Dynamics, costs, and the survival of minorities:
Optimal language policies for increasing the vitality of minority languages

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Abstract

It is assumed that language policy can influence parents' choice of language in which they bring up their children. A simple model of linguistic transmission in the family is outlined and the effect of different policies on the vitality of a minority language is analyzed.

It is argued that the habitation patterns and the numerical strength of the minority have a strong influence on the cost-effectiveness of different policy measures. It is shown that by classifying language policies into four different categories we can assign different policies to different minorities in a cost-effective manner according to the size of the jurisdiction where the minority lives and to its strength in the jurisdiction considered.

We provide a general intuitive discussion and a specific example to support the general analysis.

Keywords: vitality of minority language; language policy; cost-effectiveness analysis; structure of costs

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Résumé

Il est supposé que la politique linguistique puisse influencer le choix de la langue dans laquelle les parents élèvent leurs enfants. Les grandes lignes d'un modèle simple de transmission linguistique dans la famille sont exposées et l'effet de différentes politiques sur la vitalité d'une langue minoritaire est analysé.

Il est avancé que la structure d'habitation et le nombre de personnes de la minorité ont une forte influence sur le rapport coût efficacité des différentes mesures politiques. Il est démontré qu'en classant les politiques linguistiques en quatre catégories différentes, nous pouvons attribuer différentes politiques à différentes minorités de manière rentable en fonction de la taille de la juridiction où la minorité vit et de sa force dans la juridiction considérée.

Nous fournissons une discussion intuitive générale et un exemple spécifique à l'appui de l'analyse générale.

Mots clés : vitalité de la langue d'une minorité ; politique linguistique ; analyse coût effet ; structure des coûts

1 INTRODUCTION

An economic approach to any social phenomenon has to take into account that economics is about making choices. In one way or another, benefits – or, more generally, effects – and costs are compared for the purpose of making decisions.[1] This can easily be applied to the evaluation of public policies, such as language policies. In the analysis of any policy one generally distinguishes between cost-benefit and cost-effectiveness analysis. In the first one, benefits – or utility – of a policy measure are quantified and compared to costs, in the latter a goal is as a rule specified without reference to its value, and the costs necessary to reach the goal is minimized, or for a given budget, the cost structure that makes the goal fulfillment the highest is looked for. In the case of language policy, the first approach could be one deciding if a certain policy measure – introducing bilingual street signs, say – brings more "welfare" to the members a minority than it costs. In the second case, the goal might be to increase the size of a linguistic minority, and one looks for the policy measures that will fulfill this goal in in the best way, given the available budget.

The biggest problem in a cost-benefit analysis is the measurement of the value of the benefits. Ideally each beneficiary should report how high he or she values the measure, and these evaluations should be added to give the gross benefits. However, there are both theoretical and practical difficulties here.[2] Given these difficulties, in many practical policy evaluations, the benefits are simply fixed by the policy maker as a result of the political process. In a cost-benefit analysis, since the beneficiaries are individuals, the policy maker would have to specify average benefits of the members of the minority, and the total benefits would be proportional to the number of beneficiaries.

In a cost-effectiveness analysis, this approached is abandoned and the goals are simply defined without any reference to the well-being of the beneficiaries. In this contribution, the goal of the policy maker is taken to be of this kind, namely a high vitality of a minority language. This is further specified as the language having a large number of users in everyday situations. We will further assume – in accordance with real-world observations – that speakers of a minority languages are bilingual in the majority language of their region. The research question is how the vitality, thus defined, can be improved through language policies. In addressing the question, we will discuss how different language-policy measures can be thought to affect different minority languages. The language communities thereby differ in the number of speakers and in their geographical extension.

In comparison to the benefit/effectiveness side of the analysis, the cost side is relatively well-defined and objectively measurable. The structure of the costs opens up a broad spectrum

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[1] For a discussion related to language-policy issues, see WICKSTRÖM (2016) or WICKSTRÖM, TEMPLIN, and GAZZOLA (2018).

[2] The theoretical difficulty is that the individual evaluations, the propensities to pay, are not well-defined, and so called Scitovsky paradoxes, see SCITOVSZKY (1941), or "path dependencies" can occur. That is, the evaluation of two policy measures (A and B, say) would be different if A is implemented first and B thereafter than if B is implemented first and then A. Especially in language policy, the probability of path dependencies can be very high. The practical problem is that the individual evaluation has to come directly from the various beneficiaries, who often have no incentives to speak the truth, see GINSBURGH (2017).

of interesting questions. The costs, however, are largely ignored in the literature.[3] The focus of this essay is on some principal results that originate in the different structures of the costs of language-policy measures.

To make the concept of language policy tractable we will define policy measures as the "atoms" of language policy. A language-policy measure is then the smallest sensible good or service that the policy maker provides. Examples could be bilingual street signs in a town, the use of the minority language in the names of some public institutions, the publication of certain official documents in a minority language, etc. Since it is not very practical to have different rules for each measure, we let several similar measures be collected in policy category. A category is then a collection of measures for which the same rules for the implementation applies. For our purpose in this essay it is convenient to define the categories according to the cost structure of the included measures.

Before analyzing the importance of cost structures for the language policy, in section 2 we briefly discuss the social dynamics behind the survival of minorities. Then, in section 3 we discuss the costs of language policy and define what we understand under "cost structure". We provide the general intuition behind the importance of costs for a sensible language policy in support of the vitality of a minority language in section 4. This is then illustrated in a simple example in section 5. Some general remarks close the essay in section 6.

2 DYNAMICS OF MINORITY-LANGUAGE SURVIVAL

There is a rich literature analyzing the factors determining the long-run vitality of minority languages.[4] Important is the observation that decisions about language use are made by individuals. Public language policy can only provide incentives that influence the decisions. For the sake of argument, we will concentrate on a situation with two languages in society: a high-status majority language H and a low-status minority language L. Further, we assume that all speakers of L are bilingual in H, also. That is, we divide the individuals in society in two groups: the speakers of H and the (bilingual) speakers of L.

The transmission of language knowledge and use is from one generation to the next. The relevant question is, what fraction of the population will use L given that a certain fraction in the previous generation used it. The transmission can be divided up into several processes. Given that the most frequent transmission is through a two-adults family, the types of the adults in the family is important. Three different types of families can be distinguished: HH, HL, and LL. A HH family will in general produce children of type H, whereas HL and LL families will give rise to offspring of both types, H and L.

The first process is the family formation. Mating is assumed to be generally random with varying success probabilities. The probabilities of the various types, of course, depends on the frequencies of the H and L types in society, but are not necessarily equal to the result of random "blind" encounters. Two H individuals or two L individuals will probably in most cases join more easily into an HH or an LL family than an H and an L individual will become an HL

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[3] For some notable exceptions, see VAILLANCOURT (1997), GRIN and VAILLANCOURT (1999), VAILLANCOURT and COCHE (2009), COCHE, VAILLANCOURT, CADIEUX, and RONSON (2012), and DESGAGNÉ and VAILLANCOURT (2016).

[4] See, for instance, WICKSTRÖM (2005) and TEMPLIN, SEIDL, WICKSTRÖM, and FEICHTINGER (2016), as well as the references therein.

family. Once the successful mating has taken place, children will be produced. The second process is the choice of language repertoire for the children. This is partially determined by the pride of the parents in their respective languages and the public language policy in the form of acquisition and status planning. Once the children have been socialized the process with the mating and child production starts again. That is, there is a never-ending feedback mechanism determining the distribution of types in society.

This feedback mechanism will lead to a steady state with a long-run equilibrium only if enough children of type L, on the average, emerge from family type HL.[5] If this number is high enough, the minority language will survive. That is, the language-policy will have to provide strong enough incentives for "mixed families" to raise sufficiently many children as bilinguals. The incentives necessary for that is, of course, an empirical issue. The incentives basically work through two kinds of policy measures: acquisition planning providing education opportunities in the minority language and status planning making the speakers of the minority language proud of their minority language. The problem of the language planner is then to determine a policy giving correct incentives for the families of type HL. The correct incentives cannot be determined theoretically; this is an empirical matter. However, the theory provides some general insights. These insights are closely related to the cost structure of the policy measures.

3   THE STRUCTURE OF COSTS

In any selection of public-policy measures, costs play a decisive rôle. Relevant policy alternatives must always be considered. The budget for public activities is always limited which implies a choice between policy measures to be realized. The provision of bilingual street signs in a community might mean that the number of hospital beds has to be lowered or the introduction of a bilingual school system might come at the cost of an additional F16 airplane for the air force, for instance. Also, within a given policy sector we have this problem: the language planning budget might allow bilingual street signs or bilingual official government publications, but not both. In other words, we cannot have everything we find good and worthwhile if budgets are limited. We have to make choices, and making the choice leading to the most desired effect within the given budget is the central problem.

In language planning and policy, the costs – in addition to administrative implementation costs – will depend on the number of individuals in the benefiting minority and on their geographical habitation patterns. The costs of some planning measures, like bilingual street signs, are independent of the size of the minority, but strongly depend on the size of the territory where the street signs are introduced, they are spatial and non-rival. The costs of other measures, like the right to receive personal answers from public authorities in the minority language, depend on the number of inquiries received by the authorities which in turn is dependent on the number of individuals in the minority, but is largely independent of the size of the jurisdiction in question, non-spatial and rival costs. Public documents, like laws and decrees, published in a minority language cause only fix costs which, hence, are independent of both the numerical strength and the geographical distribution of the members of the minority, they are non-spatial and non-rival. Finally, many measures, like education or social services in a minority language, cause costs that depend both on the size of the minority and its geographical distribution, the costs are both spatial and rival.

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[5] See WICKSTRÖM (2005) or TEMPLIN, SEIDL, WICKSTRÖM, and FEICHTINGER (2016).

All these policy measures might increase the status of the minority language and give parents incentives to transmit their language to their offspring. The costs, both size and structure, differ considerably, though. For the non-rival and non-spatial measures the costs are the same for all types of minorities. In the case of a spatial and non-rival good, we have lower costs for concentrated minorities than for geographically spread-out minorities. A non-spatial and rival policy measure gives rise to lower costs for small minorities than for relatively large ones. Finally, a measure characterized by spatial and rival costs implies lower costs for small and concentrated minorities than for large and spread-out ones. This leads to different optimal policies for promoting the vitality of different types of linguistic minorities.

4 POLICY CHOICES FOR DIFFERENT MINORITIES

The goal is to influence the behavior of the typical *HL* family the most, giving it incentives to socialize its children in the minority language. In order to achieve this, we have to design different policies according to the characteristics of the minority community with respect to size and habitation patterns. Only in that way we can allocate a given budget efficiently. For a small and concentrated minority, relatively more funds should be allocated for spatial and rival measures such as education and social services than for non-spatial and non-rival measures such as government publications. For a small and spread-out minority, relatively more funds should be used for non-spatial, but rival measures for example the right to deal with the authorities in the minority language, than for non-rival and spatial measures such as bilingual street names. For a big and concentrated minority, relatively more funds should be allocated to spatial and non-rival measures like street signs than to non-spatial and rival measures like receiving answers from the authorities in the language. The relatively big and spread-out minority should receive relatively more funds for non-spatial and non-rival measures like official documents than for spatial and rival measures like social services.

This, of course, does not mean that the absolute amounts of funds allocated to a big minority for social services or education in the minority language should decrease. Only in relation to other measures should the *relative* size be lower than for a smaller minority. The same, *mutatis mutandis*, of course, holds for all other cases. In general, the absolute amounts of funds used for any given minority is a political issue and would in most cases depend on the size of the minority. However, given the budget for a certain minority, the distribution of funds for different policy categories should be determined by the demographic characteristics of the minority. "One model doesn't fit all."

5 AN EXAMPLE

We illustrate this with the help of a simple example. Assume that there are four types of language-policy categories under consideration: non-spatial and non-rival measures with a budget x; non-spatial, but rival measures with a budget ny, that is for each member of the minority the sum y is being allocated; spatial, but non-rival measures with a budget az, that is for each km^2 of the jurisdiction in question the sum z is being allocated; and spatial and rival measures with a budget $w(n + \varepsilon a)$, that is for each person in the jurisdiction the sum w is allocated, but due to the spatial extension this carries some additional costs, $w\varepsilon a$, proportional to the size of the

jurisdiction. The budget restriction of the policy maker with a total budget of B is then:

$$B = x + ny + az + w(n + \varepsilon a) \tag{5.1}$$

The goal of the policy maker is to distribute this budget on the different categories of policy measures. The impact of the policy on the minority families – how many type L children will emerge from a HL family – is an increasing function of how the budgets affect the individual family, $f(x, y, z, w)$. We assume that f increases in its arguments.[6] The goal of the policy maker is now to choose the four separate budgets such that f is maximized, given the limitations of the total budget. We simplify this problem as far as possible without giving up its basic structure by specifying f:

$$f(x, y, z, w) = x + \beta y + \gamma z + \delta w \tag{5.2}$$

Due to the linearity, the problem will have "pure" solutions.[7] That is, the planner will use the entire budget on one of the categories depending on the values of n and a in the jurisdiction, or he will be indifferent between two or more categories.

To find the solution we will only have to compare the impact of all pairs of policy categories, considering the trade-off in costs between the budgets for each pair. For instance, comparing the impact of increasing the budget x or the budget y, we have to note that the direct impact of y in comparison to x is $\beta : 1$; on the other hand, in the budget an increase of y by one unit causes a decrease of x by n units. We thus have to compare β and n, and it makes sense to increase y if $\beta > n$ or, *vice versa*, increase x if $n > \beta$. Comparing the impact of x with that of all other category budgets, we find that x is the better choice if:

$$n > \beta \tag{5.3}$$
$$a > \gamma$$
$$n + \varepsilon a > \delta$$

If $\delta < \beta + \varepsilon \gamma$, the third inequality is implied by the two first ones, and the entire budget should be allocated to non-spatial and non-rival measures, x, if the two first inequalities are satisfied. That is, by limited budgets it is sensible to spend the entire budget on no-spatial and non-rival measures if the minority is sufficiently large (n is big enough) and it is spread over a sufficiently

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[6] In deciding which measures to include in a policy category, the planner will presumably first choose the most cost-effective measure and then as the budget increases add new measures to the category according to their cost effectiveness. This implies that the impact of an increasing budget on the margin is less and less, and the function f will be a concave function.

[7] If the function is concave, we will get a smooth transition from one category to another. The budget will be transferred from one category to another in small steps as the area or size of its minority are changed in the jurisdiction, giving up the measures one by one in the first category and introduce new measures one by one in the latter category. By choosing a linear structure for f, this change is abrupt from one category to the other. With the more realistic assumption of specifying f as a concave function in its arguments, the sharp division lines in the diagrams in figure 5.1 would be replaced by fuzzy divisions making the transition from one policy category to another gradual with less of one policy category and more of another as the demographic characteristics of a jurisdiction change. In our specification, there is one or the other policy that is optimal for any combination of the parameters characterizing the jurisdiction and indifference for the values on the dividing lines. The advantage of our specification is that we get clear answers, albeit at the cost of realism.

large area (a is big enough). If $\delta > \beta + \varepsilon\gamma$, that is, if spatial and rival measures have a sufficiently high impact on the behavior of the HL-families, the third constraint also becomes effective.

The same arguments can be used to find the combinations of the size of the minority, n, and its area of habitation, a, where the total budget should be allocated to y, z, and w, respectively. For y we find:

$$n < \beta \tag{5.4}$$

$$n < \frac{\beta}{\gamma} a \tag{5.5}$$

$$\frac{\beta}{\delta}(n + \varepsilon a) > n \tag{5.6}$$

If $\delta < \beta + \varepsilon\gamma$, the third inequality is implied by the second one. If not, it implies the second inequality. For z we find correspondingly:

$$a < \gamma \tag{5.7}$$

$$n > \frac{\beta}{\gamma} a \tag{5.8}$$

$$\frac{\gamma}{\delta}(n + \varepsilon a) > a \tag{5.9}$$

Again, if $\delta < \beta + \varepsilon\gamma$, the third inequality is implied by the second one. If not, it implies the second inequality. Finally, for w we find:

$$\delta > n + \varepsilon a \tag{5.10}$$

$$n > \frac{\beta}{\delta}(n + \varepsilon a) \tag{5.11}$$

$$a > \frac{\gamma}{\delta}(n + \varepsilon a) \tag{5.12}$$

If $\delta < \beta + \varepsilon\gamma$, the two last inequalities contradict one another and there are no values of n and a for which it is optimal to let the budget for w be positive.

We illustrate these results in figure 5.1. We have drawn the figure for the two cases of a big and a small δ; that is for the case that the impact of a spatial and rival good is important enough or not for the status of the language in the family. Generally, we can see that for small (n small) and extended minorities (a big) a rival and non-spatial measure, for example the right to contact the authorities in the minority language, is to be preferred ($y > 0$), whereas for a concentrated (a small), but sufficiently large minority (n big), a spatial but non-rival measure, for instance bilingual street signs, is the best ($z > 0$). Finally, for an extended (a large) and large minority (n big), non-spatial and non-rival measures ($x > 0$), like publishing official documents in the minority language, are most effective. If the impact of spatial and rival measures is strong enough (δ big), we also get a region with combinations of the size of the jurisdiction (a) and the size of its minority (n) for which spatial and rival measures, for example providing ambulant social services in the minority language, are effective for reaching the goal of the policy maker ($w > 0$).

We also see that the relative impact of the measures on the behavior of the family, captured by the function f, influence when the different types of measures are most effective. If the
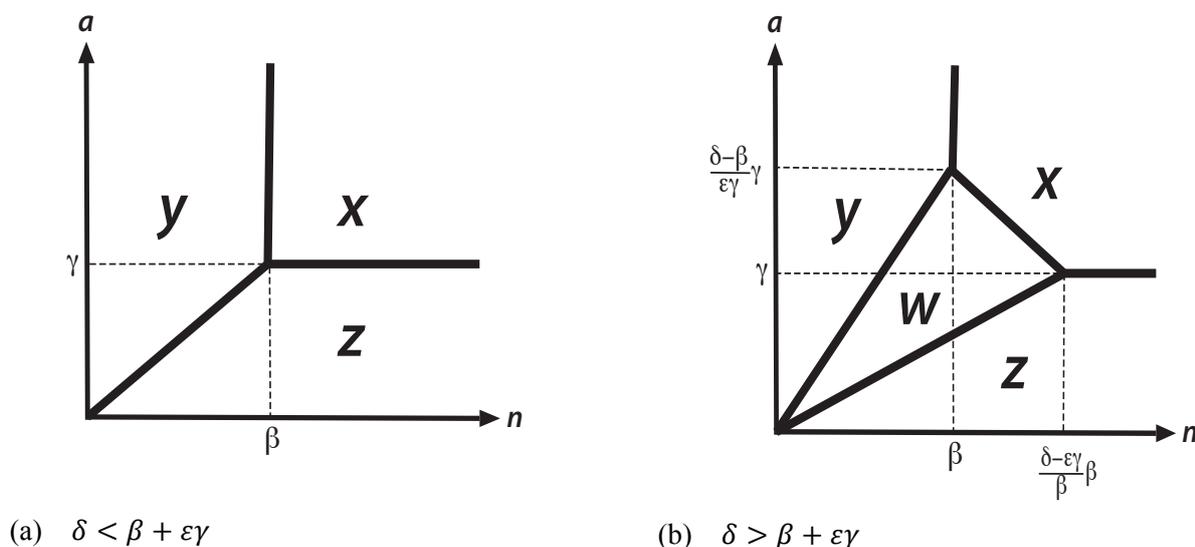
(a) $\delta < \beta + \varepsilon\gamma$

(b) $\delta > \beta + \varepsilon\gamma$

FIGURE 5.1 Characteristics of jurisdictions and optimal policy categories

non-spatial and rival measures are unimportant (β is small) the budget for these types of measures should be positive only if the jurisdiction has a small enough minority. The budget for a jurisdiction with a bigger minority should then be positive for non-rival measures (x and z) or for spatial and rival ones (w). If β is big, of course, the opposite holds. Similarly, if γ is small, spatial and non-rival measures have low impact, and these measures should have a positive budget only if the area of the jurisdiction in question is small enough. The budget for a jurisdiction with a bigger area should then be positive for non-spatial measures (x and y) or for spatial and rival ones (w). If γ is big the opposite holds.

Finally, if the impact of spatial and rival planning measures is too low in comparison to non-spatial and rival as well as to spatial and non-rival ones ($\delta < \beta + \varepsilon\gamma$), such measures should not be introduced. If the impact (δ) is strong enough, the density of the minority population in the jurisdiction (n/a) is between $\beta\varepsilon/(\delta - \beta)$ and $(\delta - \varepsilon\gamma)/\gamma$, and its size not too big, the spatial and rival measures are the most effective. The greater is δ, the wider are the ranges of the size of the area (a) and minority population (n) of the jurisdiction for which the spatial and rival measures are effective. The range of values for which the other types of measures are most effective is correspondingly smaller.

We finally note that the range of values of the parameters describing the jurisdiction (a and n) that imply a positive budget for non-spatial and non-rival planning measures ($x > 0$) increases with a decrease in any of the parameters β, γ, and δ (if $\delta > \beta + \varepsilon\gamma$, else δ has no influence).[8]

6 CONCLUDING REMARK

In order to preserve and increase the vitality of a minority language, there has to be incentives for "mixed families" to transfer the language to their children. Such incentives are – at least partially – created by public policy. The policy measures differ in their costs, not only in the magnitude

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[8] Note that the slope of the northeast segment of the triangle describing the area with positive w in the diagram is $-1/\varepsilon$. It is, hence, independent of all the intensity parameters β, γ, and δ. An increase in β, γ, or δ will, hence, increase the area marked by w in the diagram.

of the costs, but also in how the costs depend on the habitation patterns of the minority and its numerical strength. We have argued in this essay that this necessitates a flexible language policy. A *sine qua non* for such a policy, however, are reliable data. Unfortunately, very little is known about how families react to different policy measures. Very often policies are determined in negotiations between the government and representatives of the linguistic minority. It cannot be excluded that the policies decided upon are more in the short-term interests of an élite than furthering the long-run vitality of the language. The only solution is good data and reliable empirical studies.

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