. (The ultimate penalty is a fine of R100 000 and/or five years imprisonment.)

---

[6] The Competition Board is elected by the State President and its decisions are subject to Ministerial approval.

2.6.1 *THE COMPETITION BOARD'S ATTITUDE TOWARDS CONCENTRATION:*

The Competition Board does not unilaterally discriminate between concentrated and non-concentrated industries. Traditionally, it has taken a lenient stance on the concentration issue.[7] Naude (Fin. Mail 1987:37) states that the small size of South African markets necessitates the adoption of a sensitive approach to the seller concentration issue. He adds that the Board is aware of the harm that can be incurred, if an oversimplified or presumptuous approach to the seller concentration issue were adopted. Similar sentiments are expressed by the Competition Board (1985:2), that is, that competition policy requires a sober appraisal of market realities and unbiased judgement.

The Board essentially relies on two criteria in its appraisal of market structure:

1) **Effective competition**: Naude (1986:76) defines effective competition as a market situation that:

A) need not correspond to the theoretical concept of perfect competition but, nevertheless, holds the essential benefits of competition such as freedom to entry, to production, a choice of buyers and an inability of sellers or groups of sellers to impose terms (including prices) on buyers;

B) is practical, that is, workable;

C) can be reconciled with the *public interest.*

---

[7] The only recent notable exception concerned the purchase of additional shares in Gold Fields South Africa by Anglo American Corporation of South Africa Ltd and De Beers Consolidated Mines Ltd. (see Competition Board 1991:10).

Effective competition can be assimilated with the term *workable competition* (Clark:1940, Sosnick:1958), in that it represents an attempt "to reconcile meaningful competition with the existence of economic concentration." (Fourie 1987:339)

2) **The *public interest*:** *The public interest,* Mouton and Lambrecht (1982:16) state, is not defined in the Act, but has been interpreted by the Board to embrace consumer, producer, trader and national interests. The nature of the *public interest* is therefore largely subjective. Fourie (1987:335) states that some reports define *public interest,* broadly, to include not only economic factors but also social and political factors. Other reports merely consider national interests, and yet further reports document economic progress only as a prime objective. The *public interest* test provided by the Act thus provides the Board with relatively wide discretion in deciding the fate of South African industry structure.

2.7 *CONCLUSION:*

Chapter Two has served to confirm that there is widespread seller concentration throughout the South African manufacturing sector. Du Plessis (1978:268) argues that if concentration at a relatively heterogeneous, three-digit classification level proves high, the implications are an even higher level of concentration at a more homogeneous, five-digit classification level. The chapter also notes that South Africa has the necessary statutory legislation in place to dissolve any excessive seller concentration, merger or acquisition the Board and the relevant Minister deem against the 'public interest'. Whilst, Chapter Two, highlights that certain

40

facts may be raised to justify the concentrated nature of South African industry, the critical and indeed most pervasive question remains whether or not concentration impacts negatively on allocative efficiency in markets. Such an analysis requires a so-called structure-performance test and is the subject of Chapter Three.

CHAPTER THREE:

3.1 *INTRODUCTION:*

Chapter Two updates measures of industrial concentration in South Africa. It supports the findings of earlier studies that conclude that the South African manufacturing sector is highly concentrated. In terms of the structuralist argument these results suggest that manufacturing markets are inefficient and uncompetitive because market power can be abused to reap abnormal profits. The purpose of Chapter Three is to qualify those factors that influence profitability. First, the Chapter will consider those difficulties associated with measuring *economic* profit and, second, proceed to test the relationship concentration has on profitability, using 1985 manufacturing census data. A positive correlation between the concentration (market power proxy) and profit (welfare proxy) will suggest that market power abuse is widespread amongst the South African manufacturing sector.

3.2 *THE STRUCTURE-PERFORMANCE TEST (MANUFACTURING 1985):*

The structure-performance test aims to test the structuralist and efficiency interpretations of the concentration-profits debate. Sections 3.2.1 - 3.2.3 deal with the formulation of the

model and the difficulties posed by the manufacturing data set. Summary statistics are provided to outline general industry characteristics. Section 3.2.4 attempts to verify empirically the proposed determinants of industry profit rates, before conclusions are made in Section 3.3.

3.2.1 *DIFFICULTIES POSED BY THE ECONOMIC MEASURE OF PROFIT:*

From the outset it is accepted that the empirical test is bound by certain methodological and data constraints. For instance, the accounting profits measure is problematic because it fails to include opportunity cost. Accounting profits are calculated simply by subtracting total expenses from total revenue and take no cognisance of the broader economic cost. Bain (1951) argues that economic profits include the amortised value of all previously-acquired assets and the current real return on the original cost of owners equity. In an attempt to make accounting profits more suitable for the purposes of economic analysis, authors, like Bain (1951), Levinson (1960), Weiss (1963) and Sherman (1964) introduce a measure of ownership into their analyses. As a fraction of equity, accounting profits give a more realistic perspective of the opportunity cost associated in the gain or materialisation of profits. In many first world countries, data concerning equity, and both long and short term debt are readily available. The lack of such data in South Africa, however, has frustrated the author and limits the validity of the empirical research. Although net accounting profits are disclosed by the Central Statistical Services (CSS), the study is unable

43

to find measures of equity. No data can be found to approximate for unlisted private corporations. To circumvent these data problems, the present analysis includes all categories of amortised assets listed in the census data. Assets, whether funded by debt or equity, provide a measure of the extent to which owners have sacrificed their liquidity in the hope of achieving a real rate of return. Rates of return on capital employed, therefore, are calculated as the total reported net profits divided by the amortised sum of the fixed assets (land, buildings, vehicles, machinery). These rates of return are then plotted against the relative degree of concentration. In an attempt to explain the scatter, additional explanatory variables are incorporated in the analysis.

3.2.2 *ADDITIONAL 'EXPLANATORY' VARIABLES OF PROFIT:*

Twenty seven industries are incorporated into the analysis. Since there is some heterogeneity between industries, supplementary explanatory variables are considered to account for the possible profit differences between industries. These explanatory variables include:

1) NUM : the number of firms operating in the industry. Firm numbers are included to compensate for the relative Gini coefficient measure. The Gini coefficient measures the distribution of gross output between firms but gives no indication of the number of firms accounting for a particular inequality. The NUM variable is essential, following the imperfect competition and structuralist view that *large numbers* competition drives

44

competition. A smaller firm population is believed to have a positive impact on economic profit levels.

2) EFF: a measure of efficiency. This indicates the extent to which gross output per unit labour cost has increased/decreased over the period 1982-1985. The period 1982 represents the manufacturing census immediately preceding that of 1985 and serves as a proxy for the extent to which unit costs have been minimised through time. In a similar study testing for a positive correlation between concentration and profit, Duncan (1972:54) states: "It is extremely difficult in practice to measure the relative efficiency of different industries in organising their inputs". Duncan employs the rate of growth of output per worker from 1969-1972 as an efficiency index. In terms of the efficiency school hypothesis, measures of efficiency are likely to have a positive impact on profit levels.

3) PROT: a measure of effective tariff protection. It was decided to introduce tariff protection into the analysis because of the efficiency school's perception that government protection represents an effective barrier to entry. By excluding international competition, tariff protection has a positive bearing on profit. Holden (1990:4) defines the effective protective tariff rate (g_j) as "the change in the value-added due to tariff structure as a proportion of value added at world prices." Where,

$g_j = (V_{j'} - V_j)/V_j$ and,

$V_{j'}$ = value-added at protected prices (1985)

V_j = value-added at world prices (1985)

45

The tariff protection values employed in the empirical analysis are those calculated by Holden (1990:5).

4) CAPLAB: the capital-labour ratio (K/L) or the capital intensity of industries. The ratio of capital to labour in industries is included as a determinant of profit because of the potentially important bearing automation has on market performance. The capital-labour ratio is defined as the 1985 value of machinery divided by total salaries and wages in each of the three-digit manufacturing categories. Capital intensive industries are viewed by structuralist analysis as high market entry barriers. Potential difficulties in securing finance and high initial capital requirements add to the cost of entry in capital intensive industries. High capital-labour ratios are likely to be associated positively with economic profits. Capital intensive industries, in terms of the efficiency analysis, are likely to be associated with scale economies and enhanced efficiency.

3.2.3 *A PRELIMINARY DISCUSSION OF DATA:*

The data discussion provides the groundwork for the regression analysis. First, summary statistics are calculated to provide an insight into the attributes and misgivings of the industry sample. Second, the five most profitable industries are isolated in an attempt to establish any common characteristics which distinguish them from the remainder.

46

3.2.3.1   SUMMARY STATISTICS AT THE 3 DIGIT LEVEL:

Table 3.1 provides a summary of the important indicators which can be derived from the census data.

TABLE 3.1: SUMMARY STATISTICS OF THE 24 INDUSTRY SAMPLE

	NUMBER OF INDUSTRIES	MEAN	STANDARD DEVIATION	RANGE
PROFIT	24	0.27	0.22	0.98
GINI	24	0.86	0.044	0.165
NUM FIRMS	24	708	678	2816
EFFICIENCY	24	-0.083	0.12	0.63
PROTECTION	24	32.2	21.3	93.2
CAPLAB	24	1.5	1.57	5.87

1. PROFIT: The mean profit rates are high. The average return on fixed assets in 1985 is 27 percent. Nonetheless, there remain remarkable differences in profitability across industries. The most profitable industry is leather with a return of 79 percent on fixed assets, and the least profitable is that of motor vehicles which recorded a loss of 19 percent. A possible reason for the high rates of return is the lack of comprehensive economic census data in South Africa. Manufacturing census data reveals only fixed asset values and thus an inclusive measure of the return on total assets is not possible. The only current asset available in the census data is 'stock'. The inclusion of 'stock' into the analysis has no

47

significant impact on the profit mean. A further possible reason for high profit rates is that industrial concentration in South Africa, as measured by the Gini coefficient, is extreme.

2. GINI VALUES: The mean Gini coefficient for the 24 observed industries is 0.86. This indicates an extremely high degree of concentration. Moreover, Gini values vary within a very limited range. The two lowest Gini industries are plastic products and footwear (0.738) and the highest motor vehicles (0.903). The results confirm that seller concentration does not merely occur in exceptional or isolated cases. Concentration is a structural characteristic which cuts across a broad spectrum of South African manufacturing industries.

3. NUMBER OF FIRMS: Firm numbers are large, even though concentration by gross output class is extreme. This, in part, is due to the fairly broad three-digit definition of industry categories. The average firm population in each industry is approximately 708. The fabricated metal industry has the largest number of firms (2865), whilst the glass industry has the least (49). Apart from the fairly broad definition of industry categories at the three-digit level, the large number of firms suggests either that barriers to entry are low, or the 'competitive fringe' of small peripheral firms within industries is large.

4. EFFICIENCY: TABLE 3.1 highlights that gross output per unit labour cost decreases by approximately eight percent over the period 1982-1985. Possibly, this decrease in productivity may be attributed to the effects of diminishing real wages and the increasing political dissatisfaction apparent in emerging trade union movements during the period.

48

5. TARIFF PROTECTION: The summary statistics on tariff protection highlight the protected nature of South African industry and provide evidence of a policy aimed at promoting growth through import substitution. On average, South African manufacturing industries are effectively protected 32 percent through tariff structures. The table, however, indicates the wide variance in tariff protection. The most protected industries include 'other industries', plastic products and industrial chemicals.

6 CAPITAL LABOUR RATIO:

The capital-labour ratios highlight the extreme variance in the capital intensity of South African manufacturing. Industries with low capital-labour ratios include wearing apparel and footwear, whilst those with high capital-labour ratios include industrial chemicals and the paper industry.

3.2.3.2 *AN ANALYSIS OF THE FIVE MOST PROFITABLE INDUSTRIES:*

TABLE 3.2: THE FIVE MOST PROFITABLE MANUFACTURING INDUSTRIES

	GINI MEAN: 0.82	NO FIRMS MEAN: 708	CAPLAB MEAN:1.50
LEATHER	(BELOW MEAN)	(BELOW MEAN)	(ABOVE MEAN)
OTHER	(ABOVE)	(ABOVE)	(ABOVE)
GLASS	(BELOW)	(BELOW)	(ABOVE)
NON FERROUS	(BELOW)	(BELOW)	(ABOVE)
ELECTRICAL MACHINERY	(ABOVE)	(ABOVE)	(BELOW)

TABLE 3.2 highlights that the five most profitable industries have little in common with respect to Gini, number of firms and capital-labour aggregates. Three of the most profitable industries (leather, glass and non-ferrous metals) have Gini and firm numbers below the mean for total manufacturing. Two industries (electrical machinery and 'other'), however, have Gini and firm numbers above the mean. Four of the most profitable industries have above average capital-labour ratios, whilst electrical machinery has a below industry average capital-labour ratio. Profitable industries, the table suggests, have no common denominator to distinguish their performance from remaining industries. The results of the table do not conveniently fit the structuralist hypothesis. Industry profitability, the table intimates, is not primarily structurally determined.

3.2.4   REGRESSION ANALYSIS RESULTS:

Section 3.2.4 discusses the regression results for the 1985 manufacturing census period. The section, first, considers why a multivariate approach to the concentration-profits debate is necessary; and, second, attempts to separate the contributory effects Gini, firm numbers, tariff protection and capital-labour ratio have on dependent profit and efficiency variables respectively.

3.2.4.1   *MULTIVARIATE REGRESSION ANALYSIS:*

Two important considerations necessitate a multivariate approach to the concentration-profits debate:

First, theoretical controversy suggests that market structure may not be the principal determinant of market performance.   Whilst the structuralist school argues that concentration facilitates collusion and market abuse, the efficiency school asserts that regulatory or politically inspired sunk cost entry barriers are the prime determinatives of market power abuse. Concentrated market structures can represent an efficient solution and are not necessarily anticompetitive.   Evidence of excessive profits are a manifestation of greater efficiency and not monopolistic abuse.   Potential determinants of profit may thus be summarised to include: seller concentration, regulatory policies and efficiency.

Second, the cross sectional nature of the data requires the incorporation of a wider set of explanatory variables or potential determinants of profit.   The 24 firms represent a diverse spectrum of South African industries.   The description of industries at the three-digit level implies comparison across relatively heterogeneous industries.   Profit differences across industries at such a heterogeneous level are, therefore, less than likely to be determined by any single variable.

The hypothesis to be tested may be defined:

51

Regression 1

$$\text{Profit} = \beta_0 + \beta_1 \text{ Gini} - \beta_2 \text{ Firm numbers} + \beta_3 \text{ Efficiency} + \beta_4 \text{ Tariff protection} + \beta_5 \text{ Capital-labour ratio.}$$

The Gini coefficient, number of firms and capital-labour ratio represent key structuralist variables explaining the concentration-profits hypothesis. The structuralist hypothesis argues that economic profits are positively related to concentration (Gini) and negatively related to *large numbers* competition (firm numbers). High capital requirements are likely to raise market entry barriers and hence economic profits are likely to be positively associated with increasing capital-labour ratios. The efficiency and tariff protection measures describe the efficiency argument. The efficiency hypothesis argues that economic profits are largely a product of efficient resource utilisation. Economic profits may, however, also be a derivative of protectionist or regulatory policies such as tariff protection. In this respect, the efficiency argument has both procompetitive and anticompetitive elements.

The small size of the sample (24 industries) implies that any industry outliers may bias the regression results. In order to improve the frequency distribution of industries and minimise bias, logarithmic transformations are tried on several variables (number of firms, tariff protection and capital-labour ratios). The estimated regression line is as follows:[8]

---

[8] Three industries (Tobacco, Pottery, Professional and Scientific equipment) are excluded from the analysis. The data on Tobacco is not sufficiently comprehensive to calculate Gini coefficients, whilst the Pottery and Professional and Scientific

52

<div align="center">Regression 2</div>

$$\text{PROFIT} = -0.496 - 0.052\ \text{logNUM} + 0.957\ \text{GINI} + 1.136\ \text{EFF} + 0.12\ \text{logPROT} - 0.064\ \text{logCAPLAB} + \mu$$
$$\quad\ (0.71)\quad (0.04)\qquad\quad (0.86)\qquad\quad (0.31)\qquad\ \ (0.04)\qquad\qquad (0.04)$$

IND. VAR.	COEFF	STD ERR.	T-VALUE	SIG. LEV
CONSTANT	-0.49588	0.708331	-0.7001	0.4928
logNUM	-0.052534	0.037491	-1.4012	0.1782
GINI	0.957178	0.858392	1.1151	0.2795
EFF	1.135744	0.306207	3.7091	0.0016
logPROT	0.119797	0.043676	2.7429	0.0134
logCAPLAB	-0.064408	0.040901	-1.5747	0.1327

R^2 (ADJ.)= 0.4337   DurbW= 1.686

<div align="center">**CORRELATION MATRIX FOR COEFFICIENT ESTIMATES**</div>

	CONST.	logNUM	GINI	EFF	logPROT	log CAPLAB
CONST.	1.0000	-.0684	-.9140	-.1511	-.3796	.0124
logNUM	-.0684	1.0000	-.2964	.0469	.2063	.3775
GINI	-.9140	-.2964	1.0000	.1180	.1209	-.1437
EFF	-.1511	.0469	.1180	1.0000	.2725	.0752
logPROT	-.3796	.2063	.1209	.2725	1.0000	.0610
logCAPLAB	.0124	.3775	-.1437	.0752	.0610	1.0000

The results of the multiple regression on profit reveal that neither Gini nor the absolute number of firms in individual industries have any bearing on profit rates. The respective t-values of "1.1" and "-1.4" are insignificant. The results, therefore, reject the structuralist

industries do not incorporate any measure of tariff protection.

hypothesis that a positive relationship exists between concentration and the welfare proxy of profit. The results also indicate that increasing capital requirements across industries have no real impact on the level of economic profits attained. The insignificant link between capital intensity and economic profits suggests either intense competition or the absence of limit price tactics. Large capital requirements, the results suggest, do not create absolute barriers to entry. Efficiency and tariff protection, however, do have a positive and significant impact on profits, other variables held constant. The results which are significant at the 95 percent confidence level indicate that a 1 percent increase in efficiency will lead to a 1.13 percent increase in profits, and a 1 percent increase in effective protection will lead to a 0.12 percent increase in profits. Whilst tentative, these results seem to support the efficiency school's procompetitive and anticompetitive arguments. The procompetitive result suggests that efficient industries, regardless of structure, will earn profits above those which use their concentrated nature as the sole means to appropriate surplus profit. The anticompetitive result suggests that protectionist policies will raise market entry barriers, dissuade potential competitors and enhance profits. Tariff protection will present market incumbents, regardless of structure, with an opportunity to strategically abuse market power and earn unwarranted economic rents. The correlation coefficient matrix of the regression analysis reveals no important multicollinearity. All coefficients are below 0.5 (see: Gujarati 1988:299), and thus there can be no suggestion of any significant relationship among the explanatory variables. The plot of residuals against predicted values (APPENDIX 2.) portrays no evidence of heteroscedasticity. It may thus be assumed that the variance of each disturbance term u_i is largely homoscedastic. The Durbin-Watson statistic of 1.686

54

suggests that there no first order autocorrelation, either positive or negative. The R^2 value of 0.43, however, implies that the five explanatory variables together account for approximately 43 percent of the variation in profit levels across industries. In this respect, the results should be treated with caution. Approximately 57 percent of the variation in profit remains unexplained. This incomplete specification, suggests that there are other potentially important variables which have significant impact on industry profit rates and need to be identified and quantified.

Regression 3 takes the concentration-profits hypothesis one step further. If, as Regression 2 suggests, seller concentration has no positive bearing on profitability, it might be worthwhile to extend the analysis to include the question: Does seller concentration undermine allocative efficiency in markets? If the answer to the latter question is also negative, the structuralist interpretation of the concentration-profits hypothesis must be re-evaluated within the South African context.

Regression 3

$$EFF = 0.35 - 0.006 \log NUM - 0.331 \; GINI - 0.039 \log PROT - 0.01 \log CAPLAB + \mu$$
$$(0.52) \quad (0.03) \qquad\quad (0.64) \qquad (0.03) \qquad\quad (0.03)$$

IND. VAR.	COEFFICIENT	STD. ERROR	T-VALUE	SIG LEVEL
CONSTANT	0.349613	0.524598	0.6664	0.5131
logNUM	-0.005742	0.028058	-0.2047	0.8400
GINI	-0.330845	0.638627	-0.5181	0.6104
logPROT	-0.038866	0.031484	-1.2345	0.2321
logCAPLAB	-0.010039	0.030557	-0.3285	0.7461

R^2 (ADJ.) = 0.0000   DurbW = 2.00024

55

The multiple regression result, using the rate of change of gross output per unit labour cost (1982-1985) as an independent variable, highlights that neither firm numbers nor Gini have a significant effect on the levels of efficiency across industries. The t-values are insignificant at "0.2" and "0.5" respectively. A further regression, removing the three lowest Gini industries was also conducted. The estimated regression line is as follows:

Regression 4

$$EFF = 1.296 + 0.002 \text{ logNUM} - 1.619 \text{ GINI} - 0.011 \text{ logPROT} - 0.01 \text{ logCAPLAB} + \mu$$

(0.49)	(0.02)	(0.62)	(0.02)	(0.03)
(2.62)	(0.11)	(-2.63)	(0.43)	(0.54)

$$R^2 \text{ (ADJ)} = 0.16$$

where the figures in parenthesis are standard errors and t-values respectively. The 21 Gini industries above the Gini threshold of 0.77, suggest a negative and significant relationship between concentration and efficiency. The results indicate that a 1 unit increase in Gini decreases the rate of change of gross output per unit labour cost by 1.6 percent. The results, however, suggest that a comparatively large change in the relative distribution of gross output is necessary prior to any significant negative impact on industry efficiency levels. Seller concentration, the analysis suggests, has little negative impact on allocative efficiency. The correlation matrix (APPENDIX 3.) reveals no evidence of multicollinearity. The pair-wise correlations among regressors are all below 0.5 and hence the explanatory variables may be assumed to be nonstochastic. The plot of residuals against predicted values (APPENDIX 4.) does not suggest any heteroscedasticity. The Durbin Watson d statistic of 2.26 appears to indicate the presence of first order positive serial (spatial) correlation. However, because of the cross-sectional nature of the data and the limitations

of the Durbin-Watson test (see Gujarati 1988: 375-379), an alternative measure for serial correlation was sought. A χ^2 statistic of 2,7052 constituted from a La Grange multiplier test indicates the absence of serial correlation at both the 95% and 99% levels of significance. The results of Regression 3 and 4, therefore, largely support the results of Reression 2. Seller concentration in South African markets, it would seem, had little or no significance on either allocative efficiency or profit levels during the 1985 census period.

3.3 *CONCLUSION:*

Chapter Three, empirically examines the structure-performance test for three-digit South African manufacturing industries using Gini coefficients to measure structure. Performance is represented by the return on fixed assets. In order to provide a more complete specification of profit, variables such as efficiency, tariff protection and capital-labour ratios are included in the model. A summary review of the sample data suggests that South African manufacturing industries are highly concentrated. Calculated profit rates, on average, are high. Nonetheless, among the 24 industries there is great variability of profit rates and these rates cannot be explained statistically by the Gini index. Consequently, the results of the 1985 empirical analysis highlight that concentration does not explain profitability. The findings further indicate that there is no high profit vs low profit break by Gini. Three of the five most profitable industries (leather, glass and non ferrous metals) have Gini coefficients below the mean of 0.82, whilst the remaining two (electrical machinery and other industries) have Gini's above the mean. In addition, the empirical

57

findings conclude that seller concentration has a relatively insignificant effect on market efficiency. The regression of efficiency on Gini industries above a threshold of 0.77, suggests that a 1 point increase in Gini will reduce gross output per unit labour cost only by 1.6 percent. Large capital requirements, the study intimates, do not necessarily provide market incumbents with an opportunity to exploit market power. The results of the regression analysis, therefore, do little to substantiate the structuralist interpretation of the concentration-profits debate. Structure is not the prime determinant describing market conduct and performance. The results of the empirical analysis must, however, be treated with caution. Several pitfalls exist. "Most important of these is the high level of aggregation when one is forced to work with data at main group (three-digit SIC level)." (Fourie and Smit 1989:252) The limited period of the analysis and the measurement problems of concentration and profit also present difficulties. Until more comprehensive manufacturing census data, with respect to concentration, asset and equity holdings, are readily available any empirical test between concentration and profits will necessarily remain incomplete.

CHAPTER FOUR:

4.1 *CONCLUSION:*

Economic success in a future post-apartheid economy will not rest merely on political stability but will also depend on the extent to which markets will be allowed to mobilise and allocate resources efficiently. Recent international developments highlight that competition market economies are perhaps best suited to the latter task. The more intense the competition, the greater the desired allocative and efficiency gains. The role for regulatory policy is to promote effective competition. Within the neoclassical framework much controversy exists over the economic character of seller concentration. The study reviews both the literary and empirical controversy surrounding industrial concentration.

At a theoretical level, the dissertation examines the lack of unanimity surrounding the exact mechanisms which drive competition. The debate surrounding the economic character of seller concentration stems from different perspectives surrounding those factors which propel competition. In terms of the structuralist viewpoint competition is driven by *large numbers*. Resource scarcity, self interest and *large numbers* are understood to represent the prime factors motivating competition and ensuring prices do not exceed minimum industry long-run average costs. A definite bias exists against markets dominated by a limited number of firms. Seller concentration is perceived to facilitate collusion, raise market entry barriers

59

and result in abnormal profits accruing to market incumbents. Competition, according to the efficiency school, is not confined to atomistic structures. Competition can operate successfully across a wide spectrum of market structures and can occur in any number of forms. Serious or long term limits to competitive interaction in markets are posed, largely, by legal constraints that raise market entry barriers, limit individual freedom, choice and distort market arbitrage. Concentration, in the absence of government intervention or significant sunk cost entry barriers can be perceived as an efficient solution.

At an empirical level, the dissertation examines the unresolved debate with respect to empirical findings on the seller concentration - profits issue. First, controversy surrounds the importance of concentration as a determinant of economic profits. Findings vary from Sherman (1964), who records a relatively strong linear correlation between concentration and profits ($r = .66$) at the 99 percent confidence level, to Stigler (1963), whose results suggest no significant correlation between concentration and profits at the 10 percent level. Second, there is the debate over whether or not this relationship is continuous or discrete. Whilst Bain (1951), Meehan and Duchesneau (1973), and Dalton and Penn (1976) argue that the relationship is discontinuous, Sherman (1964), Kilpatrick (1967) and Collins and Preston (1970) argue that the relationship is continuous. Third, there is a lack of consistency with respect to the denominator employed in the various measures of economic profit. Bain (1951) and Brozen (1971) use the post tax measure of **net worth**; Weiss (1963) and Sherman (1964) use the rate of return on **equity** after taxes; and Fuchs (1961) and Stigler (1963) use the rate of return on **total assets** after taxes. Finally, there is controversy

60

over whether a positive relationship between seller concentration and profits is indicative of market exploitation or superior efficiency. Reekie's (1982) South African analysis tends to confirm the structuralist interpretation of the structure-conduct-performance paradigm, while Demsetz (1963) and Leach (1991) confirm the efficiency view.

Although the findings of the present empirical study largely negate a structural interpretation of the concentration-profits hypothesis, these may be described only as tentative. Serious problems are presented because of inadequacies in South African data. Notable deficiencies include: the absence of annual census data; non disclosure of equity and current asset measures; the heterogeneous nature of three-digit census data and, finally, the *confidential* treatment of absolute concentration measures.

The unresolved nature of the theoretical and empirical literature and the problems presented by South African manufacturing census data, largely undermine positive policy prescription. If any policy conclusions are to be made, however, the results of this study question structural intervention into South African manufacturing on four counts.

First, controversy surrounds the exact mechanisms which drive competition. Policy makers in South Africa need to prioritise whether 'large numbers' are a necessary factor ensuring competition or the *condition of entry*? Whilst the structuralist argument suggests that market structure represents a prime determinant of market performance, more recent

efficiency literature argues otherwise. The efficiency school advocates that entry barriers are the prime source for anticompetitive abuse.

Second, empirical evidence supporting the concentration-profits hypothesis is inconclusive. Monopoly power and market welfare are traditionally represented by seller concentration and profits. South African profit and concentration levels seem high, and do at first glance confirm the structuralist notion of a unidirectional flow of causality from structure through conduct to performance. The 1985 data, however, cautions this logic. First, there is large variance in profit rates across concentrated industries. Second, a cross sectional regression of profit rates on concentration indices, reveals no significant linear correlation between growth in concentration and growth in economic profit. The results of the multiple regressions on profit indicate that neither Gini nor the absolute number of firms in individual industries have any bearing on profit rates. The respective t-values of "-1.4" and "1.11" are clearly insignificant. These empirical findings suggest that market structure is not unidirectionally responsible for market conduct and performance. Concentration thus appears to be a poor proxy for monopoly and anticompetitive abuse. The appropriate nature of concentration as an explanatory variable for varying profit rates across South African industries is thus debateable. Policy makers wishing to utilise concentration as a proxy for market abuse must, therefore, be circumspect.

Third, the results of the empirical analysis suggest that efficiency, not concentration, is a key determinant of industry profitability. This finding, whilst weak, supports the idea that

62

efficient industries will prevail above those industries which attempt to utilise their concentrated nature to appropriate surplus profit. The results suggest that a one percent increase in efficiency will increase profits by 1.14 percent. The results do not, however, necessarily imply that concentrated industries are efficient. Once a Gini level of 0.77 is exceeded, concentration appears to have a negligible but negative impact on efficiency. Ideally, an annual publication on concentration levels, would allow this relationship to be viewed more comprehensively through time.

Fourth, even if empirical results should reveal a significant and positive relationship between seller concentration and profits, such studies may only serve as guidelines for further and more focused investigations into individual industries. This is because the causative nature of the concentration-profits link is questionable. Is it structure which results in abnormal profits, or is it industry efficiency and profit levels which dictate structural tendencies in markets? As the efficiency school argues, there is more likely mutual causation and feedback between market *structure, conduct and performance* variables. Any empirical link between concentration and profits should therefore be viewed, at most, only as a first approximation of market behaviour.

In the absence of empirical studies to the contrary, the limited findings of this thesis indicate that there can be no presumption against seller concentration. Further empirical research is essential. It can only be through more comprehensive and empirically based

investigations, that a more credible and consistent approach to competition policy can be implemented.

BIBLIOGRAPHY:

African National Congress., 1990, 'Draft Economic Policy Document', *Unpublished Internal Discussion Document*.

Armentano D.T., 1982, *Antitrust and Monopoly: Anatomy of a Policy Failure*, New York: John Wiley and Sons.

Bain J., 1951, 'Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936-40', *Quarterly Journal of Economics*, LXV:293-323.

Bain J., 1968, *Industrial Organisation*, 2nd ed., New York: Wiley and Sons.

Brozen Y., 1971, 'Bain's Concentration and Rates of Return Revisited', *Journal of Law and Economics*, 14:351-359.

Chamberlin E.H., 1933, *The Theory of Monopolistic Competition*, Cambridge Mass: Harvard University Press.

Clark J.M., 1940, 'Towards a Concept of Workable Competition', *American Economic Review*, 30:241-256.

Collins N.R. and Preston L.E., 1970, *Concentration and Price-Cost Margins in Manufacturing Industries*, Berkeley: University of California Press.

Competition Board, 1985, *Fifth Annual Report*, Pretoria.

Competition Board, 1989, *Ninth Annual Report*, Pretoria.

Competition Board, 1991, *Eleventh Annual Report*, Pretoria.

Cowell F.A., 1977, *Measuring Inequality*, Oxford: Bocardo and Church Army Press.

Dalton J.A. and Penn D., 1976-1977, 'The Concentration-Profitability Relationship: Is There a Critical Concentration Ratio?', *The Journal of Industrial Economics*, 25:133-143.

ᵡ Demsetz H., 1973, 'Industry Structure, Market Rivalry and Public Policy', *Journal of Law and Economics*, 16:1-9.

Demsetz H., 1974, 'Two Systems of Belief about Monopoly', in Goldscmidt H.J.et al, *Industrial Concentration the New Learning*, New York: John Wiley and Sons.

Duncan I., 1972, 'The Measurement of Industrial Concentration with Special Reference to the Entropy Concentration Index', *Unpublished Thesis*, University of Natal.

Du Plessis P.G., 1977, 'Concentration of Economic Power in the South African Manufacturing Industry', *Unpublished Thesis*, Stellenbosch University.

Du Plessis P.G., 1978, 'Concentration of Economic Power in the South African Manufacturing Industry', *South African Journal of Economics*, 46:257-269

╱ Financial Mail, 1987, *Economic Concentration*, 02:37-38.

Fourie F.C.vN., 1987, 'Issues and Problems in South African Competition Policy', *South African Journal of Economics*, 55:333-354.

Fourie F.C.vN. and Smit M.R., 1989, 'Trends in Economic Concentration in South Africa', *South African Journal of Economics*, 57:241-256.

66

Fuchs V., 1961, 'Integration, Concentration, and Profits in Manufacturing Industries', *Quarterly Journal of Economics*, LXXV:278-291.

Gujarati D.M., 1988, *Basic Econometrics*, 2nd ed., New York: McGraw-Hill.

Holden M., 1990, 'The Structure and Incidence of Protection in South Africa', in forthcoming: *Readings in Micro-Economics*, ed. by Black P. and Dollery B., Oxford University Press.

Kamerschen D., 1969, 'The determination of Profit Rates in Oligopolistic Industries', *The Journal of Business*, 25:297-298.

Kilpatrick R., 1967, 'The Choice among Alternative Measures of Industrial Concentration', *The Review of Economics and Statistics*, 49:259-260

Leach D.F., 1991, 'Concentration and Profits in South Africa: Monopoly or Efficiency?', conference paper presented at the *Biennial Conference of the Economic Society of South Africa*, University of Stellenbosch.

Levinson H.M., 1960, 'Postwar Movement of Prices and Wages in Manufacturing Industries', *U.S Congress Joint Economic Committee Study Paper*, 21:12-18.

Meehan J.W. and Duchesneau T.D., 1973-1974, 'The Critical Level of Concentration: An Empirical analysis', *Journal of Industrial Economics*, 22:21-36.

Mouton Commission, 1977, *Report of Inquiry into Regulation of Monopolistic Conditions Act, 1955*, Government Printer Pretoria, RP64.

Mouton D.J. and Lambrecht J.A., 1982, 'Official Competition Policy in the Republic of South Africa', *Finance and Trade Review*, 15:1-23

Naude S.J., 1986, 'South African Competition Policy: Challenges and Pitfalls', *Modern Business Law*, 25:76-81.

Reekie W.D., 1984, 'The Structure-Conduct-Performance Paradigm iu a South African Setting', *South African Journal of Economics*, 52:146-155.

Report No. 10-21-39, 1979, Statistics According to Major Groups and Subgroups: South Africa, *Census of Manufacturing*, Central Statistical Service:Government Printer.

Report No. 30-01-01, 1982, Statistics According to Major Groups and Subgroups: South Africa, *Census Of Manufacturing*, Central Statistical Service:Government Printer.

Report No.30-01-02, 1985, Statistics According to Major Groups and Subgroups: South Africa, *Census Of Manufacturing*, Central Statistical Service:Government Printer.

Robinson J., 1934, *The Economics of Imperfect Competition*, London: Macmillan.

Sherman H.J., 1964, *Macrodynamic Economics*, New York: Appleton-Century-Crofts.

Smith A., 1991, 'A Critical Evaluation of Resale Price Maintenance in South Africa: An Efficiency Interpretation', *Unpublished Thesis*, University of Natal.

Sosnick S.H., 1958, 'A Critique of Concepts of Workable Competition', *Quarterly Journal of Economics*, 72:380-423.

Spandau A., 1977, 'Towards a new South African Competition Policy', *South African Journal of Economics*, 45:299-309.

Stigler G.J., 1963, *Capital Rates of Return in Manufacturing Industries*, Princeton: Princeton University Press.

Tregenna-Piggot J.V., 1976, 'Concentration and South African Industry', *Occasional Paper No.5*, Department of Economics, University of Natal.

Weiss L., 1963, 'Average Concentration Ratios and Industrial Performance', *Journal of Industrial Economics*, 11:237-254.

	1979		1982		1985	
	Min Gini	Max Gini	Min Gini	Max Gini	Min Gini	Max Gini
FOOD	.822	.871	.833	.872	.820	.875
BEVERAGES	.709	.779	.731	.792	.725	.820
TEXTILES	.781	.838	.795	.827	.793	.829
WEARING APPAREL	.801	.815	.782	.793	.780	.793
LEATHER	.746	.764	.744	.766	.768	.787
FOOTWEAR	.659	.691	.694	.727	.717	.749
WOOD & CORK	.797	.810	.804	.815	.815	.833
FURNITURE	.771	.782	.760	.782	.750	.793
PAPER	.687	.778	.782	.825	.810	.869
PRINTING & PUBLISHING	.792	.805	.797	.805	.795	.809
INDUSTRIAL CHEMICALS	.684	.829	-	-	.700	.795
OTHER CHEMICALS	.762	.855	.806	.872	.765	.845
RUBBER	.772	.850	.829	.895	.810	.863
PLASTIC	.703	.729	.760	.781	.722	.747
POTTERY	.816	.841	.812	.861	.809	.875
GLASS	.797	.911	.829	.922	.667	.849
NON-METALLIC MINERALS	.866	.882	.691	.706	.867	.884
IRON & STEEL	.726	.868	.817	.896	.758	.869
NON FERROUS METALS	.568	.603	.725	.825	.707	.812
FABRICATED METALS	.822	.840	.813	.827	.817	.834
MACHINERY	.616	.640	.798	.817	.784	.802
ELECTRICAL MACHINERY	.812	.848	.829	.853	.817	.854
MOTOR VEHICLES	.863	.895	.877	.908	.877	.916
TRANSPORT EQUIPMENT	.860	.896	.863	.876	.854	.867
PROFESSIONAL & SCIE	.763	.823	.772	.791	.811	.818
OTHER MANUFACTURING	.847	.863	.823	.836	.809	.916
AVERAGE	.849	.875	.864	.878	.855	.880

Residual Plot for PROFIT
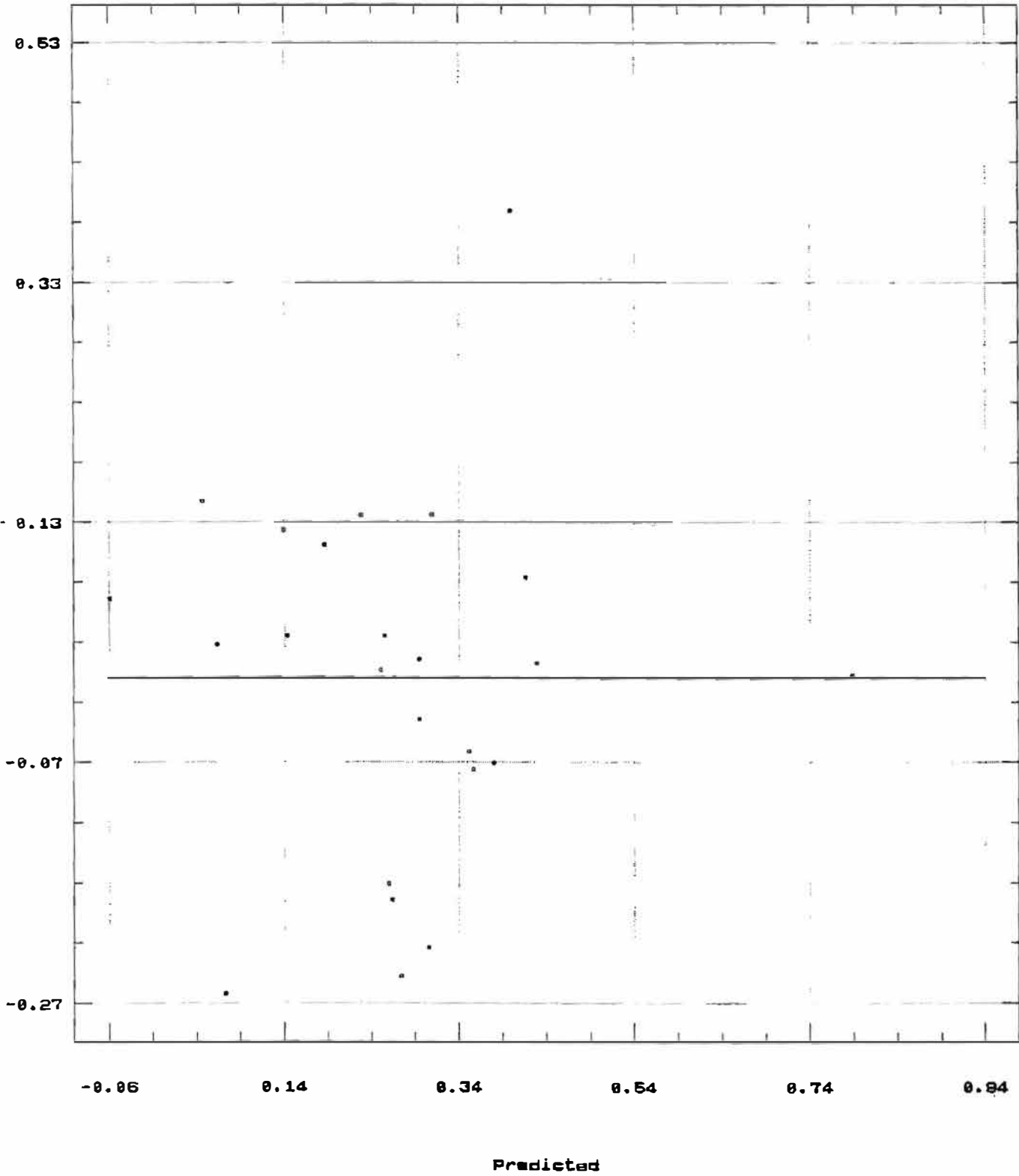
CORRELATION MATRIX FOR COEFFICIENT ESTIMATES

	CONSTANT	logNUM	GINI	logPROT	log CAPLAB
CONSTANT	1.0000	-.0396	-.9377	-.1244	.0225
logNUM	-.0396	1.0000	-.2705	.2120	.4314
GINI	-.9377	-.2705	1.0000	-.0981	-.1518
logPROT	-.1244	.2120	-.0981	1.0000	.0815
logCAPLAB	.0225	.4314	-.1518	.0815	1.0000

Residual Plot for EFF

Predicted