

Research on the Sunk Cost of Telecommunications Industry

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Abstract: When new technology and old one compete in the homogeneous services, excess competition of telecommunication industry tends to occur. The reason is incumbent why adopt a new technology when old one that has great sunk cost can exert its value? If entrant with new technology just serves in same market with incumbent, it is reasonable when incumbent design strategy to think over sunk cost, Sunk cost no only is an entry barrier, but also an exit barrier. For a rational incumbent, as long as sunk cost can has its value and can compete with entrant, why they invest in a new technology? Our framework and findings are analyzing strategic choice of incumbent when entrant entry. Afterward discussing how regulation agency make equilibrium price to cover sunk cost of incumbent and balance revenue of entrant. Ultimately walk out of the whirlpool of price war and safeguard healthy development of telecommunication industry.

Keywords: sunk cost; excess competition; regulation policy

1. Introduction: cause of sunk investment of telecommunications

In the monopoly period, telecommunications operator maybe set average price above marginal cost to balance budget. The kind of pricing may cover sunk cost of the enterprise and boost telecommunications industry in the early of telecommunications development. But at the same time monopoly lead to low efficiency and high price, consumer and economist in telecommunications industry always blame monopoly power result to higher product cost and price than in competitive environment, so it never stop to appeal to open telecommunications market, but at one time it is a very high expense to construct another network. With telecommunications technology development, economics of scale in any telecommunications field not very remarkable anymore. First in America deregulation begins with telecommunications law enact. Up to now, most countries have opened telecommunications market, consumer shares the lower price and more alternative in services, telecommunications industry has made substantial progress when exposure to competition. But problem went with exposure to competition, as prominent character of telecommunications industry, economics of scale still exist, telecommunication industry is unfit to induce perfect competition, excess entry will make it is difficult to incumbent cover sunk cost, especially when the entrant competes with incumbent in homogeneous service. Because the entrant prefer to investment in high profit area, and they use new technology have lower product cost than the incumbent (presupposition is entrant output reach point of economics of scale) and share more favorable

price policy. Besides technology disadvantage, incumbent tend to embark on universal service obligation because of history reason. So in competitive environment, traditional incumbent have not enough investment to renovate its facility if incumbent don't cover great sunk cost. Hence it is rational to maximize its value of sunk cost when new technology of entrant aims to same client. Traditional incumbent has two choices when he meet entry of new technology which contest with the same services: one is price war to strive for market share, even drive out the entrant, the result is lost-lost; the other one is make equilibrium price, both side is win-win, incumbent cover its cover sunk cost and entrant balance its revenue. If the problem can be answered corrected, excess competition is possible to be settled perfectly. The paper focuses on the problem that incumbent how to act to entry of entrant, how to lie out equilibrium price and action of regulation agency in shaping the price. The questions when new technology can't provide new services only contest cake of old one in the same services increasingly important. At the same time, the demand is crucial factor to determine technology and product capacity. China telecommunications make great progress in the last two decades. But any problem still puzzled regulation body and manager of telecommunications industry. The call time is much longer than before, but revenue still has not rise synchronously. More than 80% profit of Telecommunication industry come from voice service. Lots of value-added service development slowly, telecommunication firms focus on existent market, telecommunication supply has exceeded demand, Telecommunications demand walk into mature period, and linear character of telecommunications industry demand is quite evident. If no demand and new service support new technology, with Exposure to competition more openly, if sunk cost not were think over, excess competition will be inevitable, obviously the sunk cost should provoke us more attention. Or else incumbent will be more difficult, recently even it was reported that AT&T be purchased; China telecom and China Netcom also experience the similar trouble. China telecommunications industry competes increasingly fiercely. In partly of telecommunications market, excess competition has come forth, which makes us worry about the harmonious development of china telecommunications in the future.

2. Sunk cost effect on telecommunications enterprise decision-making

In order to boost efficiency of telecommunication enterprise, FCC stipulates telecom tariffs must based on forward-looking incremental cost, undoubtedly, which give telecommunications enterprise strong incentive to increase efficiency and lower cost, and consumer surplus be improved greatly, but competition should be limited to a certain extent, great sunk cost is distinctness of telecommunications industry, after all economics of scale still exist, perfect competition don't fit to telecommunications industry. In any sense, sunk costs is an exit barrier more than an entry one, with the competition more fiercely than before, the incumbent have not incline to invest and more company get into trouble, ultimately consumer and company will suffer from the trouble. Below the paper analyzes action of incumbent when meeting entry of entrant. Which lay a foundation for regulation agency solve reasonably the question of sunk cost.

When meeting entry of entrant, generally incumbent have two strategy: one is contest for market share, the incumbent pay more attention to market share not to benefit .the result of game is lost-lost; the other one is focus on benefit, both sides compromise to equilibrium price (maybe regulated by agency). Under the price incumbent can cover sunk cost and entrant balance its revenue, the result of game is win-win. Below the paper analyses the two

Suppose $p, \lambda p$ be price of two parties, assume $0 < \lambda < 1$, for entrant have more favored price policy. Further assume $s, \omega s$ be sunk cost of both sides need to be covered, $0 < \omega < 1$, for development of technology the equipment provide same capacity price decrease gradually. Let q_i, q_e be output of incumbent and entrant.

Consider every company balance revenue and we draw two equation:

$$\pi_i(p, \lambda p) - cq_i = s \quad (1)$$

$$\pi_e(p, \lambda p) - cq_e = \omega s \quad (2)$$

From equation (1), (2) we draw equilibrium price of balancing revenue is $p = \frac{s(q_e - \omega q_i)}{q_e q_i (1 - \lambda)}$,

especially when $\lambda = 1$, that is to say entrant follow incumbent pricing, our findings is $q_e = \omega q_i$.

Hence our conclusions is a equilibrium price of balancing revenue maybe be achieved though entrant follow incumbent pricing and restrict market share to certain extent of market share of incumbent, the ratio decided by sunk cost of both sides. Under the price incumbent can cover sunk cost and entrant balance its revenue, the result of game is win-win.

3. An briefly analysis of regulation policy on sunk cost

Regulation agency should lead company to introduce new technology in appropriate time, today china telecommunication market has walked into ripe age, if new technology don't take new service just to partition market of incumbent, incumbent tend to react drastically when market share of entrant reach certain extent. Furious price will be internecine; the question behind excess competition is sunk cost. So the problem of sunk cost should be thinking highly in competitive environment. With telecommunications industry exposures to competition gradually, regulation agency pay more attention to open telecommunications market and break monopoly, even improve allocative efficiency of resource. No doubt, original intention of telecommunication reform is undisputed. The question of telecommunications reform don't balance interest of incumbent and entrant, regulation agency seldom think over the effect on competition of sunk cost of incumbent, above analysis show us without regulation intervention, price wars will be internecine, no side can payoff in competition. Only cooperative-competition can ensure two parties profit, regulation agency should induct both sides to shape equilibrium price.

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