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A BECKERIAN APPROACH OF LANGUAGE USE : GUIDELINES FOR MINORITY LANGUAGE POLICY

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RÉSUMÉ

Il existe à l'heure actuelle de nombreuses publications portant sur l'analyse économique de questions sociolinguistiques. Toutefois, elles concernent avant tout la problématique québécoise. La présente étude, en revanche, porte plus particulièrement sur l'analyse théorique de la situation des langues minoritaires d'Europe.

Après un rapide survol de la littérature existante, cet article définit la spécificité des langues minoritaires menacées et propose un modèle d'usage de ces langues basé sur la théorie beckerienne de l'allocation du temps. On y dérive une fonction d'usage d'une langue minoritaire permettant de mettre ce dernier en relation avec les prix, les salaires et l'exposition à la langue. La statique comparative du modèle permet d'évaluer l'efficacité de diverses politiques linguistiques visant à la protection des langues minoritaires.

Mots clés : économie de la langue, langues minoritaires, politique linguistique, allocation du temps.

ABSTRACT

There is presently a number of publications on the economic analysis of sociolinguistic problems. However, while most of these contributions are relevant to the language situation in Québec, this study focuses on the predicament of minority languages in Europe.

After providing a brief survey of the literature, this paper defines the specific situation of threatened minority languages, and develops a model of minority language use based on the Beckerian theory of the allocation of time. We derive a demand function for minority language use as a function of prices, wage rates and exposure to the language. The comparative statics of the model provide tools for the assessment of various language policies that aim at the preservation of minority languages.

Key words : economics of language, minority languages, language policy, allocation of time.

I. ECONOMIC THEORIES OF LANGUAGE : A BRIEF SURVEY

Though economists' contributions to language matters still are relatively few, they are numerous enough to make some sort of classification useful. We shall apply the one suggested by Vaillancourt (1985), which contains five headings :

(a) pure theory
(b) language policies
(c) socioeconomic status
(d) consumption-savings decisions
(e) multivariate analyses

This paper being primarily concerned with the precise focus and relevance of theoretical texts, headings (b) to (e) will not be discussed here. In so far as language policies can be sensibly applied only after some general - i.e. theoretical - view on language use is developed, it seems more appropriate to concentrate on theoretical approaches to begin with. For similar reasons, studies documenting inequalities linked with language proficiency, whether or not multivariate analyses are used, should only be discussed after some theoretical examination has been carried out. The same applies to contributions about the influence of linguistic parameters on consumption-savings decisions. The present section is therefore restricted to a discussion of the first of the above categories.

Texts falling into this category are not very homogeneous, be it in terms of the specific topic addressed, the type of causation involved, or the hypotheses made.

The earliest contribution is probably the paper by Marschak (1965) entitled "The economics of language". In fact, Marschak raises a very central question, namely why languages change, and why some languages are more likely to survive than others. Marschak's answer is that the languages that are most efficient will survive, the efficiency of a language being defined as the ability to transmit a certain amount of information in relatively less time than another language. There has not been much follow-up on this definition of efficiency, if only because it does not seem to be firmly supported by evidence. However, the significant point here is Marschak's pioneering idea that language can be looked on as an object of "choice" geared towards a certain goal, in the very same way as all economic decisions made by individuals, according to standard micro-economic theory, reflect a constrained choice.

A second group of theoretical texts attempts to model the impact of individuals' linguistic skills on their income. Obviously the topic is of particular interest to Canadian economists, and this line of study has been a frequent one. These texts draw a parallel between language group and ethnic group, and the central concept in these approaches is discrimination, which can be accommodated into economic modelling using Becker's economic theory of discrimination[1]. Wage differentials can be explained either by a positive taste for discrimination by employers [Raynauld & Marion (1972)], or by lower productivity if minority language speakers are hired (Migué 1970). The same question is addressed by Lang (1987) using a simple model of cost-minimization by employers who can hire workers from their own or another language group.

Language can also be approached without making any analogy with ethnic or cultural groups, and viewed purely in terms of communication and exchange. For example Carr (1976) suggests that money and language share similar characteristics : using money as a common medium of exchange enables an economy to move beyond barter, which is cumbersome - and therefore costly. In the same way, when various language communities want to trade among themselves, they will lower transaction costs by using a common language. The overall cost of adapting to such a situation will be minimized if minority language speakers learn the language of the majority rather than the reverse.

Breton (1964, 1978) and Breton and Mieszkowski (1979) also focus on language primarily as a means of communication with other linguistic communities. Breton examines the impact of language policies on the distribution of wealth within the community whose language is being protected by such policies. Breton and Mieskowski apply the neo-classical international trade model and interpret the use of one common language as resource-saving technical progress. The rate of return on language learning will of course be higher for the language used as *lingua franca* and will dwindle for the other language.

The rather restrictive set of hypotheses used in many of the above articles has been criticized by Lavoie (1983), who advocates alternative approaches to the analysis of language. Lavoie stresses the fact that languages define not only what an individual has, but also what he is, and that a theoretical discussion should take proper account of this.

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1 See for instance Becker (1976, chapter 2).

Language can also be viewed in terms of human capital, and this hypothesis is certainly a very fruitful one. It draws on a well-established theoretical background in which professional experience, formal schooling, etc., are assets that enhance the individual's money-making ability. In the same way, language proficiency helps explain individual incomes and the choice of the language spoken at work. This framework, as used by Grenier (1982), also sheds light on second language learning by minority language speakers. The human capital approach as extended by Sabourin (1985) includes a phenomenon which is particularly relevant to the problems of minority languages, i.e. the extent to which a language is used by a large number of other speakers. This also helps understand bilingual labor markets and has developed into a "Theory of language environment".

Another group of contributions defines language as both a form of human capital and a feature of ethno-cultural identity. This idea is used for instance by Hocevar (1975) to discuss market equilibrium for goods or factors displaying specific linguistic features (examples of such goods are : newspapers and various goods and services with instructions for use in a minority language, etc.).

II. STUDYING MINORITY LANGUAGES VERSUS LANGUAGES IN GENERAL

Though far from exhaustive, this quick glance at theoretical writings about language makes two points clear : first, the "economics of language" as a branch of economics is an extremely wide and rather scattered area of study. Although most of the contributions mentioned here link language to some traditional economic variable - many of them stressing the problem of income differentials - this range of topics need not be the core of the investigation. Explaining why language parameters give rise to wage differentials is only one of the many questions that arise. To mention only a few : why do people bother to learn a second or third language? Why and how do they split their time between two different languages over a normal working day? Are certain languages more closely linked with certain specific activities? To what extent is the use of one language dependent on its actual or perceived nature as "religious/sacred", "vernacular", "vehicular", "dominant", etc.? Does the use of a language for communication within a linguistic community react to the same variables as a language used for communication outside it? Is diglossia stable? Does it offer greater stability than clear-cut linguistic divides? Do geographical factors systematically contribute to language shift? The list in endless, but the vast majority of the items do lie within the scope of economics. Once it is acknowledged that economics is defined not by its subject matter,

but by its approach, it may fruitfully be applied to a wide range of questions pertaining to linguistic behavior.

It is safe to assume that one of the most fundamental issues to solve is the following : "Why is a language used at all (rather than another)?" Indeed, this covers most of the questions listed above. So the second noteworthy fact about the survey in section 2 is that this problem has not been addressed as such, except by Marschak in very general terms. How can this fact be accounted for? Two answers can be suggested, the first of them methodological. It would indeed seem desirable to answer this broad question by developing a general theory of language use in which changes in the latter as a response to a wide selection of variables would be explained on the basis of a few plausible axioms about human behavior. However, the very generality of the approach may defeat its own purpose. Since a general theory of language use would need to assign a specific role to most of the numerous factors mentioned above, i.e. geography, historical status of the language, wage rate discrimination, time patterns of language use, etc., the maze of causations would prove far too complex.

The absence of a general theory to answer our fundamental question ("Why is a particular language used?") can also be explained by the fact that it may not, after all, be quite as important to everyone. Why a language is spoken - or drops out of use - is a particularly meaningful question when *minority* languages are studied, because it implicitly scrutinizes the reasons for the very existence (or survival) of a language. This need not be a matter of major concern to North American economists : even if the use of French in Québec may have been jeopardized, the existence of French as a language has never been threatened; language problems arose not so much because French-speakers were a minority in Québec (they never were), but because both economic and political power were firmly in the hands of English speakers. In the same way, although Spanish and English are competing in some southern States where English still remains the majority language, Spanish can hardly be labelled an endangered language. It is therefore quite natural that Canadian economists should have paid such attention to income inequalities rather than to the question "Why is a language spoken at all?" This latter question, however, must be answered if we are to understand the challenge faced by most minority languages in Europe today.

A lot of the existing contributions to the economics of language may no doubt prove very useful when analyzing minority language survival or decline; but the fact remains that there seems to be no published economic literature specifically aimed at a theoretical analysis of situations such as those of Irish of Romanche. If attempts be made in this direction,

how should we go about it? Bearing in mind the methodological warnings sounded above, what are the proper questions to ask? What is the appropriate level of generality? What exactly do we mean by "minority language"? Which variables are relevant to most minority languages? Which can be dispensed with? Which contributions from the existing literature will provide the best stepping-stones? The following sections are intended as a blueprint for investigation of these issues.

III. A DEFINITION OF MINORITY LANGUAGES

As stated earlier, it would be too complicated to develop a *general* model of language use. Restricting ourselves to minority languages as we know them in Europe is a way to scale down the scope of the model, and also make it more tractable. Our central question narrows down to : "Why is a minority language used - or not used?[2]" This question is here put in *static* terms, and can be seen as a pointer to the *dynamic* questions that are of major concern in Europe, namely : "Why do minority languages die or survive? What language policies will be able to keep them alive?" To make our question perfectly clear, the sense in which "minority language" is used here must first of all be clarified.

1- A minority language is a language spoken by less than 50 % of the population in a given geographical area. This reference area is usually a nation-state, but although convenient, this criterion is not perfectly satisfactory[3].

2- The above definition includes languages facing quite different situations : it covers Welsh, Irish, Gaelic, Breton, Romanche, etc., as well as Hungarian in Romania, Spanish in the United States, French in Canada and Western Switzerland or Chinese in Malaysia. The first restriction we will make is that we will consider only languages that are not a majority language in any other country. This excludes the five latter situations mentioned above.

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2 It might be sounder economic theory to introduce a further distinction, and to ask why people are WILLING to use a minority language, since our model actually defines a DEMAND function for language use; actual language use would result from the combination of supply and demand, where supply denotes the availability of real situations when the language can be used. This point will not be discussed here, and we shall assume that supply is perfectly elastic.

3 French is a minority language in Canada, but a majority language in Québec. Whether the Province of Québec or all of Canada should be used as a reference area is a matter open to discussion. In the same way, it is not satisfactory to describe Marathi (which is spoken by some 77 % of the population of the State of Maharashtra) as a minority language, even though it is spoken by a minority of Indian citizens.

3- Further restrictions are still needed, since most languages of India would still be defined as minority languages even though their speakers number millions. We shall therefore consider only those minority languages that are competing with one majority language, as is the case with most minorities in Europe.

4- We will also limit our attention to situations in which the minority and the majority language are sufficiently different from each other for them not to be mutually intelligible : in other words, speaking a minority language does not *per se* imply a working knowledge of the majority language and vice versa. This restriction will enable us to overlook the case of local dialects in Germany, for instance.

5- Extinct or near-extinct languages are a special case we will not consider either. This rules out Western Swiss dialects, Manx, Cornish, or Walloon, etc.[4]

6- Furthermore, we will not consider languages spoken by elective minorities. This excludes the slang used by groups to which its members have decided to belong, whether it be a profession, a religious group or a street gang. Even though the deaf have not chosen their condition, sign language will not be considered here either. To put it another way, our attention will be restricted to minorities in an ethnic sense.

The definition suggested here does not provide a perfectly clear-cut standard according to which any language could be classified. Further and more refined criteria may still have to be introduced[5]. However, it provides a way to pick out among minority languages in Western Europe those that we may want to focus on. These are :

- Irish
- Gaelic
- Welsh
- Breton

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4 A clear criterion would be to restrict attention to languages that still have monoglot speakers. The drawback then is that there would scarcely be any European minority languages left to study.

5 Simpson (1981, p. 235-237) suggests a list of criteria defining minority languages. However, as some of these criteria are very general while others are quite specific, they are not suited to our purposes; they may nevertheless be used to adapt the model in section 6 to more specific cases.

- Basque
- Romanche
- Ladinian
- Friulian
- Occitanian
- Catalan
- Galician
- Corsican
- Sardinian
- Frisian
- Lappish

Clearly outside our definition are[6] :

- Swedish in Finland
- Danish in Southern Sweden and Northern Germany
- Hungarian and Slovenian in Austria
- Flemish in Northern France
- French and Italian in Switzerland
- German, Greek, French and Albanian in Italy
- German in Belgium

IV. A MODEL OF MINORITY LANGUAGE USE

There are many ways in which language use can be fitted into an economic analysis of behavior. We may suppose that the individual derives direct satisfaction from minority language proficiency. We may also suppose that he is not interested in language per se, but that he likes a certain way of life of which his minority language is a necessary part. These particular options could be discussed at great length, but we may be guided in our choice by a definition of minority language use. Language use will therefore be measured here by the amount of time (per day, week, month, or any other appropriate period) in which the language is spoken.

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6 The case of Romany is more difficult since it cannot be assigned to any reference area.

Assume that the individual maximizes utility over a wide range of activities : the arguments of the utility function may be extremely disaggregated activities, or rather wide-ranging ones. Any of these activities can be pursued in either the majority language or the minority language. For the sake of the argument, let us refer to language A (majority) and language B (minority). Thus activity z_i can take one of two different forms, which we will label z_i^a and z_i^b. The individual seeks to maximize his strictly quasi-concave utility function :

$$U = U(Z_i^j) \qquad j = a, b \text{ and } i = 1, ..., n \qquad (1)$$

These 2 x n activities can be treated as Beckerian commodities, and will be produced using both time and goods. The production functions are :

$$z_i^j = z_i^j(x_i^j, t_i^j) \qquad j = a, b \text{ and } i = 1, ..., n \qquad (2)$$

Time and goods are not the only factors that enable the individual to produce commodities in either language. Various other factors, which have been studied by sociolinguists and geographers, are also important; geographical isolation of speakers; language use in advertisements; frequency of minority language broadcasts on TV or radio; government attitudes to language use; psychological pressure from family and friends one way or the other; etc. Many of these factors can be summarized by the generic term "exposure". For example, exposure to B is higher if the individual hears B at home, at school or in the streets, if B is frequently used on TV and radio, or if advertisements are in B rather than in A. All these factors will increase the individual's proficiency, and will make the individual more efficient at pursuing activities in B.

The precise meaning of "efficiency" in this case is that less time will be needed to get a certain amount of any activity done in B. We can also say that the higher the individual's efficiency (resulting from exposure to B), the higher the productivity of time used to do things in B.

Psychological pressure is likely to have a more direct effect not so much on the production function analyzed here as on the shape of the utility function itself.

It may, however, to a certain extent, be interpreted terms of time productivity and included in the production function[7].

Working out the precise impact of such factors is just where economists need help. For the time being, however, let us examine how such factors can be accommodated into our formal model. We have just seen that exposure to B, availability of B goods and, to a certain extent, the absence of psychological pressure against B will increase the productivity of time devoted to "reading in B"; in other words, the individual will be "more efficient". This generic efficiency (denoted by E) can be written into the production function as follows :

$$z_i^b = z_i^b(x_i^b, t_i^b; E) \tag{3}$$

The marginal productivity of both time and goods is positive and decreasing, and it is enhanced by exposure :

$$\partial^2 Z_i^b/\partial t_i^b \, \partial E > 0 \tag{4i}$$

$$\partial^2 Z_i^b/\partial x_i^b \, \partial E > 0 \tag{4ii}$$

Since our concern is with minority language use, we do not need to make Z_i^a's dependent as efficiency; besides, exposure to the majority language is very high in all the cases mentioned in the preceding section. Let us for simplicity reduce the size of the activities vector to two, namely "doing things in A" and "doing things in B".

The problem now is to maximize

$$U = U(Z_a(x_a, t_a), Z_b(x_b, t_b, E)) \tag{5}$$

where capital letters for activities indicate aggregate activities. The goods constraint is :

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7 This is less obvious for "reading" than it is for other activities, such as socializing. Suppose for instance that the individual goes out to a pub to meet people. If there is severe group pressure not to speak B because of the negative image of the language, other costumers will abstain from using B. Should the individual insist on socializing in B, he will need more time on average to meet someone that agrees to speak the language. Here again, the productivity of time will be adversely affected.

$$r L = p_a x_a + p_b x_b \quad (6)$$

where r is the wage rate and L the number of time units spent at work, while p_a and p_b represent price indices of goods used to pursue activities in A and B respectively.

If total working time available per period is denoted by H, the time constraint reads :

$$H = L + t_a + t_b \quad (7)$$

Equations (6) and (7) can be combined into a simple Beckerian full-income constraint :

$$S \equiv r H = p_a x_a + r t_a + p_b x_b + r t_b \quad (8)$$

Note that working time L is attributed to neither language. This hypothesis reflects the fact that language of work - mostly in the minority language situations described here - usually is not an object of choice to the same extent as other activities such as the various types of leisure included in t_a and t_b. Optimal values for these inputs, as provided by the model, will still cover the greater portion of waking life. Recall that the total amount of time not devoted to work represents more than 75 % of total waking life, even if the individual works 42 hours a week from age 20 to age 65 without ever taking holidays, and enjoys 5 years' retirement before his death.

Maximizing (5) under constraint (8) yields demand functions for all four inputs, but we need only focus on the optimum level of time devoted to minority language activities :

$$t_b^* = t_b(p_a, p_b, r, E) \quad (9)$$

Note that t_b^* is homogeneous of degree zero in prices and wage rate.

V. EVALUATION OF LANGUAGE POLICIES

Comparative statistics with respect to p_b, r and E yield useful insights into the effectiveness of language policies that have been applied in various minority language contexts. However, before moving on to this analysis, a few definitions will be helpful. Let us rewrite (8) as :

$$S = \left[p_a \phi_a\left[\frac{r}{p_a}\right] + r\,\tau_a\left[\frac{r}{p_a}\right]\right] Z_a + \left[p_b \phi_b\left[\frac{r}{p_b}, E\right] + r\,\tau_b\left[\frac{r}{p_b}, E\right]\right] Z_b \qquad (10)$$

where ϕ and τ represent marginal input-output ratios, so that the input of time spent doing things in A can be expressed as :

$$t_a = Z_a \cdot \tau_a\left[\frac{r}{p_a}, E\right] \qquad (11)$$

Note also that the expressions between brackets in (10) are the shadow prices of activities conducted in A and B respectively. These prices are :

$$\Pi_j = p_j \phi_j + r\,\tau_j \qquad j = a, b \qquad (12)$$

and they cover the expenditure on goods and time. The cost of time is evaluated in terms of forgone earnings and the earnings-intensiveness of activities conducted in language j is defined as :

$$f_j = r\,\tau_j / \Pi_j \qquad j = a, b \qquad (13)^8$$

A. Subsidizing minority-language goods

Express (11) in log form and derive with respect to the log of the price of B goods :

$$\frac{\partial \log t_b}{\partial \log p_b} = \frac{\partial \log Z_b}{\partial \log p_b} + \frac{\partial \log \tau_b(r/p_b, E)}{\partial \log p_b} \qquad (14)$$

Equation (14) includes an output and a substitution effect. To evaluate the former (within which no substitution occurs), let us apply conventional factor demand analysis. From (12) we know that :

$$d\Pi_b = \phi_b\, dp_b \qquad (15)$$

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8 Since all activities use both time and goods, $0 < f_j < 1$.

Dividing through by Π_b and multiplying by 1 :

$$\frac{d\Pi_b}{\Pi_b} = (1 - f_b)\frac{dp_b}{p_b} \tag{16}$$

The relative change in the amount of B activities can be expressed as :

$$\frac{dZ_b}{Z_b} = \frac{dZ_b/Z_b}{d\Pi_b/\Pi_b} \cdot \frac{d\Pi_b}{\Pi_b} \equiv \varepsilon_b^p \cdot \frac{d\Pi_b}{\Pi_b} \tag{17}$$

where ε_b^p denotes the elasticity of Z_b with respect to Π_b when the latter changes as a result of a change in p_b. It is negative as any normal own-price elasticity. Combining (16) and (17), and applying the usual definition of the substitution effect as the elasticity of substitution multiplied by factor share in total unit cost yields :

$$\frac{\partial \log t_b}{\partial \log p_b} = (1 - f_b)(\varepsilon_b^p + \sigma_{x,t}^b) \gtrless 0 \tag{18}$$

Subsidizing minority language goods is therefore not certain to induce an increase in minority language use; furthermore, the possible increase may be disappointing. If substitutability between factors is weak, (18) is more likely to be negative. Z_b will increase if activities done in B are not Giffen activities, and this will cause x_b^* to rise[9], but substitution away from time, which has become relatively more expensive, can cause a drop in actual language use. Given the kinds of goods that are usually subsidized in minority language policies, we can safely assume that the relevant production functions resemble the Leontief type with negligible or zero elasticity of substitution. Books and artistic performances are typical minority language goods and services that tend to receive subsidies, and they are used in activities where factor substitutability is low, so that (19) would in general be negative as expected by language planners. However, since such goods are used in earnings-intensive commodities, $(1 - f_b)$ will be close to zero; the overall impact of a subsidizing policy will therefore tend to be disappointing. We conclude that subsidies to minority language goods are not, in general, an effective tool for protecting or promoting minority language use.

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9 It can easily be shown that :

$$\partial \log x_b / \partial \log p_b = \varepsilon_b^p(1 - f_b) - f_b\,\sigma_{x,t}^b < 0.$$

Also note that if working hours are not flexible, the amount of time spent on certain activities can be increased only if less time is spent on certain other activities. The effects of the subsidizing policy on the use of B will be positive only if the amount of things done in A actually decreases. This will be the case if doing things in A or doing things in B are generally good substitutes, which implies that the individual can easily switch from A to B in many activities. Alternatively, the individual may be unwilling or unable to reduce the amount of time spent doing things in A; the only way to use his increased spending power is to move resources from time-intensive to goods-intensive activities, keeping time expenditure constant. For the use of B to increase, such goods-intensive activities must be available in B. If this is not the case, then only activities in A will benefit form lower prices of B goods.

B. Increasing wage rates

Increasing real wage rates in areas where the minority language is still widely spoken has often been seen as a means to keep these languages alive because residents would enjoy higher spending power in minority language surroundings. Using similar procedures as in (A) above, it is easily seen that

$$\frac{\partial \log t_b}{\partial \log r} = \varepsilon_b^r f_b - (1 - f_b)\,\sigma_{x,t}^b \gtrless 0 \qquad (19)$$

where ε_b^r is the elasticity of Z_b with respect to Π_b when the latter changes as a result of a change in the wage rate r. Note that the sign of ε_b^r is ambiguous, because an increase in wage rates causes both full income and the time cost of any non-work activity to increase. This produces an unambiguous outward shift of the full income constraint[10], but the positivity of ε_b^r does not follow unless further assumptions are introduced. An obvious (though unappealing) sufficient condition for ε_b^r to be positive is first-degree homogeneity of U; alternatively, we may impose an identical average earning-intensiveness on activities pursued is either language, since these cover an a priori identical spectrum[11]. In this case, ε_b^r will be

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10 $\partial S/\partial \Pi_j = S(\Pi_j - r\,\tau_j)/\Pi_j^2 > 0,\ j = a, b.$

11 $f_a = f_b$ is a necessary and sufficient condition for the slope of the full income constraint to remain constant.

positive if activities in B are non-inferior. Even if negative values of ε_b^r are ruled out by assumption, the increase in Z_b can be produced by higher expenditure on goods and a decline in t_b which has become more costly. Wage rate increases would affect t_b positively if factor substitutability were negligible.

However, the rather disappointing results of average wage-rate increases observed in the Gaeltacht (the Irish-speaking areas of Éire) or in the Romanche-speaking parts of Switzerland may be explained not so much by the respective values of ε^r and σ as by the rigidity of working hours. Suppose for a moment that the number of working hours is fixed. Two consequences follow : first, the amount of time devoted to doing things in the minority language can increase only if less time is spent doing things in the majority language; second, the increased resources must be spent on material goods. The individual would therefore have to shift from earnings-intensive to goods-intensive commodities, engage in upper-class types of leisure, and so on. For minority language use to increase, it is vital that such goods-intensive activities in the minority language actually exist. If goods intensive activities are more frequently available in the majority language, only the latter will benefit from the increase in spending power.

Goods-intensive commodities are frequently, though not systematically, correlated to superior activities (where status is defined with respect to full income elasticity). This provides another rule of thumb for evaluating the probable effectiveness of a wage rate-increasing language policy : instead of asking whether some goods-intensive activities are available in the minority language, it may as relevant to ask whether superior activities are available. Since activity status is ultimately defined by the individual's set of preferences, increasing income in minority-language areas will prove effective only if the people themselves view at least some minority-language activities as prestigious.

C. Exposure-increasing policies

Exposure increasing is the most complex and stimulating tool of language policy that will be considered here. It can take the form of legislative action making B language signs and advertisements compulsory, of increases in the numbers of hours of broadcast in language B, etc.

In order to derive comparative statics results with respect to E, assume the production function of Z_b to display constant returns to scale, so that omitting subscripts for clarity, output can be expressed as :

$$Z = x\,Z_x + t\,Z_t \qquad (20)^{12}$$

where Z_x and Z_t denote the marginal productivity of factors. Derive with respect to E to obtain :

$$dZ/dE\Big|_{x,\,t} = \hat{Z}_E = x\,\partial Z_x/\partial E + t\,\partial Z_t/\partial E \qquad (21)$$

where the hat over Z denotes that inputs are held constant. Multiplying through by E/Z provides the exposure-elasticity of Z at constant factor inputs. Multiplying the two terms on the right-hand side by one and rearranging yields :

$$\hat{Z}^E = \frac{Z_x\,x}{Z}\cdot Z_x^E + \frac{Z_t\,t}{Z} Z_t^E \qquad (22)$$

where Z_x^E and Z_t^E represent the exposure elasticity of marginal productivities. We know from the first-order conditions that the ratio of the marginal productivity of factors inputs must equal the ratio of their prices, so that :

$$Z_x/p = Z_t/r = 1/\Pi \qquad (23)^{13}$$

Substituting (23) into (22) and recalling (11), we get :

$$\hat{Z}^E = (1 - f)\,Z_x^E + f\,Z_t^E \qquad (24)$$

The value of Z also changes because of factor reallocation. Deriving (20) with output level kept constant and applying the same procedure as above yields :

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12 The procedure used here was first developed by Michael (1972).

13 This follows directly form the fact that the first-order conditions can be expressed either in terms of commodities or in terms of inputs.

$$dZ/dE\Big|_z \cdot E/Z = \bar{Z}^E = (1 - f)\, x^E + f\, t^E \tag{25}$$

where x^E and t^E stand for the exposure elasticity of factor inputs. The total change in Z is the sum of (24) and (25), and it can be written as :

$$Z^E = \hat{Z}^E + x^E - f\, x^E + f\, t^E \tag{26}$$

Using (26), t^E can be expressed as follows :

$$t^E = Z^E - \hat{Z}^E - (1 - f)\,(x^E - t^E) \tag{27}$$

The last term in parentheses on the right-hand side of (27) can be expressed by means of the elasticity of substitution. Given the first-degree homogeneity of Z, the ratio of marginal productivities at equilibrium can be described by a function of factor intensiveness and exposure such as :

$$Z_x/Z_t = \theta(x/t, E) = \theta(\delta, E) \tag{28}$$

Totally differentiating θ and multiplying through by $E/\theta dE$ yields :

$$\theta^E = \frac{\partial \theta}{\partial \delta} \cdot \frac{d\delta}{dE} \frac{E}{\theta} + \frac{\partial \theta}{\partial E} \frac{E}{\theta} \tag{29}$$

where θ^E represents the exposure elasticity of the ratio of marginal products. (29) can be rewritten using the direct elasticity of substitution, because

$$\frac{1}{\sigma} = -\frac{\partial \theta}{\partial \delta} \cdot \frac{\delta}{\theta} \tag{30}$$

Multiplying and dividing (29) by δ and substituting (30) into the resulting expression yields :

$$\theta^E = -\frac{1}{\sigma}(x^E - t^E) + (Z_x^E - Z_t^E) \tag{31}$$

Recall that the ratio of marginal products at equilibrium must equal the ratio of factor prices, so that (31) can be rearranged to read :

$$(x^E - t^E) = [(Z_x^E - Z_t^E) - (p^E - r^E)]\,\sigma \tag{32}$$

Substitute (32) into (27) to obtain :

$$t^E = Z^E - \hat{Z}^E - (1 - f)\,[(Z_x^E - Z_t^E) - (p^E - r^E)]\,\sigma \tag{33}$$

Equation (32) represents the exposure elasticity of minority language use. Conditions for signing this elasticity are easier to interpret if explicit reference is made to shadow prices.

The change in unit cost of Z resulting from a change in exposure must be evaluated with output held constant, i.e. equation (26) must be set equal to zero; this will provide the following expression for the exposure elasticity of the goods input :

$$x^E = (-\hat{Z}^E - f\,t^E) \cdot 1/(1 - f) \tag{34}$$

Multiplying through by x/F yields :

$$\frac{dx}{dE} = -\frac{\hat{Z}^E\,x}{(1-f)\,E} - \frac{f\,t^E\,x}{(1-f)\,E} \tag{35}$$

Under constant returns to scale, marginal and average productivities at equilibrium will be identical, so (12) can be rewritten as :

$$\Pi = \frac{p\,x}{Z} + \frac{r\,t}{Z} \tag{36}$$

Differentiating (36) with respect to E yields :

$$\frac{d\Pi}{dE} = \frac{p}{Z}\,\frac{dx}{dE} + \frac{r}{Z}\,\frac{dt}{dE} \tag{37}$$

Substituting (35) into (37), multiplying and dividing the last term on the right-hand side by t provides an expression for the exposure elasticity of the shadow price that simplifies to :

$$\Pi^E = -\hat{Z}^E \tag{38}$$

Equation (38) therefore describes the percentage change in the unit cost of Z before factors are reallocated. Let us now define a logarithmic price index for activities as :

$$\Pi_G = \Pi_a^{Sa}\, \Pi_b^{Sb} \tag{39}$$

where weights s_a an s_b are defined in percentage of total expenditure :

$$s_j = \Pi_j Z_j / \sum_j \Pi_j Z_j \qquad j = a, b \tag{40}$$

It follows that the relative change in the value of the price index after exposure changes can be expressed as :

$$\Pi_G^E = \sum_j s_j \Pi_j^E = -\sum_j s_j \hat{Z}_j^E \qquad j = a, b \tag{41}$$

So that the exposure elasticity of real full income is :

$$(S/\Pi_G)^E = \sum_j s_j \hat{Z}_j^E = \hat{Z}_b^E \tag{42}$$[14]

Now the exposure elasticity of demand for Z_b can be expressed as a function of real full income elasticity η_b and relative shadow price elasticity ε_b, using equations (38), (39) and (40) above :

$$Z_b^E = \eta_b (S/\Pi_G)^E + \varepsilon_b (\Pi_b/\Pi_G)^E \tag{43}$$

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14 Recall that full income S = r H is unaffected by changes in E, and that Z_a is not a function of exposure.

Equation (33) may now be expressed as follows :

$$t_b^E = \eta_b \hat{Z}_b^E - \hat{Z}_b^E + \varepsilon_b(-\hat{Z}_b^E + s_b \hat{Z}_b^E) - (1 - f_b)\,\sigma^b(Z_{xb}^E - Z_{tb}^E) \qquad (44)^{15}$$

Equation (44) lends itself to a wide range of interpretations, depending not only on the number of B activities considered, but also on the impact of changes in E on Z_x and Z_t respectively.

It is certainly more realistic - though by no means simpler - to assume that factor productivities are not equally affected by exposure. The assumption made here is that the productivity of goods is independent of exposure, and that only the productivity of time - which reflects return to personal effort - will rise with increase in E[16]. If we only consider one aggregate activity Z_b, and recalling that Z_a is not a function of E, (44) simplifies to :

$$t_b^E = (\eta_b s_b - \varepsilon_b + \varepsilon_b s_b - 1)\,\hat{Z}_b^E + (1 - f_b)\,\sigma^b Z_{tb}^E \qquad (45)$$

Under commodity neutrality, $\hat{Z}_b^E$ reduces to :

$$\hat{Z}_b^E\Big|_{cn} = f_b Z_{tb}^E \qquad (46)$$

which can be substituted into (45) to read :

$$t_b^E = (\eta_b s_b f_b - f_b - \varepsilon_b f_b + \varepsilon_b s_b f_b)\,\hat{Z}_{tb}^E + (1 - f_b)\,\sigma^b Z_{tb}^E \qquad (47)$$

Equation (47) is a sum of two terms, the first of them describing the effect of a change in E if factor ratios are constant (as would be the case with a fixed coefficients production function) while the second term contains the effect of factor substitution.

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15 Exposure elasticities of factor prices are zero since these prices are exogenous.

16 Formally, equation (4ii) is set equal to zero. This assumption can be called "commodity neutrality", as opposed to "double neutrality" (in which the productivity of both factors in both A and B is affected proportionately), and to "factor neutrality", in which one factor only is affected, whether used in A or B activities.

An exposure-increasing policy, by enhancing individual efficiency, will positively affect the productivity of time, so Z^E_{tb} is unambiguously positive; since the elasticity of substitution is positive and $0 < f_b < 1$, the second term on the right-hand side of (47) is positive. The sign of the first term, however, is ambiguous, because full income elasticity of demand is positive but shadow price elasticity is negative.

Consider β, defined as :

$$\beta = \eta_b s_b - \varepsilon_b + \varepsilon_b s_b - 1 \qquad (48)$$

For the impact of an exposure increasing policy to be beneficial to minority language use, β must be positive or, at least, have a negligible negative value so as not to offset the positive impact of factor substitution.

- $\partial\beta/\partial\eta_b$ is positive. In other words, the better the image of the minority language (or, in sociolinguistic terms, the higher its status) the more efficient increased exposure will be.

- $\partial\beta/\partial\varepsilon_b$ is negative. Greater sensitivity to the relative cost of doing things in language A or in language B will make exposure-increasing activities more effective.

- $\partial\beta/\partial s_b$ has an ambiguous sign. The weight s_b can be interpreted as a proxy for language vitality in a given area. In regions where the minority language is still very much alive, a greater share of full income will be devoted to B activities, and s_b will be higher. On the other hand, in "zones of collapse"[17] where many activities are conducted in A, s_b will be low. The ambiguity of the sign of $\partial\beta/\partial s_b$ confirms that a major question of language planning remains unsolved, i.e. should exposure-increasing policies focus on areas where B is most alive or most threatened?

- $\partial\beta/\partial f_b$ also has an ambiguous sign : higher average earnings-intensiveness of B activities will be an asset only on the condition that relative shadow price elasticity is high.

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17 See Ambrose and Williams (1981) for a definition of the "zone of collapse".

Since f_b is positive, the necessary and sufficient condition for β to be positive simplifies to :

$$\eta_b s_b + \varepsilon_b(s_b - 1) > 1 \qquad (49)$$

which can be interpreted as follows : the income effect plus the relative price effect (individuals do more things in language B) must outweigh the production effect (less time than before is needed to do things in language B). For the overall impact of an exposure-increasing policy to be beneficial, the income, relative price and substitution effects must outweigh the production effect.

VI. SUMMARY GUIDELINES FOR MINORITY LANGUAGE POLICY

The above discussion can help to shed light on the disappointing results of certain language policies because they define precise conditions for these to be effective. Policies applied in a variety of minority language contexts have failed to identify these conditions, and in the face of renewed interest in minority cultural problems a careful evaluation of proposed policies should be carried out. Let us briefly summarize the points that must be ascertained before adopting one or the other of the language policies analyzed here.

A. Subsidies to minority-language goods will be more effective if minority-language activities have a high shadow price elasticity. There is not much point in subsidizing goods used in activities that do not respond to changes in costs.

Goods used in goods-intensive activities should be subsidized, and only disappointing results can be expected from subsidizing other types of goods. Subsidies to items such as minority-language books and newspapers (which are typically used in earnings-intensive leisure activities like reading) makes sense only if the market does not provide the goods with adequate quality when left to itself.

The very existence of goods-intensive activities in language B is an absolute condition for success if working hours are fixed.

B. Increasing average wage rates in minority language areas is negatively affected by factor substitutability because the time cost of both A and B activities rises. Even if

substitutability is not too high, goods-intensive activities must exist in language B, so that the increased spending power can be used in language B.

This condition is even more commanding if working hours are not flexible.

For both of the above policies, another rule of thumb may be applied. In so far as goods-intensiveness is positively correlated to the status of the activity, the full income elasticity of demand of B activities must on average be sufficiently high, i.e. these activities must not be viewed as inferior by native speakers. In other words, subsidies or wage rate increases are likely to fail if the image of the language, as revealed by consumer preferences, is not prestigious enough in the first place.

C. Increasing exposure to the minority language, although it enhances speakers' efficiency at using B, will prove effective only if the sum of an income, relative shadow price and substitution effect outweighs the production effect. This outcome is more likely to occur if full income elasticity of demand is high and if relative shadow price elasticity is high. Whether exposure should primarily be increased in strong B areas or in zones of collapse also depends on the respective values of these elasticities.

In many real world situations, the values for s_b can be easily estimated, and by focusing on specific activities, f_b can be confined to a certain range. Further estimates for η_b and ε_b could be obtained for individual cases, making the above guidelines more specific. However, as a general rule, our model substantiates the often-made claim that language status is a necessary condition for minority language policies to be effective. Any language policy that provides money, but avoids sincere commitment to boosting the image of the language, is therefore likely to fail. There seems to be no way around this: for a minority language to survive, its image must be positive.

VII. CONCLUSION

In this paper, I have provided a brief survey of existing contributions to the economics of language, noting that most of these focused on specific issues relating language use to some traditional economic variable. One striking point is that the case of minority languages as we know them in Western Europe today does not seem to have been approached from an economic perspective.

After defining what is meant here by "minority language", this paper develops a model of language use based on the household production function approach. The standard Beckerian framework is extended to include explicit reference to the exposure to the minority language, and comparative statics results are derived with respect to minority-language goods, wage rate and exposure. These results are then analyzed in order to assess the effectiveness of language policies regarding prices, wage rate and exposure. Conditions for such policies to work are identified and summarized in a set guidelines for minority language policy.

Obviously, alternative approaches to the economics of minority language planning could also be used, and some of them can be put on the agenda for further research.

A. Stable preferences and the rationality hypothesis

As with 99 % of economic theory, the model presented here assumes that the individual's preferences do not change in the course of time. They are, however, liable to change in response to higher exposure. This provides the strongest argument in favor of increasing the number of B-language programs on TV and radio, and making access to B goods and services easier, because this type of language policy may induce a shift in preferences away form A and towards B.

Modelling endogenous tastes usually proves quite impracticable, and I do not believe it is the best line to follow. It may prove more fruitful to relax the rationality hypothesis, and to replace the utility maximization paradigm by Simon's limited rationality approach. Limited rationality theory has not yet produced a set of widely recognized axioms about human behavior. However, it pays more attention to psychological mechanisms that govern individual decision-making processes. In order to work in this general direction, some of the eight suggestions made by Lavoie[18] in the specific case of languages may prove easier to integrate into future approaches.

B. Working hours

In line with Becker's theory of the allocation of time, working hours have been assumed to be flexible. It has proved easy enough to relax this hypothesis informally, but a formal

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18 Lavoie (1983) p. 60-61.

model of minority language use with fixed hours of work still has to be developed. It may provide results not obtained here.

C. Adapting the model to specific cases

It may be worth applying the model to real situations in which field research has provided estimates for s_b. It is also possible to restrict our attention to particular activities, so that hypotheses can be made about the value of f_b. The range of possible results is likely to narrow down and to provide more precise guidelines for language policy.

D. Aggregation

In this paper we have quite casually moved back and forth between the individual and aggregate levels. This particular point needs to be looked at more carefully, if only to take a very important feature of languages into account : the higher the number of speakers, the more valuable it is to be able to speak the language concerned.

E. Language quality

Language quality is not featured as such in the model. It only helps explain language quantity evaluated in time units. However, the phenomenon of language quality may deserve more attention. There is indeed a clear difference between communication that dispenses with borrowings from the majority language, and communication so heavily influenced by the latter as to include complete sentences in it. This particular problem can be linked to archaic usage and word creation.

More generally, the causations selected here may need further analysis in order to reflect more accurately the actual weight of certain influences on language use. I believe this task may be an area of fruitful collaboration between economics and other social sciences.

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