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# ***N-Poly Viability and Conglopolistic Competition in Small Emerging Market***

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*(Work in Progress: Don't Quote)*

## **Abstract**

The economic catch-up of the East Asian region went hand-in-hand with the emergence and even dominance of large quasi-state or private conglomerates. Such for example were the Zaibatsus in the pre-WWII and the Keiretsus of the post-WWII Japan and the Chaebols of South Korea which enjoyed extensive state sponsorship and the Taipan-led business empires of South and South East Asia which were largely autonomic. The trend continues to this day especially in the People's Republic of China. This dominance was not just an accidental fixture but the natural result of the economic and social environments prevalent in emerging markets. After reviewing the literature on why a few large private conglomerates tended to dominate the landscape of less developed economies in a rapid catch-up mode, we attempt a game theoretic account for the spread of these firms across different markets. We first define the concept of "n-poly viability" or the number of firms that can profitably Cournot compete in a market of a given the size and fixed capital requirement. We then show that conglopolistic competition (conglomerates competing in many markets) is a subgame perfect equilibrium of an entry game among initial monopolists and that this evolution is consumer welfare-improving. We identify the conditions under which only one firm or no firm benefits from the evolution.

**JEL:** C79, C72

**Keywords:** behavioral, polymorphism, Bayesian, cooperation, groups

## I. Introduction

### A. The Vent for Size in LDCs

Coase's (1937) seminal observation that market transactions are not without cost and the higher the cost of market transactions the larger the firms started the "the boundary of the firm" problem. But the idea went into eclipse for 30 years before Oliver Williamson (1975), the 2009 Nobel Memorial Prize winner for seminal studies in the boundary of the firm, resurrected the idea in the 1970's and put "transactions cost economics" and firm-market boundary back on the disciplinary agenda. The crucial decision problem for the firm in this arena is whether to "make or buy" a service or an input, an issue alien the black box of the Arrow-Debreu firm. In underdeveloped economies, market exchange costs tend to be prohibitive, and the pioneering entrepreneur having no one to buy from faces all the attendant forward and backward linkage risks. The "make" decision taking the form of vertical integration to reduce those risks leads to the emergence of large vertically-integrated firms. The "vent for size" in the form of vertical integration comes in this case from profit seeking through efficient provision and control of the value chain. Does the story apply as well to horizontal integration?

### B. Market Conglomeracy: The Coase-Williamson Moorings

Conglomeracy or the spread of large conglomerates across many disparate unrelated markets is motivated in the burgeoning literature mainly by underdevelopment of the factor markets (Khanna and Palepu, 1999). The primus inter pares among these factor markets is the capital market. Firms need capital to grow their businesses but in LDCs the financial markets may not be able to meet their capital requirements at reasonable rates. The resulting market failure is usually the motivation for state financial intervention in favor of certain companies considered socio-economically strategic and underlies the emergence of state-sponsored conglomerates. Firms outside the orbit of the state largesse need to raise capital internally (Williamson, 1975; Stein, 1997; Klein, 2001). Size is the way to pursue internal capital generation. Large companies also tend to be sought after and favored with lower interest rate by the banking sector which

following the Stiglitz-Weiss logic use size as a proxy for collateral. They also serve as conduits of foreign capital (subject to certain transparency requirement). Thus large companies will tend to have more capital than they can use in their home or traditional bailiwicks. The second most pronounced motive for conglomeracy is the mitigation of returns volatility. In underdeveloped capital markets (say for equity), investors can implicitly diversify their portfolio by owning shares of a conglomerate. This makes investment in conglomerate equity attractive. Portfolio diversification by firms reduces returns volatility, lowers bankruptcy risk and earns better credit rating. This should make conglomerate shares enjoy a premium in such markets. Other reasons for the premium have been proposed: lower tax burden due to intra-firm transactions, sharing of managerial best practice and leveraging of managerial resources. Where markets are small, economic size is attained by presence in many markets.

In emerging markets, however, the relevance of market conglomeracy continues (Khanna and Palepu, 1999; *The Economist*, 7 April 2001, "In Praise of Rules" Survey of Asian Business). We are of the opinion that the story of the dominance of conglomerates in emerging markets extends beyond the firm-market boundary arena where size is a vehicle for the pursuit of efficiency. Size can itself be a trait selected for survival beyond pure economic efficiency especially in many weak governance polities.

### **C. Vent for Size and the Politics of Predation**

The vent for size is rendered more urgent by the need to survive the politics of predation. Less developed economies are backward for many reasons but the most encompassing reason is weak governance due to weak institutions (Shirley, 2008). Weak governance starts with a hobbled state whose many organs of rule making and enforcement intended to protect the common weal are susceptible to capture and used as instruments of predation. This is related to the famous risk associated with the emergence of the state: it can be an instrument of protection or an instrument of expropriation (Acemoglu, 2002, North, 2005). Unfortunately, the political environment in LDCs not only does not guarantee state benevolence but may indeed induce state

predation. Where predation is an integral part of the politico-economic landscape, the firm must also vertically integrate into self-protection in order to survive

A weak governance environment begets the proverbial predation table where rents rather than added value is the prize. It is popularly observed that having a seat in the predation table means you don't end up in the menu. The seats in the table are, however, allocated according to political power. Economic size, in so far as it gets translated into political power can procure for its holder a seat in that table. While size is a magnet for predators, it is also rampart against predation. Small firms are vulnerable to predation because the cost of protection can be prohibitive and not affordable. Having a hand in the election of the president of the republic means having a say at who becomes the minister of finance or the commissioner of the tax bureau. Being able to afford the highest paid and highest profile lawyers gives the firm an edge in dealing with tax collectors and regulators. This is in a sense a "make" decision that renders uncertainty manageable where the wielding of state power is unpredictable. Where the state is weak, firm size, in the language of evolutionary biology, is a trait selected for survival. Once an adequate self-protection capability is acquired, however, the marginal cost of its further use is negligible. It thus acts like a sunk capital with attendant economies of scale.

Where furthermore markets are small, this vent for size mandates playing in many markets, hence the presence in many markets at once or conglomeracy. The danger here goes beyond the "too big to fail" risk. The danger of size in weak governance environment also includes the "too big to behave" risk. Having acquired a capacity to repel predators, the temptation to use the same capacity to prey on others is strong. Large conglomerates may succumb not only to abuse of market power but to the use of political leverage for rent-seeking.

As part of the defensive posture, many of them tended to develop and maintain clandestine mutually beneficial relations with political actors. This murky matrix of relationships became the favorite whipping boy of Western observers in the wake of the Asian Financial Crisis

of 1998 which for many signaled the end of the proverbial East Asian Model (“In Praise of Rules” The Economist, 7 April 2001). The global growth leadership played by the Asian economies in the post-2008 crisis years shows that the news of the demise of the Asian model is premature.

In emerging markets, casual empiricism suggests that the dominance of conglomeracy is only growing rather than abating. Contemporary Philippines, where most of the newsworthy economic actions involving large capital outlays whether in privatization or in the public-private partnership space are linked to one or more of the very visible conglomerates, seems emblematic of this trend.

#### **D . The Questions We Address**

Our own interest is an additional wrinkle to the question of why large business firms when allowed by law or by market conditions, compete in many disparate markets (conglopolistic competition not vertical integration) and what the welfare implication of this may be. We first begin in Section II with the concept of n-poly-viability which we will use in the subsequent section. In Section III, we introduce the concept of conglopolistic competition and model its emergence. We show that conglopolistic competition is a subgame perfect equilibrium of a two-market-two-firm entry game.

## **II. N-poly-Viability of Symmetric Cournot Markets**

### **A. The Cournot Competitive Market**

We consider a market with inverse demand function  $P = a - bX$  and where the number of firms is  $n \geq 0$ . Each firm faces the same fixed marginal cost  $c > 0$ . Each firm faces an exogenous fixed capital cost of  $K \geq 0$  to be amortized at fixed rate  $r \geq 0$ . The size of  $K$  reflects scale economies. The firms play a Cournot market game. This characterization of the oligopoly market with fixed  $K$  is common (Dasgupta and Stiglitz, 1981; Neumann et al, 2001; see Hegji, 2001 for a case with endogenous  $K$ ). The net profit per firm as a function of  $n$  is well known:

$$\pi(n) = [(a - c)^2/b(n + 1)^2] - (1 + r)K \quad (1)$$

We assume that for some small enough  $n > 0$ ,  $\pi > 0$ . We suppose  $n$  to be continuous.

In the following we will consider the demand intercept “ $a$ ” as a proxy for market size (also called vertical growth by Hegji, 2001; Neumann et al, 2001). Our concern here is viability in small economies. The following is known in the literature if expressed in different ways:

Definition 1: The viable number of firms  $n_0$  in the symmetric Cournot competitive market with free entry is defined by  $\pi(n_0) = 0$  in (1) and given as:

$$(2) \quad n_0 = [(a - c)(b(1 + r)K)^{-1/2}] - 1$$

Remark 1: By the mean value theorem,  $n_0$  always exist since  $\pi(n) > 0$  for some small enough  $n$  and  $\pi'(n) < 0$  and monotonic.

Remark 2: The viable number of firms once attained forms an *economic barrier to entry* as opposed to the *legal barriers to entry*. In casual conversation, businessmen refer to this market as “saturated”, one where returns to additional investment is no longer competitive with returns in other markets. Players in a saturated market begin to actively scout for opportunities in other markets.

The following reproduces known results (see e.g., Neumann et al, 2001): The viable number of identical Cournot competing firms:

- (i) rises with a rise in market size “ $a$ ”:

$$\partial n_0 / \partial a = (b(1 + r)K)^{-1/2} > 0$$

- (ii) falls with a rise in the marginal cost  $c$ :

$$\partial n_0 / \partial c = - (\partial n_0 / \partial a) < 0$$

- (iii) falls with a rise in the fixed cost  $K$ :



$$\partial n_0 / \partial K = - (a - c)b(1 + r)(b(1 + r)K)^{-1} < 0$$

(iv) falls with the rise in b:

$$\partial n_0 / \partial b = - (a - c) / 2 (b(1 + r))^{3/2} < 0$$

(v) approaches infinity as K or b approaches 0.

The concept of viable number of firms relates to the concept of competitiveness only *in potentia*. Result (i) says that the larger the market the more potentially competitive it becomes. The enduring concern in the literature is the relation between market size and competitiveness understood as market structure or number of firms. Result (ii) says that a fall in marginal cost due say to a technological change raises the potential competitiveness of the market. Result (iii) says that the higher the fixed cost hurdle (r and K), the less potentially competitive the market. (iv) says that the steeper the demand curve, the less potentially competitive is the market. Finally, (v) says that perfect competition is viable when the fixed capital cost requirement is near zero or the demand curve is horizontal. The following classification is informative.

Definition 2: A symmetric Cournot-competitive market is

- (i) unviable (missing) if  $n_0 < 1$ ;
- (ii) monopoly-viable if  $1 \leq n_0 < 2$ ;
- (iii) duopoly-viable if  $2 \leq n_0 < 3$ ;
- (iv) n-poly-viable if  $n - 1 \leq n_0 < n + 1$
- (v) Walrasian competition-viable if  $n_0 \rightarrow \infty$  ( $K \rightarrow 0$ ).

The n-poly-viable market may nonetheless have less than n firms actually operating. This is accounted for by a variety of reasons. One obviously is the presence of legal barriers to entry. The other is the dearth of entrepreneurs and finally an imperfect capital market. Likewise, insiders

may spread the idea the market is saturated. Def 2.v is effectively the operational definition of “completely free entry” involving zero fixed cost. Any  $K > 0$  results in some market power. On the polar opposite, many remote communities may remain completely un-served (e.g., no electric power) because they are unviable (small “a” and large K requirement). This viability idea is the basis for state intervention known as “missionary provision” or “cross subsidy” usually attached to franchise contracts where normally unviable markets are extended service subsidized from viable ones.

From the above and Definition 2, we know that a market can cross viabilities: say, from n-poly viability to n+1-poly viability due to either (a) the market growth (a rises), (b) technical change (K falls or c falls), (c) capital constraint easing (r falls), or (d) a fall in the slope of the demand function, or all of them together. When this happens, we say that the market graduates to a higher, or crosses, viability. Adam Smith’s *The Wealth of Nation (1776)* was in part a polemic against Mercantilism expressed in the legal or jurisdictional balkanization of markets thus preventing scale economic operation and innovation.

## **B. Governance Failure**

While K is usually understood as fixed capital requirement, it can be readily interpreted to include any fixed cost due to legal or illegal barriers to entry. The cost of hurdling a maze of formal and/or informal licensing requirements for example can be very high in LDCs as exemplified by the well-known “permit Raj” in India. As cost to a potential entrant, the predatory or rent-seeking tendencies among state functionaries and politicians can deter entry. If this cost governance failure is severe enough, it can result in the only viable market structure being either a Cournot monopoly or even a missing market. This is an example of a governance failure inducing a market failure!

Thus, among others, bad governance in LDCs can also result in firms with substantial market power; that is, among badly governed LDCs, market structure will tend to be more

concentrated. *De jure* liberalization of entry alone may fail to induce more players to enter. On the other hand, substantial market power may itself be converted into effective political lobby against reforms or for legal barriers to entry.

### **C. Small Markets: Entry Barriers**

In many LDCs where markets are small, it is likely that in many formal sector markets, a private dominant firm or a monopoly will exist even when entry is legally allowed. Private monopolies may be the only viable supply side in such small markets. They are, in a sense, natural monopolies not by virtue of technological scale economies but by virtue of the smallness of the market. However, due to information asymmetry, such a state of affairs may not be known *ex ante* to other players who will discover it only after actual entry. Such entry will result in eventual bankruptcy of some of the players in a process known as “consolidation” which can incur social cost. Policymakers in the past who viewed this as “destructive competition” readily intervened to block entry by such devices as “measured capacity.” As such this barrier to entry is not automatically welfare reducing. However, the legal barrier to entry originally designed to avoid an original market failure may, in time, due to growth become a “government failure,” preventing the entry of viable firms.

## **III. Emergence of Conglomerative Competition**

In the literature, the overwhelming motive for size and diversified portfolio is risk diversification. In this section, we show that even without the risk diversification imperative, there is a natural tendency to invade other markets. We use a game-theoretic model to study the evolution of market structure in LDCs that goes from essentially separate monopoly-viable markets to markets where many firms compete once these markets graduate to higher viability.

### A. The Initial Economy

Let the initial economy consist of only two markets  $x_1$  and  $x_2$ . The two markets may share the same geographic area. Entry into each market requires a fixed cost  $K_1$  and  $K_2$ . The variable cost in each market is fixed:  $c_1, c_2 > 0$ , respectively. The inverse demand functions are  $P_1 = a_1 - bx_1$  and  $P_2 = a_2 - bx_2$ , respectively. Note that  $b > 0$  is the same for both markets so it is the intercept  $a_i$  that spells the difference on the demand side. Both firms are facing the same interest rate  $r$ . On the supply side, it is the variable cost  $c_i$ . Each market is assumed initially monopoly-viable due to high-fixed cost and/or small markets. Alternatively, entry may be severely regulated. Thus, only one firm serves each market:  $F_1$  for  $x_1$  and  $F_2$  for  $x_2$ . Letting  $\pi[i, k, j]$  stand for the maximum net profit of firm  $i = 1, 2$  as a  $k$  player,  $k = (\text{monopolist (m), duopolist (d)})$  in market  $j = 1, 2$ , The maximum net profits of  $F_1$  and  $F_2$  as monopolists in their respective markets are, respectively:

$$1. \quad \pi[1, m, 1] = (a_1 - c_1)^2 (4b)^{-1} - (1 + r)K_1$$

$$2. \quad \pi[2, m, 2] = (a_2 - c_2)^2 (4b)^{-1} - (1 + r)K_2$$

We now consider one type of shock, economic growth, that results in the graduation of both markets: a rise in the market size to  $a_i' > a_i$ ,  $i = 1, 2$ . This economic shock we assume leads to a graduation from monopoly to duopoly viability. It effectively lifts the economic barrier to entry from smallness to entry. Let the two firms' profits as monopolists be large enough to afford the fixed cost of a foray into the other market.

*Definition 3:* The market structure is "conglolistic competition" when the two ( $n$ ) firms compete with each other as duopolists (oligopolists) in two ( $n$ ) markets.

In the present paper, we consider only two markets with a monopoly firm operating in each initially. Conglopolistic competition exists when both firms compete as duopolists in the two markets.

### B. The Firm Entry Game: Emergence of Conglopolistic Competition

The two firms now face the option “Enter the other market” (E) or “Stay put” (S). The option set is (S, E). If  $F_1$  chooses E while  $F_2$  chooses S,  $F_1$  becomes a duopolist in  $x_2$  while remaining a monopolist in  $x_1$ .  $F_1$ 's and  $F_2$ 's net profit as a duopolists in  $x_2$  are, respectively,

$$1. \quad \pi[1,d, 2] = (a_2' - c_2)^2(2/9b) - (1 + r)K_2$$

$$2. \quad \pi[2,d, 2] = (a_2' - c_2)^2(2/9b) - (1 + r)K_2.$$

Since the markets are now duopoly-viable, (3) and (4) are positive.

Clearly,  $F_2$  loses since  $\pi[2,d, 2] < \pi[2,m, 2]$  while  $F_1$  strictly gains since its net profit with entry.

$$3. \quad \pi[1,m, 1] + \pi[1,d, 2] > \pi[1,m, 1],$$

its net profit with S.

Now  $F_2$ 's decision to stay while  $F_1$  enters  $x_2$  forces  $F_2$  to become a duopolist in  $x_2$  earning (4). Since its own credit line or capital asset affords it the choice to enter  $x_1$ , should it enter? If  $F_2$  enters  $x_1$ , it becomes a duopolist in that market earning net profit  $\pi[2,d,1]$ .

$$4. \quad \pi[2,d, 1] = (a_1' - c_1)^2(2/9b) - (1 + r)K_1$$

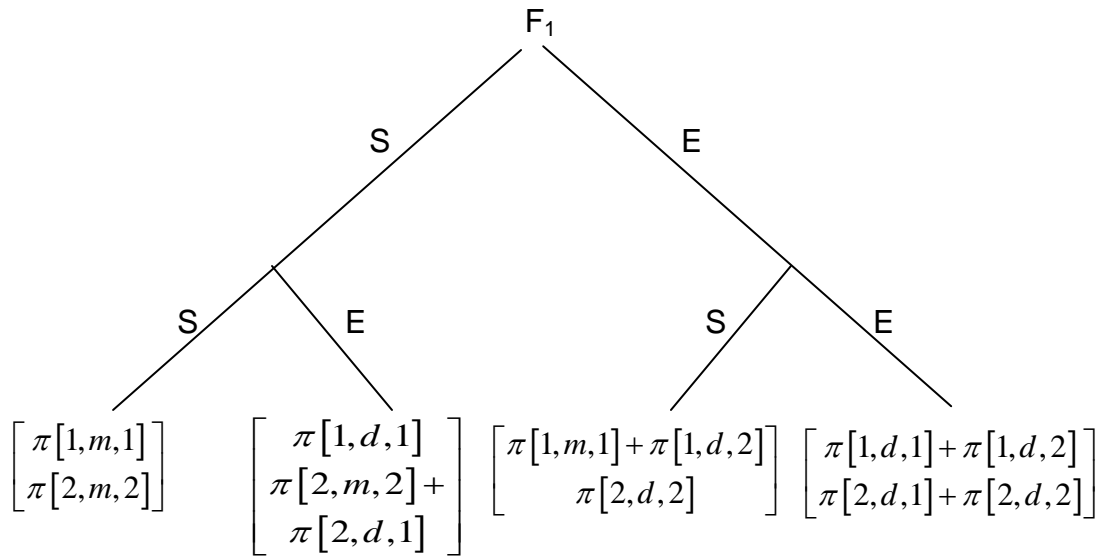
while  $F_1$  is forced to become a duopolist in  $x_1$  earning

$$5. \quad \pi[1,d, 1] = (a_1' - c_1)^2(2/9b)^{-1} - (1 + r)K_1$$

By duopoly-viability, (6) and (7) are strictly positive. Now  $F_2$ 's decision to enter  $x_1$  gives it a net profit of:

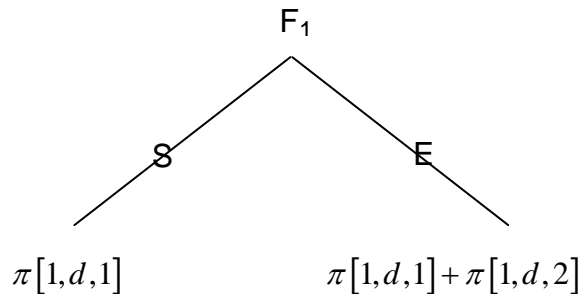
6.  $\pi[2,d, 2] + \pi[2,d, 1] > \pi[2,d, 2]$

Clearly,  $F_1$  having entered  $x_2$ ,  $F_2$  does better by entering  $x_1$  himself. The entry game in two periods can be represented in extensive form where  $F_1$  decides in period 1 and  $F_2$  decides in period 2.



where  $\pi[2,m,2] + \pi[2,d,1] > \pi[2,m,2]$   
 $\pi[2,d,1] + \pi[2,d,2] > \pi[2,d,2]$   
 $\pi[1,d,1] + \pi[1,d,2] > \pi[1,d,1]$

Since  $F_2$  will always choose  $E$  whether  $F_1$  chooses  $S$  or  $E$ , the reduced form for  $F_1$  becomes



For  $F_1$ , E beats S. Therefore, (E, E) is subgame perfect Nash equilibrium. This outcome still holds if firm 2 moves first. We have demonstrated the following:

Lemma: In the entry game under the given assumptions, (E, E) is SPNE regardless of who moves first.

The following is obvious:

Claim 1: Suppose the initial economy consists of two markets each served by a single firm by virtue of being initially monopoly-viable. Let each market subsequently graduate to duopoly-viability due to economic growth. Then a congopolistic competition will emerge as the stable equilibrium.

The emergence of congopolistic competition can also come about due to the entry deregulation, technological advances and/or dramatic reduction in cost of borrowing that trigger graduation from monopoly-viability. However it is triggered, this emergence has positive welfare implications.

The following holds:

Claim 2: The congopolistic competition welfare-improves on the initial economy characterized by two markets each served by a single firm either due to monopoly-viability or due to a legal restraint.

Proof: The welfare index we use is consumer's surplus CS. Let us consider only the impact of economic growth moving the demand intercepts to  $a_i'$ . The CS for monopoly (m) in market  $x_1$  be  $CS[m,1] = (a_1' - c_1)^2(8b)^{-1}$ . The CS for monopoly in  $x_2$  is  $CS[m,2] = (a_2' - c_2)^2(8b)^{-1}$ . The CS for an identical duopoly in  $x_1$  is  $CS[d,1] = (a_1' - c_1)^2(2/9b)^{-1}$ . Note that  $CS[d,1] > CS[m,1]$ . Likewise, the CS for a duopoly

in  $x_2$  is  $CS[d,2] = (a_2' - c_2)^2(2/9b)^{-1}$ . Thus,  $CS[d,2] = (a_2' - c_2)^2(2/9b)^{-1} > CS[m,2]$  and the subsequent economy with conglopolistic competition (SPNE) is welfare-superior to the initial economy.

Q.E.D.

## Summary

This paper started with a discussion of the phenomenon of conglomeracy: large business groups operating in many disparate markets in many less developed economies. The usual motivations for size was the need to overcome many market imperfections in LDC such as capital market and insurance market imperfections and transactions cost following the Coase-Williamson “make-or-buy” narrative. We introduced another reason for the vent for size in LDCs as a trait selected for survival in hazardous and predatory environments. Size allows a firm to vertically integrate into predation-repulsing activities exemplified by the capture of positions of rule-making and enforcement and political influence peddling which greatly reduce the uncertainty.

Our main concern in this paper is conglopolistic competition, the industrial organization where a few large conglomerates in small economies compete in diverse hardly related markets such as retail trade, transportation, banking, real estate, telecoms, power and even private education. To prepare the ground for our analysis, we first introduce the concept of “N-poly viability” of a market: the maximal number  $n$  of firms that can profitably compete in a market given the size of the market defined by the intercept of the demand curve, the slope of the demand curve, the marginal cost and the fixed capital cost required (the latter three consist the technology parameters).

A monopoly has  $n = 1$ , a duopoly has  $n = 2$ , an oligopoly has  $n > 2$  and a perfectly competitive market has  $n \rightarrow \infty$ . The viability changes as the market grows, the rule-of-law improves and/or the technology changes.



Our initial condition is an economy with small fragmented markets requiring high fixed cost and weak rule of law. We assume two markets each being monopoly-viable or served by a single firm. As these markets grow or as technology improves, these markets graduate into duopoly-viability and the two firms are now faced with a choice: stay at home as monopolist (S) or enter (E) and become also a duopolist in the other market while still operating in own market. If one enters (chooses E) and the other doesn't (chooses S), the aggregate profit for the entrant from E exceeds that from S. The same holds for the other firm. Thus (E, E) is the subgame perfect equilibrium. The two firms end up being players in both markets. We call this outcome "conglopolitan competition." It is easy to show that conglopolitan competition results as well when  $n > 2$ .

This evolution is welfare-improving.

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