Monopoly and X-Efficiency

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The concept of X-Efficiency rejects the technical efficiency notion of profit maximising and cost minimising. Liebenstein (1966) argued that individual workers are free to choose their level and interpret their own jobs . The equilibrium position for a firm price is when every individual maximises utility. In this essay, Justin Morton relates the theory of X-Efficiency to the monopolistic market structure.

INTRODUCTION

Adam Smith refers to monopoly as a "*...great enemy to good management*", and to competition as the medium for "*...new divisions of labour, and new improvements of art, which never otherwise would have been thought of*" Hayek claims that "*It is only through the process of competition that the facts will be discovered.*" Cournot, after whom Cournot competition is named, finds that "*the result of competition is to lower the price.*" If increasing social welfare or well-being is an objective, then we should have some notion of which market structure is the most desirable. With this we can design competition policy and competition law so as to maximise the economic cake. Hence in this essay, I will examine the market structure of monopoly and its associated costs, concentrating on the theory of X-Efficiency.

Competition Theory

Any study of monopoly would be vacuous without firstly outlining the underlying (neo-classical) theory of competition. It starts by assuming perfect competition in the goods market. This involves infinite buyers and infinite sellers, each with perfect information regarding costs, profits and demand, freedom of entry and exit into/from the marketplace, all selling an homogeneous good. The factor market is also perfectly competitive, which means the marginal productivities of both capital and labour are known, and all factor contracts are complete. In both spheres agents are profit and utility maximisers subject to constraints (budget, leisure, ability cost and technology). Given that these conditions are fulfilled in all markets consumer welfare is maximised (or more technically the economy is in a pareto equilibrium). Economic resources are allocated in the precise way consumers wish, wishes being reflected by the price system. As well as allocative efficiency, perfect competition leads to productive efficiency (minimum average cost production, in other words), since above minimum average cost selling would mean zero sales.

If the market structure has only one seller, rather than an infinite amount, and a barrier to entry (or exit) which guarantees only one market player, there is allocative inefficiency. Due to extra market power, the monopolist restricts quantity, sells at a higher price and earns supernormal profits. This allocative inefficiency is referred to as the dead-weight loss triangle of non-competition. [1] However, early estimates of the dead weight loss were small compared to intuitive estimates of the costs of non-competition. One possible explanation is that monopolies waste resources by rent seeking. A second explanation is what is termed X-inefficiency.

The Concept of X-Efficiency

Leibenstein introduced this theory of inefficiency generated from non-competition. Since it was not allocative and he was unable to characterise it as motivational or

technical, he named it X-efficiency. As a concept it may be summarised as follows: "*for a variety of reasons people and organisations normally work neither as hard or as effectively as they could. In situations where competitive pressure is light, many people will trade the disutility of greater effort, or search for the utility of feeling less pressure and of better interpersonal relations.*"[2]

**Figure 1: Differing Costs of Monopoly and Perfect Competition**
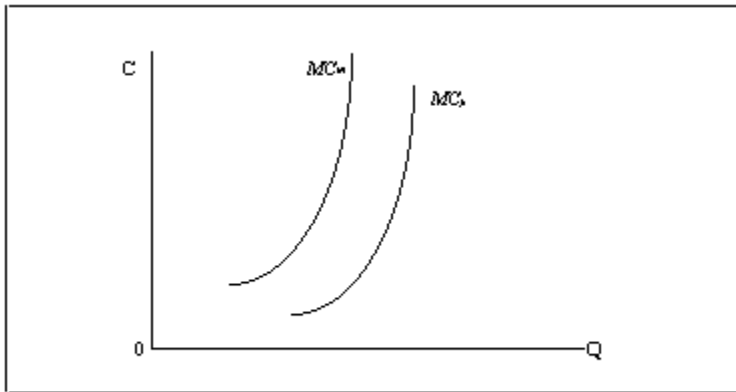
Essentially, since extra costs do not mean immediate bankruptcy for a monopolist, they will be slack in cost control and in the amount of effort put in by management and workers. This concept of X-efficiency leads to the existence of different cost structures associated with different market structures, higher costs being associated with non-competition. It seems intuitively quite attractive. However, Leibenstein's related theory of X-(in)efficiency, by which he explains the higher cost phenomenon is more controversial.

The Theory

Leibenstein enters what is termed micro-micro theory; which is "*the interactive, but somewhat constrained, economically bargained decision among 'atomistic' individuals within the firm.*" [3] In examining the molecular make-up of the firm, which is treated as a maximising "black-box" in neo-classical theory, he finds that the internal agents are non-maximisers. Invoking the Yerkes-Dodson Law, at low pressure levels, individuals will not put much effort into carefully calculating decisions, but as pressure builds they move toward more maximising behaviour. He identifies an inert area, probably due to the incomplete nature of labour contracts. Although payment is specified, effort generally is not. Variation in effort is due to the discretion which employees have in choosing effort levels and discretion which top management have with regard to working conditions. Clearly a Prisoner's Dilemma type outcome could exist with effort and wages both at a minimum. However Leibenstein rules this out due to conventions, which ensure equilibrium within the inert area surrounding the point c.

Figure 2: Leibenstien's Theory of X-Efficiency
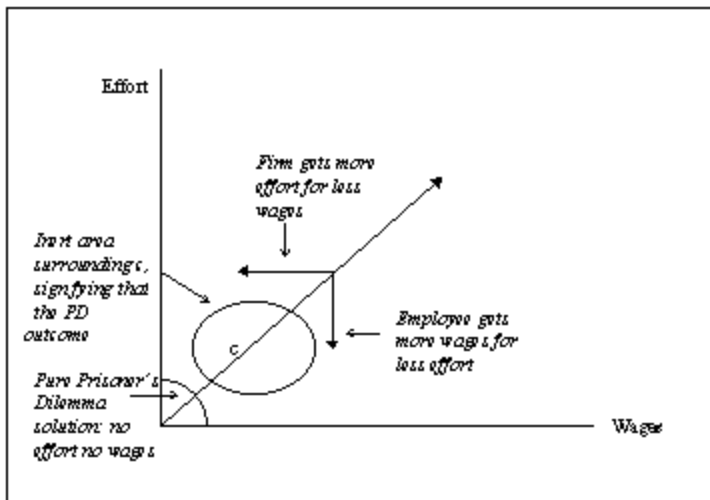
As pressure mounts, the circle reduces in size and wages reflect effort more and more accurately; with perfect information and honesty, the equilibrium is on the 45 line, where wages reflect effort.

Criticisms Of The Theory

The theories of monopoly and X-efficiency are not without criticism. Some authors argue that a monopoly may generate higher social welfare than perfect competition. With the opportunity of profits, monopolists will innovate and invent since the extra guaranteed rent will not be competed away. These supernormal profits can be invested in new product development and new technological advances, which are not necessary in the perfectly competitive world of horizontal demand curves. Perhaps, safety and general working conditions may not be adhered to in the cut-throat perfectly competitive world. This is not, however the predominant thinking.

Certain critics also question the existence of X-efficiency. Since all economic agents are rational, any slack is a rational leisure-income trade-off. Higher costs, therefore, are not a symptom of inefficiencies, but the effect of fully rational workers' preferences for leisure. According to Stigler (1976) "*increased output due to (say) increased effort is not an increase in 'efficiency', but a change in output.*"[4]

Another criticism of X-efficiency theory comes in the empirical evidence of motivational slack in competitive industries. Leibenstein himself refers to an example of two petroleum plants in Egypt only half a mile apart. One transpired to have been X-inefficient for years, after a management change increased output substantially without changing inputs. Why did this persist for so long in a competitive environment? It may be that the internal pressure is a greater influence than the external pressure. Internal pressure has been described as "*inner prodding, be it religious, moral, or cultural*" which motivates the individual to cost minimise for his employer.[5] Leibenstein (1966) refers to a domino type effect - if a top manager is X-inefficient for whatever reason, this lack of motivation will in turn affect all those below him. Hence it is possible to explain X-Inefficiency in the competitive market place via focusing on internal pressure.

General existence is not the key criticism, however. The main issue is that X-efficiency theory is not compatible with neo-classical microeconomic theory. Leibenstein's rejection of the black box firm would be an interesting advancement in non-competitive markets, if it were to agree theoretically with the general thinking. However, Leibenstein's idea of non-maximisers conflicts with the whole basis of economics as we know it. It is not logical or perhaps not possible to have an economic system based on non-maximising individuals.

[Vickers (1993)](#) provides us with a theory compatible with neo-classical economics which manages to explain differing degrees of inefficiency which constitute X-efficiency theory. He uses performance comparisons as incentives for efficiency, in his principal-agent, for instance firm owner-firm manager model. Pay is related to performance which is a function of effort, ability and luck. Whereas the distributions of luck and ability are known, the amount of effort is not. Hence there is a trade-off between the cost of slack and the cost of risk. Where there are other managers available for comparison, yardstick competition can be invoked, where Payi = f(Perfi, Perfj - Perfi). If performance related pay is impossble, but only pay related to expected future performance is possible in the case of academics for example, Vickers refers to the signal to noise ratio as the essential factor determining effort. "*Effort incentives are better the less noise in the luck element.*" [6] If pay in the future is based on a performance ratio, it may be optimal for the manager to act inefficiently now, so as to retain future earning potential at a suitable effort level. Hence Vickers has isolated three effects; the insurance, the reputation and the ratchet effect. Each of these effects is compatible with maximising behaviour of non-competitive markets, and put together successfully explain differing degrees of efficiency with differing degrees of competition.

The Empirical Evidence

Theoretical issues aside, has there been any empirical studies suggesting the existence of X-efficiency? Many simple cases have been cited, for example the case of the Ford Motor Company with almost identical plants in England and Germany. The German plant managed to produce 50% more cars with 22% less labour. According to Leibenstein in the New Palgrave, "*despite identical plant design, the differing effort conventions help to explain the X-efficiency result in the UK plant.*"[7] Of course many more complex econometric studies have been done. One of the usual econometric problems, that of missing variables, is especially important in this case. [Frantz (1990)](#) claims that there are many econometric studies which measure only external (market) pressure, while offering explanations that include internal constraints. He refers to "*approximately 60 empirical studies consistent with the implications of the theory.*"[8] [Button and Weyman-Jones (1992)](#) note that two of the three approaches to measuring X-efficiency are based on maximising behaviour. The third is a non-parametric programming approach known as data-envelopment analysis (DEA). On studying a set of DEA based studies, the two authors were able to draw conclusions suggesting that bureaucratic or publicly administered industries were on average less efficient than their competitive counterparts.

Conclusions

In summary I have looked at the theories of monopoly and of X-efficiency. I raised some of the critical issues regarding the existence of X-efficiency and some of the theoretical objections to Leibenstein's explanations of the concept. Finally, I examined some of the empirical work done in the area. The million dollar question is whether there exists a gain other than Harberger's triangle in moving from monopoly to competition. The theory of X-efficiency provides us with an intuitive concept within the neo-classical world of maximisers predating Vickers and strengthened by positive empirical evidence. This I believe to be sufficient to guide us in the area of competition policy and law.

Notes

[1] [Harberger, 1954](#)

[2] [Leibenstein, 1966](#)

[3] [Leibenstein, 1966](#)

[4] Stigler, 1976

[5] Leibenstein, 1966

[6] Vickers, 1993

[7] Leibenstein, 1987

[8] Frantz, 1990

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