



Productivity spillovers through labor mobility in search equilibrium [☆]

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Abstract

This paper proposes an explicit model of spillovers through labor flows in a framework with search frictions. Firms can choose to innovate or to imitate by hiring a worker from a firm that has already innovated. We show that if innovating firms can commit to long-term wage contracts with their workers, productivity spillovers are fully internalized. If firms cannot commit to long-term wage contracts, there is too little innovation and too much imitation in equilibrium. Our model is tractable and allows us to analyze welfare effects of various policies in the limited commitment case. We find that subsidizing innovation and taxing imitation improves welfare. Moreover, allowing innovating firms to charge different forms of fees or rent out workers to imitating firms may also improve welfare. By contrast, non-pecuniary measures that reduce the efficiency of the search process, always reduce welfare.

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1. Introduction

Productivity spillovers associated with R&D are considered to be important.¹ Due to such productivity spillovers, the argument goes, R&D gives rise to positive externalities on other firms, which in turn may call for policies that spur innovation. The recent empirical literature has identified labor mobility as an important channel for such spillovers.² If a worker moves from a technologically advanced firm to one that is less so, she may bring valuable knowledge with her.³ Hence worker flows create information flows.

In this paper we construct a canonical model of productivity spillovers through worker flows, and use the model to perform welfare analysis. The model has two periods, and a firm may enter as an innovating firm in period 1, or as an imitating firm in period 2. An innovating firm shares its productive idea with its worker and an imitating firm gains access to this knowledge if it hires such a worker. Between the periods, workers with knowledge do on-the-job search in a competitive search market. An innovating firm that loses a worker still possesses the required knowledge, and can therefore hire a new worker and continue production. However, due to search frictions, losing the worker is costly.

From a social planner's perspective, there is a trade-off between innovation costs on the one hand and search and waiting costs on the other. If a large fraction of the firms innovate, aggregate innovation costs are high. On the other hand, innovations come in more quickly and the planner economizes on search costs, as less job-to-job transitions are necessary in order to disseminate the knowledge to imitating firms. The optimal trade-off features both innovation and imitation. In our benchmark model, with no other frictions than the search frictions, the equilibrium allocation is efficient. If an innovating firm can commit to long-term wage contracts, it will give the employee the full match surplus of the second period. This will induce the employee to search in a way that maximizes this surplus, which the firm in turn extracts through a relatively low period-1 wage. As a result, a firm that innovates pockets the full social value of its innovation, and the decentralized equilibrium realizes the socially optimal allocation.

We then analyze the welfare properties of the equilibrium allocation with restrictions on the contracting environment for innovating firms. More specifically, we restrict the firms' ability to write long-term wage contracts. In period 2 they trade off a higher rent by lowering the wage in the second period against a lower chance of retaining the worker. This leads to a lower joint surplus in period 2, which is anticipated in period 1, implying less entry of innovating firms. On the other hand, imitation – by hiring workers from innovating firms – becomes cheaper, implying excessive entry of imitating firms. Hence, there is too little innovation and too much imitation in equilibrium compared with the social optimal levels.

¹ See Romer (1990), Grossman and Helpman (1993) and Aghion and Howitt (1992). Arrow (1962) first drew attention to the labor channel for spillovers. For a survey of the literature on growth and spillovers see Jones (2005).

² We discuss the empirical literature in more detail below.

³ This knowledge may for instance be intangible organizational capital transferred by managers, see e.g. Lustig et al. (2011) and Eisfeldt and Papanikolaou (2013).

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