

Skill-Related Externalities in the Computer Game Industry; Does Geography Matter?

[Extended Abstract]

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The mobility of skilled workers is crucial for regional development and firm performance, since job-hopping enables the diffusion of tacit knowledge across firms and regions, which allows for their increased competitiveness (Eriksson & Lindgren, 2008; Eriksson et al., 2008; Maskell & Malmberg, 1999; Saxenian, 1994). Economic geography literature usually argues that knowledge transfer takes place within a region rather than across regions (Boschma et al., 2009). A reason for it is because of the immobility of labor; individuals aim to lower the social costs of job changing which makes labor mobility to have a local dimension (Storper & Walker, 1989). Therefore, as tacit knowledge diffuses through labor mobility, it tends to be rather sticky (Gertler, 2003; Iammarino & McCann, 2006). A problem which might arise in this case is the one of regional lock-in of knowledge; i.e. lack of openness and flexibility (Boschma, 2005). Too much reliance on local and regional knowledge can result in lock-in effects, which are damaging to firm or regional growth (Asheim & Isaksen, 2002).

Following the works of Boschma et al. (2009) and Östbring et al. (2016), what actually contributes to firm performance depends on the type of knowledge that is brought in and how that matches the existing knowledge base of the firm, rather than human capital concentrations. The purpose of the paper is to therefore study how the relatedness of the previous skills of workers, affect the performance of the firms in the computer game industry.¹ The best way to assess the economic effects of labor mobility is to disentangle the different skills that workers have previously acquired and how they match the in-plant competences. The cognitive ability of individuals is largely affected by previous work experiences, and not only the educational background. Consequently, I measure the skills of the labor force through three dimensions: (i) high education, (ii) the industry they have previously been working at, and (iii) the previous occupation they have had. Moreover, a geographical dimension is considered in order to examine whether labor inflow in this industry comes from the same labor market region and whether the geographical dimension has an effect on the performance of the firms. Having such a three-fold approach on measuring their abilities and how they relate to the existing knowledge base of the firms, this paper aims to shed light to the literature of labor market externalities for this specific industry.

This point of view can be related to the literature of spinoffs, where entrepreneurs take advantage of their previous abilities from related industries and start a new firm in similar industries (Klepper, 2002). In the same sense, it can be argued that employees may also

¹ An issue that might arise is the one of the number of observations for this specific industry. If that becomes a problem, I will broaden the scope of the sector in a later version of the manuscript of the paper.

bring useful skills and knowledge which enhance the firm performance (Almeida & Kogut, 1999). However, Boschma et al. (2009) argue it is not the previous experience per se which matters for firm productivity growth, but rather the cognitive relatedness among employees. Firms where employees have related competences tend to have higher productivity than the ones where employees had similar or unrelated skills. Hence, labor inflow with related skills had a positive impact, while the ones of similar skills a negative impact on productivity. Regarding the geographical dimension, when inflows of unrelated skills came from the same region, firm productivity increases. As for labor inflow from other regions, a positive impact is only found for related skills. However, the authors measure the competence levels of employees only through educational background. This is accounted for by Östbring et al. (2016) who focus on the knowledge intensive business service sector and measure skills through both formal knowledge and industry experience. They argue that high human capital ratios or high similarity in previous experience, reduces the negative effect that similarity in formal knowledge has on firms' performance.

This paper adds on to the literature in several ways. To the best of my knowledge, there is no other study which has accounted for relatedness in all three measures of skills. Besides, the dynamics of the employees in the computer game industry have not been previously researched. The importance of the local labor market in this sector is also highly interesting. Despite its global scope, geographical proximity is important in the video game industry, at least for the creation of inter-firm networks (Balland et al., 2012). Whether location matters for the recruitment of employees, that has not been studied before in the literature.

The computer game industry provides an interesting case of study as it is one of the youngest and most rapidly growing media sector (Cadin & Guérin, 2006; Hotho & Champion, 2011). Compared to the rest of the creative industries (often addressed as labor-intensive and low-tech-oriented), computer gaming is very technology-intensive and often interacts with both hardware manufacturing and software publishing (Aoyama & Izushi, 2003). Therefore, I argue that the importance of previous experience is much higher for this industry than the rest of the creative industries which do not require the same level of relatedness in the knowledge-base. In general, it is rather under researched in the literature of economic geography and since it is very fast-growing, it is crucial to better understand its dynamics.

To answer the research questions of the paper, I use geo-referenced longitudinal matched employer-employee data. The time span of this study is constrained for the period 2007-2013². Even if that is the case, I can track the employees of the gaming industry back in time (until 2001) to see what type of experience they had before being employed at the current firm. Empirically, I will use a pooled OLS with year fixed effects, with standard errors clustered on labor market regions.

The **preliminary** empirical model will be the following:

$$\begin{aligned} Growth_{i,(t-(t-1))} = & \beta_0 + \beta_1 Same.Edu_t + \beta_2 Rel.Edu_{i,t} + \beta_3 Unrel.Edu_{i,t} + \beta_4 Same.Ind_{i,t} + \beta_5 Rel.Ind_{i,t} + \beta_6 Unrel.Ind_{i,t} \\ & + \beta_7 Same.Occ_{i,t} + \beta_8 Rel.Occ_{i,t} + \beta_9 Unrel.Occ_{i,t} + \beta_{10} FirmSize_{i,t} + \beta_{11} Regional.charact_{i,t} + \varepsilon_{i,t} \end{aligned}$$

² Before 2007, when it got its own 5-digit NACE industry code, it was part of the "Publishing of software" which is a broader concept.

I will then re-run the same regression but instead of having the relatedness of experience of the employees, I will control for the intra- and inter- labor market inflow for each specific ability.

To measure the related and unrelated variety of skills, I will follow the same measure as proposed by (Frenken et al., 2007). The relatedness of education will be measured through the ISCED-F 2013 on the field of education; the relatedness of the previous industries among workers through NACE industry codes and the relatedness of occupations through ISCO-88 codes.

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