Is Regulation Better Than Liberalization? Challenge Revisited

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‡Abstract

Based on actual cases in Iran, this paper shows that monopolies can be more inefficient than what has already been perceived in economic theory, and provides evidence that regulation, relative to liberalization, may not lead to higher welfare. I demonstrate this argument with two models. One is a monopolist who cares about her leisure and consumption together, therefore, may not try to minimize her firm's costs as much as possible, and the other is the case of a monopolist who employs more labor than she needs in order to use unemployment of labor as a threatening tool/bargaining power against government liberalization policies. I find that in both cases, social welfare is lower than what it is under a profit-maximizing monopolist. Interestingly, the models predict that these two monopolists would act the same as a profit-maximizing firm with no inefficiency if they were in a duopolistic competitive setting. I expand this argument to show that regulated monopolies are less attractive than what is perceived by Armstrong and Sappington (2005). The results strengthen the support for unregulated competition versus regulated monopolies in a developing economy, especially Iran.

JEL Classification: L12, L5, L78, L1, O12

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Key Words: Monopoly, Regulation, Government Policies, Market Structure, Developing Countries

Introduction

In the classical economics, the monopoly considered to be inefficient in comparison to perfect competition because of the dead-weight-loss it produces. It is considered that although monopolies and perfect competitors have similar incentives (maximizing profits), they behave differently as they face different market structure and the outcome is not socially optimal under monopolies. But, in developing countries where some industries are protected by government under an umbrella of market regulation such as tariffs, new and different patterns of management across firms emerge which could imply that monopolies may have different incentive structure as well. These patterns, which are the result of adaptation of these firms to this special market environment, can lead to inefficiencies, which have not received attention in the economic literature. I start my discussion by explaining the story of two firms operating in such environment.

The first one is a leading firm in the home appliances industry in Iran. In this industry, three domestic firms are competing with each other. While a big umbrella of high tariffs protects them, they face intense competition from smuggled foreign products dominating 60 to 80 percents of the market. Under this pressure of competition from strong foreign competitors, top and middle managers of this firm is working hard to maintain the survival of the firm. During late 80's and early 90's, they made strong ties with the government, in order to lobby for a big tariff policy on the imported goods and they succeeded. But they soon realized that this cannot prevent the competition as corruption is versatile in the gateways of trade, making smuggling sometimes easier than formal importing.

Despite their efforts to overcome such difficult circumstances, foreign made appliances are all over the country traded in huge numbers everyday and domestic firms are

losing market share rapidly. Foreign products leading quality and price are the biggest threats for the domestic producers, and hence these managers are using every method possible to solve their problems. Having strong ambitions, they have hired management consultants and used state of the art techniques in management and worked long hours, non-stop, in order to just maintain survival of the firm.

The second firm is in the automotive industry and enjoys a long time monopoly inside the country. The industry growth was rapid and it has reached its stable condition a long time ago. The products are of poorer quality relative to their foreign counter parts, but have higher prices. Import of autos is banned to support the giant domestic automaker and smuggling cars because of the nature of the product is not viable. Enjoying monopoly profits, the firm is in financial stability with no specific concern on its future profits as the monopolistic position is guaranteed.

Contrary to home appliances managers, executives in these firms have relatively few problems to deal with and enjoy increasing revenues every year, since the market and profit are continuously growing – thanks to the growth of economy and population – and there is no need for revolutionary changes in the firm or in the products. The problems are just day-to-day problems of business which can be handled by middle-level managers. While their foreign rivals are leaders in managerial techniques and even are inventing managerial technologies such as kaizen and JIT, these managers have no incentive to revolutionize their old processes or increase efficiency. The effective time that a top manager may work is relatively low and most of their time is wasted on management fads rather than real endeavors. They attend many conferences, seminars and workshops around the world which produce little results for the company, but bring them prestige and leisure. They hire

management consultants for the sake of esteem and praise among their peers. The costs of these programs and the negligible productivity of executives translate into higher marginal cost of production.

On the other hand, these factors derive forces inside the governments to reform the structure of the industry and open the doors of the economy to international automakers, at least at a small scale. But the domestic monopoly reacts to these forces by arguing that this will lead to a devastating result by making a large part of the labor force unemployed. They use employment as a *hostage* in the bargain with the government. Therefore, there is a strong incentive for the monopolist to increase its employment above the efficient level, as much as needed, to use it as leverage for maintaining its monopolistic position. This is interesting since higher than optimal level of employment means inefficiency and higher than usual marginal cost of production.

These two interesting phenomena, the low productivity levels of the top managers (who could be owners of the firm also[§]) and higher than optimal employment levels are rare cases, which happen in the context of the environment these monopolies live in. Interestingly, they are intertwined. The monopolies in closed economies, which are producing large value-added products with a guaranteed, strong and growing market share, has relatively less ambitious objectives and put less effort to decrease their costs. A simple reason for this is that the benefit of one unit reduction in cost is smaller than the hardship of putting the effort to do that. This phenomenon is particularly pervasive in less-developed countries (LDCs) with closed economies.

[§] This inefficiency is different from the principal agent model.

In this paper, I am going to propose two models to explain why and when these inefficiencies take place and how they may change our understanding of regulating monopolies in general. First, I study the case, in which monopolist cares about his utility which is partly dependent on what and how much she consumes and partly on how much she works, a ***reluctant monopolist***. I will show that this monopolist can be less efficient than the monopolist who only cares about profits. I show that interestingly, this reluctant monopolist, who cares about her leisure, can become efficient if it operates under competitive pressures.

Then, I will discuss the monopolist who over-employs because she can use it as a bargaining leverage against the liberalization policies of the government, and therefore, maintain her monopolistic position. I prove that this monopolist has inefficiencies relative to the monopolist who freely chooses her level of employment. Quite interestingly, similar to a reluctant monopolist, the ***over-employer*** monopolist will behave efficiently in a competitive market.

In the final and main part of this paper, I revisit the literature on regulation and liberalization. Armstrong and Sappington (2005) have an interesting survey of Regulation literature. Introducing these inefficiencies into their discussion of regulated monopoly and unregulated competition, I find that if we consider other inefficiencies of monopolies in closed economies, especially in less-developed countries (LDCs), competition may produce higher social welfare in more cases than were known by Armstrong and Sappington (2005). In the conclusion, I will talk about how we can improve regulation or the process of liberalization to increase the social welfare.

The Reluctant Monopolist

The example of the monopolist who was reluctant to put high efforts in order to decrease marginal costs while on the other hand was very eager to increase her consumption of services like management seminars and workshops (which bring her prestige and leisure) in the expense of the marginal cost of the firm is not particularly modeled before in the economic theory. It is especially interesting, as this behavior decreases the profit from its optimum. It seems that the monopolist has more objectives in her mind than only maximization of profit.

Suppose the owner of a firm, which has monopoly in the market, runs it (no moral hazard problem.) She has a well-behaved[**] utility function, $U(x, M, e)$, in which x is the consumption of composite good x, M is the consumption of other goods and e is the effort she puts to run her firm. The firm faces a normal demand function $p(Q)$, and has a cost function $C(Q, e)$ and marginal cost function $C_Q(Q, e) = c(Q, e)$ are continuous in both Q and e, and increasing and convex in Q but decreasing and convex in e. The owner maximizes her utility subject to a budget constraint containing its firm profits (maximization problem (1)).

$$\max_{\{x,M,e,Q\}} U(x, M, e)$$
$$\textit{subject to} \quad p_x X + M \le p(Q) \cdot Q - C(Q, e) \tag{1}$$

The owner cares about how much effort she wants to put into her firm to control the costs. She has a continuum of efforts from which she can choose. Without loss of generality,

[**] The utility function has the usual properties, It is quasi-concave and increasing in x and M, but decreasing in e.

let us consider this continuum between 0 and 1[††]. In addition, for simplicity suppose $C_e(Q,1)=0$. We can show that this monopolist will choose a higher marginal cost than a monopolist who does not care about her efforts. I state this and other implications in proposition 1.

Proposition 1. Monopolist A cares about her utility and hence maximizes problem (1), in which $e \in [0,1]$. Monopolist B does not care about her efforts and therefore maximizes her utility function $U_B(x,M)$ subject to the same budget constraint in problem (1). The utility functions are well-behaved and demand function for Q is normal. In this setting:

(1) Monopolist B has lower costs than monopolist A, since monopolist B always chooses the highest effort, $e=1$.

(2) Monopolist B's price is lower than monopolist A, while monopolist A's quantity is lower than monopolist B.

(3) Monopolist B's profit is higher than A's.

(4) The Social welfare is higher under monopolist B than A.

Proof. See the appendix. ■

Proposition 1 shows that monopolist A is not as efficient as monopolist B, since in addition to the classical dead-weight-loss her cost is higher than a monopolist who only cares about her profit. I argue that monopolists are generally of type A (not profit maximizing type B). They are already at the highest achievement level in their business field and have little incentive to work very hard in order to increase the productivity of their firms marginally, as for them, the marginal benefit of working for another hour or day is higher

[††] It is a normalization in the cost and utility function which does not affect my argument.

than its marginal cost for them. Hence, in modeling monopolies, one should certainly take into account the inefficiencies induced by dis-utilities from effort, even when the principal and agent are the same, i.e. when there is no agency problem.

Now consider two duopolists with the same utility function, $U_i(x, M, e)$, $i \in \{1,2\}$, and same cost function $c(q_i, e)$, facing the same consumers. I claim that if these firms compete under Bertrand competition, they will choose the highest efforts no matter how much they care about their efforts. In other words, each of them solves the maximization problem (2). I show my claim and other implications of it in Proposition 2.

$$\begin{aligned} &\max_{\{x_i, M_i, e_i, p_i\}} U_i(x_i, M_i, e_i) \\ &\quad \textit{subject to} \quad p_x X + M = (q_i(p_1, p_2) - c(q_i, e)) \cdot q_i \quad i \in \{1,2\} \end{aligned} \tag{2}$$

Proposition 2. Suppose two agents, each of whom owns a firm, care about their utility functions, and hence maximize problem (2), in which $e \in [0,1]$. The firms are identical competing a'la Bertrand. In this setting:

(1) The duopolists choose the maximum effort, $e = 1$, like monopolist B.

(2) The price is equal to marginal costs of firms and profits are zero.

(3) There is no dead-weight-loss. The social welfare is at its highest and all of it goes to consumers.

Proof. See the appendix. ■

This means that assuming these firms are competing a'la Bertrand, they always choose what the economic theory has already predicted, even if they care about the amount of effort they put in their work. It is an interesting result, as we could now explain what happens in the example of automakers and home appliances manufacturers. Considering the same people that were automakers, if they face serious aggressive competition, they will inevitably

behave similarly as managers of home appliances firm, i.e. what the economic theory has already predicted. But when they don't face competition, they choose something more inefficient. These results strengthen the support for the competition in comparison to monopoly, since they show that monopolists could be more inefficient than expected before. I will discuss this later in more detail.

The Over-employer Monopolist

The case of the monopolist who is employing more people than she needs, in order to please the government or use it as a hostage or bargain leverage against the government to guarantee her monopolistic position in the market is a prevailing form in the Less-developed countries. Shleifer and Vishny (1994) studied the impact of a bargain between a politician and a firm on employment and *soft budget constraints*. The politician is in favor of more employment as it brings her more votes so she bribes the firm by government pecuniary support, in terms of direct taxes and subsidies, generally called *soft budget constraints*. But these soft budget constraints are sort of transfers from the government treasury to the firm in order to entice the firm to employ more people. They did not consider the case where the firm increases its employment in order to get monopoly license.

Here, I propose the model in which the firm over employs and use the size of labor she employs, as a hostage against the government. Whenever the government wants to implement liberalization policies, the firm threatens it by saying that she will lay-off her employees and file bankruptcy. This policy is helpful for the firms with a large size of labor and a strong and big supply chain like automakers. The automakers bankruptcy leads to the bankruptcy of many firms down the supply chain who are providing the big automaker parts

and raw material. This leads to unemployment of a large group of people which provides a strong motivation for the government to support the industry.

Suppose the government cares about the consumer welfare and the firm employment together. Therefore, it has a utility function as

$$U_G(l) = v(p) + B(l) \tag{3}$$

in which, $v(p)$ is the consumer welfare and is decreasing and convex in price *p*. $B(l)$ is the government utility from l, the *excess* level of employment by the firm, i.e. employment above the efficient level[‡‡]. *l* is bigger or equal to zero and if $l = 0$, the firm employs the efficient level of labor for its production. The firm cares about her profit only. So, the parties play the game depicted in Figure 1.

The government maximizes its utility with respect to *l* while *p** comes from the maximization of the firm problem using the optimal *l* from the solution of the maximization problem of the government. So the problem is formulated as a game played by both parties. Government maximizes,

$$\begin{aligned} &\max_{l} U_G(l) \\ &\quad \textit{Subject to} \quad \text{firm maximizes its profit.} \end{aligned} \tag{4}$$

in which $U_G(l)$ is defined in equation (3), and firm maximizes its profit according to

$$\begin{aligned} &\max_{q} p(q) \cdot q - C(l^*, q) \\ &\quad \textit{Subject to} \quad l^* \text{ is the solution to (4).} \end{aligned} \tag{5}$$

in which, $C(l,q)$ and $c(l,q)$ are the cost and marginal cost functions respectively, which are increasing and convex in both *l* and *q*. *l* is the excess level of employment , i.e. the

[‡‡] *l* is the difference between the actual employment by the firm and the efficient level of employment that firm should have had.

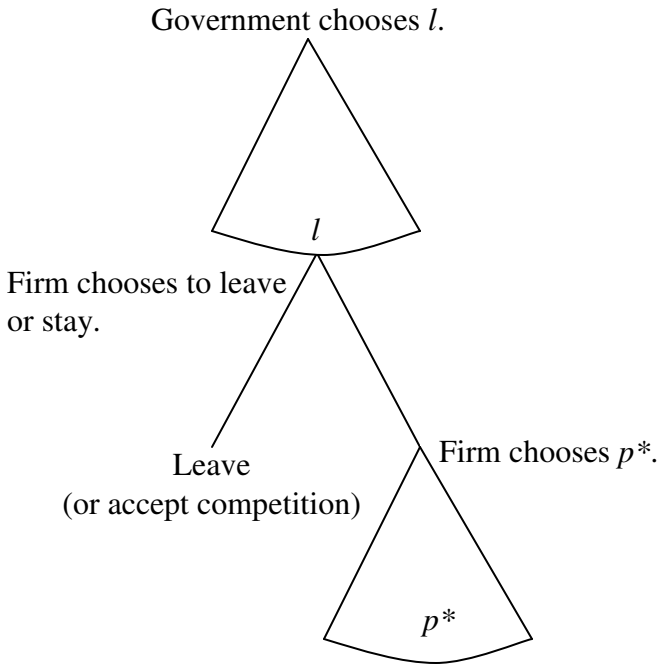

Figure 1 – The game played by the government and the over-employer monopoly

difference between actual employment and the efficient level of employment. l is bigger or equal to zero. We also know that if $l' > l$, $c(l', q) > c(l, q)$ for any q.

Proposition 3. Government allows monopolist A to maintain its monopolistic position if she employs a minimum amount of labor, otherwise she will face intense competition. In other words, they play the game depicted in figure 1 and formulated in maximization problems (4) and (5). Meanwhile monopolist B is not under constrain from the government and only cares about her profit. In this setting, if monopolist A chooses to stay, then:

(1) Monopolist B has lower costs than monopolist A.

(2) Monopolist B's price is lower than monopolist A.

(3) Monopolist B's profit is higher than A's.

(4) The Social welfare is higher under monopolist B than A.

Proof. See the appendix. ■

The results from this proposition are interesting, as they show that under these circumstances the model predicts higher than usual costs for monopolist A and therefore she has more inefficiencies than a normal monopolist who maximizes her profits without constraints. In other words, this over-employer monopolist is more inefficient compared to an unconstrained (normal) monopolist, since it produces less social welfare.

In Less-Developed Countries (LDCs), where import-substitution policies were (and are) the main industrial development strategies of governments, almost all the industries that emerged were under the strong protection policies of the government against the outside (foreign) competition. In this anti-competitive environment, the companies try to build up their own castles by merging and making cartels, in order to stabilize the market and reduce the domestic competition. Therefore, strong effective monopolies emerges which are socially inefficient, with low quality products and high prices. They maintain their monopoly position by maintaining their strategic ties with the governments and also increasing their number of employees to the amount they can threaten the government when it tries to liberalize the market.

Until now, we saw two cases in which monopolists were more inefficient than the economic theory predicts. Now, I want to use these cases to argue that an unregulated competition is better than a regulated monopolist more than what is actually proposed in Armstrong and Sappington (2005).

Regulated Monopolist vs. Unregulated Competition

In an ideal world for the policy makers, where a benevolent regulator is omniscient and omnipotent, competition can not improve upon regulated monopoly. This is because the regulator can control everything perfectly to fulfill her benevolent objectives much better and faster than market mechanisms. Unfortunately, the reality is far from this ideal world and markets can react to hidden information faster and better in many cases. Since the firms have more information about the market, the future demand, and the technical features of production than the regulator. There is an information asymmetry between the monopolist and the regulator. Hence, the problem would be an inevitable trade-off between rent and inefficiency. In other words, the regulator can entice the firm to operate efficiently if and only if it remunerates the firm with enough rent. But in this process, it is optimal to accept some inefficiency in addition to the rent.

Armstrong and Sappington (2005) depict a model of regulated monopolist vs. a model of unregulated duopoly and show that in some cases regulated monopoly is better than unregulated duopolies. Here, I explain a slightly different model from theirs by incorporating the above discussion of reluctant/over-employed monopolist to show that the regulated monopolist outcome is worse than is perceived by Armstrong and Sappington (2005).

Suppose the regulator is benevolently willing to maximize the social welfare of $V + \alpha U$, in which V denotes the consumer's surplus and U is the firm's rent and $\alpha \in [0,1]$ is a parameter indicating how much the regulator cares about firm's surplus relative to consumer's surplus. A transfer payment T from the consumers to the monopolist as the rent, costs the consumers $(1+\lambda)T$. The parameter $\lambda \geq 0$ represents the regulator's cost of gathering T as tax from consumers.

The monopoly supplies a good at price p while the demand curve $q(p)$ is common knowledge. The regulator sets both the price and transfer payment T, from consumers to regulated firm. The firm has a fixed cost of *operation* F, and a constant marginal cost of production, c. For simplicity suppose the firm's marginal cost can be either ***High*** or ***Low***. If the marginal cost is ***High***, it can be either $\overline{c_H}$ or $\underline{c_H}$, and $\overline{c_H} > \underline{c_H}$. The firm will have the marginal cost $\overline{c_H}$ if she is a reluctant or over-employer monopolist, otherwise she tries to maximize her profit by minimizing her cost and will choose $\underline{c_H}$. Similarly, if the marginal cost is ***Low***, it can be either $\overline{c_L}$ or $\underline{c_L}$, and $\overline{c_L} > \underline{c_L}$. The firm will have the marginal cost $\overline{c_L}$ if it is a reluctant or over-employer monopolist, otherwise it tries to maximize its profit by minimizing its cost and will choose $\underline{c_L}$. In other words, a ***High*** (***Low***) type firm can operate with both $\overline{c_H}$ or $\underline{c_H}$ ($\overline{c_L}$ or $\underline{c_L}$), depending on the type of market and its owner's utility function.

The firm knows if it is a ***High*** type or ***Low*** type, but the regulator does not know that and it is equally likely for her to think that the firm is a ***High*** type or a ***Low*** type. In addition, the regulator is only aware of $\overline{c_H}$ and $\overline{c_L}$, and does not know how much the firm can make itself more efficient. In other words, the regulator does not know the $\underline{c_H}$ or $\underline{c_L}$. So, the regulator decides based on her information and proposes two options for the monopolist to choose, (p_H, T_H) and (p_L, T_L) for each type of the monopolist. The monopolist decides on her choices based on maximization of her benefits, U, which is the sum of its profit, $\pi = q(p)[p-c] - F$, and the transfer payments, T. So the regulator's problem is maximization of the expected social welfare $V + \alpha U$ as follows

$$\max \text{Exp}\{V + \alpha U\} =$$
$$\max_{\{(p_L,T_L),(p_H,T_H)\}} \frac{1}{2}\{v(p_H) - (1+\lambda)T_H + \alpha[q(p_H)[p_H - \overline{c_H}] - F + T_H\}$$
$$+ \frac{1}{2}\{v(p_L) - (1+\lambda)T_L + \alpha[q(p_L)[p_L - \overline{c_L}] - F + T_L\} \quad (6)$$
$$\textit{Subject to} \quad \text{revelation principles.}$$

in which, $v(p)$ denotes consumer surplus for price *p*. $v(p)$ is a convex function of *p*. Considering the firm's benefit function $U_i = \pi_i + T_i = q(p_i)[p_i - \overline{c_i}] - F + T_i$, in which $i \in \{H, L\}$, and defining $w_i(p_i) = v(p_i) + (1+\lambda)[q(p_i)[p_i - \overline{c_i}] - F]$ we can write (6) as

$$\max \text{Exp}\{V + \alpha U\} =$$
$$\max_{\{(p_L,T_L),(p_H,T_H)\}} \frac{1}{2}\{w_H(p_H) - (1+\lambda-\alpha)U_H\} + \frac{1}{2}\{w_L(p_L) - (1+\lambda-\alpha)U_L\} \quad (7)$$

$$\textit{Subject to} \quad U_L \geq U_H + (\overline{c_H} - \overline{c_L})q(p_H) \quad (8)$$
$$U_H \geq U_L - (\overline{c_H} - \overline{c_L})q(p_L) \quad (9)$$
$$U_L \geq 0 \quad (10)$$
$$U_H \geq 0 \quad (11)$$

in which, inequalities (11) and (8) bind and inequalities (9) and (10) satisfy. So inequality (8) becomes $U_L = (\overline{c_H} - \overline{c_L})q(p_H)$ and the maximum expected welfare would be:

$$\frac{1}{2}\{w_H(p_H) - (1+\lambda-\alpha)(c_H - c_L)q(p_H)\} + \frac{1}{2}\{w_L(p_L)\}\ , \quad (12)$$

Now, consider the case of two firms with the above specifications that compete under Bertrand competition without any interference by regulation. Each firm knows her own type and her rival's. There are three cases possible. The first is both firms are ***High*** types. In this case, according to proposition 2, both will choose $\underline{c_H}$ as their minimum cost and the price would be $p = \underline{c_H}$. The likelihood of having both firms to be of high type is one quarter. The second case is that both firms are *low* type. Therefore, according to proposition 2, both will

choose $\underline{c_L}$ as their minimum cost and the price would be $p = \underline{c_L}$. The probability of this case is also one quarter. The last case is when one of the firms is *High* type and the other is *Low* type. Therefore, the equilibrium price would be $\underline{c_H}$. The probability of this case is one half.

The firms' profits in the first two cases are zero. In the last case, the profit for the high type firm is zero while for the low type firm is $(\underline{c_H} - \underline{c_L})q(\underline{c_H})$.Therefore, expected social welfare under these circumstances, if we ignore the firms' fixed costs *F*, would be:

$$\frac{1}{4}v(\underline{c_L}) + \frac{3}{4}v(\underline{c_H}) + \frac{\alpha}{4}(\underline{c_H} - \underline{c_L})q(\underline{c_H}) \ , \qquad (13)$$

To compare the regulated monopoly with the unregulated competition, we can evaluate the social surplus under regulation and competition, i.e. comparing equations (12) and (13). Similar to Armstrong and Sappington (2005), I assume that $\lambda = 0$ and $F = 0$, i.e. there is no social cost of gathering taxes from consumers and no fixed costs for the firms. Therefore, equation (12), depicting the maximum expected social welfare under regulated monopoly, will be summarized as:

$$\frac{1}{2}v(\overline{c_L}) + \frac{1}{2}v(\overline{c_H} + [1-\alpha][\overline{c_H} - \overline{c_L}]) \ , \qquad (14)$$

Social welfare in Armstrong and Sappington (2005) set up under regulated monopoly is,

$$\frac{1}{2}v(\underline{c_L}) + \frac{1}{2}v(\underline{c_H} + [1-\alpha][\underline{c_H} - \underline{c_L}]) \ , \qquad (15)$$

Comparing equations (15) and (14), and having in mind that *v*(.) is convex in *p*, one finds that social welfare under the reluctant/over-employer monopolist is lower than a normal monopolist. Armstrong and Sappington (2005) argue that regulated monopolist can

produce higher social welfare than unregulated competition if the demand is sufficiently inelastic. But, comparing equations (15) and (14), we can see that the demand curve should be even more inelastic than they thought in order that the regulated monopolist becomes better than unregulated duopoly, which is a rare case. Concluding that competition is better than what Armstrong and Sappington (2005) found especially in the environments where the reluctant monopolist or the over-employer monopolist is prevalent, such as most less-developed countries (LDCs).

Conclusion

In this paper, I discussed a monopolist who is not efficient not only because she produces dead-weight-loss, but as she is not minimizing her costs function. This is interesting as the economic theory did not talk about this phenomenon before. Unlike most developed economies, in less-developed countries (LDCs) where monopolies are prevalent in many capital intensive industries, it is possible to have firms that run more efficiently with much lower costs but unfortunately they are not.

I explained two special cases which are the central point of argument. One is the owner of the monopoly, who is the manager too and prefers to put less effort in the firm to enjoy more leisure although this costs her part of her profit. This case is highly prevalent in closed economies where the monopolies enjoy guaranteed high profits and stable market perpetuately. Their owners/managers have least incentive to work hard and decrease the marginal cost of production.

On the other hand, there is another monopolist whose position is under pressure from the government liberalization policies and therefore tries to threaten the government

by laying off its employees in large size. In order to do that, first it employs a large number of people, more than her needs, in a way that if the threat is implemented it may have significant impacts on the economy and political officials. In this case, the monopolist will end up having higher than usual employment and therefore higher than usual marginal costs.

These two cases provide a ground to argue that monopolists can have higher marginal costs than what was previously thought. I proved that if the same monopolists face competition pressure, they may reduce their marginal costs as much as possible. Therefore under competition they will have the minimum marginal costs. So they become efficient again as the usual case in economic theory.

Based on these arguments, I proved that monopolies can perform worse than what has been perceived before and therefore are much worse than competition. This reasoning strengthens the arguments for competition. I showed that even the regulated monopolist is worse than what is found by Armstrong and Sappington (2005) and hence it could be highly beneficial to introduce and support competition in economies with strong lobbied monopolies.

In less-developed countries (LDCs), where monopoly is pervasive in capital intensive industries which are usually state-owned enterprises, the regulatory policies become less efficient than pro-competitive policies. There should be institutions that promote fair but strong competition in these markets. All the barriers to competition must be overthrown gradually to give time for the lethargic industries to adapt themselves to the highly intensive structure of market competition. In the case that competition is very hard to implement, regulation of these firms should be based on the efficiency of their foreign competitors not themselves. Regulators should force these firms to produce with a marginal cost equal to

their foreign counterparts. Improving the marginal costs as much as possible should be the first aim for the regulators.

References

Armstrong, David E., and Sappington, "Regulation, Competition and Liberalization", of Economic Literature, Vol. XLIV (June 2006), pp. 325–366.

Lin, Justin and Guofo Tan, "Soft Budget Constraint", *American Economic Review*, May 1999.

Sappington, David E.M and Sidak J. Gregory. "Competition for State-Owned Enterprises", *Antitrust Law Journal*, No. 2, 2003.

Shleifer, Andrei and Robert Vishny, W. "Politicians and Firms", *Quarterly Journal of Economics*, 1994.

Appendix

Proof to Proposition 1.

Part (1). Monopolist A maximization problem is

$$\max_{\{x,M,e,Q\}} U(x,M,e)$$
$$\textit{subject to} \quad p_x x + M \le p(Q)\cdot Q - c(Q,e)$$

First Order Conditions are:

(*x*): $U_x - \lambda \cdot P_x = 0$ (*M*): $U_M - \lambda = 0$

(*e*): $U_e - \lambda \cdot c_e(Q,e)\cdot Q = 0$ (*Q*): $-\lambda[p(Q) + p'(Q)\cdot Q - c_Q(Q,e)] = 0$

(λ): $\lambda \cdot [p_x X + M - p(Q)\cdot Q + c(Q,e)] = 0$

The budget constraint binds, as *U* is increasing in both *x* and *M*. Therefore, from the first order condition for λ, $\lambda > 0$. Hence, $p(Q) + p'(Q)\cdot Q - c_Q(Q,e) = 0$ and profit will be maximized based on *Q*. So, from first order condition for *e*, we can get $c_e(Q,e) = \frac{U_e}{\lambda \cdot Q} \neq 0$, and therefore $e \neq 1$, i.e. $e < 1$. This is because according to one of the assumptions, $c_e(Q,1) = 0$ for any *Q*.

Similarly monopolist B solves:

$$\max_{\{x,M,Q\}} U(x,M)$$
$$\textit{subject to} \quad p_x x + M \le p(Q)\cdot Q - c(Q,e)$$

The first order conditions are:

(*x*): $U_x - \lambda \cdot P_x = 0$ (*M*): $U_M - \lambda = 0$

(*e*): $\lambda \cdot c_e(Q,e)\cdot Q = 0$ (*Q*): $-\lambda[p(Q) + p'(Q)\cdot Q - c_Q(Q,e)] = 0$

(λ): $\lambda \cdot [p_x X + M - p(Q)\cdot Q + c(Q,e)] = 0$

Similarly, the budget constraint binds, as U is increasing in both x and M. Therefore, from the first order condition for λ, $\lambda > 0$. Hence, $p(Q) + p'(Q) \cdot Q - c_Q(Q,e) = 0$ and profit will be maximized based on Q. On the other hand, from first order condition for e, we can get $c_e(Q,e) = 0$, and therefore $e = 1$. This is because according to one of the assumptions, $c_e(Q,1) = 0$ for any Q and $c(Q,e)$ is strictly convex in e.

So monopolist B chooses maximum effort, $e = 1$. Clearly, the effort that monopolist B chooses is higher than the effort that monopolist A chooses.

Part (2). Based on the first order condition for Q, we found that both monopolists maximize their profit based on Q. We also found that $e = 1$ for B, while $e < 1$ for A. Rewriting the first order condition for the monopolists again, we have:

For monopolist A: $p(Q) + p'(Q) \cdot Q = c_Q(Q,e)$

For monopolist B: $p(Q) + p'(Q) \cdot Q = c_Q(Q,1)$

According to our assumption, marginal cost function $c(Q,e)$ is decreasing in e. As $e < 1$ for A, the RHS for monopolist A is lower than monopolist B. Hence, the LHS of monopolist A's condition is lower than B's. As the LHS is decreasing in Q, quantity produced by A is lower than quantity produced by B. Consequently, Price under monopoly A's production is higher than B's.

Part (3). Based on the results found in parts (2) and (1) and by simple integration over quantity, we find that monopolist B's profit is higher than A's.

Part (4). Based on the results found in parts (3), (2) and (1) and by simple integration over quantity, we find that social welfare under monopolist B is higher than under A.

Proof to Proposition 2.

Part (1). The duopolists compete under Bertrand, therefore they know that the other firm can always under-price its product, so they will decrease the price as far as they can. So they decrease price until price becomes equal to the marginal cost. They have the option to decrease the marginal cost by putting more effort. If one of the firms put effort e the other can decrease its price by putting a little more effort than her rival, i.e. $e + \varepsilon$. So they put the highest effort, i.e. $e = 1$.

Part (2). As they decrease the price to the marginal cost, and the marginal cost is minimum as effort is maximum, the price would be minimum. So they will earn normal profit, i.e. profit = 0.

Part (3). Price is equal to marginal cost, similar to the perfect competition case, hence, there is no dead-weight-loss and the social welfare is maximum.

Proof to Proposition 3.

Part (1). In this case the problem for the government is to solve:

$$\max_{l} U_G(l) = v(p) + B(l)$$

Subject to $q^* = \arg\max_q p(q) \cdot q - C(l,q)$

$p^* = p(q^*)$

$p(q) \cdot q - c(l) \cdot q \geq 0$

$v(p)$ is a convex and decreasing function in p. $C(l,q)$ and $c(l,q)$ are the cost and marginal cost functions respectively, which are increasing and convex in both l and q. l is the excess level of employment , i.e. the difference between actual employment and the efficient level of employment. l is bigger or equal to zero. We also know that if $l' > l$, $c(l',q) > c(l,q)$ for any q.

The first order condition for the firm's maximization problem is:

(q): $p(q) + p'(q) \cdot q = c(l,q)$

From this equality, we can derive q^* as a function of l, i.e. $q^* = f(l)$, where f is a decreasing function is l, because if l increases the RHS of the first order condition will increase. Therefore the LHS also should increase but the LHS is a decreasing function of q. Hence, q should decrease.

Consequently, as p is an increasing function of q, p^* should increase by an increase in l. Therefore, if $p^* = p(q^*) = p(f(l)) = g(l)$, $g(l)$ is an increasing function of l. According to this condition the maximization problem for the government becomes:

$\max_l U_G(l) = v(g(l)) + B(l) = w(l) + B(l)$

Subject to $g(l) \cdot f(l) - C(l, f(l)) \geq 0$

As $v(p)$ is a decreasing function of p, and $g(l)$ is an increasing function of l, $w(l)$ is a decreasing function of l, while $B(l)$ is an increasing function of it. The first order condition of the above equation assuming the constraint is satisfied is:

(l): $B'(l) = -w'(l)$

The marginal benefit of an additional unit of labor for the government is equal to its marginal costs. Assuming that $B'(0) \neq -w'(0)$, i.e. the efficient level of employment does not maximize government utility, l^*, that satisfies the first order condition, is bigger than zero. This assumption is usually satisfied.

If the maximization constraint, the non-negativity of profit is not satisfied, we have the corner solution in which l^* is clearly bigger than zero, the efficient level of employment. Hence, in any case, $c(l^*, q) > c(0, q)$ i.e. marginal cost of the monopolist under the government which cares about level of employment is higher than normal monopolist.

Part (2). Clearly, as monopolist A's cost is higher than B's, its price is higher than B's too. Because $l^* > 0$, $c(l^*, q) > c(0, q)$ and from the firm's first order condition of maximizing profit for monopolist A and B:

for monopolist A: $p(q_A) + p'(q_A) \cdot q_A = c(l^*, q_A)$

for monopolist B: $p(q_B) + p'(q_B) \cdot q_B = c(0, q_B)$

The LHS of A is bigger than B if $q_A = q_B$. On the other, the RHS of both equations are decreasing functions of q. So $q_A < q_B$ and therefore $p(q_A) > p(q_B)$.

Part (3). Based on parts (1) and (2), as $q_A < q_B$, $p(q_A) > p(q_B)$, and $c(l^*, q) > c(0, q)$, and as the profit function is concave in quantity, we can argue that, $\pi_B > \pi_A$.

Part (4). Based on part (2), as $p(q_A) > p(q_B)$, and $v(p)$ is a decreasing function of p, $v(p_A) < v(p_B)$. On the other hand, from part (3), $\pi_B > \pi_A$. Therefore, $v(p_A) + \pi_A < v(p_B) + \pi_B$, i.e. Social welfare under monopolist B is higher than under monopolist A.