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INDIRECT EVOLUTION VERSUS STRATEGIC DELEGATION:

A Comparison of Two Approaches to Explaining Economic Institutions

by

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Abstract:
The two major methods of explaining economic institutions, namely by strategic choices or by (indirect) evolution, are compared for the case of a homogenous quadratic duopoly market. Sellers either can provide incentives for their agents to care for sales (amounts) or evolve as sellers who care for sales in addition to profits. Whereas strategic delegation does not change the market results as compared to the usual duopoly solution, indirect evolution causes a more competitive behavior. Thus the case at hand suffices to demonstrate the difference between the two approaches in explaining economic institutions. (*JEL* codes*:* C72, D21, D43)

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1. Introduction

For a given institutional design one often can derive results concerning the nature of strategic interaction by applying tools of game theory. However, the bulk of economic analysis does not address the question of why certain institutions prevail. In this study an attempt is made to compare two methods of deriving institutional designs, instead of assuming them as exogenously given.

The first approach, to which we refer as *strategic delegation*, has a long standing tradition in the social sciences. People do not only decide within certain institutions, but they decide upon institutional design. A famous example is, for instance, the *contrat social* (Rousseau 1762), to which one often refers when justifying constitutional design. Clearly, such a contract is only a fiction. But there are more realistic examples, e.g. when changing legal rules by qualified majorities, for instance by unanimous approval.

More specifically, let an *institutional design* be represented by the rules of a final subgame and assume that earlier choices in the game allow to rule out certain subgames. By solving the game one does not only determine the behavior in final subgames, but also the choice of subgames, i.e. *institutional choice*. In the context of our example the final subgame is characterized by the motivation structure of the interacting agents. More specifically, institutional choice resembles strategic delegation in the sense that a principal strategically designs the incentives of his agent.

One difficulty of the strategic delegation approach is, of course, that one needs institutions, e.g. the *contrat social*, to explain institutions. Although the institutions used to derive institutions are much more basic, one cannot avoid shifting the problem to a more and more basic level with no natural starting point. This problem is avoided in the indirect evolutionary approach which restricts decision and game theory to predicting the choice behavior within a given institutional setup, and then derives the *evolutionarily stable institutional design* by evolutionary rather than strategic considerations. More specifically, an indirect evolutionary analysis first determines the solution for any institutional arrangement, and then selects among various such structures in an *evolutionary model* with institutional design constellations as mutants.

In the duopoly example at hand, where a seller on a homogenous goods market might want to care also for sales in addition to profits, strategic delegation requires a team (a principal and his agent) whereas indirect evolution does not need such a social structure. As a matter of fact, our results can be used to analyze whether the institution of strategic delegation leads to greater success than the evolutionarily stable constellation without hired hands.

The paper is structured as follows. Section 2 specifies the basic features of the market model we analyze throughout. In Section 3 we augment the model to allow producers to care for sales, and we derive a unique evolutionarily stable concern for sales. In Section 4 we consider the effect on market interaction by allowing strategic delegation when agents may be induced to care for sales. In Section 5 we compare the results of the previous two sections. In Section 6 we generalize the analysis of Section 4, allowing more general contracts between principals and agents, and show that the main results remain intact. Section 7 comments on how our results change if preference parameters/contracts are not observable. Section 8 concludes.

2. The market model

On a homogenous duopoly market sellers i=1,2 simultaneously choose their sales amounts x_i with $0 \le x_i \le ½$, where we assume that the monetary unit and the unit for measuring sales amounts are normalized in such a way that the prohibitive price and the market satiation level both are 1. Assuming a linear demand function, seller i's revenue can therefore be written as

$$\text{(II.1)} \qquad x_i\,(1-x_i-x_j) \qquad \text{for } i=1,2 \text{ and } i \neq j$$

By the bounds on x_i and x_j, the common price $1-x_i-x_j$ of both sellers must be non-negative.

The costs of production are assumed to be given by

$$\text{(II.2)} \qquad ½\, c\, x_i^2 + C \qquad \text{with } c,C > 0$$

According to the structural relationships (II.1) and (II.2) the market is symmetric. The profit $\pi_i(x_i, x_j)$ of seller i=1,2 for sales amounts x_i and x_j with $i \neq j$ is determined by

(II.3) $$\pi_i(x_i, x_j) = x_i\,(1-x_i-x_j) - ½\, c\, x_i^2 - C$$

3. Indirect evolution

Indirect evolution allows to endogenously derive the rules of the game (see Güth & Yaari 1992) and can therefore be viewed as a way to generalize neo-classical theory which traditionally assumes that such rules are exogenously determined. Unlike in direct evolutionary analysis or usual evolutionary game theory (where one assumes behavior to be genetically determined; see Hammerstein & Selten (1994) for a survey) one does not study directly the evolution of behavior. Instead, some more basic feature of the game, in our case preferences, is the object of evolution. Rational behavior is taken for granted, but behavior may nevertheless be indirectly affected if preferences change.[1]

If in a bilateral encounter behavior may be guided by an additional incentive, one first solves all the games resulting from such incentives for both players. With the help of these results one then defines an evolutionary model with the possible incentives as strategies or mutants, and one then derives the evolutionarily stable incentive constellation.

A. Incentives for sales

It is often claimed e.g. that sellers are not only interested in their profits, but also in their prestige as sellers (see e.g. Williamson (1964)). This one can measure by their sales (quantity amounts).[2] In general, there may be many ways to include such concerns. Here we will rely on the most simple way of doing so, namely by relying on utilities

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[1] For the same type of (duopoly) market environment, Bester & Güth (in press) analyzed whether altruism is evolutionarily stable whereas Güth & Huck (1995) allow for all possible quadratic profit functions and show that monopolistic competition (in the sense of neglecting mutual dependency) can be stable.

[2] Since profits are usually private information whereas sales are often widely known, it is much more likely that the prestige of a seller depends on sales rather than on profits. Larger sales often require large production amounts and thereby an increased or more stable use of the labor force, suggesting that a concern for sales might result from more basic interests.

$$\text{(III.1)} \qquad u_i(x_i, x_j) = \pi_i(x_i, x_j) + \beta_i\, x_i \qquad \text{with } 0 \leq \beta_i \leq 1/4$$

where $\pi_i(x_i, x_j)$ is as defined by equation (II.3). The main restriction of (III.1) is that it combines the direct concern for profits and for sales in an additive way. The upper bound on β_i is imposed to guarantee that $x_i \leq 1/2$.

The first step of our indirect evolutionary analysis requires us to determine the market results for all (β_1, β_2) constellations, not necessarily with $\beta_1=\beta_2$. With the help of these results we then define an evolutionary game with mutants/strategies β. The success of a mutant is measured by the profit it makes. The determination of an evolutionarily stable mutant thus answers the question whether and to what extent sellers evolve in such a way that they care for sales in addition to profits.

B. Market interaction with a direct concern for sales

Our model has been chosen to simplify the derivation of market equilibria. From

$$\text{(III.2)} \qquad \frac{\partial}{\partial x_i}\, u_i(x_i, x_j) = 1 + \beta_i - (2+c)\, x_i - x_j = 0$$

and

$$\text{(III.3)} \qquad \frac{\partial^2}{\partial x_i^{\,2}}\, u_i(x_i, x_j) = -(2+c) < 0$$

for i=1,2 and $j \neq i$ one derives equilibrium sales amounts as functions of (β_1, β_2):

$$\text{(III.4)} \qquad x_i^* = x_i^*(\beta_i, \beta_j) = \frac{1+c-\beta_j+(2+c)\beta_i}{(1+c)(3+c)}$$

The condition $x_i^* \leq 1/2$ follows from the restriction $0 \leq \beta_i, \beta_j \leq 1/4$.

Note that we use x_i* both to refer to a specific optimum choice of x_i for given preference parameters, and to refer to the function describing this connection. In many cases below we make an analogous abuse of notation because this simplifies the presentation greatly.

C. The evolutionary model

If one inserts the solution (III.4) into the profit function (II.3) one can derive each firm's profit as a function of (β_1, β_2) and obtain for i=1,2 with $j \neq i$

$$\text{(III.5)} \qquad \pi_i^*(\beta_i, \beta_j) = x_i^* (1-x_i^*-x_j^*) - \tfrac{1}{2} c (x_i^*)^2 - C$$

i.e., a profit function expressing market success as a function of the possible incentives for sales. We will refer to equation (III.5) as the seller i's reproductive success from the incentive constellation (β_i, β_j).

By

$$\text{(III.6)} \qquad \Gamma = (M, \pi_i^*)$$

with M={β: $0 \leq \beta \leq \frac{1}{4}$} (the mutant space) and π_i^* defined by equation (III.5) for all possible incentive constellations $\beta_i, \beta_j \in M$ we have defined an evolutionary model whose evolutionarily stable strategies we now want to determine.

D. The evolutionarily stable concern for sales

An evolutionarily stable concern for sales can be defined as an *evolutionarily stable strategy* (ESS) of the evolutionary model defined in (III.5). Thus $\beta^* \in M$ is an ESS if

$$\text{(III.7)} \qquad \pi_i^*(\beta^*, \beta^*) \geq \pi_i^*(\beta, \beta^*) \qquad \forall \beta \in M$$

and if

(III.8) $\pi_i^*(\beta^*, \beta) > \pi_i^*(\beta, \beta)$ $\forall \beta \in M$ such that $\pi_i^*(\beta^*, \beta^*) = \pi_i^*(\beta, \beta^*)$

For the case at hand it suffices to look at condition (III.6), since the best reply is unique in every symmetric equilibrium (β^*, β^*) of the symmetric evolutionary model Γ.

From

(III.9) $$\frac{\partial}{\partial \beta_i} \pi_i^*(\beta_i, \beta_j) = 0$$

(III.10) $$\frac{\partial^2}{\partial \beta_i^2} \pi_i^*(\beta_i, \beta_j) < 0$$

as well as from $\beta=\beta_i=\beta_j$ one obtains

(III.11) $$\beta^* = \beta^*(c) = \frac{1}{5+5c+c^2}$$

Clearly, β^* satisfies $0 \le \beta^* \le 1/4$.

A pure preference for profit maximization behavior is *not* promoted by evolutionary forces. Only for extremely large values of c will the market evolve in such a way that sellers do not care for sales directly. When $c \to 0$ the parameter $\beta^*(c)$, expressing a direct concern for sales in the sense of the utility function (III.1), increases to 1/5. Our results can be summarized by

THEOREM 1 *If on the symmetric market with profits (II.3) sellers can develop incentives of the form (III.1) and if the incentives of both sellers are commonly known, the only evolutionarily stable direct concern for sales is* β^**, defined by equation (III.10).*

4. Strategic delegation

Unlike indirect evolution strategic delegation relies on a richer social structure of the market. The two seller firms $i,j=1,2$ with $i \neq j$ are now to be represented by two teams (P_i, A_i) and (P_j,

A_j) of principals P_i and P_j and their respective agents. *Strategic delegation*[3] typically assumes the form that first the two principals propose contracts which then, if accepted, guide their agents' behavior in the market. By imposing outside options of zero worth for the agents we guarantee that structurally there is no difference to the market on which our analysis of indirect evolution is based.

A. The two-stage game model

We assume that principal i=1,2 can only propose linear contracts[4] of the following form, designed to allow for a straighforward comparison with the indirect evolutionary analysis:

$$\text{(IV.1)} \qquad (G_i, \beta_i) \qquad \text{with } G_i \in \Re \text{ and } 0 \leq \beta_i \leq \frac{c}{2}$$

We refer to G_i (a direct transfer from the principal to the agent which may be negative), as agent A_i's *salary*. This transfer has no effect on the agent's incentives, but it puts all the bargaining power in the hands of the principal. Since the agent can earn only 0 outside the firm, the principal can reap all profits available, just like in the evolutionary model where no agent was present. We refer to β_i (a parameter) as A_i's *sales incentives*. Again, the upper constraint on β_i is imposed to guarantee that $x_i \leq ½$.

To determine the results of strategic delegation one simply has to solve the two-stage game for the subgame perfect equilibrium (which is unique). First principals choose contracts as described in (IV.1) and then, knowing both contracts, each agent i=1,2 chooses x_i to maximize

$$\text{(IV.2)} \qquad u_i(x_i, x_j) = G_i + \beta_i x_i - ½\, c\, x_i^2 - C$$

[3] Different aspects of strategic delegation have been analyzed by Caillaud, Jullien & Picard (1995), Fershtman & Judd (1987), Fershtman, Judd & Kalai (1991), Fershtman & Kalai (1996), Gal-Or (1996), Green (1990), Katz (1991), and Rotemberg (1994). For an experimental study see Fershtman & Gneezy (1996).

[4] In Section 6 we consider a more general class of contracts, and show that no essential results change.

as determined by his contract (G_i, β_i). When choosing a contract (G_i, β_i) principal P_i is, of course, motivated by his profit net of his agency cost, i.e. principal P_i will maximize

(IV.3) $$R_i = x_i\,(1-x_i-x_j) - G_i - \beta_i\,x_i$$

B. The results of strategic delegation

It can be easily seen that agents do not interact, i.e. they both face an independent maximization task. More specifically, the payoff $u_i(x_i, x_j)$ depends only on x_i and not on x_j at all. Maximization of $u_i(x_i, x_j)$ as defined by (IV.2) by choice of x_i yields

(IV.4) $$x_i^+ = \beta_i/c \qquad \text{for } i=1,2$$

For a clearcut comparison with the results of indirect evolution, we assume that agent A_i will only accept to work for principal P_i if $u_i \geq 0$, principal P_i will choose G_i such that $u_i=0$. Inserting (IV.4) into equation (IV.2) and setting $u_i=0$ yields

(IV.5) $$G_i^+ = G_i^+(\beta_i) = C - \frac{\beta_i^{\,2}}{2c} \qquad \text{for } i=1,2$$

Inserting all these values into (IV.3) results in

(IV.6) $$R_i^+(\beta_i, \beta_j) = \frac{\beta_i}{c^2}\,(c-\beta_i-\beta_j) - \frac{\beta_i^{\,2}}{2c} - C$$

for $i,j=1,2$ and $i \neq j$. Since due to the definition of $G_i^+(\beta_i)$ participation of the agent is guaranteed, principal P_i can design an optimal contract (G_i, β_i) by maximizing $R_i^+(\beta_i, \beta_j)$ with respect to β_i. From

(IV.7) $$\frac{\partial}{\partial \beta_i} R_i^+(\beta_i, \beta_j) = \frac{1}{c^2}\,(c-2\beta_i-\beta_j) - \frac{\beta_i}{c} = 0$$

and

(IV.8) $$\frac{\partial^2}{\partial \beta_i^2} R_i^+(\beta_i, \beta_j) = \frac{-2}{c^2} - \frac{1}{c} < 0$$

one obtains

(IV.9) $$(2+c)\,\beta_i = c - \beta_j$$

for i,j=1,2 and $i \neq j$. Letting $\beta^+=\beta_1=\beta_2$ we get

(IV.10) $$\beta^+ = \beta^+(c) = c/(3+c)$$

Thus each principal principals P_i, who is restricted to contracts of the form (IV.1), will choose positive incentive parameters β^+. Notice that for all $c>0$ the optimal incentive parameter β^+ always satisfies $0<\beta^+<1$. (To guarantee also that $\beta^+<¼$ one could impose the condition that $c<1$.) We summarize our results by

THEOREM 2 *Strategic delegation in the form of (IV.1) results in contracts (G_i^+, β_i^+) of both sellers with*

$$\beta_i^+ = \frac{c}{3+c}$$

and

$$G_i^+ = C - \frac{c}{2(3+c)^2}$$

for the sellers i=1,2.

5. Comparison of indirect evolution and strategic delegation

Let us recall that the usual result for the market with profit and utility functions (II.3) and no strategic delegation implies that, respectively, equilibrium sales, price, and profits can be derived as

(V.1) $$\tilde{x}_i = \frac{1}{3+c}$$

(V.2) $$\tilde{p} = \frac{1+c}{3+c}$$

(V.3) $$\tilde{\pi}_i(\tilde{x}_i, \tilde{x}_j) = \frac{1+\frac{c}{2}}{(3+c)^2} - C$$

for i=1,2. For indirect evolution and strategic delegation the corresponding results can be determined by inserting $\beta^*=\beta_i=\beta_j$, respectively $\beta^+=\beta_i=\beta_j$, into equation (III.4), respectively (IV.4). Thus one gets

(V.4) $$x_i^* = \frac{1+\beta^*}{3+c} = \frac{6+5c+c^2}{(3+c)(5+5c+c^2)}$$

(V.5) $$p^* = \frac{3+5c+c^2+c(5+5c+c^2)}{(3+c)(5+5c+c^2)}$$

(V.6) $$\pi_i^*(x_i^*, x_j^*) = p^* x_i^* - \frac{c}{2}(x_i^*)^2 - C$$

and

(V.7) $$x_i^+ = \frac{1}{3+c}$$

(V.8) $$p^+ = \frac{1+c}{3+c}$$

(V.9) $$R_i^+(x_i^+, x_j^+) = \frac{1+\frac{c}{2}}{(3+c)^2} - C$$

for i=1,2 where the results for indirect evolution are indicated by the superscript * and those of strategic delagation by the superscript +.

It may or may not surprise the reader that strategic delegation implies the same result as the case of usual profit maximization. In an optimal contract a seller chooses the incentives for his agent just so that the agent will react optimally to the other seller's behavior. Although agent i himself is not at all concerned about firm j's sales x_j with $j \neq i$, the incentive β_i is selected as to induce an optimal reaction x_i to x_j. That also profits $\tilde{\pi}_i(\tilde{x}_i, \tilde{x}_j)$ and residual claims $R_i^+(x_i^+, x_j^+)$ agree depends, of course, on the fact that the participation constraints of the two agents are of the form u_i=0. Thus principals have to compensate only for the cost of production which arises independently whether or not one relies on indirect evolution or strategic delegation.

Comparing indirect evolution and strategic delegation therefore amounts to comparing the evolutionarily stable incentive constellation β^* more or less to the usual duopoly solution. By comparing (V.1) and (V.4) one derives

$$\text{(V.10)} \qquad \frac{x_i^*}{x_i^+} = \frac{6+5c+c^2}{5+5c+c^2}$$

showing that the market results from evolution are more competitive than those from strategic delegation. This difference will, furthermore, increase when c becomes smaller and disappears when $c \to \infty$.

Instead of comparing directly market results one may, of course, be more interested in the motivational structure, as expressed by the parameter β of the two approaches. Clearly, for c=0 one has that $\beta^* > \beta^+$, whereas for c=1 the opposite is true. Since β^* is monotonically decreasing and β^+ is monotonically increasing with c, there exists a unique parameter value c' with $0 < c' < 1$with $\beta^*(c') = \beta^+(c')$. Below c' indirect evolution induces a higher sales motivation than strategic delegation, above c' the opposite is true.

REMARK We note that our results cannot be downgraded by the argument that we have concentrated on a special case where strategic delegation does not work at all. It certainly does work. Consider, for instance, the case where only seller *i* can commit his agent to a contract of the form (G_i; β_i), whereas seller *j*, or his agent, maximizes profit. Clearly, (IV.4) and (IV.5) remain true for seller *i*. For *j* we get

(V.11) $$x_j = \frac{c-\beta_i}{(2+c)c}$$

Maximizing

(V.12) $$R_i(\beta_i) = \frac{\beta_i}{c}(1-\frac{\beta_i}{c}-\frac{c-\beta_i}{(2+c)c})-\frac{\beta_i^2}{2c}-C =$$

$$\frac{1+c}{c^2(2+c)}\beta_i(c-\beta_i)-\frac{\beta_i^2}{2c}-C$$

then yields the optimal choice of β_i for P_i as

(V.13) $$\beta_i = \frac{c(1+c)}{c^2+4c+2}$$

and the agent's induced optimal choice of sales by A_i as

(V.14) $$x_i = \frac{1+c}{c^2+4c+2}$$

The sales as given by (V.14) *exceed* those given in (V.1). Thus strategic delegation induces a more competitive sales policy. It is only the competition in strategic delegation which offsets its effect. To understand this result, notice that the net cost of an agent is always zero in the sense that the value of his outside option is zero and the principal can induce this level of effort cost by making an appropriate take-it-or-leave-it offer. Thus the principal will induce such a sales amount which is a best reply to the sales amount of his competitor. And this is possible by an appropriate choice of β_i.

6. Motivating the agents by profit

In Section 4 contracts were restricted to the special class of linear reward schemes (G_i, β_i) specifying a lump sum payment G_i and a parameter β_i representing how much agent A_i gains by selling one unit more. Motivating agents by giving them incentives for increasing sales is, of course, only a special form of incentive scheme. For a non-stochastic market environment our result is, however, rather typical. To demonstrate this, let us consider the more general incentive scheme of the form

(VI.1) $$(G_i, \alpha_i, \beta_i) \text{ with } G_i \in \Re,\ 0 \le \alpha_i, \beta_i \le 1$$

allowing for a share α_i by which the agent A_i participates in the revenues $x_i\,(1-x_i-x_j)$ of seller i. The payoff resulting from such a contract is therefore

(VI.2) $$u_i(x_i, x_j) = G_i + \alpha_i\, x_i\,(1-x_i-x_j) + \beta_i\, x_i - ½\, c\, x_i^2 - C$$

From maximizing $u_i(x_i, x_j)$ with respect to x_i one obtains

(VI.3) $$x_i^+ = x_i^+(\alpha_i, \beta_i, \alpha_j, \beta_j) = \frac{\alpha_i\alpha_j + c\alpha_i - \alpha_i\beta_j + 2\alpha_j\beta_i + c\beta_i}{3\alpha_i\alpha_j + 2c(\alpha_i + \alpha_j) + c^2}$$

for $i,j=1,2$ and $i \neq j$.

One can again use the participation constraint $u_i=0$ in order to find the (subgame perfect) equilibrium values for G_1 and G_2:

(VI.4) $$G_i^+(\alpha_i, \beta_i, \alpha_j, \beta_j) = -\,\alpha_i\, x_i^+\,(1-x_i^+-x_j^+) - \beta_i\, x_i^+ - ½\, c\,(x_i^+)^2 - C$$

for i=1,2 and where x_i^+ and x_j^+ are determined by (VI.3). Seller i's rewards are then

$$\text{(VI.5)} \qquad R_i^+(\alpha_i, \beta_i, \alpha_j, \beta_j) = x_i^+ (1-x_i^+-x_j^+) - ½\, c\, (x_i^+)^2 - C$$

This, however, is the profit of the firm, i.e. of an owner who is self-producing (without hiring an agent). It is straightforward to verify that P_i can always find incentives α_i and β_i resulting in the best conceivable reply x_i^+ to any x_j^+.[5] Thus, as in Section 4 the result of strategic delegation is the one of profit maximization without delegation. The results of Section 4 and the comparison in Section 5 is thus far more general than indicated by the narrow class of contract forms on which Section 4 is based. (Of course, in a stochastic environment the assumption of linear incentive contracts would be a serious restriction since one may want to induce different sales amounts in different states of nature.)

7. Privately known types

Our analysis has so far assumed that the relevant "type" parameters (β_i ,β_j) are commonly known when sales decisions are made. A very different informational assumption would be that these parameters were private information (each i knows only his own β_i in the indirect evolutionary approach, each principal P_i knows only the contract he has signed with A_i in the strategic delegation case). In the following, we briefly comment on how our results are affected in this case.

In the indirect evolutionary approach, suppose the seller's beliefs concerning the other firms $\beta \in M$ is determined by the true distribution in the population. This is a standard case with private information (see e.g. Güth (1995)). Then (see Güth & Peleg (1997) for a general

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[5] The easiest way to see this is to inspect (VI.3) and verify that this can in fact be achieved through contracts with α_i=0. However, typically, there exists a manifold of contracts (G^+, $\alpha^+(\beta)$, β) which all imply the same market results. From $\frac{\partial}{\partial \alpha_i} R_i(\alpha_i,\beta_i,\alpha_j,\beta_j)=0$ and $\frac{\partial}{\partial \beta_i} R_i(\alpha_i,\beta_i,\alpha_j,\beta_j)=0$ as well as $\alpha=\alpha_i=\alpha_j$ and $\beta=\beta_i=\beta_j$ one obtains $\alpha^+ = \alpha^+(\beta) = \dfrac{3-4\beta+\dfrac{24\beta-3}{1-2c}-2c}{8} - \dfrac{\sqrt{29\beta^2-(8\beta-20\beta^2)c-18\beta c^2-4(1+\beta)c^3+c^4}}{2c-1}$.

analysis) only $\beta^*=0$ can be evolutionarily stable. The reason is that if a particular seller *i*'s type would change, and if there are infinitely many sellers in the population, only *i* would react. It follows that only a best reply in terms of market success (i.e., with no independent weight for sales) can be evolutionarily stable. β^* must maximize the true profit expectation and any symmetric equilibrium of the evolutionary model will have $\beta^*=0$.

For strategic delegation a similar extension of our analysis to privately known types yields the same results. If a principal cannot publicly announce the incentives of his agent, the incentives guaranteeing best replies in terms of market success are clearly best. Thus also in this case the standard Cournot outcome results in equilibrium.

Hence, indirect evolution and strategic delegation lead to the same market results with private information about types. This explains why in this paper we have focused instead on the opposite polar case where types are common knowledge.[6]

8. Conclusion

To explain institutions one either refers to a pre-institutional decision stage where players decide strategically about the future institutional set up. An example for this is the well-known, nevertheless fictitious *contrat social*, but also the stage of mechanism choice in the theory of mechanism design which—far too often?—assumes that only one individual can decide about the mechanisms to be applied later.

The other approach is that of (indirect) evolution where no one intentionally designs the future set up. The precise structure is rather determined by the relative success of the alternative designs in the given institutional environment. This reveals an essential difference of the two approaches. Whereas the first approach needs an all encompassing game model, the second one does not require this. The strategic choice of future rules are substituted by modeling their evolution, which often seems to be easier and less arbitrary.

[6] Confer Güth & Kliemt (1994) who (in a different economic context) apply an indirect evolutionary approach and discuss also informational assumptions which are intermediate to the polar cases where types are common knowledge and private information respectively.

Here we wanted to counter the argument that both approaches just allow for commitment in the sense of making sure that future behavior will guarantee certain conditions. Here such commitments take either the form of certain incentive contracts in the case of strategic delegation, or they evolve with certain incentives. By our example it is shown that the two approaches may nevertheless yield very different results. More specifically, strategic delegation does not change the results at all whereas (indirect) evolution implies more competitive market results.

In our view, this demonstrates that (indirect) evolutionary analysis offers a new and innovative perspective to explain economic institutions. Like strategic delegation, the approach does not deny that decision makers are rational. Unlike strategic delegation it does not require an all encompassing game model with all its disadvantages, e.g. to specify the incentives, the information conditions, and the strategic possibilities of those who decide about the future institutional set up. One does not have to model a pre-institutional decision stage, but rather the more natural evolution of economic institutions.

The fact that strategic delegation and indirect evolution are different suggests that these are not competing approaches, but aspects which shed independent light on how motivational forces can be explained. In principle, the two approaches can even be employed together, e.g. by assuming a market with strategic delegation and by deriving the evolutionarily stable rules of strategic delegation (pricipal and agent may, for instance, develop a feeling of corporate identity which could be captured by mutual altruism as in Bester & Güth (in press)).

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