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A simple theory of 'meso'. On the co-evolution of institutions and platform size—With an application to varieties of capitalism and 'medium-sized' countries

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ABSTRACT

This paper deals with institutional emergence in the well-known 'evolution of cooperation' framework and focuses on its size dimension. It is argued that some 'meso' (rather than 'macro') level (to be numerically determined) is the proper level of cultural emergence, diffusion, and retention. Also Schumpeterian economists (K. Dopfer et al.) have discussed institutions as 'meso' phenomena, and Schelling, Axelrod, Arthur, Lindgren, and many others have dealt with 'critical masses' of coordinated agents, including related segregations of populations. However, the process and logic of emergent group size has rarely been explicitly explored so far. In this paper, 'meso' will be explained, in an evolutionary and game–theoretic frame and a population perspective, in terms of a cooperating group smaller than the whole population involved. Mechanisms such as memory, monitoring, reputation chains, and active partner selection will loosen the total connectivity of the deterministic 'single-shot' benchmark and thus allow for emergent 'meso'-sized arenas, while expectations to meet a cooperative partner next round remain sufficiently high. Applications of 'meso-nomia' include the deep structure of 'general trust' and the surprisingly high macro-economic and macro-social performance in 'small' and 'well-networked' countries which helps to explain persistent 'varieties of capitalism'. A strategy for empirical application of the theoretical approach and some first empirical indications of its relevance are presented.

1. Introduction

This paper deals with the well-known issue of the emergence of a social institution of cooperation. However, emergence here will constitute some 'meso'-sized group of institutionally coordinated agents. Using the standard game–theoretic argument of the '*evolution of cooperation*' in a Prisoners' Dilemma (PD), the 'folk theorem', the dilemma can in principle be overcome by the emergence of coordination through cooperation which in turn is achieved by an (learned, informal) institution (see, e.g., Schelling, 1973, 1978; Schotter, 1981; Axelrod, 1984/2006).[2] However, this will basically require the simultaneous constitution and size determination of the institution's *carrier group*. This paper investigates the simple logic of that group's co-evolution and the determination of its size dimension, the numerical value of which, however, can be determined only in specific models and simulations.

Critical here will be the (subjectively perceived) importance of the common future, i.e. *expectations* either to meet the same interaction partner again next round or to meet any agent of a particular type (cooperator or defector) next round which will determine the individual's decision on his behavior and in this way determine the size of the emerging carrier group of the institution.

In a *n*-person setting, the fully deterministic '*single-shot*' logic of the 'folk theorem' implies a (weak) *total connectivity* among agents where everyone may interact with everyone else with the same

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[2] We refer to 'coordination' in a wide sense as an umbrella for 'coordination' in a narrow sense (n.s.) and 'cooperation'. Particularly, a 'coordination problem' (in a n.s.) is solved by successful 'coordination' (n.s.) gained through some social 'rule'. In contrast, a 'dilemma problem' can only be solved by 'cooperation' (a coordination in a n.s. plus the habitual sacrifice of the short run extra pay-off), gained only through an institution (i.e., a social rule plus endogenous sanction). For this use of terms, see, e.g., Schotter (1981).

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probability p in every round. While 'strong' total connectivity is defined here as $p = 1.0$, i.e. everyone definitely interacts with everyone else in every round, 'weak' total connectivity is given if $p < 1.0$. We will show that in order to explain a 'meso' carrier group we will have to 'loosen' connectivity and in this way get beyond (weak) total connectivity.

Particularly, in a *population perspective*, the individuals need to experience the population shares of the types of strategies [be it the shares of types of agents or of types of actions (when agents may behave this or that way, depending on the constellations of critical factors which are to be discussed)]. Expectations then will have to be considered '*contingent trust*', i.e. the expectation to meet a cooperator (or a cooperating action) next round.

'*Agency*' capabilities and mechanisms such as memory, monitoring, reputation building and using reputation chains, as well as active partner selection based on respectively gained knowledge then '*loosen*' *connectivity*, i.e. dissolving (weak) total connectivity. With random encounters given every round, agents will be assumed to be able to form some 'contingent trust', based on some empirically gained knowledge about some agents, and, within limits, to reject the next random interaction partner. In this way, agents will be able (within limits) to generate and 'assort' their individual relevant groups of interaction partners, i.e. their peer groups.

In this way, these mechanisms will allow for relevant group sizes to increase from 'very small' (as with total connectivity) into 'meso' sizes while keeping expectations 'to meet' sufficiently high. Expectation then still can be supportive to institutional emergence even in a growing group, i.e. make cooperation still appear to be the superior strategy for the individual even if group size increases.

However, if these agency mechanisms for some reason loose power and efficacy or reach some limits, and cooperative payoffs will approach some maximum (for instance reputation chains may generate decreasing information gains) with growing numbers of cooperators, while defectors increasingly profit from the growing numbers of cooperators, the co-evolution of institutional emergence and group size will yield some *group smaller than the whole population* involved, in this way *disconnecting the* '*whole population*' *and the* '*maximum relevant group*', thus qualifying informal institutionalized coordination (i.e. cooperation) as a 'meso'-economic phenomenon.

However, some initial '*minimum critical mass*' of cooperators has to come into being stochastically through some motivation to *diversify behavior* as we start from common defection. This may first lead to the 'takeover' of the whole population by cooperators but, if the relative success of common cooperation (as supported by the agency mechanisms above) should become exhausted with the growing share of cooperators as mentioned (a *sigmiod curve* or a curve with constantly decreasing growth of cooperation payoffs), the process will yield that 'relevant cooperating group' smaller than the whole population (a '*maximum critical mass*').

2. Size and 'meso' size in the literature so far

Some evolutionary economists have elaborated in recent years, in a Neo-Schumpeterian perspective, on the ontology of 'meso' in terms of 'meso rules' and the process of their generation, adoption, diffusion and retention (see, e.g., Dopfer et al., 2004; for the respective groundwork, see Dopfer, 2001, 2005, 2007; Dopfer and Potts, 2008). They have argued that, and described how, origination, adoption, diffusion and retention of a rule take place in a 'meso'-sized group of carriers with a 'meso'-sized *population of actualizations* of an ideal generic rule. However, they have not elaborated specific causal mechanisms by which 'meso' comes into existence to solve specific problems.

In addition to that approach, the present paper seeks to establish that the emergence, i.e. generation, adoption and diffusion of an institution, can be traced back to a specific but general problem which agents have continuously to solve both individually and collectively through that very process of institutional emergence. Gibbons has recently advocated 'to *bring interests back* into our thinking about (...) routine production' (Gibbons, 2006, p. 381; italics added), referring to the 'folk theorem': 'building an equilibrium means that interests creep in; one cannot analyze just the evolution of beliefs' (p. 385). In fact, the game–theoretic approach is about a complex interest structure to be solved through mutual adaptations of behaviors and expectations becoming consistent.

In the present paper, thus, we will explore a simple logic of the co-evolution of (1) a *complex incentive structure*, (2) 'experienced' *expectations* ('to meet . . .'), indicative, in turn, and in varying degrees, of (3) the *group size*, and of (4) the *institution* as such (as both quest and outcome of the individuals' efforts to improve their well-being).

This might contribute to a *general* '*meso*'*-economics* wherein 'meso' groups, 'meso arenas', or 'platforms' in manifold socio-economic areas (regional, industrial, or professional clusters, networks, agglomerations, segregation and neighborhood structures, etc.) may become the theoretical locus of emergent structure. Coordinated (and cooperative) systems of such 'relevant' sizes may have a specific capability of *learning*, *innovative* collective action, and thus eventually high *macro performance*, under different parameter configurations (for the large field application of different game structures in small-scale societies with different configurations, including group size, see Henrich et al. (2004).[3]

However, a heroic implicit presumption of most game–theoretic arguments is *complete information*. Agents are assumed to have a direct observable connection between actions and outcomes and thus *intense incentives or pressure to learn*. This transparency is rarely the case in reality where the direct connection of action to feedback and thus the pressure to learn typically is much weaker. Real societies, even 'primitive' and small-scale ones, display a surprising variety of degrees of learned and institutionalized cooperation and reciprocity (see again Henrich et al., 2004) since mankind is much more detached and *freed from evolutionary pressure* to adapt and learn than the game–theoretic argument of complete transparency presupposes. Thus, empirically, even 'meso'-sized and 'primitive' groups sometimes may have low degrees of cooperation. They can afford certain levels of non-cooperation and conflict. Typically, the 'backup capacity' of humans to improve their position with low levels of cooperation is exploiting the commons of nature and this does not immediately and transparently feedback to the agent.

We will apply below the theoretical considerations of this paper to 'trust' and macro-performance of some 'small' highly industrialized countries being 'well-structured' into 'meso'-sized arenas. We will discuss a potential empirical research strategy when 'meso'-sized structures are already historically given and their co-evolution with institutional emergence just means their further reproduction, generating high levels of trust, cooperation, social capital and, finally, high macro-performance. If 'meso' size is relevant it could be used even for political design to generate institutional emergence and high macro-performance.

[3] Group size is there but one critical factor among others and interferes with other factors to form different interaction conditions and trigger different resulting degrees of institutionalized cooperation, although these real societies explored are all 'small-scale' (ranging in size between 75 and 1219). This, however, does not imply that relative smallness of interaction arenas, or 'meso' group size, as such would not tend to be a favorable condition of institutional emergence. In fact, size was found in that large cross-cultural field experiment to be a good predictor (similar and related to anonymity and complexity) for payoff to cooperation.