Journal of Urban Economics 70 (2011) 47–60

Contents lists available at ScienceDirect

Journal of Urban Economics

www.elsevier.com/locate/jue

Outsourcing, labor market pooling, and labor contracts

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ARTICLE INFO

Article history:
Received 21 March 2008
Revised 23 December 2010
Available online 31 January 2011

JEL classification:
J3
J6
R1
R3

Keywords:
Input sharing
Fragmentation
Outsourcing
Labor market pooling
Labor contracts

ABSTRACT

This paper considers the interaction between input sharing and labor market pooling in urban areas. In particular, it examines the impact of the size of a city and business risks on the organizational structures of firms located in urban agglomerations, and it also discusses the impact of organizational structure on incentives to insure workers against income risks. It is shown that manufacturing firms suffer from a coordination game in their decision to outsource production. The existence of idiosyncratic risks causes manufacturers to refrain from outsourcing. The incentives to offer wage and employment protection to workers are more pronounced when manufacturers outsource the production of their inputs to a local market, which mitigates the impact of labor market pooling.

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1. Introduction

Since Marshall (1890), many explanations of urban agglomeration include the features of input sharing and labor market pooling. Input sharing is seen as a means for manufacturing firms to improve their productivity and the quality of their products. As urban agglomerations encompass larger groups of specialized suppliers, manufacturers enjoy a wider input diversity that boosts their productivity. Labor market pooling is often seen as a sharing mechanism through which workers reduce their wage and employment risks. When workers cannot obtain income and employment protection in their employment contracts, they benefit from settling in larger urban areas, where a larger pool of employers offers more numerous job opportunities and diminishes the risk of wage fluctuations (Krugman, 1991).

However, input sharing and labor market pooling are not orthogonal. On the one hand, the diversity of input producers in a city determines manufacturers' incentives to share their inputs with other firms. If a city offers a much diversified range of inputs, manufacturers may find it more profitable to outsource this production, whereas they may choose to integrate their component production if they do not find appropriate inputs in the area. As a result, cities of similar size may host manufacturing firms with different organizational structures, which definitively may have an impact on the transmission of risk to workers. The different risk transmissions in turn affect the firms' incentives to insure workers through long-term contracts and the workers' benefits from labor market pooling. On the other hand, demand and productivity uncertainty has an impact on the firms' choice to share their inputs with each other. Firms' idiosyncratic shocks alter their labor demands and are passed to other manufactures through local wages. As a result, manufacturers hurt by bad demand shocks may prefer to avoid situations in which local wages are boosted by successful firms. They may mitigate the impact of this situation by signing long-term contracts with their employees and/or by changing their organizational structure. If they integrate their component production, they limit the extent of input sharing and isolate themselves more efficiently against the business fluctuations of other manufacturers.

There exist many other relationships between input sharing, labor market pooling and labor contracting in a context where shocks can be transmitted to firms and workers within the same urban area. The ambition of the present paper cannot be to discuss all of them. Rather, the objective is limited to the discussion of two issues: (1) the impact of city size and business risk on the organizational structure of the firms located in urban agglomeration and (2) the impact of organizational structure on workers' income risk and thus on firms' incentives to insure workers through long-run

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0094-1190/$ - see front matter © 2011 Elsevier Inc. All rights reserved.
doi:10.1016/j.jue.2011.01.002

labor contracts in cities. The first issue precedes the second because one needs to have some understanding of how manufacturers choose their organizational structures before investigating the impact of the latter on labor market issues. If manufacturers mainly outsource the production of their intermediate goods, workers will face risks that are mainly associated with the producers of intermediate goods. By contrast, they will face the risk transmitted by manufacturers when the latter integrate their production. The wage fluctuations for each group of firms may significantly differ. Finally, the above issues about firms' organizational strutures and workers' contracts become specific in the context of cities that host the production of intermediate products. Intermediate commodities can be used to enhance final products so that larger cities are associated with higher productivity and wages (Fujita, 1989; Fujita and Thisse, 2002). The size of a city is therefore likely to be an indicator of the potential for the diversity in intermediate commodities and thus the degree of incentives to outsource the component production with other firms in the city.

More specifically, this paper discusses a model where firms choose whether to integrate or outsource the production of their components, where uncertainty arises from uncertain prices on external markets (or from uncertain productivity) and where firms may be able to insure workers using implicit labor contracts. More specifically, as in Ethier (1982) and Fujita (1989),[1] we assume a set of firms in an urban area or economic region that operate under conditions of increasing returns to input diversity. These firms – henceforth called "manufacturing firms", for convenience – produce tradable goods, using non-traded intermediate goods and services called "components". These intermediate commodities may be produced within the manufacturing firms themselves – a vertically integrated structure. Alternatively, components may be produced by specialized component producers who sell these components to the downstream manufacturing firms. In this "outsourcing" case, manufacturers benefit from input sharing and "Chamberlinian externalities"; that is, from the larger diversity of components that is produced in a region hosting more component producers. Stochastic demand for traded goods implies that manufacturing outputs, prices, and profits are also random, as are derived demands for intermediate and primary inputs. In particular, external demand shocks may result in stochastic fluctuations in the wages received by risk-averse workers - depending on the nature of labor contracting and, in particular, on whether workers are hired under fixed wages in advance of the realization of external demand shocks or are instead hired (and fired) under wages that depend on these realizations. The equilibrium structure of firms and employment contracts determine the ultimate distribution of income risks among firms and workers within the region.

The paper presents two sets of results. The first set of results concerns production structures, city sizes and business risks. As a first point, we show in a model abstracting from uncertainty issues that firms do not choose to outsource their component production in small cities. This reflects the above-mentioned idea that outsourcing is beneficial only if there exists a good potential for intermediate good diversity, which occurs only if there are many manufacturers interested in outsourcing. By contrast, we show that in larger cities, a coordination problem arises and that there can exit multiple equilibria where all manufacturers either integrate or outsource. The manufacturers' production structure in the location can become history dependent and can be locked in a "wrong" configuration. In contrast to the outsourcing literature, the existence of multiple equilibria does not stem from opportunism and holdup problems in the outsourcing relationship (Grossman and Helpman, 2002, 2005) but comes from the existence of gains from input diversity. To our knowledge, this effect has not been highlighted in the literature. The second point concerns production structures and business risks. We show that stronger business uncertainty increases manufacturers' incentives to avoid outsourcing. This is because manufacturers lose some flexibility to adapt their production process to their own idiosyncratic demand conditions under outsourcing. When business uncertainties are higher, manufacturers prefer to maintain control over the use and range of components. Those results suggest that the lack of market thickness is a necessary condition for the emergence of a city hosting only integrated manufacturers. By contrast, market thickness is a necessary condition for outsourcing when coordination issues are solved. These results set the stage of the subsequent analysis.

The second set of results relates to firm structure, labor contracts and business risk. Intuitively, *ex ante* labor contracts offer insurance to workers but reduce the production flexibility of manufacturers, as any ex post renegotiation of wages and employment becomes more difficult. For the sake of exposition, we compare the firms' incentives to offer ex ante labor contracts in cities hosting either only integrated or only outsourcing manufacturers. In cities with integrated manufacturers, the amplitude and covariance of business risks have an important impact on the decision to offer those labor contracts. In particular, when many manufacturers produce in the city, they do not offer *ex ante* contracts if their business risks are diversified; rather, they do so if the risks are perfectly-correlated. When risk correlation is not perfect, all manufacturers offer *ex ante* contracts if workers are sufficiently risk averse. The risk premium paid by risk-averse workers on their wage must compensate for the manufacturing flexibility losses. Those results are intuitive and the paper discusses them in more detail. However, the situation is different in cities with only outsourcing manufacturers. In these cities, the labor market includes a sector of component producers that engage in monopolistic competition. Small component producers have incentives to enter before the realization of shocks and to outbid their competitors by offering *ex ante* contracts that risk-averse workers value more. This is so because those small component producers are not harmed by flexibility costs as manufacturers are. Indeed, the above flexibility costs stem from the inability to adapt the input ranges to demand realizations and affect only manufacturers. Component producers can thus be more aggressive than manufacturers in offering insurance to workers. In particular, there exist situations in which component producers offer *ex ante* contracts that include an actuarially fair insurance to workers, whereas integrated manufacturers offer no *ex ante* contracts at all. This effect may vanish when small component producers become risk-averse or face credit market constraints.

The paper offers some perspectives on the two strands of literature about input sharing and labor market pooling. First, since the study by Fujita (1989), the main benefit of input sharing in cities (or regions) has been modeled with CES production functions (à la Ethier, 1982). In this strand of literature, the manufacturing firms exporting out of cities gain from the input variety present in a local input market, where input producers face monopolistic competition. The present paper shows that this local market may not exist if the number of manufacturers is small or if coordination problems are not solved. As a case in point, small peripheral cities are likely to organize themselves as factory towns where a small number of manufacturers integrate their production. Vertical linkages are then absent in peripheral cities so that the studies that assume vertical linkages in both core and peripheral locations may be subject to qualifications (e.g. Venables, 1996). Second, following Krugman (1991), the literature on labor market pooling studies the impact of labor pooling on workers' and firms' incentives to

[1] See further discussion in Duranton and Puga, 2000; Fujita and Thisse, 2002, chapter 4.

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