Learning without Earning
Knowledge-Based Jobs and Long-Term Firms’ Strategy

Overview

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Introduction

We built an agent-based model to simulate a market where employees, bearing skills, bargain their salaries with firms that, by imitating successful competitors, learn how to select and reward employees.

Knowledge-based economy creates jobs which generate value when embedded into an organizational network and become firm-specific.

Successful firms search for skills that fit into specific organizational networks. These skills have to be embedded into the organizational network. The more time they spend within an organization, the larger is their contribution to the value generated by the network. The value depends, for example, on socialization processes and learning of firm-specific language and tacit knowledge. Thus, if the skill to be embedded into an organizational network is scarce, firms have an incentive to capture these skills with a long-term employment.

Yet, if a firm’s environment is dynamic, that is, if skills scarcity varies as a function of time, then long-term employment may result in a failing strategy given firms’ needs to update their skill endowments frequently. The problem worsens if availability of skilled workers decreases. To speculate on outcomes of alternative employment strategies, we take an evolutionary approach:

We do not take an individual maximizing point of view rather we explore how strategies emerge from interconnected variation, selection and retention processes within a network of interacting firms.

The FirmWorld Model

The model comprises: Company (Firm) agents (50) and employee (Worker) agents (200). Companies attempt to keep in profit whereas employees are motivated by salary level and security of employment. Company income, each month, is determined by workforce skill set composition. The optimal skill set is determined by the exogenous “master model”. Income is a function of the distance from the master model. The master model represents the “economy”. The master model is not known to any company; instead, they store their own “company model” indicating what a company “believes” the optimal skill set to be. The model master changes randomly over time – the optimal skill set is therefore a moving target (dynamic economy).

Evolution in the Model

If a company goes bankrupt then all employees become unemployed. A new company is immediately formed. The new company samples the population and “copies” the company model (plus information determining higher and firing policies) of an existing company that has a high profit. Some of the copied information is changed randomly with low probability and hence the copied information represents a kind of “gene” defining company behavior that evolves over time. In this way, successful companies tend to get copied and hence their models and behaviors are propagated.

Results

We simulated our model comparing scenarios with different environmental dynamics; that is, we compared a scenario where skills’ marginal productivity evolves rapidly over time with one where marginal productivity of skills is stable. In addition, we assumed a limited supply of skilled labor. In our experiments, firms tend to increase the proportion of long-term employment in the dynamic environment (see figure 2). Why should firms prefer long-term employment when environment requires adapting frequently a firm’s skill endowment?

The explanation is the emerging of idiosyncratic skills within each company. Given a dynamic environment, non-strategic skills may suddenly become scarce and valuable. If already within a firm, these skills cannot be easily transferred to other firms without loosing a portion of their productivity. Thus, firms which in the previous cycles have preferred long-term contracts can now both offer higher salaries than competitors and still extract a rent. That is, they can retain valuable skills and limit the role of bargaining processes in inflating salaries as to erode rents. Thus, surviving firms extract larger rents from skills (see figure 3).

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