Minority-language rights: Rational policy based on welfare economics

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Abstract

The chapter analyzes language policy from the point of view of (economic) policy analysis in the spirit of cost-benefit analysis. Policy measures are characterized by attributed values and implementation costs. Language-related goods display various degrees of rivalry and spatiality; issuing decrees in a minority language is both non-rival and non-spatial, whereas.the provision of home nursing in a given language is to a high degree both rival and spatial. This determines the structure of the costs of a policy measure which is as inportant for the analysis as the magnitude of costs. Equating costs and attributed value of a planning measure, we can for each measure define an "efficiency frontier" depending on the numeric size and habitation patterns of the beneficiaries of the politic in a given jurisdiction. That way the efficiency of different measures in different jurisdictions can be characterized. Several measures are joined into policy categories with the same implementation rules, whose efficiency properties are analyzed. The analysis is extended to issues of distribution and justice and, finally, also the (optimal) size of jurisdictions for different policy categories can be determined. This is illustrated and exemplified with data from southern Slovakia.

1 INTRODUCTION

We define language policy as a collection of different language-planning measures. Such a measure could be the publication of official documents in a minority language, bilingual street signs, the elementary school system being provided in a minority language etc. These measures show very different cost characteristics. The publication of official documents in Internet in a given language causes mainly fixed costs that are independent of the number of beneficiaries as well as the spatial size of the jurisdiction concerned. The costs of providing elementary education in a minority language, on the other hand, strongly depend on both the number of beneficiaries and the physical size of the jurisdiction, where the schools are located. The costs

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of bilingual street signs do not depend on the number of people orienting themselves with the help of those signs, but the size of the territory strongly influences the costs.

The benefit side of the language policy depends on the goals of the policy maker. Two very different possible goals are: 1. treating linguistic minorities justly and 2. (re)vitalizing a minority language. The former typically involves a cost-benefit analysis, whereas the latter leads to a cost-effectiveness analysis. What they have in common is the costs. Two aspects of costs are important: their structure and magnitudes. We will concentrate on the first goal here, but occasionally also discuss the second one. For the first goal, we need to know the individual benefits of the members of the minority being considered. Comparing benefits and costs, possibly taking distributional effects into account, we can define efficiency. A reasonable assumption on the aggregate benefits of policy measures is that they are proportional to the number of beneficiaries. Because of the different cost structures and different size of the *per capita* benefits of different measures, there will be no simple planning rule for the implementation of language planning measures. In WICKSTRÖM (2020b), the fundamental ingredients of a cost-benefit based language-policy analysis is introduced.

It is also shown how, in the political economy-tradition, a formally fair language policy can be made discriminatory. In WICKSTRÖM (2024) we analyze how to group different measures into categories and how to find simple policy rules for the implementation of the different categories. The structure of the costs as well as the size of the benefits *per capita* are crucial parameters for attributing language-planning measures to categories for a given well-defined jurisdiction. This is discussed in Section 3. The redistribution side of language policy is the theme of Section 4. It is demonstrated that the policy maker's preferences for distribution can be represented by his or her determination of the size of individual *per capita* benefits of the language policy attributed to the members of the minority. In the last main section, Section 5, we ask how jurisdiction boarders should be drawn in order to increase the efficiency or impact of language policy. The chapter then closes with with some concluding remarks in Section 6.[1]

2 BASIC MODEL

As in any cost-benefit analysis both costs and benefit are important for the analysis. We define a policy measure as the smallest sensible unit of analysis.[2] The measure causes costs and creates benefits. For costs, both the magnitude and the structure are important. The benefits are often administratively defined.

2.1 COSTS

The costs are in any economics approach to policy of out-most importance. Not only the size of costs, but their structure, matter. We classify policy measures according to three dimensions: rival – non-rival, spatial – non-spatial, and durable – non-durable (or instantaneous). For a rival

[1] This chapter is an application of the corresponding chapter in the first edition of this handbook, WICKSTRÖM (2016). That chapter discusses in some detail the theoretical basis for a language policy based on welfare economics. This chapter takes the analysis several steps further in the direction of practical language policy. That is, it builds on the concepts developed in the original paper and applies them to implementable policies.

[2] Of course, depending on the problem at hand, the measure can vary considerably. In some cases, planning measures can be the name of an institution or bilingual street signs, in other cases, it might be the definition of an official language.

measure, the costs increase with the number of beneficiaries (for instance home nursing); a non-rival and non-spatial measure would be publishing laws in a minority language: the costs are independent both of of the number of beneficiaries and the area of application. Putting up street signs in a minority language is a spatial and non-rival measure: the costs increase with the area of application but are independent of the number of beneficiaries. A durable measure would be a measure that contributes to the status of the language. It takes time to build up the status which, although decaying slowly if not constantly nourished, remains for some time after the support has been removed.

As in any public policy, good estimates of the costs are a *sine qua non* for a rational analysis. In the field of language policy, however, there are very few estimates of the costs of various measures. A few exceptions can be found, mainly for Canada, in the work of Vaillancourt and coworkers; see, for instance, Coche, Vaillancourt, Cadieux, & Ronson (2012), Desgagné & Vaillancourt (2016), Vaillancourt (1996), Vaillancourt & Coche (2009), and Vaillancourt, Coche, Cadieux, & Ronson (2012). Also the costs of translation in the European Union has been studied by, for instance, Fidrmuc & Ginsburgh (2007). Much more work is needed, however.

2.2 Benefits

Whereas costs are measurable, at least in principle. benefits cause problems, both theoretically and in practice. Ideally we need to know the attributable value, or propensity to pay, of each policy measure for every beneficiary. After adding those, the sum should be compared to the cost of realizing the planning measure. There are several problems associated with this. Theoretically, propensity to pay is not well-defined, and due to income effects path dependencies, so called Scitovsky paradoxes (see de Scitovszky, 1941), are possible. This might be a minor problem for the implementation. A bigger problem is measuring propensities to pay because of different incentive problems. Generally speaking, the beneficiaries rarely have incentives to speak the truth, even if they conceptually were able to evaluate the value of the planning measures, see, for instance, Ginsburgh (2017).[3]

A way of getting around these conceptual problems and have a consistent analysis, is to let the policy maker determine the "propensities to pay" exogenously. By making the benefits a politically formed variable some political freedom is given the policy maker, who might have an

[3] It is important to note that we are talking about the value of a policy measure affecting the use or status of a language, not necessarily about the value of knowing a language *per se*. There are many estimates of the wage premiums due to language knowledge. The value of a language in this case is primarily the communication value in the labor market, in international trade, or for migrants. See, for instance, Ginsburgh & Prieto-Rodriguez (2011) or Liwiński (2019) on the labor market; Egger & Lassmann (2012) on trade; and Chiswick & Miller (2015) on migration. The value of learning a (minority) language in a multilingual society has been studied in many contributions to the literature, see, for instance, Alcalde-Unzu, Moreno-Ternero, & Weber (2022) who use an axiomatic approach to estimate the communication value of learning the language(s) of multilingual societies. In our approach, we are concerned with the value to speakers of a given language of policy measures supporting this language. Translations and acquisition planning certainly are such measures making the mentioned contributions relevant for some of the benefits and measurable. However, many measures increasing the status or visibility of a language do not necessarily contribute to the communication value, but to the emotional value of and pride in a language as an important carrier of identity of the speaker. That this value can be very important, we observe in the strong support among many of the speakers of languages such as Welsh, Basque, Sami, or Ladin, the speakers of which over the age of ten are virtually all bilingual in the dominant language surrounding them.

agenda of his or her own. Beyond the benchmark of correctly estimating the benefits, the policy maker might have distributional or discriminatory goals. As is shown in Section 4, a rational redistribution policy can be conducted by manipulating the benefits. If the democratic system is responsive to the preferences of the voters, it might be possible for a policy maker to make good estimates of the implicit values of different policies.

We will, hence, let the policy maker decide on an average benefit β for each policy measure and conduct a normal cost-benefit analysis as if the β were the true average propensity to pay for the measure.

2.3 LANGUAGE-PLANNING MEASURES

Let a be the size of a jurisdiction and n the size of its minority population. The implementation costs of a language-planning measure is written as a concave function $k(n, a)$. As already mentioned, the *per capita* benefits of the measure are given by β; that is, the gross benefits are $n\beta$. The net benefits are then:

$$u = n\beta - k(n, a) \tag{2.1}$$

A planning measure increases efficiency in society if u is positive. If this is the case, of course, defends on how the costs depend on n and a. If the costs do not depend on n, we call the measure non-rival, and if they do not depend on a, the measure is non-spatial. In general, a measure will display different degrees of rivalry and spatial dependence. The efficiency of measures with different cost structures will clearly depend on the demographics and size of the jurisdiction analyzed.

It turns out that it is convenient to make a change of variables, replacing a with the density of the minority population in the jurisdiction, δ:

$$\delta := \frac{n}{a} \tag{2.2}$$

This gives us:

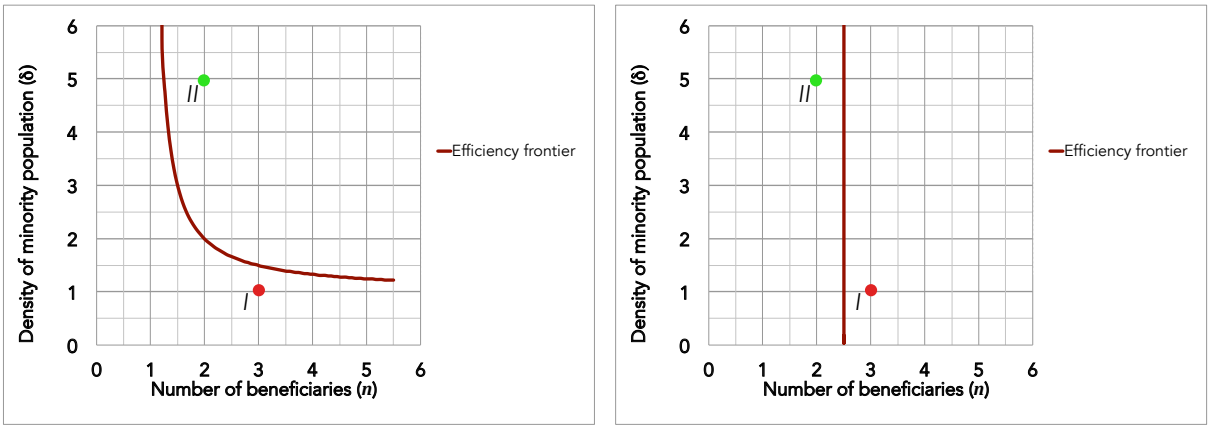
$$u = n\beta - k\left(n, \frac{n}{\delta}\right) := n\beta - c(n, \delta) \tag{2.3}$$

The measure under consideration is efficient if $u \geq 0$ and inefficient if $u < 0$. The border between efficiency and inefficiency, the efficiency frontier, $\delta^E(n)$, is then implicitly given by the equation:

$$u(n, \delta^E(n)) = 0 \tag{2.4}$$

In WICKSTRÖM (2024) it is shown that the language-policy analysis can be reduced to the two-dimension problem of analyzing the efficiency frontiers of the different planning measures in combination with the importance of the measures, captured by β, in the jurisdiction under consideration.[4] The efficiency frontier as a function of n turns out to have a non-positive slope in the $(\delta - n)$-diagram (See WICKSTRÖM, 2020b, appendix A) and divides the possible jurisdictions, characterized by the numerical size and geographical density of their minority population, into

[4] See also WICKSTRÖM, TEMPLIN, & GAZZOLA (2018) and WICKSTRÖM, GAZZOLA, & TEMPLIN (2018).



(a) An efficiency frontier of a rival and spatial measure with fixed costs

(b) An efficiency frontier of a perfectly non-spatial measure

FIGURE 2.1 Two efficiency frontiers of different planning measures

those for which the planning measure is efficient (to the North-East of the efficiency frontier) and those for which it is inefficient (to the South-West). In Figure 2.1 two typical efficiency frontiers and two jurisdictions, I and II, are given. In Subfigure 2.1a, the costs of the language-planning measure display rivalry and spatial dependence and also causes fixed costs. This measure is efficient in jurisdiction II and inefficient in jurisdiction I. The measure in Subfigure 2.1b, on the other hand, is non-spatial. It is efficient in jurisdiction I and inefficient in jurisdiction II. In WICKSTRÖM (2020b) several other examples of efficiency frontiers are given.

2.4 SOME RESULTS

Some simple policy rules follow directly from this approach to language policy and are derived for the case of changes in the demographics of the jurisdictions. Since the efficiency depends on the size n of the minority and its residential density δ in the jurisdiction, the efficiency of a policy measure is unaffected if the values of n and δ remain constant. In other words, Changes in the majority population do not affect the efficiency of policy measure for the minority population. The effects of different scenarios are analyzed in WICKSTRÖM (2020b) and reproduced here:

> PROPOSITION 2.1 (WICKSTRÖM, 2020B) For any planning measure, the efficiency frontier divides the jurisdictions into those where the measure is efficient and those where it is inefficient depending on the number of the beneficiaries (n) and their geographical density (δ) in the jurisdiction,[5] such that if the measure is efficient in a jurisdiction, it is also efficient in all jurisdictions with the same or higher values of n and δ and, conversely, if it is inefficient in a jurisdiction, it is also inefficient in all jurisdictions with the same or lower values of the two parameters.

[5] Recall that the shape of the efficiency frontier is different for different types of goods resulting from the policy measure. For non-spatial goods it is vertical implying a critical value of n independent of δ that has to be exceeded for a measure to to be efficient. For spatial measures, the frontier has a negative slope between zero and minus infinity. The steepness of the frontier is different depending on the degrees of spatiality and rivalry of the goods resulting from the policy measure.

COROLLARY 2.1 A decision rule based on the fraction of beneficiaries as part of the total population – a "percentage" rule – cannot be an efficient rule.

COROLLARY 2.2 A migration of the majority population into jurisdictions populated by the minority does not justify any change in minority rights in the concerned jurisdictions, but the percentage rule leads to less rights for the minority.

COROLLARY 2.3 The creation of bigger jurisdictions through the merger of jurisdictions containing a minority population with jurisdictions without the minority will justify a decrease in minority rights if costs are at least partially spatial. As a result, even an optimal policy becomes less efficient.

COROLLARY 2.4 A federal structure with jurisdiction borders drawn according to the habitation patterns of minorities makes more efficient minority-rights allocations possible than a federal structure that is independent of those habitation patterns.

COROLLARY 2.5 If the minority population is concentrated to a limited number of jurisdictions, a more efficient implementations of minority rights is possible than in a situation with the minority spread over several jurisdictions.

2.5 PERCENTAGE RULE

In many countries a percentage rule is used to regulate the allocation of language rights.[6] It is clear that this rule discriminates against urban minorities and favor rural ones. see WICKSTRÖM (2019) for a detailed analysis.

3 EFFICIENT POLICY

The fact that the structure of the costs differ has implications for the policy maker's tool-chest. Consider Figure 2.1. If we were to design a simple rule for the non-spatial measure we can set a critical value of n, say $n \geq n^* = 2.5$. This rule works perfectly for the measure of Subfigure 2.1b. Were we to apply this same rule to the measure depicted in Subfigure 2.1a, the measure would be enacted in jurisdiction I and not in jurisdiction II. Of course, the measure is efficient in II but not in I. In jurisdiction I we would have an *inclusion error*, the measure is approved although it is inefficient, and in jurisdiction II we would have an *exclusion error*, although the measure is efficient in II it would not be implemented.

We can try a more complex two-parameter rule: the measure will be implemented in jurisdictions characterized by a numeric size of the minority population $n \geq n^* = 1.5$ and a density of the minority population $\delta \geq \delta^* = 1.5$. With this rule, we get an efficient policy in in the case of the spatial and rival measure, but not for the non-spatial measure. This small example

[6] Countries with such a rule are, for instance, Slovakia and Romania requiring a minority of 15% or 20%, respectively for making a minority language official, see SLOVENSKÁ REPUBLIKA/SZLOVÁK KÖZTÁRSASÁG (2022) and ROMÂNIA (2001). In Estonia, only the local majority has rights, EESTI VABARIIK (1992).

illustrates an important point: a language policy aiming at efficiency must be flexible. With more measures, the policy becomes even more interesting.

3.1 Choosing categories

We have already defined a measure. If we take many different measures and put them together we talk of a measure *category*. We will associate a category with one and only decision rule. Determining which measures should belong to which category and how big a category should be, involves a trade-off. It is clear that if additional measures are added to a category the size of inclusion and exclusion errors can only increase (or stay the same). That is, many small categories signifies a more efficient organization of the language policy. However, the administrative costs are bound to increase with the number of decision processes and, as a consequence, with the number of categories. That is, there is a trade-off between efficient implementation of policy measures in different jurisdictions and ease of administering the policy.

We illustrate this in Figure 3.1. In Subfigure 3.1a, a category consisting of the three measures a, b, and c is pictured. Also a decision rule consisting of two critical values n^*, δ^* is indicated. That means that in all jurisdictions with a minority that is bigger than n^* and the density of whose habitation is greater then δ^*, all three measure will be implemented. In jurisdictions that are found in the shaded areas of the diagram measure a will cause an inclusion error (area to the left with $n > n^*$ and $\delta > \delta^*$) and an exclusion error (area to the right where $\delta < \delta^*$). For measure c there are also fairly large areas with both potential inclusion and exclusion errors, whereas for measure b the rule is rather close to efficiency.[7]

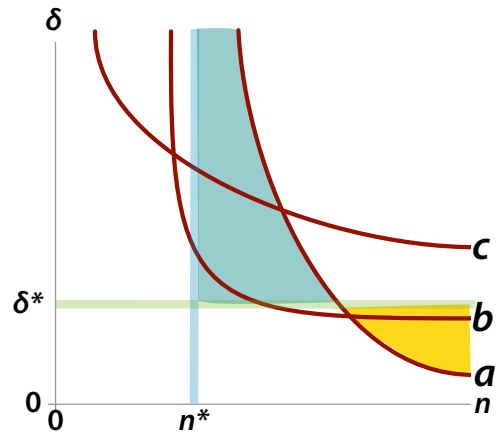
We now divide the category in two new category: one consisting only of measure a and one consisting of measures b and c. Without changing the decision rule, the size of the potential efficiency errors will, of course, not change. However, a decision rule that was optimal in category abc is not necessarily optimal in the new categories. In Subfigure 3.1b we have increased the critical value of n and lowered the critical value of δ. As a result, there is a change in the areas of potential jurisdictions where the efficiency errors will increase (red areas) and decrease (green areas). It is clear from the diagram that the net change is such that the green areas are greater than the red ones and the potential errors from a smaller in the new category than in category abc. Also in the new category bc, we can observe the same phenomenon. Lowering the critical value of n and increasing it for δ leads to a net gain. For measure b there is a net increase in the potential errors, but for c a greater gain.

For a more precise discussion, the reader is referred to Wickström (2024).

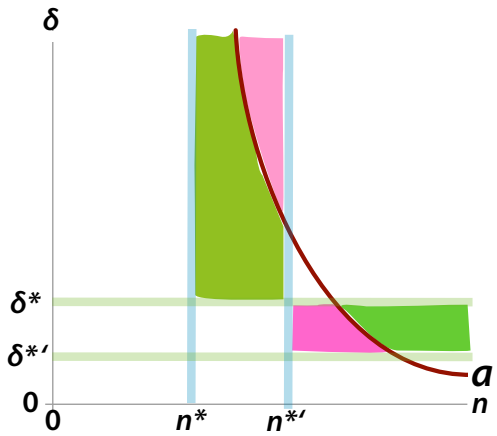
3.2 Modifying categories

In Wickström (2024) it is also shown that If we have two categories with several measures, there is a straight-forward way of characterize some misallocations. Let categories I and II both have optimal decision rules that minimize the efficiency errors. Remove measure a from category I. without changing the decision rule, measure a gives rise to a combined exclusion and inclusion error e_{aI}. The error in category I is then also reduced by this amount if the decision

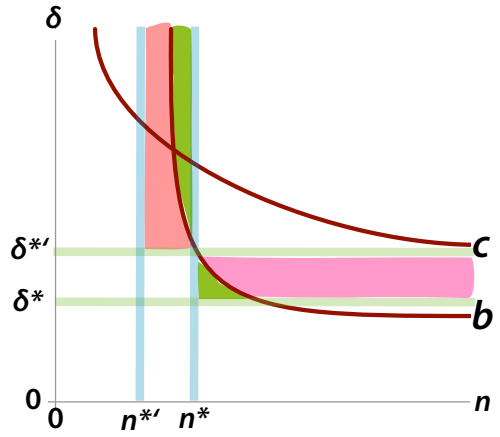
[7] We don't know the distributions of jurisdictions in the diagram, but our argument holds if they are potentially evenly distributed. If they are not, one would have to introduce a weighing factor correcting for a non-even distribution. Of course, one could observe the locations of the relevant jurisdictions and adjust the rules accordingly – or find *ad hoc* rules for each individual jurisdiction.



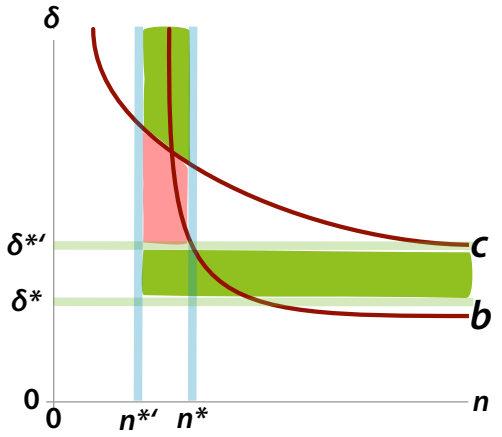
(a) A category consisting of measures a, b, and c with possible exclusion and inclusion errors due to measure a



(b) A category consisting of measure a with changes in possible exclusion and inclusion errors in comparison to category abc



(c) A category consisting of measures b and c with changes in possible exclusion and inclusion errors due to measure b in comparison to category abc



(d) A category consisting of measures b and c with changes in possible exclusion and inclusion errors due to measure c in comparison to category abc

FIGURE 3.1 Three possible categories

rule is kept. However, the decision rule is in general not optimal after a has been removed; with a new optimal decision rule the errors in category one are reduced by more than e_{aI}.

Apply the optimal decision rule of category II to measure a; the error is e_{aII}. Add measure a to category II; the error of the category increases by e_{aII} if the rule is not altered. After the rule is adjusted to a new optimal rule the error will be lower. Hence, the error in category I is reduced by an amount greater than or equal to e_{aI} and the error in category II is increased by an amount less than or equal to e_{aII}. That is, the aggregated error of the two categories is reduced if $e_{aI} > e_{aII}$ and, in most cases, if $e_{aI} = e_{aII}$.

In other words, if we have two categories with optimal decision rules and can find a measure in one category contributing a certain error given the rules of the category and which will con-

tribute the same or a smaller error under the rules of another category, then this measure should in the interest of efficiency be moved to the latter category.

Based on the arguments above, we can state some results. For a more stringent analysis see WICKSTRÖM (2024).

PROPOSITION 3.1 The total efficiency costs under an optimal decision rule of a given category will decrease (or in exceptional cases stay the same) if the category is divined into two or more categories.

COROLLARY 3.1 There is a trade-off between efficiency costs which are smaller the greater the number of categories, and administrative costs which increase with the number of categories.

PROPOSITION 3.2 If there are two categories – both with optimal decision rules – and a measure which in one category contributes a certain error with the decision rule of that category and which will contribute an error of the same size or less under the rules of the other category, then this measure should in the interest of efficiency be moved from the first to the second category.

4 REDISTRIBUTION AND LINGUISTIC JUSTICE

Policy measures effect both the efficiency and equity of society. Measures in favor of minorities generally increase the equity, but might reduce the efficiency if the costs exceed the attributed value of the measure. That is, we have a trade-off between efficiency and equity. A policy maker has to make a choice how far to go in the direction of equity in this trade-off. We can define a "propensity to redistribute" or "inequality aversion" of the policy maker. On the one extreme, the policy maker only considers efficiency, corresponding to our analysis so far, and on the other hand, any difference in well-being due to language usage is avoided. The latter case might involve excessive costs in comparison to the attributed value of the implemented policy measures. A compromise is called for.[8] Another argument for redistribution is that there is some evidence that members of a "happy" minority are less likely to support separatism than members of a minority who feel discriminated against, see LIU, BROWN, & DUNN (2015) as well as LE BRETON & WEBER (2003).[9]

If the policy maker wants to redistribute in favor of the minority, this can easily be done exaggerating the value of β, the average *per capita* benefit assigned to the members of the minority. Traditionally in normative economics, redistribution is analyzed with the help of a concave welfare function. The best example might be the theory of optimal taxation, see MIRRLEES (1971). The utility of each individual is given by the value of a concave utility function of (implicit) income, and the welfare of society as the sum (or integral) of these utilities. Due to the concavity

[8] A more detailed analysis can be found in WICKSTRÖM (2025).

[9] Granted a considerable amount of autonomy, Südtirol/Alto Adige or the Spanish Basque countries could be examples of this, whereas the absence of fiscal autonomy in Catalonia makes its autonomy too limited.

TABLE 4.1 Scenarios for minority rights

Scenarios	minority		majority	
	numeric size	implicit income	numeric size	income
S_0: equal treatment	n	ω	N	ω
S_1: no minority rights	n	$\omega + t - \beta$	N	$\omega + t$

of the utility function, individuals with a low (implicit) income will be given a higher weight in the sum than individuals with a high income. This can easily be adapted to the analysis of an optimal language policy.[10]

4.1 CONCAVITY OF THE UTILITY FUNCTIONS AS A MEASURE OF PROPENSITY TO REDISTRIBUTE

For the discussion of distributional issues, we take as our benchmark a situation S_0 where everyone has the same rights with regard to the chosen language. The alternative situation S_1 is one where the members of the minority are deprived of language rights. There are N people in the majority or, more precisely, not in the minority considered, which has n members.

In order to discuss distribution effects of language-policy measures, the costs have to be attributed to different individuals. The simplest assumption we can make is that the policy measure gives rice to a tax t equally divided between all citizens of the country in question. To keep the analysis simple, we assume that all individuals in society have the same implicit income ω if they enjoy the same rights in relation to their preferred language. if a minority is denied certain rights, valued at β by the members of the minority, the individual taxes can be reduced by an amount t. That is, the implicit income e_N of a member of the majority is then:

$$e_M = \omega + t \tag{4.1}$$

and that of a member of the minority e_n:

$$e_n = \omega + t - \beta \tag{4.2}$$

The policy maker now has the choice between the two alternative situations described in Table 4.1.

Letting the individual utility function be $u(e)$. It is determined by the policy maker and its shape – degree of concavity – reflects the preferences for redistribution of the policy maker. We can write the (Paretian)[11] welfare of S_0 as:

$$W_0 = nu(\omega) + Nu(\omega) = (n + N)u(\omega) \tag{4.3}$$

[10] In a philosophical discussion of distributional issue, this is often called a "prioritarian approach"; see PARFIT (1995).

[11] "Paretian" simply means that the welfare function does not contradict the concept of Pareto efficiency. Here that means that the welfare function is non-decreasing in the individual utility values.

and of S_1:

$$W_1 = nu(\omega + t - \beta) + Nu(\omega + t) \tag{4.4}$$

The policy maker chooses the policy that leads to the highest value of welfare.[12] This will depend on the degree of concavity of the utility function u. If it is linear, efficiency, as defined in Section 3, is the chosen policy if:

$$\begin{aligned}(n+N)\omega &\geq (\omega + t - b)n + (\omega + t)N \\ n\beta &\geq (n+N)t = c(n,a)\end{aligned} \tag{4.5}$$

Benefits exceed costs.[13] Maximal concavity implies a comparison of the lowest utility value of W_0, which is $u(\omega)$ and the lowest value of the utilities making up W_1, which is $u(\omega + t - b)$. Giving rights to the minority is just, given the welfare function, if:

$$\begin{aligned}u(\omega) &\geq u(\omega + t - \beta) \\ \beta &\geq t\end{aligned} \tag{4.6}$$

The person worst off has to profit from the rights allocation.[14]

> PROPOSITION 4.1 Given that taxes financing the language policy are uniformly distributed among the total population, a redistribution policy will range between zero propensity to redistribute leading to pure efficiency (*equivalence principle*), $n\beta \geq c(n,a)$ and extreme propensity to redistribute, maximizing the well-being of the worst-off individual (*differential principle*), $\beta \geq t$.

The first result is, of course, a direct consequence of our definition of welfare as an increasing function of utility levels emerging from a concave utility function and of propensity to redistribute defined as the degree of concavity of the utility function employed. It s basically a tautology: if the policy maker is exclusively concerned with efficiency, the utility function is minimally concave, that is linear, and the policy maker selects the most efficient policy. The second result rests on the assumption that a policy maker is only concerned with the weakest

[12] An equivalent concept that goes back at least to PLATO (1980 /1888 [ca. – 395]) is the so called "social contract". Justice has been discussed by many great philosophers using this concept; see, for instance ROUSSEAU (1762), KANT (1797), or RAWLS (1971). Translated and trivialized by economists, the basic argument is that all individuals in society find themselves in an original position or behind a "veil of ignorance" form where they are unaware of their position in society. From here they have to chose the society they will be faced with as soon as the veil is lifted. In other words, they see society as a lottery where each individual with the same probability ($1/P$ with $P = N + n$ being the total number of individuals in society) can end up in any position in society. Applying expected-utility theory in order to model this situation, we arrive at the same formulation as in the text: maximization of the sum of individual concave utility functions. In the lottery, the degree of concavity corresponds to a degree of risk aversion. This can be translated into inequality aversion. A more detailed discussion can be found in WICKSTRÖM (2020a) and WICKSTRÖM (2025).

[13] This corresponds to the equivalence principle of WICKSELL (1896). The expenditure on a public measure should be covered by taxes that could be distributed among the people in such a way that everyone should be at least as well off as without the measure – a potential Pareto improvement.

[14] This corresponds to the difference principle of RAWLS (1971). Inequality due to a policy measure is acceptable as long as it improves the well-being of the worst off individual.

individual and maximizes his/her utility. Note that the second result is conditioned on prevailing institutions. The tax system influences the various utility values. Financing the language rights with a tax exclusively on the members of the minorities would in our set-up, with all members of the minority being identical as far as implicit income goes, lead to the efficient allocation. The analysis of polar scenarios helps us structure the problem, however.

In general, the policy maker will be indifferent between implementing the given measure or not if expressions 4.3 and 4.4 are equal:

$$\begin{aligned} (n+N)u(\omega) &= nu(\omega+t-\beta)+Nu(\omega+t) \\ u(\omega) &= \alpha u(\omega+t-\beta)+(1-\alpha)u(\omega+t) \\ \alpha\left[u(\omega)-u(\omega+t-\beta)\right] &= (1-\alpha)\left[u(\omega+t)-u(\omega)\right] \end{aligned} \tag{4.7}$$

where the minority population's fraction of the total population is: $\alpha := n/(n+N)$, and *mutatis mutandis* for the rest of the population: $(1-\alpha) := N/(n+N)$.

We already noted that the propensity to redistribute in favor of the minority can be represented by the concavity of the utility function. The concavity can be quantified by several parameters, for instance the coefficient of relative risk aversion, which is the marginal-utility elasticity with respect to income. Denote this with η. For a given η we can solve equations 4.7 for β in order to find the smallest β for which the policy maker would approve of providing minority rights: $\beta_0(t,\alpha,\eta)$. If $\eta = 0$, the utility function is linear and $\beta_0 = t/\alpha$. That is, efficiency is required. For an infinite η, $\beta_0 = t$, the case of the difference principle above.

An equivalent approach to redistribution, can be had by manipulating the policy variable β_p. The policy maker simply defines the "justice factor" as:

$$\phi(\eta) = \frac{t}{\alpha\beta_0(t,\alpha,\eta)} \tag{4.8}$$

and multiplies the best estimate of the average propensity to pay ($\hat{\beta}$) with this factor:

$$\beta_p = \hat{\beta}\phi(\eta) \tag{4.9}$$

and then perform the normal cost-benefit analysis comparing $n\beta_p$ with the costs $c = (n+N)t$. That is, the cost-benefit approach to language policy lets us incorporate distributional issues in the analysis in an elegant fashion.

> PROPOSITION 4.2 A cost-benefit analysis of language policy permits us to consider distributional issues in a consistent fashion by redefining the benefits of policy measures using a justice factor ϕ to multiply the "true" propensities to pay, thereby obtaining the "policy propensities to pay" that can be directly compared to the costs of the policy measure.

5 OPTIMAL SIZE OF A JURISDICTION

So far, the jurisdictions have been treated as exogenous variables, and we have seen that the implementation of language-policy measure should differ for different jurisdictions and different types of policy measures. We, however, very often see jurisdictional reforms in different

countries, and the changed jurisdictions can significantly change the direction of the language policy.[15] For that reason, it is important to understand the interaction between language policy and jurisdictional design. As a matter of fact, it might make sense to have overlapping parallel sytems of jurisdictions; one system for minority policies and another for general governance. We first set up a simple model for the size and location of jurisdictions and then look at how different language-policy measures interact with different types of jurisdictions and different underlying demographics in the country.

5.1 Model of the size the jurisdiction

For the sake of simplicity, we let the jurisdiction have unity width and variable length $a \in [0, a_M]$, where a_M is the size of the country. That is, the area of the jurisdiction is also a. The local density of the minority population is given by a (differentiable) function $\Delta(a)$. We assume that the minority is living in the area defined by $a \in [0, a_0]$ with $a_0 \leq a_M$ and that its density is non-increasing in a.

$$\begin{aligned} \Delta(a) &> 0 \quad \text{for } 0 \leq a < a_0 \\ \Delta(a) &= 0 \quad \text{for } a_0 \leq a \leq a_M \\ \frac{\partial \Delta}{\partial a} &\leq 0 \quad \text{for } 0 \leq a \leq a_M \end{aligned} \tag{5.1}$$

The size of the minority population in the jurisdiction is denoted by the function $n(a)$:

$$n = n(a) := \int_0^a \Delta(x)\mathrm{d}x \tag{5.2}$$

The total size of the minority population, n_0, in the country under consideration is given by $n_0 = n(a_M) = n(a_0)$. It is readily seen that $n(a)$ is concave on the interval $[0, a_M]$.

The average density of the minority population (δ) in the jurisdiction can also be written as a function of the size of the jurisdiction a:

$$\delta = \tilde{\delta}^J(a) := \frac{n(a)}{a} = \frac{1}{a}\int_0^a \Delta(x)\mathrm{d}x \tag{5.3}$$

The function $\tilde{\delta}^J(a)$ is decreasing due to the concavity of $n(a)$.

The efficient policy, however, depends on the size of the parameters n and δ. In equations 5.2 and 5.3, n and δ are parametrized by a. Since $n(a)$ is strictly increasing on the interval $[0, a_0)$, the reverse function $n^{-1}(n)$ exists on this interval and is also strictly increasing. We can then define the function $\delta^J(n)$ and the corresponding a on the interval $[0, N)$:

$$\begin{aligned} \delta^J(n) &:= \frac{n}{n^{-1}(n)} \quad \text{for } 0 \leq n < N \\ a(n) &:= n^{-1}(n) \quad \text{for } 0 \leq n < N \end{aligned} \tag{5.4}$$

The fact that $\tilde{\delta}^J(a)$ is decreasing implies that $\delta^J(n)$ is also decreasing on the interval $[0, N)$.

[15] Such changes are rather common. Norway, for example just made such a reform that has consequences for the language policy, see Det kongelige kommunal- og distriktsdepartement (2022b) and Det kongelige kommunal- og distriktsdepartement (2022a).

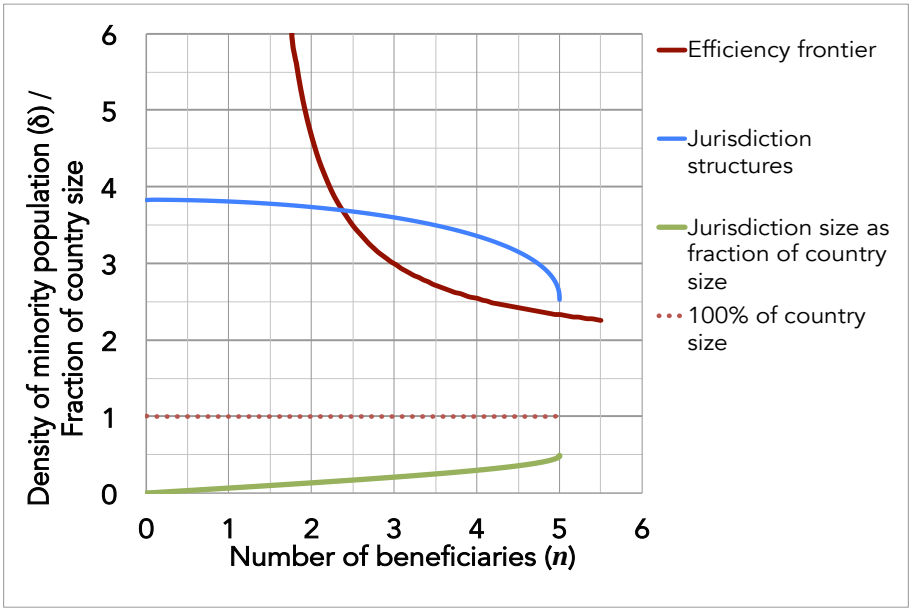


FIGURE 5.1 Efficiency frontier and minority structure of different sized jurisdictions

In figure 5.1, the efficiency frontier of a planning measure, $\delta^E(n)$, and the location of a jurisdiction, $\delta^J(n)$, in the $(\delta - n)$-diagram in dependence of the size of the minority population n are illustrated. Also the fraction of the state territory that is taken up by the jurisdiction for different values of n is indicated. For the sake of illustration, we have specified $\Delta(a)$ as $\Delta(a) = \Delta_0 - ba^\varepsilon$ with $\varepsilon \in [0, \infty]$. Then:

$$n(a) = \int_0^a \Delta(x)\mathrm{d}x = \Delta_0 a - b\frac{1}{1+\varepsilon}a^{1+\varepsilon} \tag{5.5}$$

and

$$\tilde{\delta}^J(a) = \frac{n(a)}{a} = \Delta_0 - \frac{b}{1+\varepsilon}a^\varepsilon \tag{5.6}$$

5.1.1 Maximizing net value

The value of the planning measure is increasing in the difference of the two curves illustrating the minority structure of the jurisdiction and the efficiency frontier. In fact, it is given as a function of n by $u(n, \delta^J(n))$. It is clear that the policy is beneficial only for the values of n for which $\delta^J(n) \geq \delta^E(n)$. This in turn implies different values of a.

To find an exact expression for the optimal (that is efficient) size of a jurisdiction we let a increase by a small amount, $\mathrm{d}a$. This will increase the minority population in the jurisdiction by $\mathrm{d}n(a) = \Delta(a)\mathrm{d}a \geq 0$. We are interested in the optimal size, $\hat{a}$, of the jurisdiction. It is sensible to move the border if then the benefits of the language rights in effect increase more than the costs of implementing those rights. The change in gross benefits (b) of a policy measure due to a small change in the border, $\mathrm{d}a$, are given by $\mathrm{d}b(a) = \beta\mathrm{d}n = \beta\Delta(a)\mathrm{d}a$ with β the average *per capita* benefit of the policy measure among the members of the minority. The increase in costs

due to the change in the border location is:

$$\mathrm{d}c(a) = \frac{\partial c}{\partial a}\mathrm{d}a + \frac{\partial c}{\partial n}\mathrm{d}n = \frac{\partial c}{\partial a}\mathrm{d}a + \frac{\partial c}{\partial n}\Delta(a)\mathrm{d}a \tag{5.7}$$

The change in net benefits becomes:

$$\mathrm{d}u(a) = \left[\beta\Delta(a) - \frac{\partial c}{\partial a} - \frac{\partial c}{\partial n}\Delta(a)\right]\mathrm{d}a = \left[\left(\beta - \frac{\partial c}{\partial n}\right)\Delta(a) - \frac{\partial c}{\partial a}\right]\mathrm{d}a \tag{5.8}$$

The change is non-negative if:

$$\left(\beta - \frac{\partial c}{\partial n}\right)\Delta(a) \geq \frac{\partial c}{\partial a} \tag{5.9}$$

This is our decision criterion for finding an efficient size of the jurisdiction. Using 5.9 and the assumption that $\Delta(a)$ decreases in a we can find the optimal size of a jurisdiction for a policy measure, $\hat{a}$, provided that the measure is at all sensible. Formally, we write:

> PROPOSITION 5.1 Let a^* be the largest feasible a satisfying expression 5.9. Then a^* maximizes the net benefit of the measure under consideration, $u(a)$. If $u(a^*) \geq 0$, $\hat{a} = a^*$, and this is the optimal size of the jurisdiction for the measure. If $u(a^*) < 0$, the optimal size is $\hat{a} = 0$; that is, the measure should not be implemented.

5.1.2 Maximizing number of beneficiaries subject to a positive net value of the planning measure

An alternative criterion could be to make sure that the language policy does not cause inefficiency. That is, make sure that $u(a) \geq 0$. In this case, one should choose the biggest a for which the jurisdiction values of n and δ are above the efficiency frontier.

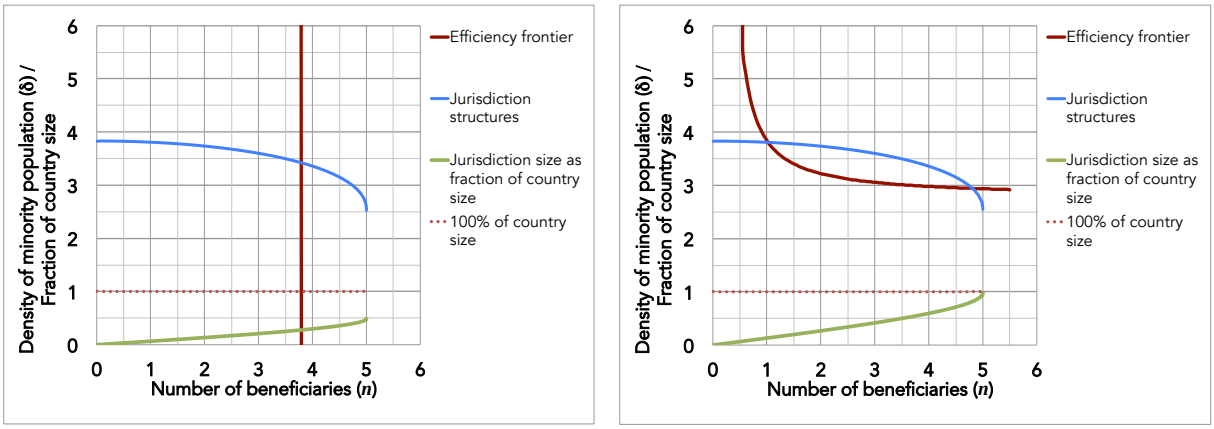
> PROPOSITION 5.2 The maximization of the number of beneficiaries of an efficient language-policy measure is achieved by finding the biggest n satisfying $\delta^J(n) \geq \delta^E(n)$. If the inequality cannot be satisfied, then the number is zero.

The different sizes to be chosen depend on the local density of the minority population as well as on the cost structure and the importance of the measure in addition to the demographics of the minority population in the country.

5.2 DEPENDENCE ON THE COST STRUCTURE OF THE POLICY MEASURE

We assume that the policy measures bring the same gross benefits *per capita*, β, but differ in cost structures. We also assume that the population structure stays the same. The cost structure is captured in expression 5.9 by the dependence of costs on the area of application, $\frac{\partial c}{\partial a}$, and on the dependence on the number of beneficiaries, $\frac{\partial c}{\partial n}$. If the costs of the policy measure are independent of a, expression 5.9 reduces to:

$$\left(\beta - \frac{\partial c}{\partial n}\right) \geq 0 \tag{5.10}$$



(a) Non-spatial planning measure (b) Spatial and rivaling planning measure

FIGURE 5.2 Measures with different cost structures

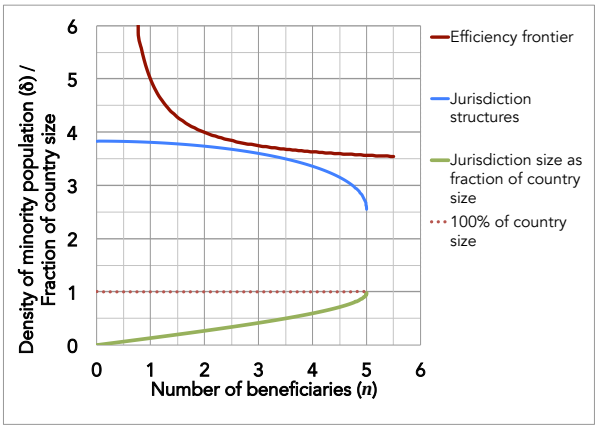
We note that concavity of the cost function implies that $\frac{\partial^2 c}{\partial n^2} \leq 0$ and conclude that only a "bang-bang" solution is possible. Either the entire region populated by the minority is optimal or the optimal region is zero if the critical value of n is larger than the total minority population. The result is the same for both goals – maximum value or maximum beneficiaries. This is illustrated in figure 5.2a. The optimal size is a_0, the entire area with a minority population which in the figure is half the country.

If the costs structure is spatial, the situation is more complex. However, we know that the efficiency frontier has the "normal" shape. That is, either the optimal a is zero or – if the measure is sufficiently spatial – it, in general, is less than a_0 for both goals.This is illustrated in Figure 5.2b. Of, course, the case that the efficiency frontier on the right end of the jurisdiction curve is below or equal to the jurisdiction curve can occur. In this case, maximizing the number of beneficiaries leads to a corner solution including all members of the minority.

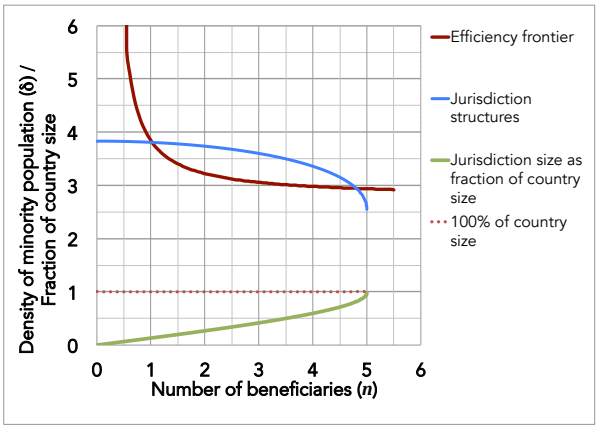
> PROPOSITION 5.3 If the policy measure is non-spatial the density of the minority population does not directly influence the size of the optimal jurisdiction and the optimal size of the jurisdiction is either the total area with a minority population, or the measure should not be implemented. For a spatial measure this changes and both the efficient size of the jurisdiction and the size maximizing the number of beneficiaries are, in general, less than the the total area with a minority population, or zero.

5.3 THE IMPORTANCE OF A MEASURE

The importance of a policy measure is reflected in the value of the *per capita* gross benefit β. Expression 5.9 tells us that an exogenous increase in β can ony be countered by decreases in a and n of the jurisdiction as long as the efficient size is positive. That is, the efficient jurisdiction should be made smaller. See Figure 5.3; in Subfigure 5.3a the two values are both zero, but in Subfigure 5.3b both the efficient size and the size maximizing the number of beneficiaries are positive. Increasing the importance "lowers" the efficiency frontier, which – as we saw analytically – lowers the efficient size, but – as we readily see in the figure – increases the size of the jurisdiction maximizing the number of beneficiaries under the condition of a positive net value. Also here the corner solution is possible.



(a) A spatial and rivaling planning measure of little importance



(b) An important spatial and rivaling planning measure

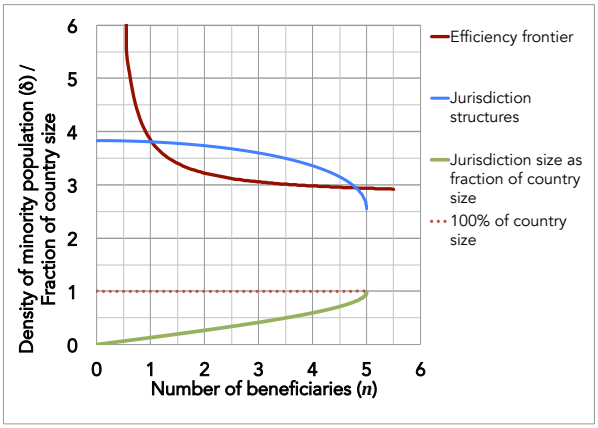
FIGURE 5.3 Planning measures of different importance

PROPOSITION 5.4 In the case of the efficient size of the jurisdiction being positive, an increase in the importance of the measure will cause the efficient size of the jurisdiction to decrease, but the size maximizing the number of beneficiaries to increase.

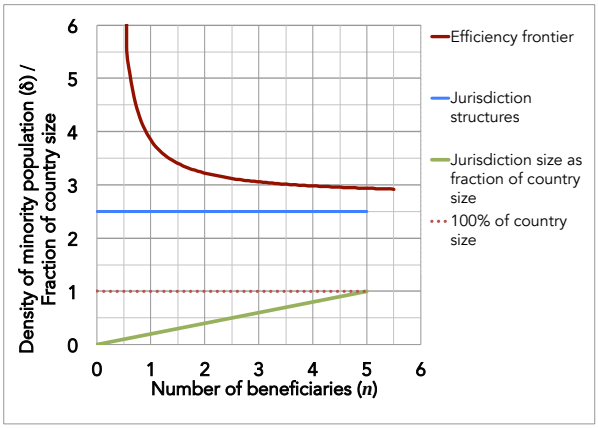
Of course, the same results apply if we interpret β as a measure of linguistic justice.

5.4 THE POPULATION STRUCTURE AND THE OPTIMAL SIZE OF JURISDICTIONS

Maybe the most interesting case is that due to changes in the population structure. The migration of members of the minority away from traditional areas into cities and towns away from the homelands does not change the size of the minority population, but the spacial structure.[16] Also this has implication for the optimal size of a jurisdiction.



(a) Geographically concentrated minority



(b) Uniformly distributed minority

FIGURE 5.4 Demographics of the minority

[16] For an analysis of urbanization in the areas around Helsinki/Helsingfors and Cluj-Napoca/Kolozsvár, see WICKSTRÖM (2023b),

Since the local density $\Delta(a)$ is non-increasing in a, so is $\delta(n)$ for all $n < n_0$. The *loci* of the jurisdictions in the diagram wlll become "flatter" the flatter is $\Delta(a)$, and for a uniform minority population the curve describing the possible jurisdictions is horizontal and below the curve with a concentrated minority. Indeed, many rival and spatial measures will have efficiency frontiers above the curve describing the uniform distribution, making them inefficient for any size of the jurisdiction. Only the non-rival measures will be unaffected by the change in the population structure, since they need a critical number of beneficiaries in order to be efficient and the total size of the minority remains at n_0, making any measure with a critical number less than or equal to n_0 efficient in the jurisdiction consisting of the entire country. Figure 5.4b illustrates the case of a homogeneously distributed minority as compared to a concentrated minority in Figure 5.4a.

> PROPOSITION 5.5 A reduction in the concentration of a minority will lead to fewer language planning measure being efficient and hence to less language rights for the minority. Only non-spatial measures are unaffected.

5.5 SOUTHERN SLOVAKIA – AN EXAMPLE

Practical policy, however, often differs from the optimal policy. We here look at the policy with regard to the Hungarian minority in Slovakia. It is easy to show that considerable efficiency gains are possible through minor changes in the jurisdiction structures.

Slovakia is divided into eight regions (*kraje/kerületek*) and each region in a number of districts (*okresy/járások*). The kraje/kerületek belong to level 3 of the EU system *NUTS*. All in all there are 79 districts. In Table 5.1, we present some data for two regions bordering on the Danube. As can be seen from the table, the districts very much differ in relation to the Hungarian minority in the two regions. It is clear that an optimal region will consist of, at most, nine districts.

In combining the districts we have started with the one with the highest density of the minority (Komárom/Komárno), then added the one with the next highest density (Šaľa/Vágsellye). However, in order to ensure that with each increment of the region there are no "island districts", we have to modify the order in some cases. We, hence added the jurisdictions as follows: Komárom/Komárno, Šaľa/Vágsellye, Nové Zámky/Érsekújvár, Levice/Léva, Veľký Krtíš/Nagykürtös, Lučenec/Losonc, Rimavská Sobota/Rimaszombat, Revúca/Nagyrőce, Nitra/Nyitra, Zlaté Moravce/Aranyosmarót, Topoľčany/Nagytapolcsány, Zvolen/Zólyom, Banská Bystrica/Besztercebánya, Žiar nad Hronom/Garamszentkereszt, Poltár/Poltár, Krupina/Korpona, Banská Štiavnica/Selmecbánya, Žarnovica/Zsarnóca, Detva/Gyetva, and Brezno/Breznóbánya.

In Figure 5.5, we find the present structure of the two regions and an alternative division of the districts, producing two new regions, with both size and population between those of the two present districts. The new South consists of up to eight districts and is clearly Pareto superior to both present regions. Were one to include Nitra/Nyitrai in the new South (instead of – as in the figure – the new North), the difference between the new North and the New South both in population size and area becomes very big with the new North considerably smaller than each of the two old regions and the new South considerably bigger than the old regions, both in number of inhabitants and in area.

TABLE 5.1 Two jurisdictions in central/southern Slovakia (area in km² and density in persons/km²)
Source: Census 2011, ŠTATISTICKÝ ÚRAD SLOVENSKEJ REPUBLIKY, 2011

Kraj/kerület	Population			Area	Density
Okres/járás	Total	HU	% HU		HU
Nitriansky/Nyitrai	689867	183535	27	6344	28.9
Komáromi/Komárno	103995	71425	69	1100	64,9
Šaľa/Vágsellyei	53286	17455	33	356	49.0
Nové Zámky/Érsekújvári	144417	52704	36	1347	39.1
Levice/Lévai	115367	30661	27	1551	19,8
Nitra/Nyitrai	159143	10447	7	871	12.0
Zlaté Moravce/Aranyosmaróti	41402	442	1	521	0.9
Topoľčany/Nagytapolcsányi	72257	401	1	598	0.7
Banskobystrický/Besztercebányai	660563	79830	12	9454	8.4
Rimavská Sobota/Rimaszombati	84889	36310	43	1471	24.7
Lučenec/Losonci	74861	19975	27	826	24.2
Veľký Krtíš/Nagykürtösi	45562	12731	28	848	15.0
Revúca/Nagyrőcei	40400	9298	23	730	12,7
Banská Bystrica/Besztercebányai	111242	517	0	809	0.6
Zvolen/Zólyomi	69077	318	0	759	0.4
Žiar nad Hronom/Garamszentkereszti	488289	175	0	518	0.3
Poltár/Poltári	22545	128	1	476	0.3
Banská Štiavnica/Selmecbányai	16595	63	0	292	0.2
Krupina/Korponai	22927	106	0	585	0.2
Žarnovica/Zsarnócai	27084	46	0	425	0.1
Detva/Gyetvai	32896	47	0	449	0.1
Brezno/Breznóbányai	64196	116	0	1265	0.1

5.6 EFFICIENCY IMPROVEMENT

Many policy measures that today are implemented at the level of districts could be made more efficient if administrated on the level of jurisdictions consisting of several districts. This does not exclude the possibility that some measures are better implemented in districts. The moral is that a sensible minority policy has to be flexible, with some local district measure, some regional measures, as well as some national measures.

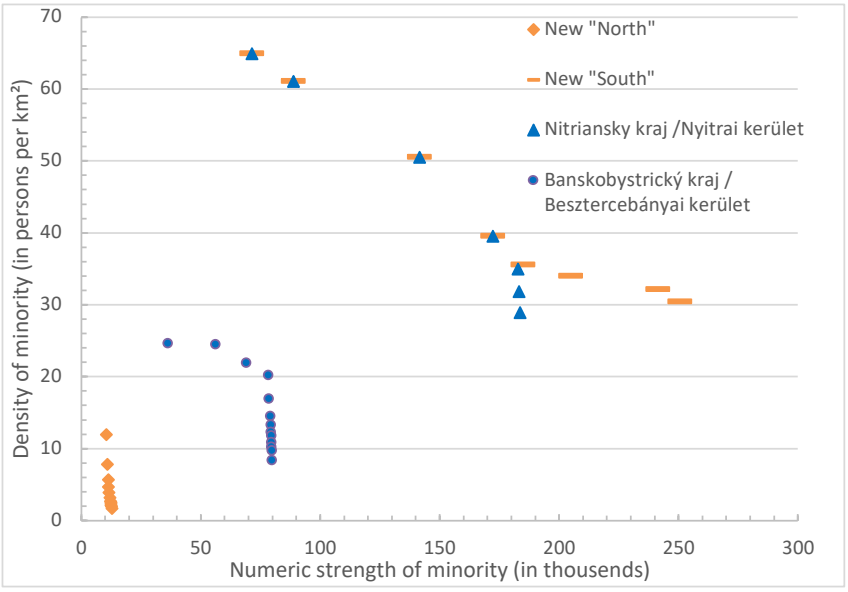


FIGURE 5.5 Efficient organization of the jurisdictions Nitriansky kraj / Nyitrai kerület and Banskobystrický kraj / Besztercebányai kerület and two alternative jurisdictions
Source: Census 2011, ŠTATISTICKÝ ÚRAD SLOVENSKEJ REPUBLIKY, 2011

6 CONCLUDING REMARKS

Language policy is one form of public policy. Language planning should. – in our opinion – be looked upon as any other public policy analysis and; hence, be subjected to normal policy analysis. This essay draws up the main lines of such an analysis. Many aspects of language policy are untouched, most notably dynamic aspects, which open up a number of interesting questions.[17]

What is certain, is that more flexibility, both in the territorial structure and in the design of language policy and planning – not just having one category "official language", but several depending on the cost structures and benefits of the single measures – can improve the situation for everyone.

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