

Institutional Dynamics as a Historical Process

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1 Introduction

This is a report on the lectures on ‘The Institutional Foundations of Market Formation in the Late Medieval Period’ given by Professor Avner Greif at the NAKE workshop in Rotterdam, December 1998. This report will deal with the methodology and themes of historical comparative institutional analysis. Observing institutions and its role in economics, the following points are essential:

- There is a tremendous institutional infrastructure that makes the market economies work.
- Institutions are subject to change over time. Whereas one can state that institutions are exogenous to the individual members, but endogenously to the society as a whole.

The purposes of the lectures of Greif are twofold. The first is that he wants to explain the theory of historical comparative institutional analysis and the second is that he wants to illuminate this concept with a historic empirical application. This application will be a historical comparison between two groups of traders in the late medieval period, where the (institutional) differences will be explained by concepts from game theory. Because of the fact that Greif rehearsed much in his lectures and tried to explain his methodological approach in several ways, this report will not follow his lectures exactly, but tries to reflect the given literature instead. This introduction will be followed by a section where the methodological framework will be laid out. Next a section with the empirical application of Greif will be given. The report will conclude with some comments and remarks.

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2 Historical Comparative Institutional Analysis

Comparative Institutional Analysis is a field of economics that regards the economic system as a (coherent) set of institutional arrangements and inquires into the causes, nature and implications of the diversity of such systems across economies. The role of institutions in e.g. technological growth, trade-arrangements, dispersion of knowledge and so on is widely accepted as extremely important. Yet not much is known about the historical institutional developments that enable exchange relations to expand, even though such knowledge can shed light on the nature and evolution of modern institutions and facilitate the understanding of the institutional transitions that developing economies still face (see Greif, 1993). Although most institutional analysis is applied on market economies, transitional economies and developing economies, two interrelated classes of themes seem to be recurrent. The first one is the question of what determines (differences in) institutional arrangements: can their source be traced to parameters exogenous to the economy or should they be understood as endogenous constructs of the economy. The second one is whether or not there exists an ideal institutional arrangement or whether there are conditions under which there will be gains from diversity. In this context the question immediately arises whether an economy can learn from the institutional arrangements of other economies. Though economists have widely adopted the concept of institutions, they still do not know where institutions come from and how they interrelate with each other within each economy and across economies. Even the concept of institutions themselves is subject to debate. In the next section we will give three definitions of institutions. First Greif wants to make it clear that, when conceptualizing institutions, an analogy of the economy with a game is apt. The application of game theory is an indispensable component of Comparative Institutional Analysis and the analogy of the economic process with a game can be dated back as far as Adam Smith, who stated: “In the great chessboard of life, every single piece has a principle of motion of its own. Altogether different from that which the legislature might choose to impress upon them.”

Historical Comparative Institutional Analysis couples game theory, sociology, history and concepts from economics. After explaining the importance of studying institutions and the use of game theory (though we will discuss later why we should make historic comparisons), we can now turn to the study of the underlying methodological background.

2.1 Methodology

First of all we need a good definition of institutions before we go with building our theoretical framework. Luckily, there are three candidates:

- The first definition is of North, who sees the institutions as the rules of the game (see e.g. North; 1981, 1991). Alternatively in economic jargon, institutions define and limit the set of choices of individuals. He makes a division in informal (e.g. social norms, conventions, reputation) and formal (political rules, property rights and contracts) institutions. These rules can not be changed by the players, but have to be set ‘a priori’ by ‘the policy that specifies and enforces the economic rules of the game’.
- A second definition is given by Hurzwick. In his approach the rules of the game can be expressed by specifying what behaviors players can adopt under any given environment (a choice set) and what physical outcome corresponds to each profile of players’ choices (an outcome function). This parametric representation is more dynamical of nature, because Hurzwick allows room for variations in the parameter value. A further restriction is that he considers that rules need to be enforceable and formalizes this notion in terms of a Nash equilibrium, where no player has incentives to change its strategy when other players are expected to remain within the prescribed strategies. In this context it can be interpreted as a social standard of behavior that is chosen as a best response by individuals when they anticipate that the same behavior will be employed by the rest of the people.
- The third definition comes from (amongst others) Milgrom, North and Weingast (1991) and Greif, Milgrom and Weingast (1994). Greif gives as a summary definition of an institution from an equilibrium perspective as follows: “In a game theoretical framework, two interrelated institutional components are expectations (with respect to other player’s behavior) and organizations. Organizations are non-technologically determined constraints that impact behavior by introducing a new player (the organization itself) changing the information available to players or changing payoffs associated with certain actions.” This outcome of the game view can be divided in those who are in favor of using the evolutionary-game approach (the view of an institution as a spontaneous order) and those who are in favor of sub-game perfect equilibria (individual players have perfect capability of inductive reasoning regarding a feedback mechanism between their own and others’ choices). There is nothing that game theory can say about why a certain institution evolves in one place and another

elsewhere. The actual selection of an equilibrium expectation out of many possible ones may be influenced by an equilibrium pattern of behavior in games preceding, or embedding, the game under consideration. When there are multiple equilibrium expectations and the selection of a particular one is conditioned by historical patterns of behavior, Greif aptly calls these expectations ‘cultural beliefs’.

It is the third notion of institution we adopt for our analysis and our analysis will be based on classical game theory. First we have to see institutions as an equilibrium approach (just as above). Secondly, we have to adopt that constraints are the main concept. Constraints come in three sorts: Behavior, values and beliefs and social constructs (credit bureau’s, banks, social networks, firms et.). Social constructs come in two states: tangible and non-tangible. An interesting form of a tangible social construct is an organization, in which individuals are making decisions on behalf of the social construct. A non-tangible social construct is an abstract term, of which a political lobby could be an excellent example.

An institution, in our definition, is now a socially constructed state from which agents are not motivated to depart as long as others do not do so. However, there is one fundamental difficulty: institutional constraints are by definition unobservable. Luckily, game theory reveals the interrelations between institutional constraints and existing social constructs, such as organizations and coordination mechanisms.

Institutional constraints do have certain properties. They are social roles, which means that e.g. the father is an institutional constraint, but the person behind the father is not. They are endogenous to the society, but exogenous to the individual member. That is, the society is able to add to the dynamics of the institutional changes, while individuals can not. They are self-enforcing, to ensure a Nash-equilibrium and they have to be robust in terms of the situation and in terms of deviation. With classical game theory we have N players, S as the set of strategies and π as the pay-off, so the game is (N, S, π) . Now denote with $s^* \in S$ the Nash-equilibrium, then we have an endogenous specification of the game, as an endogenous, self-enforcing and self-imposing constraint. Thus, in this specification we only have to account for the expected social roles and our specification of an institutional constraint has been done.

Now we go back to the dynamical setting we like to happen. Classical game theory has no feedback and no process-innovation, because the same play will be played over and over (there is a path to an optimal outcome and why should you deviate from that path?). How to overcome this difficulty? First of all, Greif argues, there is incomplete and asymmetric information in the real world and secondly, this imperfect information ensures

agents to have bounded rationality, in the sense that they are bounded in their ability to process information and compute their optimal choices. And it is this bounded rationality of agents, which ensures institutional innovation. Because incomplete information may be adequate to make decisions in a relatively stable environment, but this information may become problematic when there is a drastic environmental change and crisis or when a path or continual change crosses a certain threshold. Then individual agents may then become to perceive that the taken-for-grantedness of institutional arrangements may not be tenable and begin to search for a new pattern of choice based on the collection of information, learning, experimentation, and so on, as well as the messages brought by existing institutions.

Knowing now that institutions can change over time, because of bounded rationality, and thus that they are in fact endogenous to the society as a whole, the validation of the use of historical facts can be twofold. Firstly, because we are working with game theory, in which most games can have multiple equilibria, the importance of historical facts lies mainly in determining an origin, from which you can calculate inductively, to the true equilibrium. The other reason is that institutions change, in a somehow consistent pattern. Past institutions will change the rate and directions of change. In this light the changing of constitutions nowadays, as the collapse of the communistic regime or the transition to a market economy many countries now face, could be explained or largely accounted for with long forgotten institutions, even dating back to the middle ages as Greif argues.

The paragraphs above have explained and reasoned the main theoretical framework in a snapshot. The next section will deal with how to set-up an empirical framework, in order to understand the relationships of institutions in the past and, consequently, the relationship of past institutions with modern institutions.

2.2 Empirical Framework

Following Aoki (1998) we will lay the empirical framework, in which historical comparative institutional analysis should be done, down in five steps. The eventual goal will be to hand over a recipe, which exactly prescribes the process of empirical work, which will clear the way for the institutional analysis of the Maghribi and Genua traders in the late Medieval period of Greif (1993 and 1998).

- *Step 1: Identifying.* First one has to identify an important social interaction or transaction in the historical episode (exogenously given) under consideration. Examine then the historical context and the technological and non-technological aspects of the

situation that are exogenous to the analysis. The central question we have to ask ourselves in this respect is: Which transactions are crucial for achieving particular economic outcomes (efficiency or distribution) in that society? Thus as Aoki reasons, the analysis does not begin by identifying institutions and their function, but by identifying relevant transactions and their associated contractual problems. In order to translate the problem to a game we have to identify the empirical details, that is the relevant decision makers, the nature of their inter-relations, their possible actions and their preferences over possible outcomes. It is also here that we have to identify the relevant endogenous features of the situation, especially of organizations and behavior, which are observable.

- *Step 2: Identification and Modeling.* Now a hypothesis has to be presented and examined through a context-specific model. The assumptions of the model have to be based on evidence derived from historical evidence (direct and indirect). The game stands or falls with a correct specification of the rules of the game. The other reason for correct specification of the parameters lies in the fact that selecting assumptions based on historical limits the ability to account for the observed phenomenon with ad-hoc assumptions regarding unobservables.
- *Step 3: Substantiating your model.* In this stage we use the context-specific model interactively with evidence, in order to understand, substantiate and refine the made hypothesis. If our game generates an equilibrium, that produces the kind of behavior consistent with stylized facts we can use evidence to further substantiate our hypothesis and to get some confidence in it. Where Aoki stresses the importance of direct evidence (explicit statements and documentary references that indicate that the behavior of the historical agents are in consistency with the hypothesis), Greif and Aoki think indirect evidence (documentary references and agents' behavior not directly linked with the hypothesis) is the most important to substantiate the hypothesis. Indirect evidence can also be regarded as the confirmation of various predictions generated under the assumption that the hypothesis is correct. Game theoretic analysis is able in the study of self-enforcing institutions to generate predictions, which can be falsified based on hypotheses regarding expectations off the path of play. The more predictions the analysis can account for, the more likely it is that the hypothesis is indeed the relevant one. Specifically, the hypothesis gains support when it is based on the simplest possible assumptions that are consistent with the historical analysis, robust to different specifications, indicate the existence of a consistent equilibrium, confirmed by direct and indirect evidence and indicates that the expectations and

behavior associated with the equilibrium are reasonable in that specific historical period.

- *Step 4: Consistency Analysis.* Consistency analysis enables us to examine the feedback from behavior, expectations, incentives and knowledge generated within these rules on the rules themselves. Game theory enables us to substantiate a hypothesis regarding the relevance of particular institutional features through examining endogenous, self-enforcing constraint on behavior.
- *Step 5: Origin, Dynamics and Implications.* Once we have identified institutions that prevailed in a society across time and situations, we can shift our view to the origin, dynamics and implications of the institutions under consideration. We leave the field of game theory here and have to improvise which methodology we will be using. Is it also in this phase that a fundamental division is made in the social sciences. Economists believe that past institutional features, such as social structures, or past expectations associated with an equilibrium should have minimal effect on institutional dynamics. However, the sociological approach maintains that they do.

Though the above can not be regarded as a standard recipe, it will be useful as a guideline in doing historical comparative institutional analysis. Figure 1 summarizes the discussion of the role of history, game theory, sociological and other theories, and their relations to the empirical methodology.

3 Late Medieval Mediterranean Trade

The empirical example Greif gave in his lecture address the issue of late Medieval trade in the (western) Mediterranean area (see Greif 1993, 1998a and 1998b). In the late Medieval period all long-distance trade, was trade across the sea, with small, fragile ships traveling along the coast line. The trade was characterized by a large amount of uncertainty, not only because the ‘crappyness’ of the ships, but also because the uncertainty over the prices. In economic terms, curves for supply and demand were very steep. How were the merchants able to cope with this uncertainty? Merchants had to do all complex transactions themselves or they had to hire agents, who were also a source of uncertainty. That’s why traders organized themselves in groups, reducing uncertainty and realizing large efficiency gains. The case considers two of those groups of traders.

The first one is a group of so-called Maghribi-traders in the 11th century, who were Jews in the Muslim-world. The reason that this society of traders is chosen is that all

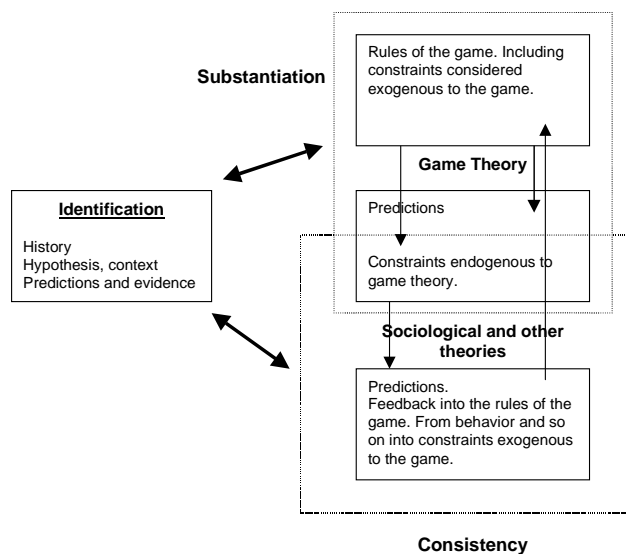


Figure 1: History, theory and empirical methodology

correspondence of this group of Jewish traders has survived throughout the centuries. Their correspondence is widely recognized as one of the best of the Muslim-world. Their group of traders was very close even in their own Jewish society. Their relationships could be characterized as multilateral, horizontal and mutual responsibility. The second group were traders from Genoa in the 12th century. Their social structure was much looser. Their organizational structure was much more hierarchical, vertical and their contacts were mostly bilateral. Traders from Genoa had several agents, who were mainly working for them, while Maghribi traders had one or two agents working for several traders. The question that now arise is how these institutions we observe, multilateral relations against bilateral relations, arises as an equilibrium outcome. For this we may obstruct the following game (see Figure 2).

Figure 2 models the relationships between agents and trader, the parameters that involve them and the possible outcomes. M is the number of merchants and A is the number of agents ($M < A$), k represent the pay-off for the merchants when he does not hire an agent and ω is the wage paid to the agent (see also Greif, 1993). An unemployed agent receives his reservation wage $\bar{\omega}$. Where the merchant can decide whether or not he hires an agent, an agent can decide whether to be honest or to cheat. When the agent does not cheat, the merchant's pay-off is $\gamma - \omega$ (hence γ is the cross gain from the cooperation). When the agent cheats his gain is α and the gain for the merchant is 0. Uncertainty can also be brought into the models, that is the merchant does not know whether the honest

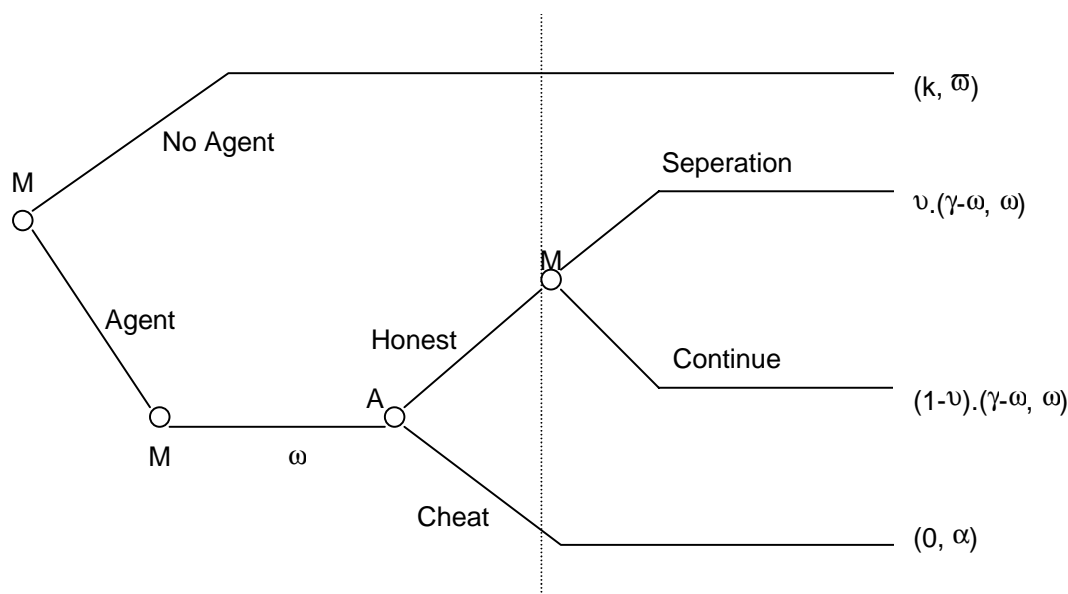


Figure 2: Model of relationships between agents and merchants

agent has cheated and is forced for this or other exogenous reasons to fire the agent with probability v . In order to make the model more realistic, we have to make three assumptions. First of all $k + \bar{\omega} < \gamma$ (the cooperation is efficient), $\gamma > \alpha > \bar{\omega}$ (cheating entails a loss and an agent prefers cheating over his reservations wage) and $k > \gamma - \alpha$ (a merchant prefers operating only on himself if the agent is going to cheat him or receives a wage α). It is in essence the game above that explain some of the relationships between Maghribi traders and merchants from Genoa and the unsetting of some institutions that have their origin in this time-period.

From history we can say that the Maghribi had a multilateral reputation mechanism (MRM) and the traders from Genoa and a bilateral reputation mechanism (BRM). Furthermore you can say that the agents who cheated, would always be fired and that if the agent had a sufficiently high wage he would not cheat you. But what were then the exact differences between then Maghribi and the Genoese traders. It lies in the fact that an agent who cheated would never be rehired in the Maghribi case but with some probability he would be rehired in the Genoese case. Let h_h be the probability that an honest agent would be rehired and h_c the probability that a cheater would be rehired (from the pool of unemployed agents), then the optimal wage ω^* would depend upon the parameters in a

following way:

$$\omega^* = \omega(\beta, h_{h-}, h_{c+}, v_{+}, \bar{\omega}_{+}, \alpha)$$

In the above equation β denotes the time-discount. So the optimal wage to pay your agents will be lower when the time-discount or the probability that an agent will be rehired when he is honest rises. On the other hand, ω^* will be higher when his reservation wage will rise, when the pay-off of cheating (the loot) will increase, when the chance of separation between merchant and agent will rise and when the chance of being rehired, in the case of being a cheater, will be higher! We know that the probability h_h was the same in the case of MRM and in the case of BRM, but in the case of MRM h_c is 0. We now may argue that e.g. MRM is a subgame-perfect Nash equilibrium, because when decreasing h_c merchant can decrease ω^* . So you will always hire someone who has never cheated before, providing $\gamma - k \geq \omega^*$. Now we may also state the following: investing in information under BRM is not an equilibrium, while investing in information under MRM is an equilibrium. Under MRM the history has value, and who can you better trust than people of your own group, including your family. So the implicit assumptions in this model will predict that the distinct and segregated group of the maghribi traders will remain closed endogenously (because it is the outcome of the game). It is interesting to see that the Genuese traders were far more integrated in their society than any of their counterpart, the Maghribi traders.

We can now use direct and indirect evidence to confirm our results and to substantiate our model. Not much direct evidence is provided. We only know of an agent X in Maghribi. X cheated and was publicly expelled from society and became a social outcast. This is an example of direct evidence from the letters found of the Maghribi. Indirect evidence is much more provided.

- It seems that in the Maghribi the time-length of contracts with agents were very short but agents seem to be ‘de facto’ quite long with their merchants.
- In both societies accounting systems were per venture, because of the risky nature of the business.
- An information network had value under MRM, but not under BRM and this was especially true in Genoa and Maghribi.
- In the Maghribi the relationship between agents and merchants were very flexible (MRM), which can certainly not be said about the relationship in Genoa (BRM).

- If an agent cheats he can gain α and with this α he can set up a business of his own. However, in Genoa they made a social construct (court) to change the rules of the game. They had to swear on God, which was quite serious in that time, not to steal more than a particular amount. So Genoa has two social constructs, God (belief) and the court. This all was not necessary in the Maghribi. There MRM ensured agents not to cheat.
- It is possible to construct an agency measure: $A(M) = A / (A+M)$ where $A(M)$ is the number of times that the merchant is also an agent. In the Maghribi case $A(M)$ was 70%, in the case of Genoa $A(M)$ was reduced to 21%

The society of Genoa started with borrowing a lot from the Muslim and Byzantium world, but was already very different in the 14th century Italian form. The collective of Maghribi traders relied much on collective informal punishment, while Genoa was more relying on formal instruments, like court and a bill of lading. Genoa was among the first societies that established the 'firm', because they want to lower the probability of divorcement (v), and the firm is a good tool to establish that goal.

4 Comments and Remarks

Avner Greif tried to explain us the complex issue of historical comparative institutional analysis and to illuminate his theory with an extensive empirical case study. One of the best elements Greif's lectures contained, was the building of his framework and the concise attention he gave it. With this framework Greif was able to explain much in a very convincing manner. Also the cross-section of disciplines he uses is interesting, intriguing and powerful. The empirical case study Greif gave at the end of the week was wonderful in its complexity and the patterns and processes of institutional change were slowly revealed. In was in this process that some of the abstract terms Greif gave earlier became clear and useful to apply.

Notwithstanding all this praise, Greif was sometimes difficult to follow, rehearsed himself quite some times and had difficulty to explain the core elements of his theory. Because of this, the empirical application got less attention than it deserved. However, it was clear that we were facing a famous and enthusiastic scientist, one of the best in his discipline and though there were some minor flaws, the form and contents of his message were delightful to listen to.

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