Markets and Linguistic Diversity

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MAN IN THE DARK
LOS ETARRAS LANZAN UNA NUEVA OFENSIVA

Al menos 12 terroristas ejecutaron los atentados

Interior atribuye los tres coches bomba al "complejo Vizcaya", que se ha reactivado

El otoño irrumpе con fuerza en Cataluña

Barcelona multa cada día a solo ocho ciclistas

Castells acusa a Mas de frenar el frente único por la financiación

EUTA no se saldrá jamás con la suya, dijera el hijo del brigada asesinado en Santona

Zapatero y Rajoy refuzan el discurso de entendimiento contra la banda
Al menos 12 terroristas ejecutaron los atentados

El otoño irrumpe con fuerza en Catalunya

Barcelona multa cada día a solo ocho ciclistas

Castells acusa a Mas de frenar el frente único por la financiación

La tardor irrompe amb força a Catalunya

Barcelona multa cada día només 8 ciclistas

Castells acusa Mas de frenar el front únic pel finançament

El Govern trenca la falla d'entitat amb CIU, avansa a ERC i debilita la Generalitat en la negociació amb Madrid
Introduction

• Language as an independent characteristic of some goods: books, films, newspapers, TV programs, radio programs

• Language choices are not trivial in markets with multi-lingual consumers (competent in more than one language but with a preference for one of them)

QUESTION: Do markets provide the efficient level of linguistic diversity?
The local motivation

- Catalonia (7.5 million inhabitants):
  - A very large fraction of the population is bilingual: competent in both Catalan and Spanish (Castilian)
  - roughly 50% of the population report Catalan as their family language or the language they use more frequently. The other 50% report Spanish

- Potential market:
  - Goods in Catalan: less than 10 million (Catalonia, Balearic Islands, Valencian Community)
  - Goods in Spanish: 48 million (Spain), almost 400 million (including Latin America)
Catalonia: % Consumption in Catalan

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<td>Films</td>
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English around the world

• **The Economist:**
  – 400 million speak English as their mother tongue
  – 400 million speak English fluently as their second language
  – One billion are learning it

• **British Council:** Within a decade Two billions will be learning English

• Dominant position of films and books originally made in English in the world market

• Examples of Al Jazeera, France 24 and Russia Today (TV stations based in non-English speaking countries)
Question

- As a larger fraction of the world population becomes competent in English...
  ...will the world’s linguistic diversity fall below socially efficient levels?
Don’t we already know the answer to this question?

- **Received wisdom**: markets may provide too much or too little diversity ("anything goes"): market expansion vs. business stealing effects.
- What is different about language? What matters is having more than one dimension of product differentiation.
- Consumers have preferences about:
  - Intrinsic characteristics of the good
  - Language of the good
- As a first approximation: These two dimensions are independent i.e., preference distribution over intrinsic characteristics is the same for all linguistic communities
Main ingredients

• Relative size of the minority community
• Degree of competence of the minority in the majority language (intensity of the linguistic preferences of the minority)
• Is the majority also competent in the minority language (symmetric versus asymmetric bilingualism)
• Firms must supply their products in a single language (adoption model) or they can supply more than one linguistic version (translation model)
• Private incentives (profits) versus social incentives (total welfare): no distributional issues, no political economy.
• Exogenous (linguistic) preferences
Set up

- Spokes framework (Chen and Riordan, 2007) representing the space of intrinsic characteristics
  - Arbitrary number of spokes of length 1/2 that start at the same central point.
  - Consumers are uniformly distributed over all spokes.
  - Firms are located at the end of the spoke.
  - Each consumer has a preference for only two varieties: uniform distribution over all possible pairs
  - Model works as Hotelling, where each firm competes “against the market” (monopolistic competition in the spirit of Chamberlain)
  - All possible varieties are activated
  - Continuous version (Caminal and Granero, 2007): mass of firms is normalized to one.
Set up

• Two languages: C and S.
  – A fraction $\alpha$, $0 < \alpha < 0.5$, prefer consumption in C-language, and the rest in the S-language.
  – Independence: For any pair of preferred varieties and in every location the fraction of C-consumers is $\alpha$.

• Symmetric bilingualism
  – If a consumer has a preference for varieties j and k and is located at a distance $x$ from firm j, then
    • If she consumes one unit of variety j then her utility is $U = R - x - \lambda \Theta - p_j$
    • $U = R - (1 - x) - \lambda \Theta - p_k$ if she consumes variety k.
  $\Theta$ takes value 0 if she consumes the good in her favorite language, and 1 otherwise
Remark

- Number of active firms is exogenous. Firms’ language choices affect the degree of mismatch in terms of both intrinsic characteristics and language, but DO NOT AFFECT TOTAL DEMAND
  
  ...a limitation of the model
The adoption model

• Each firm produces a single variety and chooses either S or C (and prices). Constant marginal costs (normalized to zero)

• $\beta^*$: the fraction of goods supplied in C that maximizes total welfare

• $\beta^e$: fraction of goods supplied in C in equilibrium with profit maximizing firms
The adoption model

• *Proposition 1:* $\beta^e \leq \beta^*$ and if $\beta^* > 0$ then $\beta^e < \beta^*$.

Markets provide too little linguistic diversity
Figure 1

\[ \beta^* > 0 \quad \beta^e > 0 \]
Figure 2

\[ \frac{1}{2} \]

\[ \beta \]

\[ \alpha \]

\[ \beta^* \]

\[ \beta^e \]
Intuition

• **First best:** If $\beta > 0$ then most consumers have access to goods in their favorite language at the cost of a mismatch in intrinsic preferences. As $\lambda$ and/or $\alpha$ increase, it becomes more important achieving a good linguistic match: $\beta^*$ increases.

• **Equilibrium**
  - **Market size:** Under exogenous prices all firms choose S
  - **Specialization:** Under endogenous prices firms may have incentives to specialize in selling to C-consumers (those with higher willingness to pay).

$\Rightarrow$ Firms can only appropriate a fraction of the total surplus.
The translation model

• Firms choose:
  – Supply the good in S.
  – Supply the good in C
  – Supply two versions, on in S and one in C. In this case they pay a cost F.

• Endogenous variables: $\beta_s$, $\beta_c$
  – Varieties supplied in both languages (translations): $1 - \beta_s - \beta_c$
  – Varieties supplied in C: $1 - \beta_s$

• Index of linguistic diversity: $\mu = (1 - \beta_s) - (1 - \beta_c) = \beta_c - \beta_s$
Translation model

• Proposition 2: There exists a threshold value of $F$, $F_T$, such that if $F \geq F_T$ then $\mu^e < \mu^*$ (unless $\alpha$ is so low that $\mu^e = \mu^* = -1$), and if $F \leq F_T$ then $\mu^e > \mu^*$ (unless $\alpha$ is so high that $\mu^e = \mu^* = 0$).

Markets may provide too much or too little linguistic diversity
Translation model

• Another “anything goes” type of result?

• NO.
  – Too much diversity only if fixed costs are so low that the fraction of varieties in the minority language is very high with respect to the size of the minority community ($1 - \beta_s \gg \alpha$)
Figure 4a

\[ z = \frac{F}{\lambda \alpha} \]

\[ \beta^e_c - \beta^e_i \]

\[ \beta^i_c - \beta^i_i \]
Figure 4c

\[ z = \frac{F}{\lambda \alpha} \]

-1

\[ 1 - \frac{\lambda}{2} \quad 1 - \frac{\lambda}{4} \quad 1 \quad 1 + \frac{\lambda}{4} \]

\[ \beta_i - \beta_i^c \]

\[ \beta_i^c - \beta_i^e \]
Intuition

• If $F$ is high, then no translations in equilibrium (adoption model): insufficient linguistic diversity
• If $\alpha = 0.5$, then excessive translations.
  It turns out that $\beta_s = \beta_c = \beta$,
  Number of translations: $1 - 2\beta$
  $1 - 2\beta^e > 1 - 2\beta^*$ (Business stealing effect dominates)
• Result is a combination of both forces.
Robustness

- Price discrimination
- Asymmetric bilingualism
- Advertising
- Second best
- Endogenous number of varieties
- Multi-product firms
Robustness

- Price discrimination ✔
- Asymmetric bilingualism ✔
- Advertising ✔
- Second best ✔
- Endogenous number of varieties ❌
- Multi-product firms ❌
Conclusion

• Market incentives are biased against minority languages …

… except if the costs of supplying more than one linguistic version are sufficiently low