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## Cosmopolitanism, endless history, and game theory

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**Abstract:** This paper assesses the theory, first voiced by Schelling and Kant, according to which an infinite historical process will lead to cosmopolitan institutions. The assessment will mainly be done on the basis of theories about infinitely repeated games. The first part of the paper reconstructs “infinitesimal” historical cosmopolitanism as proposed by Schelling and Kant. The second part confronts this position with the results of the theory of infinitely repeated games among groups. The third part offers reflections on additional conditions and contingencies of the theory and the fourth part draws the conclusion: while we can reasonably assume global cooperation to increase and stabilize over time under sustainable conditions, we cannot predict the institutional design of that cooperation.

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# Cosmopolitanism, Endless History, and Game Theory

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## **1. Introduction**

The main theme of this paper is a certain parallelism between historical cosmopolitanism and evolutionary game theory. Historical cosmopolitanism (HC), as for instance voiced by Schelling and Kant, holds the thesis of a progressive development of mankind towards cosmopolitan cooperation under the law. This progression is not conceived as a predetermined process ending in a historical *eschaton*, but as infinitesimal approximation in infinitely iterated events. HC has been subject to variations and developments internal to the works of these thinkers and others we overlook (e.g. Dante, C. Wolff). And there are differences and nuances between Schelling and Kant. But such historical and exegetical aspects are not the subject matter of this paper. What interests me here is the question whether a generalized version of HC finds a scientific foothold in evolutionary game theory and what that foothold could eventually mean for both HC and evolutionary theory.

My incomplete and imperfect assessment of this question is done on the basis of theories about infinitely repeated games and related empirical studies. After this brief introduction the second part of the paper presents a brief historical sketch of “infinitesimal” historical cosmopolitanism. The third part confronts this position with the results of the theory of infinitely repeated games. The fourth part offers reflections on additional conditions and contingencies of the theory, and the fifth part draws the conclusion: while we can reasonably assume cooperation to increase and stabilize over time globally under sustainable conditions, we cannot say anything about the concrete institutional design of that cooperation.

## **2. Historical Cosmopolitanism**

In Schelling’s work we find the formulation of HC in the *System des transzendentalen Idealismus*, in the fourth section: *System der praktischen Philosophie nach Grundsätzen des transzendentalen Idealismus*, and there in the *Additions to the Third Proposition*.<sup>1</sup> In Kant’s work, HC is dispersed in several writings: in the *Critique of Pure Reason*, the *Idea of History in Cosmopolitan Understanding* (1784) and the *Conflict of Faculties* (1798).<sup>2</sup>

Here is Schelling’s version in three steps:

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<sup>1</sup> Schelling 1992: 252-277

<sup>2</sup> See Makkreel 1989. Many thinkers of the 17th and 18th century considered the concept of human species as a possibly infinite series of generations. See Cheneval 2002: 518, n.264-267

1. “Es ist also an kein anderes Bestehen nur einer einzelnen, wenn schon der Idee nach vollkommenen Staatsverfassung zu denken, ohne eine über den einzelnen Staat hinausgehende Organisation, eine Föderation aller Staaten, die sich wechselseitig einander ihre Verfassung garantieren.“ (Schelling 1992: 256-257)

2. “Wie nun eine solche allgemeine... Rechtsverfassung durch Freiheit zu realisieren sei ... dies ist schlechthin nicht zu begreifen, wenn nicht eben in jenem Spiel der Freiheit, dessen ganzer Verlauf die Geschichte ist, wiederum eine blinde Notwendigkeit herrscht, welche zu der Freiheit objektiv das hinzubringt, was durch sie allein nie möglich gewesen wäre.” (Schelling 1992: 257)

3. “Dass im Begriff der Geschichte der Begriff einer unendlichen Progressivität liege, ist in dem Vorhergehenden hinlänglich bewiesen ... Wenn aber das einzige Objekt der Geschichte das allmähliche Realisieren der Rechtsverfassung ist, so bleibt uns auch als historischer Massstab der Fortschritte des Menschengeschlechts nur die allmähliche Annäherung zu diesem Ziel übrig, dessen endliche Erreichung aber weder aus Erfahrung ... geschlossen, noch auch theoretisch a priori bewiesen werden kann”. (Schelling 1992: 257)

There has been a more or less direct discussion between Kant and Schelling regarding the scientific status of the science of history. Schelling unequivocally dismissed a deterministic approach to history in 1797:

„Es ist keine Philosophie der Geschichte möglich ... Was a priori zu berechnen ist, was nach nothwendigen Gesetzen geschieht, ist nicht Objekt der Geschichte; und um gekehrt, was Objekt der Geschichte ist, muss nicht a priori zu berechnen seyn“ (AA I,4, S. 183-185).

“Wenn also der Mensch Geschichte (a posteriori) hat, so hat er sie nur deswegen, weil e keine (a priori) hat; kurz, weil er seine Geschichte nicht mit-, sondern selbst erst hervorbringt” (Ebd. S. 470).

The following passage from Kant’s *Conflict of Faculties* reads like an answer to Schellings statement. Kant states that historical knowledge a priori is possible on the basis of Schelling’s statement that humans are themselves the makers of history:

„Wie ist aber eine Geschichte *a priori* möglich? – Antwort: wenn der Wahrsager die Begebenheiten selber macht und veranstaltet, die er zum Voraus verkündigt“. (Kant 1798): 79-80).

Kant’s slightly ironic statement refers to the possibility of an a priori status of propositions containing historical knowledge of future events in the sense of a self-implication. One can predict what one intends to do and will carry out. Two problems come to mind: First, a single action will hardly make “history”. If X intends to go to the supermarket at a later time  $t_1$  and makes a statement at an earlier time  $t$  “X will go to the supermarket at  $t_1$ ”, X hardly predicts history the way we understand it. If X actually goes to the supermarket at  $t_1$ , X can hardly say

to have predicted history. X has predicted an isolated action of his own, most probably of little relevance for the general course of history. If we want to call isolated individual events history, we seem to miss out on history in another and probably more relevant sense of the term: as a complex series of interconnected action-events over a longer period of time involving a significant number of actors and brought into a comprehensive narrative by an interpreter. Whether and how an event  $y$  is part of personal, local, tribal, national or global history and so forth, and what the event's significance is in these contexts is a matter of contextualization and interpretative judgment. Kant's statement is first and foremost about a hermeneutic circle: the person interpreting history has a priori knowledge of his or her interpretation.

Second, the certainty of the knowledge "X will go to the supermarket at  $t_1$ " is questionable even if X is at the same time the author of that statement and the actor intending to go to the supermarket at  $t_1$ . In order to be absolutely certain, X's power to perform his intended actions has to be presupposed. If X predicts a series of future actions, X would also have to control all intended and unintended consequences of his actions and the actions of other people who can interfere. Only an all-powerful being could predict what is going to happen factually on the basis of own intentions. This is even more plausible if history is supposed to imply a significant number of actors and series of interconnected events over a longer period of time. Philosophy of history in the sense of predicting the course of history on the basis of intentions is possible only for a divine being.

Kant also criticises historical determinism and an understanding of history as reality that is disconnected from action and interpretation. Statements about the course of history (as opposed to statements about the factuality of an isolated event), about the realization and realizeability of moral purposes in history are therefore not statements about what is or will be the case. Statements on the direction and normative finality of history necessarily contain evaluative judgements. Furthermore, since history is at least partially and indirectly "made" by the actors that comment on it, or that are under the influence of people commenting on it, statements about the future course of history or about fundamental principles of history can take on the character of self-fulfilling or self-defeating prophecies. The observer of history-making statements on future tendencies or a future course of history thereby influences the object of his "scientific" observation. In other words, human reflexivity can operate as an accelerator of perceived natural tendencies, but only under the condition that the objectives of artificial acceleration have a realistic foothold in a natural tendency.

Historical prediction has another dimension: pessimistic realism underpinning repressive state action disregards the responsibility of government in the bringing about of certain realities to which the government reacts. Kant's philosophy of history is rather to be read as an interpretative assessment of theoretical possibilities of realizing certain normative goals in history.<sup>3</sup> Kant thereby tries to prove the possibility to influence history according to normative principles or to count on nature's own "cunning" where individual or collective human action is likely to fail on moral grounds. In this scheme, law has a special function. As

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<sup>3</sup> Cf. Dodson 1994

enabler and regulator of future cooperation among human beings, law is a medium between natural constraints and the value of freedom. In human law, as opposed to law of nature, the objective constraints of law of nature (e.g. gravity) are complemented by the inter-subjective constraints of manmade law. Herman Cohen therefore wrote that law is the “vehicle of history”.<sup>4</sup> As humans act under the constraints of a law that follows reasonable constitutional principles there is justified hope that the course of history understood as the interactive result of actions under that law is more reasonable and more acceptable from a normative point of view than it would be under the absence of such human made law.

In his *Idea of a universal history from a cosmopolitan point of view* Kant states that a philosophical essay on a global history could be seen as promoting a cosmopolitan constitution of mankind („beförderlich angesehen werden“).<sup>5</sup> This promotion makes all the more sense if the objective is not contrary to natural processes. Historical interpretation biased by practical principles is therefore understood as a practice that can foster morally desirable social reality. Kant was a legal and social constructivist, albeit one who tied this constructivism to objective moral theory and the constraints of the law of causality.

Kant’s position that historical knowledge *a priori* is possible is therefore not a refutation of Schelling. Both reject a deterministic notion of history and the possibility of knowledge of future events by pure extrapolation. Kant points to the possibility of history *a priori* but states that no single subject exists which makes history and controls all the conditions of its actions. There is no reasonable, all-powerful “history maker”. But then comes the point where we can wonder whether Kant does not relapse into a theology of history. He states that the substitute for a reasonable history maker is mankind when organized according to the idea of law (coexistence of free beings under a general law). The history resulting under such conditions would not be predictable in detail, but according to Kant we can justifiably make the assumption that the social reality and the course of events enabled by law would be more reasonable than the history occurring under the absence of human law designed according to the ideal of law.

But mankind is a diffuse mass of people, not a reasonable law and history maker. Statements by different philosophers that “nature”, the “invisible hand”, or the “cunning of reason” make history reasonable, i.e. direct it towards reasonably acceptable purposes such as peaceful cooperation and prosperity, really indicate that history occurs under the absence of a reasonable, all powerful history maker. But at the same time these statements indicate that history occurs under rules that are independent of the involved actors intentions. Any attempt by human subjects to change this and to take the vacant place of the history maker has lead to highly repressive collective action in the past. Fidel Castro has repeatedly stated to act in the name of history and he was not the only one. Against such repressive historicism philosophers ought to pledge in favour of the perennial vacancy of the position of the history maker and at the same time carefully study the rules that underlie historical evolution.

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<sup>4</sup> Cohen 1910: 505

<sup>5</sup> Cf. Kant 1968a: 29

In sum, the fact that no human individual or institution ought to be considered the history maker does not mean that there are absolutely no mechanisms or rules determining history. Evolutionary theory identifies mutation and natural selection as fundamental principles, as “history makers” of evolution. According to Kant, no human person or group should become history maker, but the cosmopolitan rule of law would be an acceptable and desirable surrogate of providence. Kant and Schelling diagnose that all human action contributes to the making of history. Mankind is thus interested not only in individual action-events but also in the aggregate result called “history”. Mankind should therefore try to influence the aggregation and make history as reasonable as possible by establishing institutional constraints of action under the rule of law. Thereby it should refrain from repressive collective action that is in contradiction to fundamental norms of human co-existence. Humans try to orient themselves in history as actors by referring to it as a reality that is open to guided action but also determined by causal and logical relations. Kant and Schelling understand progress in history not as progress of the moral content of individual actions but as progress of external cooperation.

To sum up: Schelling's and Kant's cosmopolitanism contains two main theses that I am interested in:

Thesis 1: The establishment of the law among all interrelated reasonable actors according to the idea of the law (coexistence of free reasonable beings under general norms) is the reasonable purpose of human history.

Thesis 2: Cosmopolitan cooperation under the law can be assumed to come about naturally given the hypothetical assumption of infinite progress of human interaction in time. Both Kant and Schelling state that given the hypothetical assumption of an infinite progress in time the institutionalization of a cosmopolitan constitution will necessarily come about. In the vanishing point of endless history the random process of history and the practical purpose of law giving reason come together.

### ***3. Historical Cosmopolitanism, Endless History and Game Theory***

In this and the following section, I will now confront this historical cosmopolitanism with the results of infinitely repeated prisoner’s dilemma, evolutionary game theory and the statistical interpretation of modal propositions. It is possible to model the necessity of a coercive guarantee of a legal system by a Hobbesian calculus of survival among rational egoists as prisoner’s dilemma in game theory. The prisoner’s dilemma can be modelled as singular, finitely, and indefinitely iterated game. It must be mentioned from the outset that Hobbes’ state of nature cannot be modelled as an infinitely repeated game given the anthropological conditions he sets. The Hobbesian state of nature rather resembles a one shot prisoner’s dilemma.

The assumption of a finite or indefinite repetition of the game has a very strong influence on the incentive of the actors to cooperate. In repeated games with possible retaliatory behaviour in subsequent rounds the actors have an interest in keeping a good reputation by being “nice” (cooperative). But if we presuppose a finite number of iterated games, the probability of cooperation does not increase, and in the last game no player has an interest in a good reputation. By backward induction this creates an incentive to defect even in earlier rounds. If we assume for each round a certain probability of a next round and discounted importance of the future, the success of the strategy to cooperate and thereby obtain a good reputation is influenced accordingly.

Let us suppose a public good game. A group of people lives in a dangerous environment (violence, theft, illness, poverty, natural disaster, etc.). The danger is being assessed by each member with  $-d$ . Dangers and disasters hit people randomly. If we assume  $n$ -persons, the probability of being affected is  $1/n$ . In this situation each member is confronted with the possibility to cooperate in the establishment of a support infrastructure at the cost  $c$  or not to cooperate. The latter does not lead to any immediate cost. Those in need of support will receive a benefit  $bN$  of the  $N$  members who cooperate. We can assume that  $b > c$ , because aid is being appreciated higher by the needy than the cost  $c$  by the cooperating members.

Now comes the famous problem for the case that the members do not know if the others will cooperate or free ride. All have an interest in a general system of cooperation lending last resort to people in need. Let presuppose last resort is a mixed good. That is to say, some aspects are a public good in the strict sense of the term, i.e. people cannot be excluded from benefiting from the general security system and free riding is possible, and other aspects of security support are excludable. It is not possible to determine how many will actually support such a system. The subjective evaluation by every member is the following: if only the others support the cooperative security system and I refrain, I have the benefits without incurring the costs. If others don't help and I contribute, I help others more than myself. It is the classic prisoner's dilemma in which non-cooperative behaviour has the better pay-off from the point of view of individual rationality but cooperative behaviour of both players would lead to a higher pay-off for both. This is true if the game is played once or iterated a finite number of times.<sup>6</sup>

In indefinitely iterated prisoner's dilemma results change: First, under the assumption of direct reciprocity, a tit-for-tat strategy in which an actor first cooperates and in subsequent rounds does what the other actor did in the previous move<sup>7</sup>, cooperation will evolve and consolidate over time. It will even be collectively stable against non-cooperative invaders and a small group of tit-for-taters will be able to turn around a system of predominantly non-cooperative members (meanies). However, this presupposes that players choose to first cooperate in clusters and then devise their action according to what others did in the first round. And it poses the problem of how a cooperative cluster can first establish itself in a predominantly non-cooperative environment. Because as such, a system of “meanies” is

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<sup>6</sup> Axelrod 2006

<sup>7</sup> Axelrod 2006: viii.

totally stable.<sup>8</sup> Thirdly, the tit-for-tat strategy is flawed with respect to erroneous moves. A mistaken defection is immediately punished and causes a long sequence of retaliation.<sup>9</sup> “Niceness” and “retaliation” will thus not succeed unless complemented by “forgiveness”.<sup>10</sup> Tit-for-tat evolves as successful strategy in a predominantly non-cooperative environment, but the most successful cooperative strategy once cooperation is achieved is the Pavlov win-stay, lose-shift strategy: the previous move is repeated when doing well and changed otherwise. A Pavlov player cooperates if and only if both players opted for the same alternative in the previous round. A Pavlov player will retaliate only once and cooperate at least in every second round.<sup>11</sup>

Coming back to our public good game, contributors can devise a scheme to differentiate between people with good reputation (contributors) and people with bad reputation (free riders). In the second round, people with good reputation can count on the excludable parts of the security service, people with bad reputation are excluded. If we assume a probability  $p$  for a repetition of the game, the probability to be needy in the second round is  $p/n$ , the probability to stay in need in the third round is  $p/n^2$ , and so forth. The expected result of non-cooperation is that one has a bad reputation in the second round and will be in need without help with a probability of  $p/n$ . The probability to stay in need, and without help, in the third round is  $p/n^2$  and so forth. The expected result of momentary non-cooperation is  $(-d) [p/n + (p/n)^2 + \dots]$ . Accordingly, the expected result in the case of cooperation is  $(-c) + [(n-1)b-d] [p/n + (p/n)^2 + \dots]$ . Cooperation is thus rational if the probability of a repetition of the game is higher than  $nc/[(n-1)b + c]$ . The negative consequences of loss of good reputation worsen if the probability of game repetition increases and if the benefit  $b$  exceeds the cost  $c$  substantively. If we presuppose a game with  $n=2$ ,  $b=3$ , and  $c=1$ , cooperation is rational if  $p > 0.5$ .

If we assume an infinite history as in HC, is this equivalent to an infinite repetition of games ( $p=1$ )? Not quite because infinite history can be generational and individual actors still have a finite life and thus participate only in a finite number of games. Towards the end of life, actors start playing end games. Their individual  $p$  can be even less than 0.5 and non-cooperation rational. It is interesting that Kant’s postulate of practical reason (not HC) assumes an infinite duration of existence of the human person. This corresponds to the assumption of infinitely iterated games by the same actors. Under this assumption the rationale for cooperation increases and cooperation sets it.

The finite repetition of games has many stable strategies (nash-equilibria) and therefore entails the necessity to install a non-spontaneous, coercive implementation of cooperation (state). This corresponds to the notion of a social contract as counterfactual anticipation of possibility conditions of successful cooperation.<sup>12</sup> The guarantee of law and the benefit of cooperation cannot be postponed to the end of history, but ought to be founded in a constitutional act. We are reminded of John Maynard Keynes’ dictum that long term, self-

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<sup>8</sup> Axelrod 2006: 63-66

<sup>9</sup> Fudenberg & Maskin 1990; Selten & Hammerstein 1984

<sup>10</sup> Nowak & Sigmund 1992

<sup>11</sup> Nowak & Sigmund 1993



regulating solutions are fine but pointless because “in the long run we are all dead”.<sup>13</sup> But the point of the exercise of conceiving infinitely repeated games is not to substitute the state by spontaneous cooperation *hic et nunc*. The point is the theoretical insight that what is demanded by practical reason (cooperation as niceness, forgiveness, transparency of behaviour) can be modelled on the basis of amoral rationality, albeit under the assumption of very numerous and potentially infinite repetition of interaction.

However, under normal conditions the gap between finite and infinitely repeated games is a problem. The infinite approximation to a world of cooperation can be seen as a euphemism for the frustration for its infinite absence. The endless timespan and permanent absence of solution reminds us of the endless journey of the Flying Dutchman. It is difficult to see how this theoretical model can represent a horizon of motivation for any cooperation *hic et nunc*.

But at least one important point of the analysis is still missing. For the rationale of cooperation to work the probability of a repetition of the game need not be 1, history need not be infinite. It is enough that the subjective average perception of the probability of a repetition of the game by the actors is higher than the cost-to-benefit ratio of the cooperative act.<sup>14</sup> In other words, the theoretical uncertainty about the “end” is decisive for the gradual realization of the practical purpose of cooperation. The presupposition of infinity has to be seen in a different light. History need not be endless for cooperation to become rational and actors need not have an infinite life span. The hope of humanity thus lies in uncertainty about future rounds of “games”: in an assessment of the probability of more rounds of the game and in the perceived cost-to-benefit ratio. Actors have to be sceptical about the factual end of their history and the turnover of players. Incompleteness of information about future encounters saves cooperation. Hence the evolutionary importance of “see you”, “au revoir”, “auf Wiedersehen”, “hasta la vista”, “arrivederci”, etc. If society increases in compactness, the players perceive a higher probability of meeting again in further rounds of the game. If  $p > c/b$  cooperation becomes rational. *Ceteris paribus*, the fact that human beings live longer should influence the propensity to cooperation. The historical cosmopolitanism that makes some sense is thus not about a social *eschaton* within history. It simply explains the plausibility of increased cooperation in history based on its success in comparison and in interaction with other strategies.

Evolutionary game theory takes these findings substantially further. It supports the assumption about the evolution of cooperative behaviour over time. No substantive anthropological determination of man as cooperative or uncooperative actor is presupposed, only the randomness of such behaviour. Factually it can be shown that some people are disposed to carry considerable costs of cooperation even in non-repeated games, but that is not the point.<sup>15</sup> A study using evolutionary computer simulations shows that, under the assumption of a long period of time (90 simulations on 20'000 generations each) the capacity to deceive and manipulate transforms into cooperative dispositions. But we do need thousands

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<sup>12</sup> Binmore 2006

<sup>13</sup> Keynes 1923: 80

<sup>14</sup> Nowak 2006

of generations for this to happen.<sup>16</sup> However, we do not need to presuppose an infinite life for individual actors, nor do we need infinite history strictly speaking. The evolutionary simulation supports the thesis that sustained cooperative behaviour is possible even under the presupposition of contrary dispositions at the outset. Moreover, although based on fierce competition for survival, cooperation is a “winner” in evolution and mankind so far the champion of cooperation.<sup>17</sup>

Direct reciprocity over a long period of time is an insufficient explanation for this fact. History does not evolve as the one by one interaction of the same humans and the capacity to cooperate is highly unequal among humans. But human cooperation also evolves through indirect reciprocity. The standard setting of indirect cooperation is the random pairwise encounter of individuals who need not meet again. One is donor, the other recipient. The donor can decide to give or not to give. The interaction is observed by a public and communicated to third parties. Reputation now becomes the decisive factor of the evolution of cooperation because natural selection favours strategies that base the decision to help on the reputation of the recipient. People with the reputation of being more helpful are more likely to obtain help.<sup>18</sup> Since communication, language, and cognitive capacities now become an “accelerator” of reputation knowledge, humans or any beings capable of oral and written language communication win out over animals because they can cooperate on a larger scale. Behavioural morality and social norms evolve within the setting of indirect reciprocity.<sup>19</sup> The state of the art of research on this topic seems to support the rule that indirect reciprocity promotes cooperation if the probability  $q$  of knowing someone’s reputation exceeds the cost-to-benefit ratio of the cooperative act  $q > c/b$ .<sup>20</sup>

There are barriers of reputation and a good neighbour is worth more than a distant friend. This setting is modelled by Nowak as neighbourhood or network reciprocity. A cooperator pays a cost  $c$  for each neighbour to receive a benefit  $b$ . This form of cooperation pays-off for the cooperator if the average number of neighbours  $k$  is lower than the benefit-to-cost ratio  $k < b/c$ .<sup>21</sup> But the evolution of cooperation can be extended to a comparison between “neighbourhoods” or groups. Cooperative groups are expected to outperform groups of defectors. Cooperation among groups can outperform individual non-cooperative groups. Research suggests that group selection allows evolution of cooperation if the benefit-to-cost ratio exceeds the number of groups ( $n$ ) maximum size of group ( $m$ ) ratio ( $n/m$ ).<sup>22</sup>

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<sup>15</sup> Camerer & Thaler 1995

<sup>16</sup> Orbell et al. 2004

<sup>17</sup> Nowak 2006: 1560; Tomasello 2009; Reboul 2010

<sup>18</sup> Nowak 2006: 1561

<sup>19</sup> Alexander 1987; Ohtsuki & Iwasa 2004

<sup>20</sup> Nowak 2006: 1561

<sup>21</sup> Nowak 2006: 1561

<sup>22</sup> Nowak 2006: 1561

#### ***4. Cooperation as Fundamental Principle of Evolution***

The synthesis of this research suggests that new levels of organization evolve when cooperation kicks in among previously competing units. For that to happen the benefit-to-cost ratio of cooperation is always important and weighed against some other condition. The probability of a next round (“endless history”) is only one condition necessary in the mechanism of direct reciprocity; genetic relatedness, social acquaintanceship, number of neighbours, groups size, number of groups are the other conditions for other mechanisms in which other rules apply. For all five evolutionary mechanisms identified by Nowak it is true that cooperation is a “fundamental principle of evolution” alongside with mutation and natural selection. Cosmopolitan cooperation among all nations is thus a realistic perspective of natural evolution but it is tied to more conditions than just infinite progress of time.<sup>23</sup>

We can thus assume that cooperation evolves naturally over a long period of time given certain conditions. If we combine this finding with an old philosophical principle stating that all that can happen will happen (principle of plenitude P), we might obtain the result stated by HC: the necessary development of cooperative structures. Cooperation is not only a logical possibility. It is highly probable in different settings in the long course of history. So given P, cooperation will evolve necessarily if history is infinite. But P has an ironic history due to different applications and understandings. It was used by Descartes to prove the existence of God. Leibniz on the other hand thought P was absurd and that it would, if true, cause the utmost disorder in the universe.<sup>24</sup> Also, if we do not only assume the infinity of the future but also the infinity of the past, we must assume, according to the statistical interpretation of P, that cosmopolitan cooperation has already developed and, obviously, disappeared in order to reoccur again some time in a distant future. This is not the same as to say that there is a constant progress towards a cosmopolitan constitution. There is no cosmopolitan teleology deducible from P in this understanding. Evolutionary theory shows that cooperation can occur in an environment of fierce natural selection, and certain forms of cooperation can be very stable over a long period of time. This is sufficient to make the point that the promotion of cosmopolitan cooperation is not *per se* a struggle against evolutionary rules and that this normative demands to cooperate, to be nice, and to forgive, is in line with one of the principles of evolution.

Since corruption and gang solidarity are forms of cooperation, albeit at the cost of third parties or society as a whole, cooperation should not be considered ethical and specifically “humane”. Only cooperation without harm to for thirds (or with compensations) and direct gains for thirds is rationally acceptable for thirds. Competition on the other hand is socially very useful if fair. This is probably why fairness as a distinct feature of the rule of law needed to develop in addition to a strict, and ultimately false, cooperation-competition dichotomy. This can be modelled by a game in which players develop strategies with regard to cooperative schemes of other games. Player C will for instance not cooperate with Players A and B if these players have engaged in a cooperation with negative externalities for C or others in previous rounds. In such a setting non-cooperation is the tit-for-tat to previous

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<sup>23</sup> Nowak 2006: 1563

<sup>24</sup> Hintikka 1973: 2-4

cooperation and vice versa. Another strategy would be to defect only if cooperation of A and B was harmful to C. C would thus cooperate with a mafia gang under the condition that this gang's cooperation has not harmed C in previous round. A general cooperative environment would then be one in which most players engage in cooperative *and* competitive behaviour depending on whether this produces individual and/or general positive results. Again it is the law based on such a concept of fairness that augments the scale of possible successful cooperation as it allows for competitive behaviour non-harmful to thirds by prohibiting externally harmful cooperation and by allowing for internalization of externalities via property rights. Private property law also allows for cooperation under circumstances of reduced compactness of societies. The fitness of groups will depend on this right mix of cooperation and competition regulated by the rule of law. Contract law and property law allowing only contracts that are not made to deliberately harm third parties and not allowing for non-harmful non-cooperation, for instance in competition among economic competitors, can again be seen as an accelerator of evolution.

## **5. Conclusion**

We can understand Cohen's statement that the law is a "vehicle of history" in an evolutionary sense. Indirect reciprocity is favoured by language because language enables communication about the reputation players in a wider public. The probability of knowing someone's reputation is considerably augmented in a system of law because law formalizes identity and property (traceability of address) and certifies players as past co-operators or defectors. It thereby enables large-scale cooperation under conditions of stabilized expectations. Not only does law boost indirect cooperation by augmenting the probability of knowing the reputation of the other (or by drastically reducing the transaction costs of knowing the reputation of the other) (*q*). Through anonymous cooperation law widens the scope of cooperation and thereby dramatically favours the building of capital and revenue (*b*).<sup>25</sup> By creating legal personhood law multiplies possibilities of cooperation and the pooling of capital. A law which certifies identity and grants property rights is thus an accelerator of indirect reciprocity on both sides of the term  $q > c/b$ . Needless to say that tyrannical (confiscatory) and arbitrary law can be expected to do just the opposite. The rule of law enables the evolutionary development of cooperation at higher levels.

In the case of group selection there seems to be a problem with this judicial optimism because internal cooperation increases the fitness of the group in non-cooperative intergroup relations. In multi-level scenarios cooperation is a double-edged sword and any model-constellation of indirect reciprocity becomes considerably more complex. There is much controversy and the state of research is insufficient to give precise indications on the evolution of cooperation among "teams" (or political units in international relations). Given the assumption that cooperation is a fundamental principle of evolution it would be surprising if international relations turned out to be an exception of evolution in the sense that it would systemically favour non-cooperative behaviour or represent a tragic environment in which no rational

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<sup>25</sup> De Soto 2000

strategy of cooperation can be more successful than defection.<sup>26</sup> The security dilemma would then rather explain the difficulties to find a tipping point in which the generalized non-cooperative environment of international relations could be overruled by tit-for-tat and subsequently by Pavlov. Research seems to indicate that this is the case, for example, when systemic risks are created by individual risk diversification. Regulation giving incentives to diversify diversification then creates systemic stability. The cosmopolitan design of creating ever greater units opposing each other (herding strategies of nations) in view of creating the one world unit is thus a dangerous counter-evolutionary idea under such circumstances. It brings an increase of cooperation alongside with an increase of confrontation between ever more powerful units. Tentatively we can say that competitive multilateralism regularizing cross-cutting cooperation and diverse diversification is systemically more stable and rational.

Conclusively, we can say that HC makes a valuable point regarding the evolution of cooperation and it even seems to be supported by evolutionary theory regarding the “naturalness” of the development of cooperation under the law. The idea of law and the spreading of law to all possible subjects of law is not a misguided product of imagination; it has a basis in evolutionary science. Evolution favours the development of law as vehicle of higher order cooperation. But all evidence shows that it is not possible to counterfactually anticipate the concrete institutional design the evolution of cooperation will have in a distant future, nor is it possible to indicate an institutional *telos* of cosmopolitan evolution. The conditions of success of cooperation are too diverse and the developments of the conditions of cooperation as well as of the learning processes are dynamic and open ended.

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<sup>26</sup> Collins 2004

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