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Scale-free Growth of Human Society Based on Cooperation and Altruistic Punishment

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Abstract

Selfishness and cooperation are the key elements in evolution. Recently, it has been shown experimentally that the altruistic punishment of defectors where punishments bring no material gain for punisher is a key motive for the explanation of cooperation. Here we study how punishment and cooperation among the subjects of a system affect the growth of the entire system where we propose an evolution mechanism by merging scale-free growth and game theory. The subjects cooperate, defect and altruistically punish each other, where the increase of the level of punishment makes the system more cooperative. We derive under which conditions the system grows, what is the speed of growth, and for which condition the system can even collapse. For a set of countries we analyse how depending on the level of corruption a country punishes those who brake the traffic rule. We perform a survey to identify what should be a punishment for those who ride without the ticket in public transportation.

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