The Scandal Matrix:

The use of scandals in the progress of society*

by

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0. Summary

Social conventions and norms can be modeled as equilibria of coordination games. It is argued that the critical mass necessary for a society to move from one convention, that is from one equilibrium, to another changes with changes in the population structure due to generation shifts. A scandal is defined as a breach of the accepted norm by a prominent person When the critical mass necessary for a change in the accepted convention is sufficiently small, a scandal can trigger such a change since the scandal maker has a certain number of sympathizers, who follow her in breaking the accepted norm. The argument is illustrated with several examples from the history of mankind. *Journal of Economic Literature* Classification: C72, D74, J19, Z10

1. Introduction

The Concise Oxford Dictionary (ninth edition) defines a scandal as a thing or a person causing general public outrage or indignation especially an irrelevant abusive statement, malicious gossip or backbiting. In the following we will not argue against the adequacy of this definition. Neither will we develop an encompassing picture of scandal. Instead we will discuss some of the features which we generally relate to this - and will do so not in a systematic but in playful way. In fact, we will refer to game theoretical models to illustrate some of the selected features of the concept of scandal.

The result of this discussion should, on the one hand, help scandal-makers to find out how they should make their scandals more skillful than they did in the past. On the other hand, readers who as yet do not belong to the elite of scandal-makers should find out why this is so and how they could change their fate. In order to support this project, the chosen models will be kept as simple as possible so that no potential reader and may-be user should be alienated by the abstract language.

Some readers may feel that a game-theoretical presentation of the problem is a scandal in itself. However, we are sure that they will concede that a scandal is a matter of social interaction: game theory is a formal way of analyzing social interaction if decisions are strategic, *i.e.*, if decision-maker *A* forms expectations with respect to the decisions of decision-maker *B* and

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thereby assumes that *B* forms expectations with respect to the decisions of *A* under the assumption that *A* forms expectations with respect to the decisions of *B*, and so on.

Although we have to admit that "the science of game theory is far from being complete, and in some ways strategic thinking remains an art" (Dixit and Nalebuff, 1991, p.3), it seems an adequate vehicle for a short trip into the world of scandal. In the following, we will therefore call the model of a strategic decision situation a game, decision-makers are players and the decisions are on strategies. Each combination of the decisions of the players determines an outcome of the game. Players are assumed to maximize the expected utility (called payoffs) which they individually derive from the outcomes. If, in a two-person game, *A* and *B* have opposite preferences with respect to the outcomes of the game, then the game illustrates a decision situation of pure conflict, and the well-known zero-sum game is an adequate representation of it. Most "games of war" and parlor games like chess belong to this category. If, however, *A* and *B* prefer identical outcomes then the decision situation is reduced to a pure coordination game. Driving left or right is an obvious case - at least, to most of us. Players could find a favorable solution to a coordination game if they have a chance to talk to each other before they choose their strategies or if there is an authority (or a rule of thumb) which serves as a coordinator. In the case of a game of pure conflict, however, talking should have no influence on the selection of strategies. Often real-world decision situations are characterized by both coordination and conflict elements and exchanges of verbal information and nonverbal signals may have some impact on the behavior of the agents. That is why we are interested in scandals. It is a focal point of social interaction and communication. Our conjecture is that the following statement by Peter Gould (1994, p.123) also applies to scandal: "If a private language made no sense to Wittgenstein, a private, with-no-other 'world' makes no sense either. 'Sense' requires others: the wholly private world is the knifed-off world of the autistic, the schizophrenic." A scandal is a means, an event or an institution, by which the private and the public worlds transgress each other.

The analysis will show that a scandal can be profitable from an individual point of view - and efficient from a social point of view. Scandals can be successful strategies in business and politics. However, it seems that we should know more about them "before success can be guaranteed."

2. Scandal in a Chicken Game: the Revision of the Status Quo

The matrix in Figure 1 expresses a standard 2-by-2-game. Player *A* is characterized by the pure strategies a_1 and a_2 while player *B*'s strategies are b_1 and b_2. If, for example, *A* and *B* choose a_1 and b_2, respectively, the payoff of *A* will be 1 and the payoff of *B* will be 5 and, hence, the corresponding payoff vector is written (1,5). This explains the entry in the upper-right cell of the game matrix. In standard game theory it is assumed that players have *complete information* and thus know the game matrix. Moreover, it is assumed that they know that all other players also know the matrix and that all players have this knowledge, and so on. However, if no further specification is given then the matrix expresses *imperfect information* inasmuch as player *A* does not know which strategy player *B* chooses, and *vice versa*.

A,B	b_1	b_2
a_1	2,2	1,5
a_2	5,1	0,0

Figure 1: *The Chicken Game*

Why the game in Figure 1 is called Chicken Game has no immediate relevance for the following discussion. It should only be noted that, in the original setting, a player is called "coward" when choosing the first strategy, given that the other player, the "hero", selects his (or her) second strategy. It should be mentioned that this game has two Nash equilibria in pure strategies:[1] (a_1, b_2) and (a_2, b_1). Each of these strategy pairs represents a pair of decisions with the property that neither *A* nor *B* can get a higher payoff, *i.e.* improve himself, *given* the corresponding strategy choice of the other player. This defines a Nash equilibrium for a two-person game. The two equilibria are not equivalent for the two players, though. Player *B* very much prefers the first one and player *A* the second one. Here, we have a coordination problem. Even if they are allowed to talk beforehand, they will not agree upon what to do when the play starts. If player *A* can credibility convince player *B* that he will play strategy a_2, player *B* has no better choice than playing strategy b_2. The problem is only how *A* can secure this credibility, since *B* can behave similarly. In the following, we will attempt to show, how in a game with many players, this credibility problem is present, and how a scandal can change the situation.

In order to discuss the potential of a scandal, we have to give a "public interpretation" of a game like the one in Figure 1. To simplify matters a bit, we choose a slightly different game, see Figure 2.

i, j	I	II
I	v_i, v_j	0,0
II	0,0	w_i, w_j

Figure 2: *A game of conventions (v_i, v_j, w_i, w_j > 0)*

Here, we assume that there are many players in society who randomly encounter one another. At each encounter one has to behave according to one of two conventions (the strategies I and II). Such a convention could be on which side of the street to travel or which language to speak. If two players, *i* and *j*, encounter one another and adopt the same convention, the payoffs are positive for both: (v_i, v_j) for convention I and (w_i, w_j) for convention II. If they adopt different conventions the payoff is zero for both players.

Now, let us assume that the status quo is characterized by convention I. That means everyone adopts this convention when encountering another individual. The expected payoff from an encounter is then for individual *i* if it chooses convention I:

$$u_i(\mathrm{I}) = 1 \cdot v_i + 0 \cdot 0 = v_i$$

[1]There is also a Nash equilibrium in mixed strategies if we consider that players can choose each of the two pure strategies with a probability which is smaller than 1 but larger than 0. Of course, these probabilities have to add up to 1 for each player. The mixed strategy equilibrium of the game in Figure 1 is characterized by each player choosing his first strategy with probability 1/4. For the calculation and a critical discussion of mixed-strategy equilibria see, e.g., Holler (1990, 1993) and Wittman (1985, 1993). - It is interesting to note that if 1/4 of A players choose their first (pure) strategy and 3/4 of A players their second and if B players split in the identical ratio with their first and second strategies, then relative frequencies within the "population of strategies" corresponds to the probabilities of the mixed strategy equilibrium. (See, e.g., Mailath (1992) for the population interpretation of mixed strategies in the evolutionary context.)

since it encounters an individual adhering to convention I with probability one. By the same token, if individual *i* chooses convention II, its expected payoff is

$$u_i(\text{II}) = 1 \cdot 0 + 0 \cdot w_i = 0\ .$$

It is clear that the individual will adhere to convention I. In fact, everyone will adhere to convention I because everyone adheres to it. A single individual in a big population cannot make a difference; the society is locked into convention I. Only concerted effort of a large number of individuals could change this. In adopting convention II, a single individual can only cause its own misery and that of the other single individual it encounters.

As noted, this situation could change through a concerted effort of several individuals. In fact, there exists for each individual *i* a smallest fraction of the population that would have to use convention II for it to be sensible for individual *i* to adopt convention II also. This fraction of the population is known as the *critical mass* for player *i*. It is straightforward to find the critical mass for an individual *i*. Denoting the proportion of the population adhering to convention II by δ, we can again find the expected payoffs of individual *i*:

$$u_i(\text{I}) = (1-\delta)v_i + \delta \cdot 0$$
$$u_i(\text{II}) = (1-\delta) \cdot 0 + \delta w_i$$

The individual will be indifferent between the two conventions when the payoffs are identical. This occurs if

$$\delta = \frac{1}{1+\frac{w_i}{v_i}} = \frac{1}{1+\mu_i} =: \delta_i$$

where we have defined μ_i as player *i*'s *revolutionary propensity*, *i. e*. the individual's valuation of a society adhering to convention II in comparison to one adhering to convention I. The parameter δ_i is player *i*'s critical mass. The revolutionary propensity is greater than 1 for people who would prefer convention II to be the norm, and it is smaller than 1 for people who would prefer the norm to be convention I. Similarly, the critical mass for an individual who would prefer to stay at status quo, is greater than ½. For those who prefer a new norm the critical mass is smaller than ½.

We can now order the individuals according to their critical mass, *i. e*. in reverse according to their revolutionary propensities. We further denote by $\theta(\delta)$ the fraction of the total population with a critical mass equal to δ or smaller. That is, $\theta(\delta)$ is the fraction of the population that would adopt convention II if at least a fraction δ has already done so. In order to facilitate the analysis we will assume that the function θ has the form displayed in Figure 3:

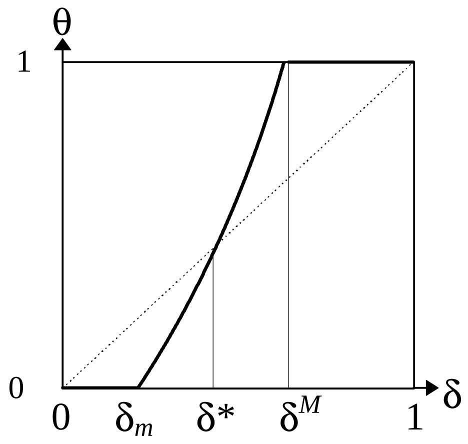

Figure 3: *The function* θ(δ).

The critical mass of the most revolutionary member of society is denoted by δ_m, and that of the most reactionary by δ^M. We assume that the function θ is increasing at a rate higher than one. This implies that it has only one point intersecting a 45° line (the dotted line), that is, a point where $\theta(\delta) = \delta$. In the diagram this is denoted by $\delta = \delta^*$. This is known as a *fixed point*. The important property of this fixed point is that it is the “true” critical mass of the society as a whole. If a fraction slightly bigger than δ^* adopt convention II, then there is an even greater fraction θ that finds it advantageous to adopt convention II. After they have done so, even more would like to do so, and the bandwagon starts rolling and does not stop until all individuals have adopted convention II. In other words, the fixed point of our scandal problem does not represent a stable equilibrium. This is an important feature in the analysis of the social rôle of scandals.

In order to arrive at a change in the convention, it is, hence, necessary to coordinate at least a fraction δ^* of the most revolutionary individuals in society to take the first step. It is our hypothesis that this can be achieved through a scandal.

If the first player choosing II is a prominent figure his defection from the status quo equilibrium could be seen as a signal of attacking the behavioral norm defined by the status quo. Since the deviating player is prominent, his or her deviation may trigger others to follow suit and through this *bandwagon effect* the critical mass for a change in the (expected) strategy choice is likely to be achieved. There will be an outcry of the reactionary players who prefer convention I and, hence, feel their privileged status threatened by chaos, given by outcomes (I, II) in their encounters with other individuals with a resulting payoff zero, or the for them unfavorable equilibrium (II, II) with payoff *a*. The strength of this outcry might even double if an immediate victim, the first reactionary player interacting with the scandal maker "under such unfavorable conditions", is a celebrity, too. As already observed by Adam Smith (1759) in *The Theory of Moral Sentiments*, and daily corroborated by the success of tabloid press, ordinary people tend to develop fellow feelings so that they share the sufferings of the mighty, the rich and the beautiful. However, even if we abstract from this empirical phenomenon, the reaction of the reactionary players should be stronger if the first victimized reactionary is an outstanding figure than otherwise.

There is also an outsider option in this game. If neither the revolutionary player, who chooses convention II, nor the matching reactionary player is prominent, the deviation from the status quo can still be exploited by others through “scandalizing”. A prominent reactionary player, or a group of reactionary players, with excess to the public (the "press" or, more general, the "media"), could point out the deviation of the revolutionary player and the disastrous result as a warning to other potentially revolutionaries or to provoke an institutional change which puts a ban on behavior according to convention II - either through obstructing choice of strategy II or by reducing the related payoffs of the revolutionaries. In both cases, the aim is to stabilize the status quo equilibrium of convention I. Alternatively, a prominent revolutionary, or a group of potential revolutionaries, with access to the public, could celebrate the deviating revolutionary player as a pioneer, and a model to follow, in order to induce more potential revolutionaries to select strategy II so that it becomes more and more likely that the old reactionaries choose it, too, and, in the end, the equilibrium in the strategies II emerges as behavioral standard. In cases where both equilibria are socially justified inasmuch as they are efficient, we may find prominent outsiders on both sides who are prepared to transform the mismatch of two marginal members of the society into a scandal if this is likely to affect the equilibrium of the society.

Anecdotal evidence tells us that the old are conservative and the young radical. That would mean that the critical mass is smaller (the revolutionary propensity higher) the younger an individual is. Since with time the old die and new young individuals are born, the distribution of revolutionary sentiments in society changes with this demographic shift, society is becoming more and more radical every year. That means that the curve in Figure 3 shifts to the left and δ^* becomes smaller. If a scandal maker has an immediate following of, say 10%, then the changes in the structure of society would have to go on until δ^* has fallen under 10% in order for a visible change to take place. That is, we have a theory of periodic social revolutions. The inertia has to fall to a certain level, then the revolution can be released through a suitable scandal. It will take several years for the inertia to be built down sufficiently for the next social revolution, etc. We will have periods of rapid change followed by periods of conservatism and then again rapid change, and so on.

A good example of this might be the sexual revolution in the European film industry during the 1960’s. Before this time, explicit sexuality was hardly found in movies. The ice was broken by a few outstanding directors like Fellini (*La dolce vita*) and Bergman (*Tystnaden*), and the bandwagon started rolling. In a short time, the industry standard changed dramatically.

3. Overcoming excess inertia

Scandals are a means to achieve a better world if, to use a technical term of standardization literature, society is bothered by *excess inertia* (see Farrell and Saloner, 1985). For example, “if anarchistic ideas have often been a source of direct action, it should not be forgotten that they have also inspired much that was creative and constructive” (Guillet de Monthoux, 1991, p.201) which threatened to break the bonds of the existing social setting in order to install conditions for a “new and better society”. Scandals were dominant elements in the toolbox of “direct action”.

However, not only anarchists choose the scandal strategy to destabilize society in order to give a better society a chance. If politicians follow this track then very often it looks like revolution or coup d’état. Examples are numerous. But politics can be scandalous even within the existing constitution and legal boundaries when it aims to change the social context. In 594 BCE the Athenians elected Solon for a one-year period as archon and empowered him to institute political and economic reforms in order to avert civil war. Nevertheless when he freed those Athenians who had been enslaved, and when he enacted a law which forbade loans in which the loss of personal freedom was the penalty for default, this was perceived as a scandal. The nobility claimed that he gave too many rights to the poorer population and the poorer population maintained that they did not get enough of them. After Solon had implemented his reforms he was wise enough go on a ten-year journey which brought him to Egypt, Cyprus and Lydia. Before he left Athens the people of Athens had to promise that they would not change the law while he was away. As history tells it, they did not keep this promise.

Perhaps, by going on his journey, Solon avoided a fate similar to scandalous Socrates. Almost two hundred years after Solon's reform, Socrates was brought to trial on a charge of “impiety” and “corrupting the youth” and given a cup of hemlock to drink in execution of the death penalty. Plato reports that Socrates refused to propose a compromise of exile. As a consequence, we have to learn the paradoxical result that a large majority of citizens upheld the death penalty while only a small majority approved of the conviction beforehand. Not surprisingly, Solon was considered one of the Seven Wise Men of Greece, but so was Socrates, too, we presume.

A,B	b_1	b_2
a_1	2,2	7,6
a_2	5,1	0,0

Figure 4: *Excess inertia*

We can reconstruct the underlying philosophy of social change in Solon's reform with the help of Figure 4. This figure derives from Figure 1 through changing the payoffs for the strategy pair (a_1, b_2). We here have two groups of people, the *A*’s and the *B*’s. If all *A* players keep to their norm, say a_2, and all *B* players stick to their norm, say b_1, then the payoffs to an *A* player is 5 and to a *B* player 1. Note that, again, this game has two equilibria in pure strategies, *i.e.*, equilibrium I (a_2, b_1) and equilibrium II (a_1, b_2), but this time one is (Pareto) inferior to the other: all members of the society are better off if equilibrium II instead of equilibrium I prevails. If there is an outside coordinator like Solon, it should be easy to switch from equilibrium I to II. However, if - contrary to the usual assumptions - the payoffs in Figure 4 are interpreted cardinally and even allow for interpersonal comparison, then the *A* players feel better in equilibrium II than in I, but they may suffer from the fact that in II the *B* players are doing almost as well. Even without rigorous cardinality of the payoffs, *A* players might find out that *B* players get their best outcome in II while they achieved only their third best in I whereas *A* players only improved from the second best to the first best through switching from I to II. This may create envy - and keep away potential coordinators, but then the payoffs would be wrongly specified, since also envy would have to be part of the payoff.[2]

It might be argued that if substantial gains accrue to the members of the society, i.e., *A* and *B* players, from switching from I to II, then an external coordinator should not be necessary. However, Farrell and Saloner (1985) show that communication may not be sufficient to overcome "excess inertia" in a strategic context as described by Figure 4, with many agents on both sides of the game, if information is incomplete. In their model, incomplete information results from uncertainty about other players' preferences. However, Farrell and Saloner mention that incomplete information could also be the result of the uncertainty of a player about whether he would be followed by others (and by how many) if he switched his strategy, i.e., whether there is a large enough bandwagon effect, or not. If the process of switching comes to a halt halfway between the two equilibria, then at least one type of players is worse off than in the status quo (a_1, b_1). With or without an external coordinator, this might be hazardous to the society as a whole.

As a matter of fact, even in the game of Figure 2, it might happen that two norms can prevail at the same time and be stable. The reactionaries, the *B* players, stick to norm I and the radicals, the *A* players, to convention II. This will, for instance, happen if we have two equally big groups, the reactionaries with a revolutionary propensity of μ_m that is smaller than 1, and the radicals with a revolutionary propensity of μ^M that is bigger than 1. This situation is pictured in Figure 5.

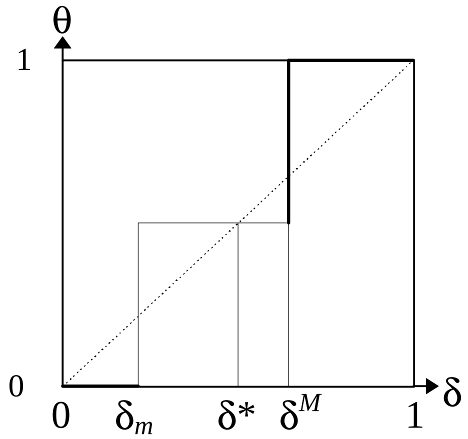

Figure 5: *A two-norm society*

Here, for the whole society to change to convention II the critical mass is δ^M, whereas the critical mass for the radicals to change is δ_m. If the scandal maker gets a following of at least δ_m, the radicals will follow her and the reactionaries will stick to their old norm. That is, the

[2]Liebowitz and Margolis (1990) argue that if there are substantial gains to all members of the society then there will always be a coordinator who will implement the Pareto improvement and appropriate a substantial share of the rent related to it as a honorarium for his entrepreneurship. This view abstracts from distribution effects such as envy and the risk for the coordinator which derives therefrom.

middle of the three fixed points (δ*) is a stable equilibrium. The payoffs to the radicals will be ½b_A and to the reactionaries ½a_B.

4. The Theory of Moves: Foreseeing Scandals

Let us go back to the game in Figure 1. So far we have not discussed the strategy pair (a_1, b_1). Obviously, the payoff pair (2,2), which results from (a_1, b_1), represents a Pareto optimal outcome: no individual player can achieve a higher payoff without reducing the payoff of another player. However, (a_1, b_1) is not a Nash equilibrium: there is at least one player which has an incentive to choose another strategy, *given* the strategy of the other player. One should not be too serious about the constraint which holds the other player's strategy fixed because this player also has an incentive to choose another strategy than the one prescribed in (a_1, b_1). It therefore seems very unlikely that (a_1, b_1) describes the status quo but if it does then this status quo should be highly unstable - it seems so unstable that an action which destabilizes it can hardly be called a scandal.

This story seems so obvious that the following result looks (almost) paradoxical. If the interacting pairs of *A* and *B* players are fixed and the players look ahead "several" moves before they choose their strategies, then the strategy pair (a_1, b_1) can be stable in-as-much as no player has an incentive to choose an alternative strategy. This result derives from an application of the *Theory of Moves* which has recently been advocated by Steven Brams. (See Brams, 1993, and Brams and Mattli, 1992, for a summary.) For two-person games, this theory is based on the following six rules: (1) The game starts with an *initial state*, *i.e*., the status quo, which is defined by a strategy pair and the corresponding utility values of a payoff matrix. (2) Either player can switch to an alternative strategy; the first player to move is called player 1 and the other player is called player 2. (3) Player 2 can move after player 1 has chosen the new strategy; then player 1 has the possibility of responding. (4) Players respond alternatingly until neither changes strategies. This defines the *final state*, *i.e*., the outcome, and the only payoffs which players actually accrue. (5) Players will not move unless they expect a preferred outcome as final state. (6) Players consider the calculation of the other player before moving. Thereby they take into account their possible moves, the possible countermoves of the other player, their own counter-countermoves, and so on - within the set of rules defined by (1) to (5).

A, B	b_1	b_2
a_1	2,2 $\rightarrow$	$\downarrow$1,5
a_2	5,1	$\leftarrow$ 0,0

Figure 6: *The Theory of Moves*

In Figure 6, which describes a payoff matrix that is identical with Figure 1 above, a potential path of a move, a countermove, and a counter-countermove is illustrated by arrows, starting with the initial state given by the strategy pair (a_1, b_1). Here player *B* is assumed to be the first to move and therefore to take the role of player 1. Since the game is perfectly symmetric, a similar scheme of arrows can be drawn so that player *A* is player 1. In both cases, players will refrain from doing the first step since they prefer the status quo, characterized by the payoff pair (2,2), to the final state which gives player 1 (i.e., the player who does the first step away from the status quo) a payoff of 1. For example, note that player *A* has no incentive to choose strategy a_1 instead of a_2 once (a_2, b_1) has been reached. So (a_2, b_1) is the final state if player *B* chooses b_1 in the state (a_2, b_2). Player *B* can avoid (a_2, b_2) if, in the initial state (a_1, b_1), he does not choose strategy b_2, but sticks with the status quo strategy b_1.

We can conclude that the players will be happy with (a_1, b_1) if this strategy pair describes the initial state and both players are sufficiently farsighted. (a_1, b_1) is not a Nash equilibrium for the original simultaneous move game but it is a *non-myopic equilibrium*[3] if the conditions of the *Theory of Moves* can be applied to it.

It seems that there is no room for scandals in this game. However, so far we assumed that the interacting pairs of *A* and *B* players are fixed. This is a rather heroic assumption in the face of the nature of scandals. Typically, scandals break up social ties. Most likely, if player B_1 "cheats" player A_1 by choosing strategy b_2 and A_1 retaliates by choosing a_2 instead of a_1 then this retaliation will hit some player B_2. This is rather favorable to A_1, and compensates at least part of the misfortune A_1 suffered through interaction with B_1, if B_2 chooses the status quo strategy b_1 and the Nash equilibrium (a_2, b_1) prevails. This might be considered as a follow-up scandal now seeing a *B* player as a victim. B_2 could be very angry at B_1 for triggering the retaliation by A_1. Of course, in such a scandalous world an outcome of (0,0) cannot be excluded. There is no way to get out of this trap in a systematic way if interacting pairs of *A* and *B* players are not fixed. In-as-much as scandals contribute to loosening up social ties, which they do in general, they counteract the application of the reasoning which is behind non myopic equilibria and we cannot expect a behavior such as prescribed by the strategy pair (a_1, b_1) in the game of Figures 1 and 6. Is there another cure to a world which is threatened by scandals?

5. Burning Ships and Bridges

There are, of course, other forms of scandalous behavior than the ones analyzed above, dealing with inertia and critical masses. In this section, we give a couple of examples of highly rational scandalous actions, but we choose to save the detailed analysis for the future.

William the Conqueror ordered his army to burn its ships after they had reached the shore of Great Britain in 1066, thus they had to fight the Battle of Hastings instead of retreating to Normandy. Upon his arrival in Cempoalla, Ferdinand Cortés ordered to destroy all but one of the ships which brought him and his men from Spain to Mexico. Dixit and Nalebuff (1991, pp. 152-154) give these examples to point out two advantages which result from this voluntary reduction of the strategy space and thus the set of possible actions. First, it became obvious to every single soldier that there is no alternative to fighting and this is so for all of them. Second, if the enemies learn of the burning of the ships and that their opponent has no other choice than to fight, they may give in or retreat whenever this option is feasible. It is said that the Aztecs retreated into the jungle, and thereby lost their fighting power, instead of facing the opponent as long as they were strong and still had the support of fellow tribes. There is some truth in this story. The Aztecs did not know how to gain the friendship of the neighboring peoples they conquered. When Cortés and his men campaigned against them, the Spaniards were not only aided by the enemies of the Aztecs but also by many tribes which the Aztecs had subdued and made part of their empire. The Spaniards probably could not have defeated the Aztecs without

[3]For the theory of *non-myopic equilibrium* see Brams and Wittman (1991). Note that this concept, together with a game setting which corresponds with the Theory of Moves, supports the cooperative outcome in a prisoners' dilemma game. if this outcome characterizes the status quo.

the support of these allies. The retreat and hesitation of the Aztecs helped Cortés to gain more and more of them as allies in the course of time.

If we apply the logic of *burning ships* (or, likewise and more familiar, of *burning bridges*) to the game matrix in Figure 1 (or Figure 6) then it implies that, e.g., player A credibly renounces the possibility to choose strategy a_1 in order to assure the payoff pair (5,1). If B knows that A no longer has the option of choosing a_1 then b_1 will be the best reply and the equilibrium (a_2, b_1) prevails which is most favorable to A.

Scandals often have the effect of limiting the range of possible social interaction. If A was involved in a scandal, this may well exclude his first strategy which looks less selfish than his second. In fact, if a scandal has this effect, then A should opt for this possibility of changing the rules of the game - as William the Conqueror and Cortés changed the rules of the game by destroying the ships. B's countermove is not to scandalize A's behavior, or to ignore the scandal or to reject any information about it.

A Chinese rule of war says that one should always give the opponent a chance to retreat - otherwise the enemy might fight too hard - and to let him know about this possibility. This is quite the opposite of the "do not take prisoners" option. Often war leaders maintain that the enemy follows this option in order to "encourage" a maximum willingness to fight for their own soldiers. Unfortunately, too often this assertion has been corroborated in history.[4] On the battle ground of scandals, the strategy of "do not take prisoners" corresponds to warning fellow players not to respond to a scandal by choosing a strategy which is different from the status quo - because if you do so, you will never again achieve a preferred position and you endanger the favorable position of those fellow players who are not threatened by a scandal. This explains, at least to some extent, why fellow players often queue up to help sweeping scandals under the carpet.

References

Brams, S.J. (1993), *The Theory of Moves*, Cambridge, UK: Cambridge University Press.

Brams, S.J., and W. Mattli (1992), "Theory of moves: overview and examples", *Conflict Management and Peace Science* **12**: 1-39.

Brams, S.J., and D. Wittman (1991), "Nonmyopic equilibria in 2x2 games", *Conflict Management and Peace Science* **6**: 39-62.

Dixit, A., and B. Nalebuff (1991), *Thinking Strategically: The Competitive Edge in Business, Politics, and Everyday Life*, New York and London: Norton.

Farrell, J., and G. Saloner (1985), "Standardization, compatibility, and innovation", *RAND Journal of Economics* **16**: 70-83.

Gould, P. (1994), "Spaces of misrepresentation", in: F. Farinelli, G. Olsson and D. Reichert, *Limits of Representation*, Munich: Accedo.

[4]Although our analysis indicates that the strategy of "do not take prisoners" is inefficient, the assertion about the enemy becomes more convincing if one follows this strategy oneself.

Guillet de Monthoux, P. (1991), *Action and Existence: Art and Anarchism for Business Administration* (2nd ed.), Munich: Accedo.

Holler, M.J. (1990), “The unprofitability of mixed strategy equilibria in two-person games”, *Economics Letters* **32**: 319-323.

Holler, M.J. (1993), “Fighting pollution when decisions are strategic”, *Public Choice* **76**: 347-356.

Liebowitz, S.J., and S.E. Margolis (1990), “The fable of the keys”, *Journal of Law and Economics* **33**: 1-26.

Mailath, G.J. (1992), “Introduction: symposium on evolutionary game theory”, *Journal of Economic Theory* **57**: 259-277.

Smith, A. (1759), *The Theory of Moral Sentiments*,

Wittman, D. (1985), “Counter-intuitive results in game theory”, *European Journal of Political Economy* **1**: 77-89.

Wittman, D. (1993), “Nash equilibrium vs. maximin: A comparative game statics analysis”, *European Journal of Political Economy* **9**: 551-565.