# Linguistic diversity and economic security are complements

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#### Abstract (in Italian)

Si sostiene generalmente che la diversità culturale, linguistica o meno, all'interno di un paese, riduca il sostegno a politiche rivolte alla redistribuzione \_del reddito ed all'uguaglianza delle opportunità economiche. Nel presente articolo invece mostro che le politiche volte a ridurre l'insicurezza economica e gli interventi volti a favorire l'omogeneità culturale sono sostituti, più dell' uno riduce il valore dell'altro. In altre parole, dimostro una complementarietà tra la diversità culturale linguistica e la sicurezza economica, una maggiore quantità di un bene aumenta il valore che i cittadini attribuiscono all'altro bene.

The theme of the conference celebrating Philippe Van Parijs's Francqui Prize in 2003 – "Cultural diversity versus economic solidarity" – expressed the widespread and empirically founded concern that ethnic, linguistic, religious and other differences among citizens might reduce support for public policies that redistribute income and economic opportunities to a society's less fortunate members. The topic unified two of Philippe's passions and important strands of his scholarly contribution, and (the title notwithstanding) the meeting provided some hopeful suggestions that cultural diversity and economic solidarity might be synergistic rather than in opposition.

Prominent among these were Philippe's concluding remarks (Van Parijs 2003) and what he called "Pagano's good news." Ugo Pagano's paper (building on earlier work: D'antoni & Pagano 2002) advanced the idea that cultural diversity within a nation inhibits geographical, occupational, and other forms of mobility when economic adversity requires a job change or other relocation, thereby exposing citizens to greater economic risks and inducing them to demand more adequate levels of economic insurance from

<sup>&</sup>lt;sup>\*</sup> I would like to thank Philippe Van Parijs for decades of stimulation of the sort that led me to think about the topic of this paper, Ugo Pagano for the idea that cultural standardization is a form of insurance, and the Behavioral Sciences Program at the Santa Fe Institute both for an extraordinary scientific environment and for the more mundane assistance it has provided.

the state. Here I extend Pagano's idea and my subsequent work with him (Bowles & Pagano 2006) to show that an unconditional basic income grant (hereafter BIG) of the kind that Philippe has championed would reduce the citizens' incentives to learn a *lingua franca* rather than investing in acquiring more culturally specific assets. (For the moment I ignore the many reasons to learn a *lingua franca* that are unrelated to risk reduction.)

The idea is simple. Consider an individual with a given set of skills and no other sources of income. Learning the lingua franca is costly, but by providing access to otherwise inaccessible labor markets in which one's skills may be in demand, it reduces the expected cost of losing one's job. Let us suppose that job loss is the risk to which the citizen is exposed. The basic income grant reduces risk exposure in a way similar to the lingua franca. It provides a fixed income (the grant) at the cost of paying taxes that are levied on a risk exposed income stream. Thus it substitutes a fixed transfer for a variable flow of income. Because the degree of an individual's risk aversion varies with the level of risk exposure, the provision of a basic income grant reduces the citizen's risk aversion and hence limits her demand for the implicit insurance provided by a lingua franca. For analogous reasons it is also true (as Pagano suggested) that policies promoting learning the lingua franca will reduce the demand for social insurance. We will see that the basic income grant and the lingua franca are substitutes, more of one reduces the value of the other. Or to put it more positively, linguistic diversity and economic security are complements: each enhances the citizens' benefits of having more of the other.

## The citizen's choice of risk

To see why this is true we need to study three things: the risk choices that the citizen makes and their consequences for her expected income, the citizen's attitude towards risk, and the way that a basic income grant or knowledge of a *lingua franca* will alter these aspects of the individual's decision problem (see Bowles 2004 and the appendix). Concerning the first, suppose the individual has two choices. She may select a degree of specialization in her training (studying a particular physical therapy technique, for example, rather than liberal arts, which would give her a lower expected income (net of the costs of education) but greater occupational flexibility and hence less risk exposure. Her second choice is how much to invest in learning the *lingua franca*.

Concerning the citizen's attitude toward risk, suppose in the absence of the BIG and any investment in the *lingua franca*, an individual's realized income, *y*, is his expected income plus deviations from expected income that cannot

be predicted in advance. As a result income varies in response to stochastic shocks according to

$$y = g(\sigma) + z\sigma$$

where  $g(\sigma)$  is expected income and z is a random variable with mean zero and unit standard deviation. Thus,  $\sigma$  is the standard deviation of income, a measure of risk. States among which the individual must choose differ in the degree of risk to which the individual is exposed,  $\sigma$  and the expected income g. For example a university student specializing in a very specific and well paid skill would face elevated levels of both risk and expected income compared to a student with a less specialized course of studies. Then we write the individual's utility function as

$$v = v\{g(\sigma), \sigma\}$$

with the marginal utility of expected income,  $v_g > 0$  and the marginal utility of risk,  $v_{\sigma} \le 0$ , so g is a good and  $\sigma$  is a "bad", except, as we will see when risk exposure is absent. The citizen's preferences can be expressed as a simple two-parameter utility function in this case because the variation in income is generated by what is termed a linear class of disturbances. (For technical details: Bowles 2004, drawing on the earlier work of Meyer 1987 and Sinn 1990.)



Fig. 1. Indifference loci of a decreasingly risk averse individual and choice of a risk level

There is evidence that the poor are risk averse and that risk aversion decreases with an individual's income level (Binswanger 1980; Saha, Shumway & Talpaz 1994). The indifference loci of such a so-called decreasingly risk averse individual appear in Figure 1.

The slope of an indifference locus in the figure is the individual's marginal disutility of ris posure relative to their marginal utility of expected income or  $-v_{\sigma}/v_g = \eta$  which is termed the marginal rate of substitution between risk and expected income. Thus  $\eta(g,\sigma)$  is a measure of the level of risk aversion experienced by an individual faced with the level of expected income and risk given by the particular values of the arguments of the function.

The indifference loci are flat at the vertical intercept ( $\sigma = 0$ ), meaning that in the absence of risk a small increment in risk exposure is virtually costless to the individual. The loci are increasing and convex in  $\sigma$ . They become steeper as  $\sigma$  increases. Finally they become flatter as g increases when  $\sigma > 0$ , that is risk aversion declines as expected income increases. The vertical intercept of each locus is the *certainty equivalent* of the other points making up the locus: It gives the maximum amount the individual would pay for the opportunity to draw an income from a distribution with the mean and dispersion given by each of the other points on the locus. Because one can overspecialize even if one were to care only about expected income, it is plausible to assume that the so called risk-return schedule,  $g(\sigma)$ , is inverted u-shaped, first rising and then after reaching a maximum falling as shown in Figure 1.

The decision maker faced with this risk return schedule will vary  $\sigma$  to maximize his utility subject to  $g = g(\sigma)$  and thus will equate  $g' = -v_{\sigma} / v_g$  requiring that the marginal rate of transformation of risk into expected income (the lefthand side, that is, the slope of the expected income function) be equated to the marginal rate of substitution between risk and expected income. Were one to exist, a risk neutral individual (namely, one for whom  $v_{\sigma} = 0$  for all values of  $\sigma$ ) would set g' = 0, maximizing expected income by choosing the level of risk that implements the maximum of the g function. The risk-averse individual (with  $-v_{\sigma} > 0$ ) will select a level of risk such that g' > 0, which implies a lower level of risk, with a lower expected income.

# The basic income grant and cultural standardization as insurance

The risk reduction effects of the BIG are readily studied in this framework, as they result in a leftward shift in the g function that results from the fact that the basic income is not risk exposed and it is funded by taxes that reduce the risk exposed income stream, thereby substituting a certain income for the tax portion of the uncertain income. In Figure 2, I show a horizontal displacement of the g function indicating that the BIG is a pure risk reduction intervention without income reducing effects that might be associated with other conditional risk reduction policies (I have shown in Bowles (1992) that a substantial BIG can be introduced without adversely affecting incentives to work and invest.)





[should "c" in this § be in **bold**?] In this figure, the pre- and post-BIG risk choices and expected incomes are indicated by super scripts o and b respectively and by points **a** and **b** respectively. Point c resulting from an unchanged level of risk taking after the introduction of the BIG cannot be a utility maximum because the indifference locus at c must be flatter than at **a**, while the slope of the g function is unchanged. So the tangency required for a maximum must be at some higher level of risk taking. The increase in the level of risk-taking is due to both the lesser level of risk exposure of the citizen and (given that risk aversion is decreasing in expected income) the higher level of expected income at point **b**. It is worth noting (but not studying in detail) that were the intervention to reduce expected income for any given level of risk choice (shifting the g function down as well as to the left) then the above result need not hold, as the reduced expected income would enhance risk aversion and could offset the effects of reduced risk exposure.

To determine the effect of learning a *lingua franca* (for the moment in the absence of a BIG) we imagine that one can incur costs to learn various amounts of the *lingua franca*, and that learning more is associated with greater risk reduction as it makes one's skills more valuable in a wider range of alternative labor markets. Thus we posit a cultural risk reduction technology that for a cost of  $f\lambda$  reduces risk exposure by an amount  $\lambda$ .



Figure 3. Learning the *lingua franca* reduces the experienced risk level and induces a higher choice of risk

In figure 3 the individual could select point **a** as before. But if it costs f to reduce risk exposure, as long as this cost is less than the degree of risk aversion (the slope of the indifference locus) the citizen would do better to learn some of the *lingua franca*. Thus he will choose point **a**, trading off some expected income for reduced risk exposure (this is not shown in the figure). But the citizen could do even better by then adopting a higher level of risk and learning even more of the *lingua franca*. This is show in the figure by point **f** (the citizens choice of risk and expected income) and point **L** (the citizen's experienced level of risk exposure and reduced expected income net of the costs of language study). At point **L** the citizen's optimum is given by equating the marginal rate of transformation of increased risk into increased expected income (g') with the marginal rate of transformation of reduced risk in the cultural insurance technology (which is just f). The expected income net of the language costs need not increase (in the case depicted in the figure it does

not change). The contrast with the BIG case arises because we have assumed that language training is costly while the transfers associated with the BIG are not.

## The economic security and cultural diversity are complements

It is now clear why the *lingua franca* and the BIG are substitutes: what they both accomplish, namely risk reduction, is subject to diminishing returns, so that more of one reduces the marginal value of the other. We just saw that the individual would choose to learn the *lingua franca* in the absence of a BIG, and we reproduce this result at point **a** in figure 4, where because f is less than the degree of risk aversion, the individual could benefit from learning the *lingua franca*.



the incentive to learn the *lingua franca* 

Note: at point a the upward sloping line gives the individual's cultural risk reduction technology (with slope f) and shows that acquiring the lingua franca would be optimal (as explained with respect to figure 3). The reduced level of risk exposure of the citizen at the post-BIG outcome (point b) makes the citizen indifferent to learning the lingua franca.

But will the citizen also gain from learning the *lingua franca* if the BIG is introduced? It need not be. Figure 4 shows the level of the BIG such that given the resulting risk exposure of the citizen (point **b**) there would be no benefit to learning the *lingua franca*. A smaller BIG would reduce the optimal acquisition of the *lingua franca* (compared to the no-BIG situation), but not

eliminate it. A poorly designed BIG that reduced income substantially while not accomplishing much risk reduction could leave the degree of risk aversion unaltered, or even raise it, thus possibly even increasing the demand for learning the *lingua franca*.

Not surprisingly, the converse is also true: the availability of cultural risk reduction technology that is sufficiently effective (f low enough), will reduce the demand for a BIG. This can be seen in Figure 3 where the demand for risk reduction associated with the BIG is just the degree of risk aversion. At point **a** this is considerable, indicating that the citizen would be willing to incur a substantial expected income loss in order to reduce risk exposure. Even though acquiring some of the *lingua franca* induces the citizen to incur more risk, the resulting degree of risk exposure is reduced, and the citizens' willingness to pay (in expected income losses) for a reduction in risk is reduced (the slope of the indifference locus at **L** is less than at **a**).

Learning the *lingua franca* in this model is just a metaphor for any costly activity that reduces an individual's risk exposure by making her income earning assets less vulnerable to culturally local shocks. Cultivating culturally diverse network ties could play a similar role. The example returns us to the many reasons (put aside at the outset) other than risk reduction that an individual might want invest in less culturally specific skills. It also reminds us that those who invest in either more universal skills or skills specific to more than one culture provide important benefits to their fellow citizens and no-citizens alike. Thus one cannot infer from the analysis here that we should count the reduced demand for learning the *lingua franca* and the possible contribution that this makes to cultural diversity as a reason to support the BIG (and similar risk reducing public policies).

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## Appendix

To take account of the financing of the BIG we let the citizen pay a tax equal to a fraction  $\tau$  of her income and to receive a grant of b, with the two terms selected so that varying the size of the grant and its necessary funding does not alter citizen's expected income. This is just a device for abstracting from the redistributive effects of the BIG so as to study the pure insurance effects. Given some tax rate and grant level, when the citizen selects a level of risk  $\underline{\sigma}$ , and language training  $\lambda$  her realized income (taking account of both the BIG and cost of learning the *lingua franca*) is

$$y = (g(\underline{\sigma}) + z\underline{\sigma})(1-\tau) + b - f\lambda$$

and the realized standard deviation of income is  $\sigma = \underline{\sigma}(1-\tau) - \lambda$ . From this latter expression we see that a larger BIG (financed by a larger  $\tau$ ) reduces the risk exposure of the citizen. Writing  $g(\underline{\sigma}, \lambda)$  for the citizen's expected income (just the above expression for realized income minus the  $z\sigma$  term), the citizen varies  $\underline{\sigma}$  and  $\lambda$  to maximize  $v = v\{g(\underline{\sigma}, \lambda), \sigma(\underline{\sigma}, \lambda)\}$ . This optimization problem gives us the tangency conditions shown in the text, namely  $f = g' = -v_{\sigma} / v_{gr}$  requiring that the two marginal rates of transformation of risk into expected income be equal to the marginal rate of substitution between risk and expected income (that is, the citizen's degree of risk aversion).

The assumption that for a given cost (of *lingua franca* learning) the realized standard deviation of income can be reduced by a given amount simplifies the model (it makes the cultural risk reduction technology linear) but does not account for the results. Were I to assume more realistically that the costs of risk reduction are greater as risk exposure is reduced, the results presented here would be strengthened. For example, entirely eliminating the incentive to learn a *lingua franca* would require a smaller BIG than is shown in Figure 4.