

Processes of ageing among firms: a survey

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The theoretical literature on firm ageing processes is rather diverse and scattered. These theories make predictions for firms at the population level (that is, selection effects having an influence on average productivity of the population), at the individual firm level, and at the level of employees within the firm. The aim of this literature review is to reconcile theoretical and empirical investigations, and to organize these theories in a unified framework.

At the population-level, selection effects refer to either passive learning (Jovanovic, 1982) or active learning (Ericson & Pakes, 1995). With passive learning, firms have a time-invariant productivity parameter, and the population-level productivity improves as cohorts age, even though the productivity of individual firms does not improve, because selection pressures weed out the least productive firms. With the active learning model, however firms can invest in the ability to improve their productivity levels.

At the firm level, there are a number of processes having conflicting effects. Some of these processes are automatic, whereas others are moderated by efforts undertaken by the firm. A key concept is that of routines. Younger firms do not have established routines, and every challenge they face is new (Garnsey, 1999). These young firms meet these challenges through 'bricolage' rather than through routines (Baker and Nelson, 2005). Young firms have all the buzz and excitement of a young entrepreneurial team – and this higher energy or 'youthful spunk' translates into higher growth rates (Coad and Tamvada, 2012). As firms age, their production tasks become better defined and more efficiently allocated between employees. Employees become more familiar with their tasks, they internalize their routines in the form of tacit knowledge, they can better 'chunk' together related production processes, and through routinization and mechanization they achieve higher productivity through higher throughput and fewer defects. Routinization is related to 'learning by doing' (Arrow, 1962), and learning can be either conscious or unconscious. However, these routines become a liability to the firm when the environment changes (possibly leading to 'misfirings' and inappropriate generalizations), because the firm must 'unlearn' its previous routines to rebuild new routines for the new environment. This is known as the 'liability of obsolescence' (Barron et al, 1994). Relatedly, older firms have older capital vintages (Salter, 1960) which may make them outmoded, and they may lack the incentives to invest in the costs of adopting new technologies. Furthermore, the 'liability of senescence' refers to the processes by which a firm becomes ossified through the accumulation of rules, routines and organizational structures.

As the firm ages, it accumulates interactions in the marketplace, and gains legitimacy, reputation and a richer network of acquainted suppliers, customers, and incumbents. Familiarity with incumbents may lead to a reduced need for dynamic capabilities, and for competitive dynamics to slow down (although this remains to be investigated). As the firm's reputation increases in value, it can charge higher prices, although it must be more careful to adhere to industry norms and standards, be more careful to display corporate social responsibility (e.g. with regards to pollution standards), and generally guard its reputation more carefully. This leads to an environment of reduced risk-taking and radical innovation.

The empirical evidence suggests that firms become more profitable with age, at least up to a certain point (Coad et al, 2013). This is the net effect of countervailing forces. On the one hand, older firms can exploit their previous routines and harvest their previous investments to reap higher profits. On the other hand, as time goes by, costs tend to creep upwards (Dixon, 1953), perhaps partly because young firms tend to hire younger employees (Quimet and Zarutskie, 2014) and because slack rises with age (Scharfman et al, 1988).

At the individual level, we consider the age-related performance of entrepreneurs and employees. The available evidence on entrepreneur performance reveals an inverted-U shape with age, as entrepreneurs move from the liability of youth, through to the 'golden age', and then into old age. Similar processes of learning, routinization and rigidity occur at the level of employees and of firms – however, empirical work has not generally found an inverted-U shaped relationship between age and performance, perhaps because new hires constantly rejuvenate old firms.

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