

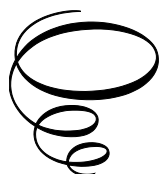
Market Dominance and Market Power

Market Dominance and Market Power

By

T.V.S. Ramamohan Rao

**Cambridge
Scholars
Publishing**



Market Dominance and Market Power

By T.V.S. Ramamohan Rao

This book first published 2020

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Copyright © 2020 by T.V.S. Ramamohan Rao

All rights for this book reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

ISBN (10): 1-5275-5944-0

ISBN (13): 978-1-5275-5944-8

To the memory of my wife Krishnaveni

TABLE OF CONTENTS

Preface	viii
Chapter 1	1
Introduction	
Chapter 2	10
Lerner Measure	
Chapter 3	19
Herfindahl Index	
Chapter 4	31
Non-Price Strategies	
Chapter 5	42
Market Dominance	
Chapter 6	55
Market Power	
Chapter 7	71
Regulation	
Chapter 8	83
Cyberspace Regulation	
Chapter 9	95
Managerial Implications	
Chapter 10	102
In Retrospect	
References	108

PREFACE

“We have all encountered moments when our mind-sets and emotions are conflicted, when our head tells us to stop and our heart tells us to keep going. It is these very conversations that ... will bring clarity about (the) purpose and ... direction and enable (us) to bring ... clarity to (our) actions.” - (Mills 2019, 12).

The prevalence of the use of non-price strategies in oligopolistic markets is by now an axiom. They seem to provide firms a degree of market dominance which translates into market power adding to that provided by the nature of product markets. However, market dominance is entirely a result of the choices of the managers of firms. Economic theory has not yet paid any attention to this concept.

The notion of market power has been around for almost a century. Two measures, the Lerner measure and the Herfindahl index have been at the forefront. Both these measures have their advantages, both in terms of conceptualization and measurement. However, they have been subjected to severe criticism and their limitations have been documented in detail. Despite their drawbacks, these measures held their ground though almost fifty other indices have been developed and utilized in one context or the other.

The fundamental realization is that while markets provide some power, as firms relate to their interface with the consumers, non-price choices have effects on market shares arising from the interaction of the firms among themselves in their efforts to capture as large a share of the market as they can even while foregoing some profits. It is necessary to integrate both the effects while constructing a measure of the market power of the industry and/or individual firms within it. This is another important development of this study.

The necessity for regulatory policy, ostensibly against monopolistic practices, has been central to reinforcing the necessity for such measurements. The use of these indices, utilized in legal debates, has been justified on economic grounds but they remain practically subjective. They are well entrenched and further debates are relatively minor.

Three aspects of these measurements have been well documented. First, these measures are computed at an industry level, irrespective of how they are defined in practice. Very few attempts at measuring them at the firm level are discernible. Second, irrespective of the level at which the measures are estimated, they are not able to pinpoint the sources, especially regarding the role of non-price strategies, of market power. The only aspects that received attention are the elasticity of demand and the mergers and acquisitions that are surmised as the sources of market dominance. Third, though the role of non-price strategies is very well acknowledged, they have not been brought into the centerfold of assessing the market dominance they provide to firms, the market power they contribute and the necessity to conceptualize antitrust relevant to some of these choices. Four reasons seem to predominate: (a) their influence, in contrast to price determination by the markets (and firms), is rather negligible (a claim not substantiated as yet), (b) the market power advantages are purely transitory in nature and they will be eliminated through competition in the markets (recent experiences do not corroborate this), (c) they offer useful information to consumers in their quest to improving their welfare (the actual choices do not seem to be limited to this alone), and that (d) regulatory policies will stifle innovation apart from inhibiting possible welfare gains (in fact, non-price strategies appear to be an innovative way of limiting the effects of the market and regulations). Be that as it may, there is little (or no) attention to the measurement and implications of market power attributable to non-price strategies of firms.

The emergence of cyberspace, importance of the services provided through the internet, and the near absence of prices that the consumers are normally expected to pay for most of the services, changed the basics of thinking significantly. The focus of the shift in the analysis centers around the use of central servers and the search algorithms by the subscribers. Two aspects of the concern are worth attention: (a) the intrusion into the privacy of individual centered information and (b) the use of advertising to generate revenues for the service providers and their implications, to the consumers, of the prices of advertised products. Clearly, that they exceed what the markets themselves can create, has been the focus of the debate. Nevertheless, the regulatory requirements around the qualitative aspects received far more attention than the quantitative dimensions.

The importance of non-price competition to the emergence of the market power of firms appears to receive emphasis in recent works. However, there is no clear conceptualization, let alone a procedure for the measurement of market power so derived. This study is an attempt to define and measure

market power as it applies to the firm level as well as specific non-price strategies of firms. The important observation is that while measures at the strategy level only need to consider the interaction of the firms among themselves the others require an integration with the market determined power.

Note that various forms of regulating non-price choices of firms are already in place. Especially notable are the data mobility and number portability among mobile networks, criteria for spectrum allocation, the internet, quality standards as they relate to durable goods and regulations of electric utilities. But such regulations appear to be piecemeal and lack a welfare theoretic foundation. It is necessary to close this gap by providing an appropriate theoretical foundation.

The fundamental purpose of this work is to initiate a systematic discussion of the issues involved in this endeavor. Clearly, there is a need to develop the measures as well as specify their implications for regulatory policy. One of the major hurdles is in dealing with the multi-dimensional nature of such strategies. Information from related areas has been utilized to arrive at several, albeit tentative, procedures towards the measurement of market dominance and market power of non-price strategies. The qualitative aspects are much too diffuse and harder to examine. They will not be attempted. Several quantitative measures, based on somewhat different but related premises, have been offered. Only tentative suggestions relating to the choice of one over the others have been attempted.

It should be reiterated that some well recognized information has been utilized though suitably modified to reflect the contemporary economic scenario. Further, work of this nature necessitated utilization of knowledge from related areas. This was attempted wherever it was necessary.

I was quite alone when my wife made her way to her Heavenly abode. Srinivas and Madhuri provided me invaluable help. I greatly appreciate their concern.

I would also like to thank Dr. Adam Rummens and the entire editorial staff at Cambridge Scholars Publishing for their timely and constructive help in moving this book to its conclusion.

T.V.S. Ramamohan Rao
Kitchener, Ontario, Canada

CHAPTER 1

INTRODUCTION

“Making sense of a constantly changing environment is less a matter of systematic analysis than of being alive to alternative ways of seeing the world; opening minds to new possibilities, abandoning long held convictions, and resisting the temptation to seek comfort in facile explanations.” - (Levis, 2009, p. 354).

Abstract

The present chapter provides an overview of the activities (strategies) and objectives of firms. The concepts of market dominance and market power have been defined as well. There is also a specification of the core decision processes and their outcomes that motivate regulatory activity. Keeping these in view an outline of the rest of the chapters in the book has been developed.

1.1. Activities of the Firm

Notions regarding the firm emphasized one or more of its activities depending on the purpose of analysis. Initially the emphasis was on the production of a homogeneous output utilizing a uniform technology. Developments of technology and the advent of mass production (which signaled economies of scale and scope emphasized by Chandler (1990)) that dominated the industrial scene was the basis of some studies. Essentially, the requirement to assemble several manufactured components gave rise to the recognition of the need to supplant the market transactions to avoid what was famously called transaction costs. Given the magnitude of the number of components being assembled and the number of workers involved in production the emphasis shifted to the organization of production. Sloan's M-form organization concepts have been vastly extended by Williamson (1988, 1996, 2002) and others. All these developments emphasized only the production activities of the firm and the concomitant implications for the costs of goods produced by the firm.

Two further developments were almost simultaneous. Gurley and Shaw (1960) recognized that the largeness of production activities also meant the necessity for large amounts of capital that no one individual can offer. Hence, the importance of various forms of financing was added to the considerations of physical production activities of the firm. The other aspect that was recognized was the differences in consumer preferences for certain features that products of different firms offer. This gave rise to the notion that firms offer a variety of products that are distinct but closely substitutable. From an analytical viewpoint the emphasis all along was on the firm choosing certain products that it can produce at the lowest possible cost per unit. The firms were then expected to sell their products on markets that they could not influence in any way. It was of course recognized that the products sold on the market are differentiated. This gave rise to the notion that recognizing the value that consumers search for in products is important. At once it was acknowledged that a homogeneous market for the sale of goods was replaced by many segmented and almost distinct markets for differentiated products. The attempt was to pretend that the consumers have a clear notion of the value of the differentiated products in the market and its primary role is to arrive at a negotiated price for each of the commodities at which transactions can take place. However, given the fairly large range of differentiated products the consumers cannot be expected to have full information about all the features of differentiated products for them to make a comparison among them for the value they receive.

Firms therefore felt that they need to inform consumers of the distinctive features of their product so that they can make value maximizing choices. Even if the consumers ultimately express the value of a product to them, by specifying the price they are willing to pay, firms tend to spend some of their resources so that the consumers got to know, and can express, the true value of the product to them. The possibility that the valuation is managed by the non-price decisions of the firm cannot be overlooked.

Many products that the consumers buy are durable in nature. That is, they provide a well-defined flow of services at each point of time over a certain length of time. However, the consumer has to incur some additional cost at every point of time to ensure the integrity of the product in its delivery of the promised level of service (warranties are one of the non-price choices of the firm through which it assures the consumer of the reliability of its product). The firm may conceptually provide three types of services relating to its use at any point in time; the sale of a new durable, repair and maintenance of the durable, and products and services that constitute the result of its use at any point in time. Generally, more than one firm (a

franchisee) may be involved in the delivery of each of these three services. This may be partly due to the competence or availability of resources of the firm producing the durable. It may also be due to the intention of the firm to avoid regulatory policy.

Durability of products also implies that their production requires a certain length of time. As a result, the firm develops an inventory policy to smooth the time lags between supply and demand.

Firms may also benefit from producing two or more products that are substitutable or complementary in production or consumer's choice. For, depending on the flexibility of the capital stock and the production process the firm may benefit from the economies of scale and scope they provide. Further, several products of the same brand may be of more value to the consumer instead of choosing them from different firms. Such multi-product firms achieve market dominance.

The emphasis on the concept of a firm therefore shifted from that of a production unit to one where it guides, maybe influences, what consumers buy and at what price. Non-price strategies of firms have been at the center stage for a long time. Koutsoyiannis (1982) made an early attempt to examine some of the issues involved. However, many of them are not relevant at present. There is no denying that the market dominance of each of the firms primarily results in the market shares they achieve.

Young (2012, chs.2,6 and7) brought to light several non-price aspects of the digital age and cyberspace. In particular,

“the more we define and report on our tastes, movements, and preferences, the more targeted a market we are for advertising, and for marketing to our friends. Continually pumping out and externalizing our tastes and preferences, which is so much a part of what it is like to be a digital person right now, is just not spontaneous. It is engineered. More than that, the bias of technology, by itself, encouraged this same tendency to push data about ourselves into the world. Digital technology 'likes' itemized lists that can be moved from one context and put into another, collated with people who like the same things as we do.” - (Young, 2012, 61)

For all practical purposes, private corporations, such as Google Plus, Facebook, Kindle of Amazon, and others, utilize central servers to store our 'likes' and preferences. They then utilize search engines to track potential customers of specific products and direct targeted advertising to them. This has led to their unprecedented market dominance. Though informative advertisements have been considered as enabling a customer to discover the

value of a product, these new non-price decisions of firms cannot be treated as equally benign. (Of course, it can be argued that by targeting individuals directly they are reducing the costs of information they provide and thereby increase consumer welfare.)

In sum, the firm may be visualized as a series of activities that must be performed in tandem to achieve the results they desire. A single measure of the non-price choices of a firm will not be sufficient to capture the different forms of dominance they provide to firms.

1.2. Objectives and Strategies

For the sake of conceptual clarity, the objectives of a firm should be considered as statements of the features of the firm that the management wishes to achieve but cannot alter directly. The following observation is pertinent. Even if the market allows a firm to charge a higher price for the output it offers, thereby increasing its price-cost margins, the firm may not do so keeping a long run perspective in view. Instead, it may attempt to increase its market share so as not to reduce the total profits. This is the genesis of the emphasis on non-price choices. In a similar fashion, firms may choose to reduce the quality of their products, commensurate with the lower price they are charging. This is another non-price strategy. To avoid the consumer forming an impression that the firm reduced the quality of its product, it may offer warranties and/or extended warranties.

In a dynamic context, the firm may consider it prudent to maintain its market share over time. This can be achieved by striving to garner the goodwill of consumers. It can be achieved, for instance, by its advertising and selling efforts. The range of non-price choices expands. To claim that the market power of a firm is solely dependent on the elasticity of demand for its product on the market would be an aberration.

Obviously, the choices, or managerial processes, described above will be classified as strategies. As a result, it can be suggested that the objectives of the firm are a consequence of their strategies and the nature of the product market. These outcomes can be measured and reflected in the available data. However, Heath (2010) observed that

“we can observe people's actions, but we cannot observe their motives. We don't really know what people are thinking or what they are trying to achieve.” - (Heath, 2010, 31)

In other words, a statement of objectives may be necessary to appreciate the nature of the market power that firms have. Profits and market shares have been the major objectives that have been recognized. It can only be surmised that the strategies of the management result in their achievement of objectives. Econometric evidence is scanty and hard to come by.

For all practical purposes, the major emphasis on the nature of the firm has to be on the various non-price choices they make, the effect of such decisions on the value recognition, or its manipulation, from the vantage of the consumer. Consumer revelation of value of the products, as expressed in the prices they pay on the market, is no longer an axiom or exogenous to the functioning of firms in the market.

1.3. Market dominance and Market Power

To this point in the analysis the emphasis was on the production and marketing aspects of the firm. The attempt was to investigate the reasons for specific choices of firms. There have been suggestions that the consumer may benefit from the non-price strategies of firms to the extent that they help the consumer in evaluating the value of the product. In addition to signaling by firms, consumers may also independently utilize search costs to assess the value of the products they intend to buy. The possibility that the sum total of all these costs (viz., the price paid on the market, search costs incurred by the consumer and the signaling costs of the firm which will be passed on to consumers eventually) incurred by the consumer can be in excess of the value of the product to the consumer has been recognized.

Since a distinction between the strategies of a firm and its objectives was necessary it follows that firms tend to establish their dominance over rivals with respect to the choice of certain strategies. The consequences of the choice of such strategies provides the firm a market power over rivals. Clearly, market dominance with respect to certain strategies may result in increasing market power depending on the consumer interface with the firm on the market for goods. Equally, as noted above, the firm may derive advantages relative to rivals in the market. Hence, it is necessary to keep this distinction in perspective.

Of utmost importance is the recognition that traditionally economic analysis emphasized only the market power at the interface of consumers with the market and did not pay attention to its quantum derived by firms in their relation to rivals.

In sum, activities of firms, including their price and non-price strategies, result in their achieving market power. The notion can be defined as the disproportionate value of one or more objectives of a firm (that are a result of market forces and/or the actions of the firms themselves) relative to other firms. There is also a disparity between the objective of the consumer to maximize the value obtained and the profit maximization (or one of the other choices) of the firms. Such differences gave rise to the requirement of regulatory policy.

1.4. Regulation

Regulation of market power, which is a consequence of the nature of the market, has a long history. Economic analysis of regulation with respect to non-price strategies was dealt with only in a few cases. For example, quality standards. Landes and Posner (1981) and Posner (2000) objected to the regulation of non-price choices of firms on two grounds. First, they offer valuable information to the consumers when used judiciously. In practice, it has been quite difficult to ascertain whether the use of a non-price choice is merely to inform the consumer of the value of the product. Hence, that there is an excess, which works against the consumer, should be acknowledged. Second, the market power derived from non-price strategies is transitory. The functioning of markets will eliminate it over a relatively short time horizon. Recent experiences suggest that this did not materialize. If anything, firms (after obtaining information about why a consumer prefers a product) may, in the absence of regulation, be emboldened to take advantage of consumers.

The approach of the present study, to the functioning of firms and regulation in such markets, can be summed up as follows. Clearly, consumers value the products differently in a market where each of the firms is offering a differentiated product. Firms will try to assist consumers in discovering the value of the products to them. As a result, it can be expected that the threshold demand curves will materialize on the market. Every firm has the option of maximizing short run profits which result in observable price cost margins. However, firms are more likely to emphasize long run survival in such markets. Consequently, they can be expected to conceptualize a maximum market share, commensurate with the consumer valuation of its product. Even so firms try to stretch beyond this market share to gain long term advantages over rivals. The value of the product and the efficient market share, as exhibited by the consumers in their interaction with the firm in the market, will be important aspects of its market power. The

primary significance of this study is in conceptualizing these thresholds. This is the basis set up in this study for the definition of the market power of a firm even if thresholds themselves cannot be measured or observed in practice. Defining the aggregate market power at the industry level will be of secondary importance.

In the final analysis, regulatory limits must consider a level playing field for each firm based on the differences in threshold values. Differences between firms persist and firms will have advantages relative to rivals based purely on the value of their products about which the consumers are convinced. This is the only practically relevant definition of efficient functioning of firms in such markets with differentiated products.

In more recent discourse qualitative aspects of market power have been considered as well. For instance, firms obtaining information about why a consumer prefers a product may also utilize that information to target non-price promotional activities to other consumers without their consent. In other words, it is claimed that there is a necessity to track the market power of a firm only if non-price strategies do not remain generic, i.e., if they are directed to specific consumers. Regulation to encompass qualitative aspects has been taken up only in a piecemeal fashion. Given the widespread influence firms have on the functioning of markets it would be worthwhile to explore this dimension further.

1.5. Sequential Approach

The following sequential approach to measuring market power and regulatory action emerges in view of the foregoing arguments. Throughout this process the modified new index of market power, amalgamating market power in relation to consumers with market power vis-a-vis rivals will be utilized.

To begin with calculate the market power of each firm. Only some firms exhibit positive market power. They should be studied further. The next step is to calculate the market power of different strategies of firms that have been identified as the signal bearers. Even in this context it will be found that only some actions need further study.

It will be acknowledged that non-price strategies have some benefits to consumers. The next stage will be to identify the quantum of a strategy that provides the necessary value information to the consumer, its observed level, though beyond this marker, that can add to the welfare of the

consumers, and thereby determine whether or not the strategic action is excessive and warrants regulatory policy. Though regulatory policies should be directed to such specific cases they must be designed in such a way that they can be applied to all firms uniformly. The participants may agree to their implementation or they should be enforceable at a higher level.

The design of these concepts and procedures requires drawing information from related areas. That is, there is need for knowledge transfer as Epstein (2019, 48) expressed it. Similarly, it involves utilizing established concepts with a contemporary emphasis as Hayek (1960, 47) noted. In the ultimate analysis, irrespective of how innovative and structured these ideas are, success depends on external forces well beyond control. Hence, the credit for the success of the suggested methods should go to them.

Given the requirements of exposition this sequential approach will not necessarily be followed in the following chapters. Segments of information and measurements will be detailed wherever they are found appropriate.

1.6. Outline of the Book

This book has several fundamental contributions. Chief among them are the following. First, in markets where differentiated but substitutable products are sold it must be acknowledged that the market power of a firm arises both in relation to the consumer valuation of the product on the market as well as the market power in their interaction with rival firms. A composite market power index has been defined incorporating both these aspects. Second, it is acknowledged that only some firms in the industry will have market power and similarly, only some non-price strategies will be significant. They have been identified through an appropriate characterization of market dominance and the market power of firms and non-price strategies. In particular, the study provides a unique definition of market dominance of non-price strategies and their identification. Third, developing these indices necessitated the specification of the process by which firms identify the value of their products to the consumer while utilizing non-price strategies. This procedure resulted in isolating the mechanisms of excessive use of non-price strategies that result in the market power of firms. Fourth, the acknowledgment that profit maximization may not be the primary objective of the firms necessitated certain modifications of the market power index. Fifth, regulatory limits, instruments and their use in several contexts have been detailed. Of specific interest is the regulatory regime of internet apps.

The rest of the book is developed with this background in perspective. Chapter 2 provides the background for the Lerner measure of market power. A careful appraisal suggests that it will not be the most useful approach while considering non-price choices. The other popular measure of market power is the Herfindahl index. Chapter 3 considers it in detail and underlines the pros and cons of its use. However, its superior use, both because it emphasizes market shares rather than the maximization of profits, and the relative ease in its quantitative measurement have been highlighted. In a general sense, the market power of a firm is a result of its interaction with consumers on the market as well as its relationship with the competitors in the market. It is therefore necessary to define a measure which takes both these effects into account. This was also attempted. Chapter 4 provides the details of the classification of non-price strategies. It deals with several issues of measurement (in particular, when profit maximization may not be the objective of a firm), the amalgamation of various non-price strategies, the mixed nature of some markets where some firms are competitive and so on. The notion of market dominance and its measurement form the contents of chapter 5. The emphasis here is on the specific non-price strategies that provide each firm its market dominance. Chapter 6 then turns to the measurement of the market power of individual non-price strategies at the firm level. The channels through which market dominance results in market power are also highlighted. The important contribution of this study is in defining and identifying the firms and strategies of firms that provide dominance and market power. Chapter 7 takes up the regulatory activities in detail. This chapter also describes how the legal studies rely on the Herfindahl index in devising regulatory practices. Issues relating to apps on cyberspace have been drawing attention over the past several years. Hence, chapter 8 is devoted to a presentation of the issues involved and possible regulatory measures. It is necessary to recognize that managerial practices are not directed to merely market power but other objectives as well. In other words, market dominance will have implications for the nature of strategic choice of the management. The related details will form the subject of chapter 9. Chapter 10 provides an outline of the fundamental achievements and the requirement for future work along the lines emphasized in this study. An overall necessity for the change in emphasis to non-price strategies and its implications of the market dominance and market power they provide have been summarized. The clarion call is to use this line of analysis in further detail since that is the need of the hour.

CHAPTER 2

LERNER MEASURE

“Much of the phenomena we observe that seem organic or unique are actually the result of repeating processes and systems. By decoding the right patterns, I believe, you can achieve goals from the frivolous to the meaningful.” - (Gannott, 2018, 11).

Abstract

The Lerner measure has been the most popular index of market power of industries. It represents the market power of firms in relation to consumers in the market. This chapter provides an overview of this and related measures as well as the essentials of the regulatory policies based on it. It was pointed out that profit maximization may not be the goal of all firms in imperfect product markets. Instead, it may be maximization of market share. The role of price cost margins, as a representation of the market power of firms in relation to consumers on the market, loses its significance. Other measures like the ratio of selling expenses to total costs may replace it. Further, the market power of any firm may now be related to the dominance a firm has over rival firms in the market as well. The thought process about efficient choices of non-price strategies and their role in determining market power have been indicated.

2.1. Lerner Measure

The Lerner (1934) index for measuring market power is in vogue for all practical purposes. In this method, every firm is postulated to install a large stock of capital and fixed assets compatible with the available finances and managerial processes that can be put in place to utilize the capital. When they are in place, the firm is expected to choose a level of output to maximize profits. The firm then sets the price per unit of its product so that the market is saturated. This will result in the price cost margin

$$\begin{aligned} L &= \text{monopoly power of the firm} \\ &= (p - MC)/p \end{aligned}$$

This is the Lerner index. It can be verified that $L = 1/\eta$, where η is the elasticity of demand.

In the context of a market with differentiated products, when Cournot competition is postulated, a similar measure is proposed. In particular,

$$\begin{aligned} L_i &= \text{monopoly power of firm } i \\ &= (p_i - MC_i) / p_i = 1/\eta_i \end{aligned}$$

where p_i = price per unit of output, MC_i = marginal cost and η_i is the elasticity of demand for firm i , where $i=1, 2, \dots, n$.

Elzinga and Mills (2011) detailed several difficulties with this approach. They argue that L_i may not be a measure of market power at all. First, $p_i = MC_i$ is a social welfare maximum only if all firms in the market are homogeneous, perfect competition prevails, and production exhibits constant returns to scale. Second, firms may have monopsony power in factor markets and MC_i does not represent cost minimizing behavior. Subsequent work of Hausman and Sadak (2007), Hausman et al (2009), and Hall (2018 a,b) made attempts to correct this. A modification of the index, due to Hernan (2007), will be presented below. Third, MC is not an appropriate measure if firms incur fixed costs. In such a case $p_i = MC_i$ pricing is not feasible. The Lerner index merely reflects the need to cover fixed costs. Consequently, it does not reflect the firm's ability to increase prices beyond cost or reduction in output. Fourth, the Lerner measure is static and does not reflect any of the changes in dynamic markets where entry and exit prevail. L_i is therefore more of a measure of market imperfection rather than market power.

2.2. Related Alternatives

Boal (1995), Boal and Ransom (1997) and Hernan (2007) consider the choice of y_i as a supply side phenomenon. Note that the firm has a demand for factors of production. The gain to the firm, in choosing the resource r_i is represented by

$$\pi_i = y_i(r_i) p_i - p_r(r) r_i$$

where $p_r(r)$ = price per unit of the resource. Clearly, p_r increases with r .

Assume that firms act like Cournot rivals even in the purchase of resources. Then, maximizing π_i w.r.to r_i results in

$MRP_i - MRC_i = 0$, where MRP_i = marginal revenue product of r_i and MRC_i is the marginal resource cost of the i th input

Now, $MRP_i = p_r(1 + s_r/\epsilon)$, where $s_r = r_i/r$ = share of input used by firm i , and

$\epsilon = (\partial p_r / \partial r) (r/p_r)$ = price elasticity of the supply of r .

Similarly, $MRC = \text{marginal resource cost} = p_r(r)(1 + \epsilon)$.

The monopoly power of the firm, revealed by its demand for the factors of production, can be written as

$$F_i = (MRP_i - p_r) / p_r$$

This corresponds to the Lerner measure on the demand side. (Surely, it is possible to develop the corresponding Herfindahl index but that will not be relevant in the present discussion.)

Hernan defines the generalized monopoly power index in the product market as

$$L_m = (p - MC) / \max(p, MC)$$

If $MRC > p$ the firm is paying more than it is getting back. That is, it has a disadvantage in factor markets despite its advantage in the product market. Hence, the firm has a low market power and it will be reflected in the calculation of L_m .

However, for all practical purposes, it is not meaningful to utilize this measure, despite its theoretical elegance, because Panzar and Rosse (1987) argued just the opposite. For, they assume that the firm has monopsony power in the purchase of factors of production. This then implies that the observed MC is not the minimum. In such a case the Lerner measure may indeed underestimate the market power of a firm.

From the viewpoint of empirical application, it is often acknowledged that measuring either MC or η is problematic. Hence, attempts have been made to modify it to make it amenable to easy measurement. The variant proposed by Hall (1998) is as follows. Hall defines

$L_m = p/MC$ as an equivalent measure. Note that

$L_m = (p/AC) (AC/MC) = (p/AC) (C/y) (dy/dC)$, where

y = output, C = variable cost of production, and AC = average variable cost.

Denote by $v = (dy/dC) (C/y)$ = elasticity of output w.r.to variable cost. Similarly, let

$$s_{\pi} = (R - C)/R, \text{ where } R = py$$

It follows that

$$(p/AC) = (py/C) = 1 / (1 - s_{\pi})$$

$$\text{Hence, } L_m = v / (1 - s_{\pi})$$

However, $L_m = \eta / (\eta - 1)$ where η is the elasticity of demand. This must be recorded while interpreting it. This measure is easy to implement.

Attempts by Fischer and Kamerschen (2003) and others to account for conjectural variation of rivals made a partial but imperfect correction. Thus, despite the advantages and difficulties associated with the conceptualization and implementation of the Lerner index it was not found suitable for use in legal practice and public policy to regulate market behavior.

An altogether different point of view emerged. In imperfect product markets, where a finite number of firms sell their products, every one of them experiences a reduction in the elasticity of demand. The Lerner measure attributes the market power of a firm to this elasticity. It would be natural to examine the sources of this elasticity. It would not be sufficient to argue that consumers determine it exclusively. In effect, it is necessary to acknowledge the firm's interaction with other firms in the industry.

It is well known that it would be difficult to dislodge customer loyalty once it takes root. Loyalty of suppliers of inputs and worker loyalty also belong to this category. It is necessary to explain how customer loyalty comes about. Evidently, non-price strategies occupy that role. That loyalties of this nature affect the market power of a firm should be obvious.

It is also necessary to acknowledge that not all firms have profit maximization as the only objective. For instance, they may accept a lower price cost margin to increase their market share. Give this observation, price cost margins will have to be supplemented, or replaced, by production cost/total cost and/or selling cost/ total cost and similar measures.

A systematic generic specification of the market power of firms in relation to their customers on the market is necessary.

2.3. Regulatory Measures

An altogether different perspective on the nature of market power is instructive and practical without any prejudice to the welfare basis of the argument or the profit maximization assumption. As Landes and Posner (1981) pointed out,

“the actual economic injury caused to society is a function of not only the deviation between price and marginal cost but also the amount of the economic activity over which the deviation occurs.”- (Landes and Posner, 1981,953).

Start with the result that the output chosen under the profit maximization assumption is below the welfare maximum level. Clearly, this involves a loss in the value to the consumer from the use of the product. A change in this quantity per unit of output change can just as well be a measure of the market power. This can be stated as $L_m = .5(p_w + p_\pi)$, where p_w and p_π are the prices at the welfare and profit maximizing levels of output. Expanding p_w by Taylor's series around p_π it is obvious that

$$p_w = p_\pi (1 - 1/\eta)$$

Consequently, $L_m = p_\pi (2 - 1/\eta)$

This can be implemented empirically just as L can be. Note that $C(y)$ does not enter the argument directly.

Deadweight loss is another possible measure. Landes and Posner (1981, 942) expressed it as

$$D = a(1 - a^{1-\eta}) - (1 - a)^{-\eta} \text{ where } a = \eta / (\eta - 1).$$

It is obvious that this measure is independent of MC calculations while maintaining the welfare basis.

In either case, the rigid mindset favoring the Lerner measure is not warranted. Incorporating changes in the position of the demand curves and the implied variations in the quantity of output sold by firms is warranted while developing an index of market power.

2.4. Role of Non-Price Strategies

Another observation is equally important. Some non-price strategies of firms; for example, reducing the cost of production by increasing the size of

the fixed capital which operates through economies of scale, do in fact increase the supply in the market. However, the value of the product, to the consumer, does not change. The only implication is that a larger quantity of output is available at the same price. If firms adopt advertising and other similar measures to increase demand the original equilibrium price for any given level of output in equilibrium can be restored. The basic point should be that firms do achieve market power through such strategies, which augment their market share, though independent of changes in prices. This is the most effective way of representing the welfare implications of non-price strategies. Changes in cost matter; not the changes in the demand curves per se.

In practical reality the price charged by a firm, for any given level of output initially, may not correspond to the highest that the consumer is willing to pay when its full value is recognized. Wang et al (2019) noted the following. A customer will be satisfied with the quality of the product and the level of service rendered when the price is low. The firm may indulge in some signaling cost to inform the consumer of the higher value of the product. Let the price increase to cover the cost of the promotional exercise. The consumer will seek repeat purchases even at the higher price so long as it is less than the intrinsic value of the product. The market share is then maintained at a steady level or increases. Repeat purchases therefore imply that from the viewpoint of the consumer shifting to another product will involve a search cost exceeding the extra price paid for the repeated purchase. Not acknowledging such effects would be a disservice to the welfare economic basis advocated by the Lerner index.

2.5. Efficient Choices

Note that the above method can also offer an approach to deal with other non-price strategies; say, advertising by the firm. From the viewpoint of the consumer some search costs need to be accepted to unravel the intrinsic value of the product purchased currently and/or calibrate the potential of a close substitute in delivering the value needed. The firm, on the other hand, views its advertising as a signal to the consumer of the value of its product. The search and signaling have the effect of assessing the extent to which the product delivers the value indicated by the price charged. This will determine whether the consumer will buy the same amount of the product or the consumer will increase the quantity bought at that price. Obviously, the consumer will accept a higher price, less than or equal to the intrinsic value of the product, if the price was initially low due to lack of information.

Rao (1989, ch.5) presented the welfare efficient level of advertising in detail. Following the approach currently in vogue the demand curve can be written as

$$p = p(y, A); p_2 > 0, \text{ where } p_2 \text{ is the partial derivative of } p \text{ w.r.to } A.$$

In a market, where several substitutable and nearly identical varieties of the product are available, the consumer would have difficulties in identifying the correct product to buy. Some cost must be incurred in searching for the desired product. Let it be represented by $S(y, A)$; $S_1 > 0$, and $S_2 < 0$. The firm utilizes advertising to inform the consumer of its product. For low values of y it can be expected that $S(y, A) > A$ suggesting that the firm is in a better position to signal its value. Hence, there will be a value of y at which the informative role of advertising ceases. On the other hand, recognizing the need to inform the consumer about the value of its product, the firm incurs a signaling cost (with the use of A as one option) $I(A)$; $I_1 > 0$. Let A' be the level of A at which $S(y, A) + I(A)$ is minimum. It is equally important to note that there exists a value A^* beyond which the consumer cannot visualize any increase in the value of the product. Surely, there is no reason why $A' = A^*$. The inefficiency in the resulting choice of y may be due to the product market conditions as well as an excessive level of advertising. It was demonstrated that this result is obtained if the ex post advertising demand curve (which appropriately represents the actual value of the product to the consumer) is utilized to define welfare. This result is in consonance with Dixit and Norman (1978). Several other results have been derived as well. For the present purpose it is important to acknowledge that the effect of advertising also consists of an increase in y chosen by the consumer. However, as before, $y_\pi < y_w$ signals a loss in value to the consumer.

Defining the Lerner measure is equally as difficult as it was earlier. However, the index based on the loss in value to the consumers would be informative. It is perhaps realistic to argue that prior to advertisements by the firm the consumer would have incurred enough search costs to obtain information about the maximum intrinsic value of the product. The equilibrium value of p , which defines the market price, both before and after the introduction of advertising, remains the same. It is plausible that the Lerner index L will be reduced while the increase in the equilibrium output level signals the source of market power that the firm derives from advertising.

It is difficult to measure the transaction costs. Hence, utilizing the Lerner measure is not possible. Instead, changes in market share are easy to trace. Consequently, the market power measures based on market share will be superior. This will be taken up in the next chapter.

2.6. Emphasis on Market Shares

It is evident from the above presentation that the Lerner measure and the entire literature associated with it recognizes price as the only parameter through which firms derive their market power. Indeed, it is taken as an immutable axiom. However, in the modern industrial context there are several other sources of market power and price determination may be the least significant at least in the context of some industries. Further, many changes have been recorded in the functioning of firms which suggests that prices are no longer determined entirely by the market. As a result, simple conceptual variations of the type described above are no longer sufficient to deal with the notion of market power of firms in the contemporary empirical setting. An altogether different perspective, based on the market shares of firms, is necessary.

To begin with, note that the notion of the value of the commodity to the user as the sole determinant of prices on the market has been questioned. Further, the idea that consumer preferences are based only on prices has been revised. Similarly, the idea that prices reflect consumer preferences has undergone a change. The reality is that firms almost exclusively determine such preferences. As Poundhouse (2010) documented extensively, price consultancy has, for all practical purposes, become a big business. Price fixation by firms has become one of their major strategies. Second, sweeping technological changes rendered dependence on market prices unreal. As Coats and Morrison (2016) pointed out,

“for every Google and Apple there are companies like Kodak, a former industrial giant crushed by digital technology, and Hewlett-Packard, a long time star fallen on bad times”. – (Coats and Morrison, 2016,147).

Third, many products in the market have long life and consumers value services from them at any point of time. Is it necessary to look at the market prices for the purchase of such products or the prices for servicing and flow of services? Fourth, industries like telecommunications, the internet and airlines are not free markets but, instead, they are strictly regulated. Fifth, some activities such as telephones and mobile spectrum involve large costs and thereby experience some market power. For some products that are in

short supply, or, where their supply is fixed the process of auctions has taken root. Sixth, companies like Google and Facebook do not charge any price to their customers directly. Instead, they obtain their revenues from advertising. Similarly, firms in the hotel and hospitality industries charge much more by claiming that they match customers with their needs since they have extensive data on individual needs, the supplier profiles and the search engines to match the finer details. Indeed, as Beattie (2009) pointed out, companies strive for

“more efficient ways of operating, for a smarter way to price their products - anything that will win them more customers and give them an edge over competition.” - (Beattie, 2009, 10)

It is therefore possible to argue that in a market where a number of firms are offering nearly close substitutes the consumer is really not bothered if one or more firms are not offering the theoretically defined welfare maximizing prices and levels of output. They can readily switch between products if they are not satisfied with one or the other.

2.7. In Perspective

A significant aspect of the behavior of firms characterized as differentiated oligopoly can be inferred by paraphrasing Hicks (1935, p.8). In non-competitive environments, where firms experience sharply rising subjective costs, they are more likely to utilize their advantage much more by not bothering to choose strategies that are near the choice of rivals. Instead, they design their own strategies to move towards the maximum possible market power to themselves. Only some strategies, out of several available choices, would be relevant given the objectives of the firm. Non-price strategies have a more important role in determining the market power of firms.

The most important conclusions from this chapter are as follows. First, the Lerner measure is difficult to estimate and it is sensitive to the estimated values of the parameters. As a result, it has not been used in regulatory practices. Second, non-price strategies are ubiquitous. Their effect on the market power is through increases in market share rather than L . It is essential that the analysis is directed to reflect this empirical reality.

CHAPTER 3

HERFINDAHL INDEX

“It rarely pays to argue that any human being is incapable of weighing the pros and cons of the decision in front of him. They are less likely to make mistakes when doing something familiar which is a point in favor of rational choice theory.” - (Harford, 2002, 18)

Abstract

The other commonly used measure of market power is the Herfindahl index based on market shares. However, there have been reports of various shortcomings of this index. More specifically, it was claimed that there is no welfare theoretic basis for it. It was shown that this is not true. The Linda index and several other variations have been outlined. A new index based on the effects of the interaction of a firm with the consumers in the market as well as its interaction with the rival firms is presented. A preference for this index over the Lerner measure is also indicated.

3.1. The Definition

As noted earlier, the Herfindhal index is another popular measure of market power. The construction of the index is based on the market shares of each of the firms in the market. To start the analysis, assume that each of the firms in the market produces only one product. Let S_i be the sales revenue of firm i ; $i = 1, 2, \dots, n$. Define

S = total sales in the market = $\sum S_i$, where the summation is over 1 through n , and

$s_i = S_i/S$ = market share of the firm i

The Herfindahl index of concentration is defined as

$H = \sum s_i^2$ where the sum is over i

Note the following. Suppose $s_1 = 1$ and $s_i = 0$ for all other i . Then, $H = 1$ and indicates that there is only one firm in the market. Assume, on the other

hand, $s_i = 1/n$ for all i . In such a case $H = 1/n$. Based on this logic $n = 1/H$ is generally designated as the number of firms with an equal market share in the market. (As will be noted later, while constructing regulatory measures this is usually the accepted definition of a competitive market.)

It was noted earlier that the measurement of marginal cost has been difficult while constructing the Lerner index. By way of contrast, the H index is much easier to compute since it does not require the measurement of marginal cost. Even so, several difficulties with the use of H have been noted.

3.2. Difficulties with the Index

Consider the measurement problem to begin with. First, Scherer (1990, 73) argued that the use of a quadratic term s_i^2 cannot be justified on economic grounds. Much earlier, Simpson (1949) provided a proximate answer. Let S denote the total market sales. Consider choosing two units from S . The number of ways of choosing this is $S(S-1)$. Now, assume that the sales of firm i can be written as S_i . The number of ways in which the two items are drawn from firm i will be $S_i(S_i - 1)$. Hence, the probability of $s_i = S_i/S$ can be represented by

$$p = S_i(S_i - 1) / S(S - 1)$$

p can be approximated by s_i^2 if both S_i and S are sufficiently large. To be sure, even from a statistical viewpoint, there is no reason why the draw of two items should be considered. On the other hand, Dansby and Willig (1979) interpreted the square terms as a representation of the Euclidian distance between the s_i s. It is more pertinent to note that no specific economic reason has been offered. Second, Hall and Tideman (1967, 164) noted that assigning equal weights to all s_i cannot be justified when dealing with differentiated products. However, there is no appropriate economic theory to conceptualize an alternative.

Hanna and Kay (1971) postulated

$$HK = (\sum \alpha_i s_i^\rho)^{-\sigma}, \text{ where } \sigma = 1/(1-\rho)$$

taking a variety of substitution possibilities into account. HK reduces to the Herfindal index if $\alpha_i = 1$ for all i and $\rho = 2$. Clearly, the values of ρ and α_i will be estimated from the data rather than postulate values for them. Nonetheless this approach does not offer an adequate theoretical reason for its choice. (Observe that α_i can be made to depend on the Lerner measure