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Equilibria and efficiency in bilingual labour markets

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ABSTRACT

We consider a labour market where two languages are commonly in use and each individual may make a costly investment to learn the language which is not his or her mother tongue. Language skills are productive in a human capital sense and can also be used to signal unobservable traits to employers. Due to the informational asymmetry between workers and employees, the equilibrium rate of bilingualism in the economy may exceed the socially efficient level. On the other hand, the spillovers associated with second language acquisition may imply there is not enough bilingualism relative to the social optimum. We consider the circumstances under which either the signalling or the network welfare effects dominate in equilibrium. Depending on the parameter values of the model, policies of either encouraging or discouraging the investment in language skills may be welfare enhancing.

1. Introduction

A fundamental source of inefficiency in competitive markets is the presence of asymmetric information. The inability of economic agents to verify the quality of goods subject to trade can lead to violations of the first welfare theorem even when those possessing superior information can take costly actions to signal quality. It is well known that the same kind of failure can occur in labour markets as demonstrated by Spence's (1973) model of educational signalling. In this case, there are instances where educational investments are individually rational but socially unproductive.

In principle, the same argument applies to investments in the knowledge of a second language. Language skills are costly to acquire and may serve as a verifiable signal to employers that an individual possesses desirable attributes as an employee. However acquired language skills and more general forms of education differ in important ways. First, the ability to learn a second language is a particularly noisy signal of unobservable productivity. While there is a correlation between linguistic abilities and favorable cognitive abilities and personality traits, the correlation is weak. The efficiency with which an individual is able to learn a second language depends primarily on exposure to the language, which typically conveys little information about the innate productive potential of the individual. Second, languages are technologies that depend fundamentally on complementarities. The value of knowing any particular language depends on the extent to which it is understood by others. An implication of this is that the acquisition of a second language may indirectly benefit the speakers

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of that language. Consequently there may be a production externality associated with second language acquisition that is not considered by individuals who make a rational cost–benefit analysis regarding their investment decision.

This paper formalizes these observations by presenting a model of a labour market where wages depend both on the worker's innate ability in production and on his language skills. It is assumed that two languages coexist in the economy so that a worker who chooses to learn a second language is rewarded with a bilingual wage premium which is determined endogenously by the equilibrium distribution of language skills. In general, the equilibrium is socially inefficient due to two counteracting effects. First, the decision to become bilingual is associated with a positive network welfare effect since learning a second language indirectly contributes to the productivity of monoglot speakers of the acquired language. Second, since ability in second language learning and unobservable abilities are assumed to be only weakly correlated, pure separating equilibria do not occur. This contrasts with standard job market signalling models where workers' ability types can be fully revealed by their investment decisions. Here, the acquisition of a second language alters the wage distribution through a signalling effect which is shown to decrease welfare at the margin. At the equilibrium, social welfare may be improved by either increasing or decreasing the rates of bilingual knowledge in each of the communities.

There is a substantial body of empirical literature concerning the relationship between earnings and language skills in a variety of contexts.[1] One strand of this research concerns the returns to bilingualism in labour markets where two or more languages are commonly in use. Most but not all of this work has been done using Canadian Census data. Examples include Shapiro and Stelcner (1997), Albouy (2008), Christofides and Swidinsky (2010) and Nadeau (2010).[2] In general, it has been concluded that wage premia are enjoyed by those individuals who can speak more than one language, although the size of the premium depends on both the worker's first language and the prevalence of the minority language speakers in the economy. The standard methodology is to estimate log-linear wage regressions that include dummy variables indicating the mother tongue and second language skills of the worker. In explaining the earnings differences between language groups, authors have made reference to both human capital theory and signalling theory but there has been little done in the way of formal modelling to explain the demand for language skills. Two exceptions are Carliner (1981) and Bloom and Grenier (1992) who sketch out arguments suggesting that the demand for language skills depends on the underlying linguistic demography of the population in question. Indeed, this idea is implicitly adopted by most of these empirical studies since it has been standard practise to estimate separate regressions for Quebec and Canada outside of Quebec and, in some cases, for Anglophones and Francophones.

Related is a theoretical literature on second language acquisition initiated by Selton and Pool (1991) and Church and King (1993) and elaborated more recently by Ginsburg et al. (2007), Gabszewicz et al. (2011) and Gabszewicz et al. (2011).[3] This literature interprets second language acquisition in terms of a noncooperative game where the payoffs are a generic benefit with no specific reference to the labour market.[4] The present paper is most closely related to Church and King (1993) and Gabszewicz et al. (2011) both of which analyze the equilibrium distribution of language skills in a bilingual economy. Church and King (1993) model a simple economy where individual utility is increasing in the proportion of the population with whom one shares a language. They assume that the costs of second language acquisition are constant across individuals so that multiple corner solutions – where either all or none of a particular group becomes bilingual – are possible. If the costs of learning are low enough it is socially efficient for the minority language group to become bilingual. However it is possible in equilibrium that either no one becomes bilingual or only the majority language group becomes bilingual. The authors conclude that a policy of subsidizing learning of the majority language may be called for in these circumstances. Gabszewicz et al. (2011) extend Church and King's model to include heterogenous learning cost distributions which allows for the possibility of interior equilibrium solutions. They also show that, for a range of parameter values, the equilibrium levels of second language learning are below the social welfare maximizing levels.

This paper contributes to the theoretical literature on second language acquisition in the following ways. First, we relate the acquisition decision directly to the market return to language skills: something that is readily observable in the data. Second, the acquisition decision in the model here is partially motivated by a signalling benefit which has not been considered in previous theoretical models. Third, the model results lead to novel implications concerning the welfare effects of language policies.

In order to motivate the theoretical analysis presented below, Table 1 presents estimates of the bilingual wage premium along with statistics related to the linguistic demography of Canada, Quebec and the Rest of Canada (ROC) based on an analysis of the 2006 Canadian Census Public Use Microdata File (Individuals). The dataset consists of the responses of 2.7% of the Canadian population to the long form census which includes questions on earnings, employment, education and demographics as well as on language use and knowledge. The sample is limited to include only Francophones and

[1] See especially the work of Barry Chiswick and Paul Miller, a good selection of which has been republished in the volume Chiswick and Miller (2007).

[2] See also Veltman et al. (1979), Boulet (1980), Vaillancourt (1980), Carliner (1981), Shapiro and Stelcner (1981), Grenier (1987), Robinson (1988), Bloom and Grenier (1992), Pendakur and Pendakur (1998), and Christofides and Swidinsky (1998) for Canada. See Henley and Jones (2005), Rendon (2007) and Garrouste (2008) for European countries.

[3] Also see Lazear (1999) for a model of language learning in a similar vein.

[4] Robinson (1988) develops a model of second language acquistion in the context of the labour market although the bilingual wage premium is exogenous.