Employment Relationships and Digitalization: Analyzing emerging social norms in an agent-based model

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Recent advances in technological capabilities of Information and Communication Technologies (ICTs) have brought up the discussion on institutional governance and individual behavioural traits of trust. Since blockchain's distributed ledger technology (e.g. Buterin, 2014) entered the spectrum of governance modes for transactions (Davidson et al., 2018), a new possibility of information provision is available: Besides securely storing and processing information about previous transactions, certain conditions required for the exchange can be set and verified via the blockchain technology. If these conditions are met, smart contracts automatically perform pre-specified transactions. These features led to labelling blockchain as an institutional innovation with the potential to change the overall institutional setting and to result in an evolution of capitalist institutions (Davidson et al., 2018).

Proponents of fully-specified contracts have promoted the ICTs' ability to easily define such contracts, especially with regards to fields in which traditionally, less specified contracts prevail. Most notably, a reorganization of the labour contract in this sense might have far reaching consequences – not only for labour itself but also for society as a whole. This contribution examines these consequences theoretically as well as on the basis of an agent-based model.

Trust is a ubiquitous component in human interaction most relevant in situations of missing information, i.e. incomplete or asymmetric information about some aspects of the good to be traded (such as quality in the market of lemons; Akerlof, 1970), bounded rationality (e.g. Simon, 1990; Williamson, 1979) or other circumstances regarding the transaction such as *ex ante* uncertainty (e.g. Knight, 1921) about the future state of the world to be realized. Conversely, mainstream economics often postulates complete information in order to derive a unique equilibrium state, in which individuals are able to bargain over the pareto-optimal allocation without the need of governance or third-party intermediaries (e.g. Coase, 1960). Assuming the complete information assumption holds and the set of individual preferences is given the problem of allocation is solved by pure rational logic in a self-organizing manner (e.g. Hayek, 1945).

However, in the broad discussion of institutional governance the markets vs. central planner continuum is not sufficient to explain the wide variety of organizational forms (e.g. Powell, 1990). It is important do stress that the price mechanism active in competitive markets is only one example of a decentral mechanism of governance, trust and network-based cooperation being another. One distinctive aspect of networks compared to pure market allocation is the role of trust: whereby complete and symmetric information is a precondition for efficient market allocations, incomplete information is a necessary condition for a situation of

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cooperation and trust. This inter-relational aspect of institutions and individual behavioral traits has been further developed by Bowles (2005), who shows that the lack of complete information gives rise to endogenous enforcement strategies. Coordination by mechanisms of reciprocity and trust outperform market mechanisms and yields the most efficient solution to coordination failures, not by incentivizing individual behavior but by decreasing the conflict of interests (Bowles, 2005). Furthermore, increased uncertainty about the future increases the overall advantages of (incomplete) employment contracts against (complete) sales contracts due to establishing a long-term relationship of trust and reciprocity, but simultaneously increases the potential abuse of authority by the employer (Simon, 1951). The degree of completion of contractual information possible depends inter alia on the ability of technical components to measure and verify real world data.

The aim of this paper is to shed some light on the interconnectedness of individual behavioral traits, social norms and the degree of contractable information in a path-dependent evolutionary process in an agent-based framework. Building on an evolutionary game theoretical model by Bowles (2005) we aim to show how different social norms of behavior emerge in the context of complete and incomplete information and *vice versa*. The model features both firms (employers) and workers and focusses on their interaction on the labor market. It is used to analyze how social norms change and which behavioral traits emerge when the prevailing type of contract is changed: How will the degree of trust in a society be impacted by a change in the contractual arrangements? Furthermore, the relevance of trust and authority, as well as their potential to substitute or complement each other are studied in detail (cf. Gräbner et. al, 2018).

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