

TV or not TV?
Subtitling and English skills

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Abstract

We study the influence of television translation techniques on the quality of the English spoken across the OCDE. We identify a large positive effect for subtitling as opposed to dubbing, which loosely corresponds to between six and ten years of formal English education at school. We then find that better English skills are positively related to high-tech exports, international college students in the U.S. and correlations in United Nations General Assembly voting patterns.

I Introduction

English is the language of the globalised world, and the lingua franca for the international communities in, among others, science, finance, advertising, culture, tourism, law and technology. As a consequence, it is the most widely learnt foreign language, and is expected to continue growing fast in the coming decades (Graddol, 1997 and 2006). The British Council estimates that about one billion people are currently learning English around the World (British Council, 1997). In 1995-96, over 400,000 candidates sat examinations administered by the Council (Crystal, 2007), and about 200 million study it in China alone.

Sixty-eight percent of the European Union –E.U– citizens rate English as the most useful foreign language—far from the second position for French with twenty-five per cent (EU, 2006)—and Japan has created one hundred "super English high schools" where classes are tough exclusively in that language (Newsweek, 2007).

A recent survey (European Commission, 2006) shows how most Europeans think that the best way to learn English is either at school (57 per cent of the interviewed) or through lessons with a teacher, either one-to-one (40 per cent) or in groups (42 per cent). Other ways in which they think they can learn the language is by visiting the country, either as a tourist (50 per cent) or to take language courses (44 per cent), or through conversation with native speakers, both through language exchanges (36 per cent) and informally (33 per cent). Learning by watching films in original version is considered important by a meagre 12 per cent.

Following people's view, the prevailing teaching model is to ensure that students gain some basic proficiency in primary school and improve it in secondary school and university, often by using it as the "vehicular" language for other subjects. More than 80 per cent of the E.U.'s pupils learn English. The duration of the studies ranges between six¹ and thirteen² years.³ In comparison, pupils in the U.K. learn foreign languages for an average 3.5 years, and there are no compulsory foreign language requirements in Ireland and Scotland (Eurydice, 2005).⁴

Despite the huge amounts spent in the teaching-intensive method, disparities in the quality of English across OECD countries are very large. For example, in places such as the Netherlands and Sweden, about 4 in 5 citizens are able to hold a conversation in English, but the proportion is only about 50 per cent in some of their neighbours, e.g. Belgium and Finland. Japanese TOEFL takers score 192 on average,

¹In some Belgian regions.

²In the Netherlands, Norway and Luxembourg.

³Spain is even introducing additional years for a total of fifteen, starting at the age of three.

⁴In 2004 a British survey discussed by the BBC showed that only one in ten U.K. workers could speak a foreign language and less than 5% could count to 20 in a second language (http://news.bbc.co.uk/2/hi/uk_news/3930963.stm).

compared to 218 by their Korean counterparts. While 86 per cent of Danes claim to be able to speak English, that is only the case for 58 per cent of Austrians. The reasons for those disparities do not seem to be straightforward.

In this paper, we suggest that the method used to translate foreign films on television is one of the main drivers of the quality of the English spoken as a foreign language in developed countries. Television has already been shown to influence social outcomes, including violent crime (Dahl and DellaVigna, 2006), voting turnout (Gentzkow, 2006), democratic/republican patterns (DellaVigna et al, 2007) and international policy (Eisensee and Stromberg, 2007). There is further research on television and social capital in rural communities (Olken, 2006), anti-americanism (Shapiro and Gentzkow, 2004) and even on the effect of soap operas on women's fertility (Chong et al 2008). Somewhat related to our research, Gentzkow and Shapiro (2007) identify an effect of television on educational test scores. They find a positive effect on verbal skills in the US, which is particularly strong for those children whose mother tongue was not English.

Most OCDE households own a television set. Where available, subtitled original version programmes provide continuous exposure to foreign languages as spoken by natives, which, we argue, is bound to improve the viewers' vocabulary, grammar and listening comprehension. The United States and United Kingdom are the largest producers of fiction programmes watched in Europe. When someone watches a television film in original version, it is therefore likely that the language source will be English. Thus, the citizens of countries where films are shown in original version should be better at speaking English than those where television is dubbed. That might, in turn, influence their attitude towards social issues like trade, investment, study abroad or politics.

In this paper we address three inter-related issues. The first question is "why are there subtitles in some countries and dubbing in some others?" We identify and systematically analyse the historical circumstances under which countries opted for one of the alternatives, during the 1930s. We show that dubbing was systematically adopted in countries with dictatorial (and nationalistic) regimes during the period, and those whose national languages were widely used internationally. Smaller and more democratic countries adopted subtitling, but essentially we find that the "size" of the language, and not the size of the country, determine the adoption of subtitling.

The second question is: "what is the influence of translation mode on the quality of the English spoken in different countries today?" We find that most variables one would a priori have considered turn out not to be too important. These include expenditure on education per capita and openness of the economy, among others. In our regressions, the quality of the English depends on the linguistic similarity with the local language plus the number of years spend learning it at school. However, the most important

explanatory factor is indeed the film translation mode prevalent in each country. We therefore provide empirical evidence that, *ceteris paribus*, English is better in countries where television is in original version with subtitles. The magnitude of the subtitling effect is very large, corresponding to between four and nine years of English learning at school, and the interaction effects indicate some complementarity between subtitling and formal learning. Pupils in countries where there are subtitles benefit more from their English classes.

The final research question is about economic and social effects of subtitling. We posit that the effects of subtitling for individually acquired English skills might spill over to society as well, accruing at a higher aggregation levels and affecting the country's economic, political and social stance in several issues. For example, having employees who speak English might be a factor improving firm openness and export potential. Workplaces in which more people speak English might offer more qualified, productive and better paid jobs.⁵ Moreover, countries in which people have learnt better English on television might trade more with anglo-saxon countries, and their citizens might be more frequent travellers and more often to English speaking countries. Finally, the implications might also be geopolitical. Building on Gentzkow and Shapiro (2004), we suggest that countries in which more people have learnt English thanks to subtitling might turn out to be more pro-American than others where they have not. Therefore, the third general question that we explore is: "How does subtitling influence a country's economic and social outcomes?"

We provide evidence of a number of instances in which there is an influence. First, we link the use of subtitles, years of English and quality of the education system to a country's technology exports. Our estimates suggest that subtitling increases the ratio of high-tech exports to total exports by 0.76 standard deviations, and for one additional year of English education, high-tech exports increase 0.21 standard deviations. In terms of high-tech exports, subtitles are equivalent to about three years of English education. Second, we find support for the fact that subtitling countries send more students to the US, relative to the total population. Third, we use a measurement of foreign policy affinity based on United Nations voting patterns and find that the relationship between, English skills and affinity with the U.S. foreign policy is strongly positive.

To address these questions, we use a data panel combining measures of English quality, historical and contemporary economic variables. Our data set includes all members of either the Organisation for Economic Cooperation and Development (OECD), the European Union (EU) or both organisations who do not have English as their local language (i.e. we exclude Australia, Canada, Ireland, the UK and the USA). In most of our sample, English is the most widely spoken foreign language. Moreover, in every

⁵In fact, the existence of those public returns often provides the justification of public funding of education.

country covered, except Luxembourg, English is one of the two most widely spoken.

The remaining of the paper is organised as follows: in section, 2 we discuss the data. Section 3 includes our work examining the historical causes of dubbing and subtitling. The results on English proficiency are presented in section 4. Section 5 includes the results on the social and economic effects of speaking good English. We conclude in section 6. The data sources are summarised in the Appendix.

II Data

Our dataset includes information from those countries who are either members of the OECD, the EU or both organisations. Table 1 reports the country list, together with measurements of the quality of the English spoken in each of them. We use two measurements of the quality of English in each country.

The first measurement consists on EU data on the percentage of people who declare themselves able to hold a conversation in English, as measured in E.U. Eurobarometer surveys. According to this $Survey_{i,t}$ variable, English (34 per cent) is the most widely known language besides the mother tongue followed by German (12 per cent) and French (11 per cent). Spanish and Russian are spoken by one in twenty respondents.

$Survey_{i,t}$ is a first approximation and has already been used in previous literature (e.g.). However, in spite of its interest, it has two shortcomings. First, it has been collected only in three occasions for at most 28 countries. Second, the data is self-reported and thus clearly subjective.

<<TABLE 1: ENGLISH PROFICIENCY BY COUNTRY: EU SURVEY AND TOEFL SCORES>>

Therefore, we feel it is desirable to complement $Survey_{i,t}$ with an alternative measurement and use the yearly averages of the TOEFL⁶ scores obtained by residents in each country. The TOEFL is a standard exam accepted by most colleges and universities in the world. It is based on multiple-choice and intended to measure the skills needed to communicate ideas in real-life, academic situations. Its standardisation means that it is relatively fair and accurate: the fact that all test takers have a similar test eliminates the inconsistency of interviews and other softer methods. We use all non-English speaking OECD countries, both inside and outside the EU. The $TOEFL_{i,t}$ variable thus addresses the lack of observations and subjectivity concerns with $Survey_{i,t}$ and allows us to increase the sample size by adding non-E.U. OCDE countries.

⁶Test of English as a Foreign Language

One potential problem with $TOEFL_{i,t}$ is that it might suffer from its own self-selection issues. It is likely that TOEFL takers will be those who are interested in pursuing studies abroad. Hence TOEFL might not measure the quality of the English spoken by the whole population but a sub-sample. TOEFL takers are likely to be better at speaking English than the average. The main issue for our purposes is whether the different national sub-samples are biased to different degrees, i.e. whether some are more representative than others. Our logic is that there might be a correlation between income inequality and the dispersion in the English spoken such that the bias introduced by the TOEFL would grow with income inequality. In egalitarian countries, most people will have achieved a similar level of foreign language skills, just as they tend to be better at maths or science. In contrast, in countries with less egalitarian income distribution, wealthy people will speak foreign languages better than poor people. In our regressions, we will therefore use a transformed version of the TOEFL scores:

$$TOEFL_{i,t}^A = TOEFL_{i,t} \cdot (1 - G_i).$$

$TOEFL_i^A$ is the adjusted TOEFL and G_i is the Gini coefficient for country i . A low G_i indicates more equal wealth distribution, and a high Gini coefficient indicates more unequal distribution. In the extreme cases of our model, 0 would correspond to perfect equality, when everyone had exactly the same income and $TOEFL_i$ was perfectly representative of the English skills of the whole population. 1 would correspond to perfect inequality, where one person had all the income and took the TOEFL, while everyone else had zero income and did not speak English. In our dataset, the G_i ranges between 0.22 for Slovenia and 0.46 for Mexico.

It is clear that none of our measures of English quality is perfect. However, to the best of our knowledge these are the most comprehensive measurements available. In addition, each of them is imperfect due to different reasons so that, together, they might complement each other and provide a good sense of the quality of the English spoken in different places. All main regressions are carried out both for $Survey_{i,t}$ and $TOEFL_i^A$. We feel that we strengthen our arguments by showing that our results appear in both specifications.

The remaining variables are presented in Table 2. An important source for the independent variables is IMD's World Competitiveness Yearbook (WCY) database. We use the overall national Programme for International Student Assessment (PISA) score to measure the quality of the educational systems in the OECD. <<We need to use linear interpolation for missing data>>

We also use a dicotomous variable taking the value of zero if foreign television programmes are mainly showed dubbed in a given country and one if they are mainly subtitled. In the case of Belgium we also

try to control for the fact that television is subtitled in Flanders but dubbed in Vallonia. The number of years of English at school are mainly taken from the European Union website.

<<TABLE 2: EXPLANATORY VARIABLES --DESCRIPTIVE TABLE

--ADD HISTORICAL DATA>>

In addition to standard economic and geographical indicators the WCY provides us with hard RHS variables on the employment in services as a percentage of the total, tourist receipts, remunerations, internet usage, high-tech exports, R&D personnel per capita, pupil/teacher ratios and public education expenditure. Moreover, the survey provides us with data on national flexibility when facing new challenges, cultural openness to foreign ideas and whether the banking industry is supportive of the rest of the economy.

One of our research questions relates to the causes of the introduction of subtitles and dubbing in the different countries. Hence, we also use a number of historical variables, including GDP, population, GDP per capita for 1933 – year when Adolf Hitler became Germany’s Chancellor. Finally, we classify each country as a dictatorship or using the standard definitions in the Polity IV dataset and also use the raw index (Democracy index) bounded between -10 and +10.⁷

Further, we use lagged and contemporary data on the age at which pupils started learning foreign languages, teaching intensity (years and minimum hours learning foreign languages), as well as the percentage of them who learn English and how many additional languages they learn. The data is taken from Eurydice (2005). <<Use this new data>>

We also obtain data on from Dyen et al. (1992). Dyen et al. (1992) construct a lexicostatistical index of language similarity by computing the percentage of words in a given list that are common/similar between two languages. The index is rescaled between 0 and 1,000. For example, the similarity index between English and Dutch is 608, between English and German is 578, and between English and Spanish is 240. We assign a value of 0 to non-Indoeuropean languages because they are not in the index.⁸

⁷"The Polity IV Project continues the Polity research tradition of coding the authority characteristics of states in the world system for purposes of comparative, quantitative analysis. The original Polity conceptual scheme was formulated, and the original Polity I data collected, under the direction of Ted Robert Gurr; the Polity scheme was informed by foundational, collaborative work with Harry Eckstein, *Patterns of Authority: A Structural Basis for Political Inquiry* (New York: John Wiley & Sons, 1975). The Polity project has proven its value to researchers over the years, becoming the most widely used data resource for studying regime change and the effects of regime authority. The Polity IV Project carries data collection and analysis through 2007 and is under the direction of Monty G. Marshall at the Center for Systemic Peace and George Mason University. " (www.systemicpeace.org)

⁸Our results are robust to including the Indo-European languages from the analysis.

In the implications part, we use the "affinity of nations" dataset to calculate a simple correlation in the United Nations General Assembly voting between each of the OECD countries and the U.S. This measurement is well-known in the international relations literature (e.g. Gartzke, E.,1998; Gartzke, E., 2000; Kim and Russett, 1996). Values for the Affinity data range from -1 (least similar interests) to 1 (most similar interests).⁹

Finally, we include measures of national television density (number of television sets per 1,000 inhabitants) and distance between national capitals and relevant English-speaking cities. For European countries, the reference is London. For Mexico, it is Los Angeles. For Japan and South Korea, the average between the distance to London and Los Angeles.

The Appendix includes a summary of the data sources.

III Television, subtitling and dubbing

A History of subtitling and dubbing

There are two main foreign film translation traditions: dubbing and subtitling.¹⁰ Dubbing is the method in which the foreign dialogue is adjusted to the mouth movements of the actor in the film so that the audience feels as if they are listening to actors actually speaking the target language. In contrast, subtitling consists of supplying a translation of the spoken source language dialogue into the target language in the form of synchronised captions, usually at the bottom of the screen, while the dialogue is in the original version.

The history of subtitling starts with the film industry. In the times of silent cinema, inter-titles interrupted the course of a film every couple of minutes to provide additional explanations to the audience. It was then easy to replace the original language titles with local text. For example, the first ever sound film, *The Jazz Singer* (1927) was shown in non-English speaking countries with subtitles (Gottlieb, 1997). However, with the introduction of sound in the early 1920s, the US studios quickly understood that one could not force audiences to watch films in a language they did not understand – as the pre-eminence of English in education was not established until the 1960s (Crystal, 2007).¹¹

⁹We use two correlation measurements: one in which we only correlate the "yes" and "no" votes and a second one in which we also use "abstention". The affinity data are coded with the "S" indicator. "S" is calculated as $1 - 2*(d)/d_{max}$, where d is the sum of metric distances between votes by US and each country in a given year and d_{max} is the largest possible metric distance for those votes.

¹⁰Or sometimes to a third, minor, mode—voiceover— sometimes used in Slavic television.

¹¹In the 1920s, English language skills in what would become the OECD were poor for two reasons. First, many people did not speak any foreign languages as access to education was very limited and illiteracy high. Second, many of those had access to education learned either French (considered to be the language of diplomacy and widely learned by wealthy classes

"The language problem was great during the first years of sound film, and this was one of the reasons why in the '20s it took so long before the major production companies turned to sound. Hollywood was simply afraid of losing its leading position in the world market. "Only five per cent of the world's population speak English", D.W. Griffith said in 1923. "Why should I lose ninety-five per cent of my audience?" Film had developed into a universal language which all of a sudden would be shattered into a thousand dialects when sound was added" (cited by Gottlieb, 1997).

Therefore, US film studios started to promote dubbing around the world. As a first step, Paramount Pictures purchased the Des Reservoirs studios in Joinville-le-Pont (outside Paris) in 1929. The new studios were used in the 1930s to dub Paramount films into fourteen European languages, including French and Spanish but also Dutch and Swedish. Tired of having read intrusive inter-titles for many years, people flocked to films in which their own language could be heard.

Although early attempts at using captioned texts to translate sound-dialogues met with a modest response (Gottlieb, 1997), some countries moved on to subtitling while others continued dubbing. The film history literature discusses three reasons of why that happened:¹²

First, there are scale economies reasons depending on the size of the local language. In contrast to larger languages, those countries in which small languages are spoken, like the Netherlands, Sweden, Greece or Portugal, moved on into using subtitling as the major translation mode. "The [dubbing] process was difficult, cumbersome, and far too expensive to be worthwhile in a small country" (Gottlieb, 1997). The use of subtitles, was not due to a wish to retain the original soundtrack so audiences could enjoy the actors' voices, nor due the idea that it would be beneficial for people to hear them speak foreign languages. The reason was the limited receipts from box office tickets sales, combined with the low cost of subtitling in comparison with dubbing and a significant number of imported films, which meant that "the production of movies started to require much higher budgets than most of these countries could afford" (Danan, 1991). The fact that subtitles might help people be better at foreign languages does not seem to have been foreseen in the early days of sound film as could today be regarded as a positive side-effect.

Note that small countries who shared large languages (e.g. Austria, Switzerland or the Dutch-speaking Vallonia region in Belgium) also adopted dubbing as the preferred translation mode. The determining scale factor would therefore seem to be not the size of the country but the size of its language. As film production in Southern Europe) or German (learnt extensively in Northern European due to the region's connections with Germany and the influence of historical figures such as Otto von Bismarck).

¹²For an excellent overview for the Spanish case, see Ballester Casado (2001).

costs rose, it became increasingly difficult for small languages to export their productions and—limited by their small domestic markets— their home production decreased and was replaced by imports. Countries in larger linguistic areas could maintain their industry.

Second, there are political motives related to the emergence of totalitarianism. During the 1930s, countries like Germany, Italy, Japan and Spain were taken over by authoritarian regimes with a strong sense of national identity. Dictators often felt that using their language in films would strengthen national pride.¹³ For example Franco of Spain ruled against any non-dubbed version and, between 1936 and 1975, there were over ninety ministerial guidelines (órdenes)¹⁴ published to make difficult showing films in a foreign language "because of the evil effects that film release can produce on society" (Szarkowska, 2005). Also the German and Italian governments adopted regulations promoting or even enforcing dubbing. In Italy, where the process of country unification was completed only in 1870, there were still many regions where local dialects were spoken, while modern Italian was virtually non-existent. Mussolini ruled that all the imported films had to be dubbed into standard Italian, with the idea of using cinema as a means of standardising the language (Szarkowska, 2005).¹⁵

Third, there is an element of cultural identity. Some countries like France or Japan even today seem to be deeply concerned about the purity of their culture and they strive to protect it from foreign (mostly US) influence. Either because their language has historically been important internationally or because it is nationally perceived as being of a higher status, these countries resist a potential Anglo-Saxon uniformisation. This view still persists in official circles. For example, see how the Académie Française perceives its role today:

“A la fin du XXe siècle, c’est une autre tâche qui attend l’Académie. La langue a atteint la plénitude de ses qualités, qui en ont fait depuis deux siècles le langage des élites du monde entier. Le rayonnement de la langue française est menacé par l’expansion de l’anglais, plus précisément de l’américain, qui tend à envahir les esprits, les écrits, le monde de l’audiovisuel. Le développement de l’anglais est souvent favorisé par l’irruption des nouvelles techniques,

¹³For example: "Entre los objetivos concretos de la gran misión hispánica reservados al cine, ninguno más trascendental, ninguno de necesidad más inmediata y apremiante que el de conservar la pureza del idioma castellano en todos los ámbitos del imperio hispano". Published in the regime’s magazine *Primer Plano* and quoted by Galán (2003).

¹⁴For example, “Queda prohibida la proyección cinematográfica en otro idioma que no sea el español, salvo autorización que concederá el Sindicato Nacional del Espectáculo, de acuerdo con el Ministerio de Industria y Comercio y siempre que las películas en cuestión hayan sido previamente dobladas. El doblaje deberá realizarse en estudios españoles que radiquen en el territorio nacional y por personal español.” (Orden del 23 de abril de 1941, apartado 8º). Quoted in Galán (2003).

¹⁵For an exhaustive account of nationalism and dubbing in the Spanish case, see Ballester Casado (2001).

le développement accéléré des sciences, le rapprochement inouï que permettent les médias et les autres moyens de communication, tous facteurs qui bousculent le vocabulaire traditionnel et imposent à marche rapide l'adoption de nouveaux mots. Le 4 août 1994 est votée la loi relative à l'emploi de la langue française (dite « loi Toubon »), qui favorise l'emploi du français dans les inscriptions, les documents publics ou contractuels, les services publics, les congrès, les médias, etc.” (Source: Official web site of the Académie française, <http://www.academie-francaise.fr/role/defense.html>)¹⁶ <<Need to translate this and move the original text to a footnote>>

The result was that development of national industries in the dubbing countries was parallel to the expansion of US cinema around the World. In 1931, Germany started to develop its dubbing industry with its own technology,¹⁷ and Hugo Donarelli opened the Fono-Roma studios in Italy. The first Spanish dubbing studios were those of Metro-Goldwyn-Meyer, Trilla-La Riva (both in Barcelona) and Fono España SA (Madrid) in 1933. In any case, the control exerted by US companies on the film industry continued in the post-war period, mainly because they monopolised the recording equipment.

American domination of the European market was as its strongest between 1930 and the late 1950s (Danan, 1991). In the 1950s, international markets were flooded with thousands of new films, often backlogged American movies produced during the war. Upon its introduction, television naturally followed the choice made by commercial cinema in each market.¹⁸ ¹⁹ This process consolidated the dubbing and subtitling regimes in each country (Szarkowska, 2005), an influence that has persisted to our days.

<<TABLE 3: ORIGIN OF FICTION IN SOME EUROPEAN COUNTRIES (PERCENTAGE OF BROADCASTING TIME DEVOTED TO FICTION, JAN 1997)>>

B The current situation

In the history of cinema account, television audiences have become accustomed to different translation technologies due to the events that created the conditions for dubbing or subtitling industries to develop

¹⁶The French are not alone in considering their language special. In 1780 John Adams, as part of his proposal to Congress for an American Academy said: "English is destined to be in the next and succeeding centuries more generally the language of the world than Latin was in the past of French in the present age" (cited by Crystal, 2007, pp. 74)

¹⁷Known as Nachsynchronisierung Gerst-Thun.

¹⁸The BBC was the initiator when it broadcasted the German film *Der Student von Prag* on 14 August, 1938 with English subtitles.

¹⁹For example, it was introduced in Denmark in 1951 and Spain in 1957.

in the different countries during the 1930s (Gottlieb, 1997). If that were the case, it seems plausible that dubbing today would be more frequent in large language countries, and those suffering authoritarian or very nationalistic governments in the 1930s - 1950s (e.g. France, Germany, Italy, Japan or Spain).

Further, the pre-eminence of US and UK programmes are essential if the translation mode has to have any influence in the quality of the local English. Table 3 reports the broadcasting time shown in several European countries²⁰ by country of origin, as a percentage of the total devoted to fiction during January 1997.²¹²² The importance of US fiction is clear, specially in commercial channels. Among those, US productions accounts for at least 60.7 per cent of the total (France), with a maximum of 79.5 per cent in the Belgian region of Flanders. Though lower, US productions are also important in the public channels. It ranges from 19.6 per cent in Germany to 52.9 per cent in France. Prime-time percentages are also very high, often above fifty percent. To those numbers one would have to add a significant amount of British productions included in the non-national (other European) epigraph. In contrast, national productions are relatively small, only reaching fifty percent in Germany. In 1995, the E.U. (including Ireland and the U.K. imported U.S. audiovisual products for a total of 6,795 million dollars. For comparison, U.S. imports amounted to 532 million dollars (Ávila, 1997).²³²⁴

While local productions are always shown in the local language, international productions are translated. Hence, the 67.6 per cent of USA productions shown by commercial channels in the Dutch prime-time is subtitled, but the corresponding 73 per cent in Italy is dubbed. It seems clear that exposure to the English language varies greatly across countries.

Table 4 provides a list of countries that primarily use dubbing or subtitling in their television broadcasting. Ten of the listed countries use dubbing as the preferential translation method. Twelve of them use subtitling. Belgium is an interesting case because dubbing is used in the French-speaking Wallonia region but subtitling in the Dutch-speaking Flanders region. The list is suggestive of some patterns. French- (Wal-

²⁰We do not have precise estimates for other countries, but there is ample anecdotal evidence that this is the case also for many of them. For example, television series in Spanish television have been dubbed since its origins in 1957.

²¹Foreign programmes consist mainly of fiction (television series and films) but sometimes also include documentaries (National Geographic, BBC) and other shows. For example, the David Letterman and Oprah Winfrey shows have been popular for years in Scandinavia.

²²In this paper we focus on television but the results for commercial cinema are very similar (Ávila, 1997).

²³Europe is not the only place where this occurs: the U.S. controls about 85 per cent of the world film market and over 80% of all films given theatrical releases in any part of the world during 2002 were in English (Crystal, 2007).

²⁴The importance of English in the film industry is also qualitative. It is not only that today is highly unusual to find a blockbuster film produced in a language different from English but also that, for example, about half the Best Film Awards ever given at the Cannes (France) Film Festival have been to English language productions (Crystal, 2007).

lonia, France, Luxembourg, Switzerland) and German-speaking countries (Austria, Germany, Switzerland) all use dubbing. Eastern and, to a lesser extent, South European countries also dub. In contrast, small language (e.g. Finnish, Dutch, Greek) and Northern European countries mainly subtitle.²⁵

Also in Table 4 we provide descriptive statistics of economic and educational variables depending on whether countries dub or subtitle. Countries with dubbing do not differ from subtitling countries in wealth per capita. Interestingly, they do not differ in the number of years of formal English education either, yet there are striking differences in their English-speaking skills. Subtitling countries score 77 points higher in the TOEFL, and obtain 23 points more in the E.U. Survey of English proficiency. These differences can be due to the education system: subtitling countries also score higher (6 points) in the PISA score. The difference is statistically significant, but in economic terms it only means that subtitling countries score 1.2 percent higher than dubbing countries. Besides, in subtitling countries governments spend \$668 per capita more in public education, but this difference is not statistically significant. It is also interesting than in dubbing countries there are 80 television sets per 1,000 inhabitants more than in subtitling countries (significant difference at the one-percent level), yet the resulting larger exposure to television programs in English does not translate into better English-speaking skills.

<<TABLE 4: DESCRIPTIVE STATISTICS BY TRANSLATION METHOD>>

Further, the table shows a strong effect of preference for subtitles in those countries in which they are present. 72 per cent of those interviewed prefer subtitles in subtitling countries, compared to only 26 per cent in dubbing countries (significant difference at the one-percent level).

This suggests that changing the translation mode would have huge adaptation costs. On the supply side, dubbing countries nationalised and reorganised their respective film industries and created infrastructures that are still central to their film industries today. <<Data on the size of the dubbing industries in some of the countries>>

On the demand side, the use of the native language, once obligatory under the pressure of the authorities, affected not only the translation strategy of the period but it also continues to determine the preference for one translation technology or the other. Austrians and Spaniards might still prefer film-dubbing over subtitling, while films audiences in Portugal and Sweden would prefer to watch subtitled rather than dubbed films. It is interesting to note that there are countries which later suffered dictatorships (e.g. Greece and Portugal) which did not reverse the subtitling industry standard.

²⁵The dubbing / subtitling dichotomy is a simplification. For example, children programmes are dubbed in most countries and some late night less commercial films are sometimes sent in original version in France or Spain.

To summarise, due to historical circumstances influencing the supply and demand for translation modes, today one can identify three main types of countries. First, there are the source-language countries, the United States and United Kingdom, where hardly any films are imported from other linguistic areas and if they are they tend to be subtitled. The second group comprises mainly French-, Italian- German-, and Spanish-speaking countries where the overwhelming majority of films are dubbed (e.g. Austria, France, Italy, Germany, Slovakia, Spain or Switzerland). Third, subtitling is preferred in smaller language countries such as the Netherlands, Norway, Sweden, Romania, Denmark, Greece, Slovenia, Croatia, or Portugal.

The film history literature suggests that the historical circumstances under which dubbing or subtitling emerged did not depend on the level of English in different countries and might even have ceased to exist (e.g. dictatorships). We argue that the dubbing/subtitling decision in the 1930s continues to exert a profound influence today.

IV The determinants of the translation technique

In this section we build econometric models to empirically examine the historical account of the spoken-films introduction in the 1930's. According to the cost motive, one would expect that dubbing had been adopted by larger and wealthier countries because it is the most expensive translation technique. Similarly, dubbing should be preferred in countries with large single-language communities. The discussion above indicates that dubbing could have been implemented in less democratic countries as part of a broader autarkic system, and to *protect* nationals against foreign influence.

In order to study the choice of translation mode, we use economic, political, and institutional variables measured in 1933 – the year in which Adolf Hitler became Germany's Chancellor. We think that these variables are plausibly exogenous with respect to the current situation of the English language. We also compute the distance in kilometers from the country's capital to the closest large city where English is the dominant language.

We use two characteristics of the local language. First we measure the size of the local language with the number of people in the world that spoke the country's local language in 1933. We argue that subtitling will be more likely in countries with small languages, while dubbing will be more likely in countries with larger languages, irrespective of their populations (i.e., dubbing in Austria vs. subtitling in Greece). Second, we use the the similarity between the local language and English.

Table 5 reports probit regressions for the decision to use dubbing or subtitling in the early days of sound cinema. The default value is dubbing, so positive parameter estimates indicate that the variable is

more conducive to subtitling and negative estimates propensity to dubbing. We use one observation per country and the final sample includes a maximum of 30 countries. Therefore, with the exception of the three last models, we use one single explanatory variable in each regression.

<<TABLE 5: HISTORICAL CAUSES OF DUBBING AND SUBTITLING>>

The language size estimates are consistently negative and significant at the one percent level or better, suggesting that countries in which larger languages were spoken tended to adopt dubbing, while smaller countries adopted subtitling. Along the same lines, larger economies tend to use more dubbing (Model 6). Furthermore, we find support for less democracy being conducive to dubbing, both with the Dictatorship indicator, or the raw Democracy index values. The linguistic similarity coefficient is negative, though insignificant. To our knowledge, this is the first econometric analysis of the causes of subtitling suggested in the film history literature.

In the last model we report our preferred specification (R-squared of 92 percent), where dubbing is explained by the size of the national language, the similarity between the local language and English, and the democracy index. We use this specification as first stage to instrument English skills in the following sections.

V The determinants of English proficiency

A Main results

Table 6 reports regressions on several educational factors which could plausibly influence the quality of the English spoken today in a country. The dependent variable is $Survey_{i,t}$. The first four columns include different variations of OLS models. The fifth to eighth columns report the estimation of a Treatment Effects Regression (Heckman, 1979), controlling for a possible endogeneity of the Subtitles indicator.²⁶ We argue that the political conditions of the country in 1933 as well as the size of the local language are exogenous variables to explain English skills in 2000-2003. In any case, the Inverse Mills Ratio in the second step

²⁶Heckman (1979) formulates a selection model where the treatment variable ("Subtitles (Y/N)" in our case) is instrumented in a first step. The initial probit also allows to compute the Inverse Mills Ratio, which is used as a regressor in the second step together with the instrumented treatment variable. Heckman (1979) shows that the two-step procedure is consistent, although the full model can also be estimated with maximum likelihood. We use the two-step estimator because it allows us to report R-squared coefficients, and therefore to compare its explanatory power with OLS estimates.

regression is a test of the endogeneity of the treatment variable and its correction.²⁷ We do not report the first-step probit regression because it is similar to the last model in Table 6. In this table, as in the next ones, we report the standard deviation of the endogenous variable used to compute economic significance levels.

The subtitle indicator is positive and significant in all specifications, irrespective of whether it instrumented or not. The effect is very large – equivalent to about nine years of English teaching on average in OLS regressions, and to about twenty years under treatment effects. In economic terms, subtitling increases the EU Survey results by 1.22 standard deviations on average. For comparison, a country would need to increase its expenditure in education per capita by \$136 (the average expenditure in education per capita is \$925), or equivalently 15 percent to achieve the same English skill levels. Given that the total population of our dubbing countries is 315 million, the annual cost of dubbing in the OECD is approximately \$42 billion of annual education expenditure. For countries like Spain, it is about \$6 billion annually, approximately 4 per cent of the State budget. When we instrument the subtitles indicator, the magnitude of its coefficient decreases slightly, but it is still highly significant.

There are other less important determinants of the quality of the English spoken in a country. One additional year of English education at school increases English skills by 0.08 standard deviations on average. Moving from the country with the fewest years of English education (seven) to the most (eleven) increases English skills by 0.32 standard deviations. The quality of the education system (PISA assessment) is significant in most regressions, but insignificant when we control for the pupil-to-teacher ratio. When it is significant, a one-standard deviation increase in the PISA score (=30.12 points) increases English skills by 0.25 standard deviations. The pupil-to-teacher ratio is however insignificant, possibly because its effect is subsumed in the expenditure in education variable.

<<TABLE 6: FACTORS INFLUENCING ENGLISH QUALITY, with EU Survey>>

Table 7 reports regressions on the same factors, with $TOEFL_i^A$ as dependent variable. The results are very similar. Subtitling increases TOEFL scores by 0.91 standard deviations, which is equivalent to 4.1 years of English education, The first four columns include different variations of OLS models. The quality of the educational system is significant only in two models, and the economic significance of the expenditure in public education per capita is the same as in Table 7. The magnitude of its coefficient at

²⁷In Treatment Effect Regressions, the coefficient on the Mills ratio measures the effect which is due to intrinsic country differences (self-selection), as well as the effect that is due to the pure direct procedural difference itself. The sign of the coefficient is however meaningless.

least multiplies three-fold once we instrument the subtitles indicator. The significance of the Inverse Mills Ratio also show that the controls account for the endogeneity.

<<TABLE 7: FACTORS INFLUENCING ENGLISH QUALITY, with adjusted TOEFL>>

Together, Tables 6 and 7 provide evidence of a significant and very large effect of subtitling on the quality of the English. The effect is equivalent to about nine years spend learning the language at school when English skill is measured with $Survey_{i,t}$, and four when it is measured with $TOEFL_i^A$. As one would expect, the quality of education and class sizes are also significantly related to English quality.

B Subtitles as a complement to formal education

In this section, we are interested in computing "*the value of one year of English education*" in subtitling vs. dubbing countries. Hence, we interact the subtitles indicator with the number of years of formal English education variable. Recall that dubbing and subtitling countries do not statistically differ in terms of years of formal education (see Table 2). In dubbing countries there are on average 9.83 years of formal English education; in subtitling countries there are 9.91. The new Results are reported in Table 9. We provide estimates of the full model using the two dependent variables in OLS and Treatment Effect regressions.

<<TABLE 8: INTERACTION BETWEEN FORMAL EDUCATION AND SUBTITLES>>

In Table 9, the subtitles dummy has a negative and significant coefficient (-51.7), which means that a subtitling country with 8 or less years of formal education in English would score less than a dubbing country. However, for each additional year of English education above 8 years, the productivity of the additional year is equivalent to 6.6 points in the endogenous variable. These effects are not significant when we instrument the subtitles variable. The value of one year of English results in 5.11 EU survey points, and 2.3 points (7.235–4.942) in the Adjusted TOEFL score. In dubbing countries, one year of English does not significantly affect their EU survey results, but increases the adjusted TOEFL score by 7.235 points. In other words, for the same years English education dubbing countries would perform better than subtitling ones only if the number of years was above fourteen.²⁸

Overall, the results show that subtitles increase more the marginal productivity of one additional year of English at school in countries located around the nine years OECD average.

²⁸A dubbing country with Y years of English education obtains an adjusted TOEFL score of $7.235 \times Y$. A subtitling country with Y years of English education obtains an adjusted TOEFL score of $72.7 + (7.235 - 4.942) \times Y$. At $Y = 14.71$ both scores are equal.

C The effect of television penetration

Television subtitling may only improve English skills as long as people watch it. However, Table 2 shows that dubbing countries have more television sets per capita than subtitling countries. In Table 9, we report the results with an additional interaction between television penetration and subtitling. We measure television penetration with the number of television sets per 1,000 people.²⁹³⁰

<<TABLE 9: INTERACTION BETWEEN FORMAL EDUCATION AND SUBTITLES>>

Table 9 first shows that English skill is positively related to television penetration. An increase of 10 television sets per 1,000 inhabitants results in an increase in the EU Survey score of 0.03 standard deviations on average, and an increase in the adjusted TOEFL score of 0.025 standard deviations. People speak better English when they watch more television. Indeed, comparing with Table 6, television penetration removes part of the effect of school education. Once we instrument Subtitles (Model 5), its coefficient is still positive ($= 52.1$, significant at the one-percent level, or 2.3 standard deviations of the endogenous variable). Even when television penetration is weak, subtitling has an economically significant effect on English skills.

In the last five models, we use the adjusted TOEFL scores. Conditional on being a subtitling country, the impact of one additional television set per capita is double than for a dubbing country (an increase in 10 television sets per 1,000 inhabitants increases adjusted TOEFL scores by 0.04 standard deviations in subtitling countries, and by 0.02 standard deviations in dubbing countries, on average). The last model shows that—once instrumented—subtitles only affect English skill through television penetration. Increasing the number of television sets per 1,000 people in subtitling countries by one standard deviation (116 television sets) increases adjusted TOEFL scores by 0.52 standard deviations. Increasing the number of television sets in dubbing countries by one standard deviation (131 television sets) increases adjusted TOEFL scores by 0.29 standard deviations. This partly explains why, while the number of television sets per capita in dubbing countries is higher than in subtitling countries (Table 2), their English skill is significantly lower.

²⁹Alternatively we would like to have a measure of time spent watching television per country, but this information is not available for a large sample of countries.

³⁰An alternative less accurate but more comprehensive data source provides us with the following data. Countries with 99-100% of households owning a television set: cyprus, greece, italy, malta, norway, portugal, russia, slovakia. With 97-98.9% austria, belgium, croatia, czech, estonia, hungary, iceland, ireland, latvia, lithuania, luxembourg, netherlands, serbia, slovenia, spain, sweden, turkey, ukraine, uk, with 94-96.9% denmark, poland, bulgaria, belarus, france, germany, finland. Countries where less than 94% of all households own a television set: switzerland, romania, macedonia (Source: Hans Bredow Institut, www.hans-bredow-institut.de/ha-lehre/ws0607/Presentation-media%20use.ppt). In any case, the magnitudes approach 100%.

Reinforcing our argument on the benefits of subtitling, this suggests that opting for subtitles could improve a country’s English skills in a relatively short period — probably about one generation.

VI Robustness checks

In Table 10 we control for additional measures of financial and economic development, and alternative determinants of the translation method. In larger countries the cost of dubbing could be lower relative to the size of the economy would so would be the need to use foreign languages. Thus, we expect that dubbing is more likely and English skill is lower in larger countries. We use total GDP and land area in square kilometers to measure country size and GDP per capita to measure its wealth.

We also have data the ratio of trade and touristic activity to GDP, percentage of high-technology exports to the total, internet penetration, and the percent of workforce in Research and Development activities. All this data comes from the IMD World Competitiveness Yearbook database.

<<TABLE 10: ADDITIONAL CONTROLS>>

The significance of the Subtitles indicator is robust to the inclusion of the additional variables, even after controlling for endogeneity. Subtitling accounts for approximately 1.2 standard deviations of the EU Survey score, and 0.5 standard deviations of the adjusted TOEFL score. Years of English education is still significant and economically meaningful.

Richer countries speak better English, as GDP per capita is highly correlated with education expenditures (correlation coefficient is 0.66, significant at the one-percent level). Trade to GDP is also related to English skill, although the direction of the causality deserves further investigation. Countries that are more dependent on touristic activities speak worse English. Although the effect is statistically significant, its economic significance is weak: a one-standard deviation increase in Touristic activity to GDP (2.05 percent) reduces EU survey scores by two points, and reduces adjusted TOEFL scores by nine points. Other variables are not significant.

VII English, economic and social outcomes

The literature already explores some economic implications of speaking English in several different contexts. A large part has focused on immigrant populations in the US (Bleakley and Chin, 2004 and 2007; McManus

WS., 1985; McManus W, Gould W, Welch F., 1983) and concluded that better English conduces to higher earnings. Levinshon (2004) finds similar results with racial groups in South Africa.

However, there is not much work on the country returns of having a population with good English as a foreign language skills, nor on non-economic outcomes. In this section we investigate some potential benefits of speaking English. Table 11 summarises the empirical results.

<<TABLE 11: ENGLISH, ECONOMIC and SOCIAL OUTCOMES>>

High-tech exports English is the lingua franca for the international communities in science and technology. Most top journals are published in English so that it is today almost impossible to become a scientist without a significant knowledge of the language (e.g. none of the this paper's authors has it as his mother tongue). In addition, English is also the language of international commerce. Even multinationals with bases in non-English speaking countries have it as their working language. Examples include Arcelor Mittal (India), Cemex (Mexico), Nestlé (Switzerland) and Nokia (Finland). The export departments of smaller companies recognise this and often ask their employees to speak English. It seems plausible that the countries in which people speak better English will have an edge against international competitors, specially in high-tech industries.

In the regressions we link the use of subtitles, years of English and quality of the education system to a country's technology exports. The dependent variable is the ratio of high-tech exports to total exports. The models suggest that subtitling increases the ratio of high-tech exports to total exports by 0.76 standard deviations, and for one additional year of English education, high-tech exports increase 0.21 standard deviations. In terms of high-tech exports, subtitles are equivalent to about three years of English education.

Student mobility Television might be conducive to cultural affinity. In the context of our research, one could conjecture that knowing more English might tend to make studies in the U.S. more attractive. We have collected data on the number of nationals of each country pursuing higher education in the US relative to the total population.³¹ In Table 11 we find that subtitling countries are more likely to send their students to the US (the economic effect is only 0.17 standard deviations). Larger but poorer countries are also relatively more likely to export students to the U.S.

³¹Source: Opendoors' Report of International Educational Exchange, <http://opendoors.iienetwork.org>

International political affinity The importance of television for political outcomes is an emergent research issue with some important papers (e.g. DellaVigna et al, 2007; Eisensee and Stromberg, 2007; Gentzkow, 2006). One earlier contribution is by Gentzkow and Shapiro (2004), who study access to CNN in the Muslim world and how it shapes anti-U.S. attitudes. They conclude that increased exposure to information is not necessarily correlated with more accurate perceptions of world events, such as the September 11th terrorist attack, and suggest that exposure to more pro-U.S. information sources could reduce hostility to America. If that were the case, it would seem plausible that knowledge of the English language – use of subtitles and learning at school – should be correlated with more international political affinity between the U.S. and that country.

We use the "affinity of nations" dataset to measure international political affinity. This dataset is well-known in the international relations literature (e.g. Gartzke, E.,1998; Gartzke, E., 2000; Kim and Russett, 1996) and based on the United Nations General Assembly voting patterns.³² ³³ The affinity data are coded with the S indicator,

$$S = 1 - \frac{2 \cdot d}{d_{\max}},$$

where d is the sum of metric distances between votes by US and each country in a given year and d_{\max} is the largest possible metric distance for those votes. We calculate the correlation between U.S. and each of the countries' votes under two specifications: one in which we only correlate the "yes" and "no" votes and a second one in which we also use "abstention". By definition, both S values range between -1 (least similar interests) to 1 (most similar interests).

We then regress the two correlation measurements against the determinants of English quality. The regressions suggest that the relationship between, on the one hand, subtitles and years of English and, on the other, affinity with U.S. international policy is strong and positive. Smaller countries and those with more service-orientated economies also seem to have higher affinity just like larger, less open economies. The results are consistent across correlation measurements and also for OLS and treatment effects regressions.³⁴

Cross-border mergers <<Do this>> Several papers have shown that a common language is significant at determining the target-acquiror match. They typically use a gravity model which explains the choice of a target firm with variables such as geographical distance, common border, and common language. The

³²We thank Erik Gartzke for providing the data through his website <http://dss.ucsd.edu/~egartzke/>

³³The dataset ranges between the year in which each country joined United Nations, mostly upon its creation in 1946, and 2002.

³⁴We have also carried out the results for recent time periods, e.g. the last ten years, and the results turned out non-significant.

latter variable systematically turns significant (Coeurdacier et al., 2008, and the references therein).

Along the same lines, we test whether the use of subtitles is correlated with the merger activity between English- and non-English speaking areas. <<Do this>>

Cross-listings <<Do this>> Pagano et al. (2002) find that a common language is a strong determinant of the decision of where to list. For instance, the Vienna Stock Exchange is the largest natural destination for German companies and viceversa. Most of the foreign firms listed in the U.S. come from the U.K. This clustering would indicate that companies tend to cross-list in countries culturally close to their country of incorporation.

In this context, knowing more English might tend to make the country closer to anglo-saxon values. We argue that, as countries improve their English-speaking abilities, their firms will be more likely to list in the US, with all the financial advantages that a dual-listing brings about.

Cross-border trade and equity flows <<Do this>> The international trade literature has shown that a common language is a factor that determines cross-border trade (Frankel and Rose, 2002). A related effect comes from findings by Portes and Rey (1999) and Tesar and Werner (1995), who show that geographical proximity and cultural homogeneity (especially common language) increase cross-border equity flows. Grinblatt and Keloharju (2001) find that investors tend to hold stocks from countries with the same language as theirs.

In the context of our research, one would expect that trade and equity flows with the U.S. will be larger in those countries who speak better English.

Productivity and wages <<Do this>> The labour economics literature consistently points to substantial monetary returns accruing to those individuals investing in education (for surveys, see Harmon et al., 2003 and Sianesi and van Reenen, 2007). However, the work on language skill acquisition has mainly been focused on the individual returns for US immigrants who learn English (e.g. González, 2005; Grenier, 1984; Koussoudji, 1988; McManus, 1985; McManus et al. 1983; Reimers, 1983) and in bilingual societies such as Quebec (Carliner, 1981) or Catalonia (e.g. Rendón, 2007). In this literature, the closest paper is Williams (2006), who has studied the returns of multi-linguism in the workplace with a sample of workers in the European Community Household Panel Survey (ECPS). <<Do this>>

Ideas from Eva and Patricia <<See which ones we can do>> - cómo afecta la tele al idioma local? porcentaje de anglicismos en el idioma;

- nombres de la gente: jennifer, elizabeth, jonathan, etc. porcentaje de los nacidos que se llaman de ese modo.

- ventas en el país por parte de empresas con un perfil muy americano: mcdonalds/burger king; nike; harley davidson.

- highly qualified immigrants en el país;

- porcentaje de la gente del país que se ha casado con un ciudadano inglés/USA/etc...

-Google revenue in the country

-Salaries of English teachers (en España hay pocos que hablen inglés, por tanto les pagarán más)

-Sueldo de controladores aéreos (es un puesto que hay que cubrir, de nuevo se supone que un controlador gana más en España)

-Sueldos en general (si el inglés se valora)

-Movilidad laboral.

-Ingresos por turismo

VIII Conclusions

Speaking foreign languages is an important factor not only in the economic development of a country. The European Commission, for instance, states that "The benefits of knowing foreign languages are unquestionable. Language is the path to understanding other ways of living, which in turn opens up the space for intercultural tolerance. Furthermore, language skills facilitate working, studying and travelling [...] and allow true intercultural communication. In other words, multilingualism contributes a great deal to the key [...] values of democracy, equality, transparency and competitiveness." (European Commission, 2006).

As English has become the world's lingua franca, countries are now keen to spend more on teaching it. However, in this paper we show that the most effective tool to enhance the English skills of a country would be to use subtitling to translate foreign films, rather than dubbing as many countries still do.

We show that dubbing countries do not differ from subtitling countries in wealth per capita, or in the number of years of formal English education. Yet there are striking differences in their English-speaking skills. Subtitling countries score 77 points higher in the TOEFL, and obtain 23 points more in the E.U. Survey of English proficiency. We show in panel regressions that the differences in English skill can be significantly explained by the film translation method used in the country.

First, we use discrete choice models to analyse the historical reasons why some countries use subtitling and others dubbing. We find that the combination of nationalism and scale economies meant that large

countries in which there was a dictatorship in the 1930s were more prone to adopt subtitling than smaller, democratic countries. Second, we use panel data and two-stage instrumental regressions to evaluate the influence of original version television on the quality of the English spoken in a given country. We identify an effect equivalent to ten to twenty years of English education at school. The results are consistent across two complementary measurements of the quality of English. This is true both when we include subtitles as a variable and when it is instrumented with historical variables. Our results are robust to the inclusion of other determinants of English skill, like wealth or economic development.

The general message in this paper is simple: Practically all OCDE households own a television set. Where available, original version fiction provides continuous exposure to foreign languages as spoken by natives, which is bound to improve the viewers' vocabulary, grammar and listening comprehension. The United States is by far the largest producer of fiction programmes shown so when someone watches a television film in original version, it is very likely that the language source will be English. Subtitled television programmes then improve the English skills of the viewers, and, thus, the citizens of countries where films are shown in original version speak better English than those where television is dubbed. That, in turn, has a positive impact in along all sorts of economic and social dimensions. We also show that television penetration is a modulating factor. Interestingly, though, there are about 80 television sets per capita more in dubbing countries than in subtitling countries. This suggests that subtitling would be more efficient in the former.

In economic terms, the subtitles effect is sizeable. A country that uses dubbing would need to increase its expenditure in education per capita by \$136 (the average is \$925), or equivalently 15 per cent to achieve the same English skill levels as in a subtitling country. Adding up the total population of dubbing OECD countries (315 million), the annual cost of dubbing is approximately \$42 billion per year. We believe the savings are worthwhile even after considering the cost of dismantling the national dubbing industries.

Finally, we provide some evidence of a number of instances in which subtitles influence social outcomes by making the population better at speaking English. First, we find that subtitling increases the ratio of high-tech exports to total exports. Second, we find support for the fact that students from those countries in which there are subtitles travel more to the United States, relative to the total population. Third, we find that the relationship between, subtitles and affinity with the U.S. foreign policy is strongly positive.

As simple as our findings seem, it turns out that to our knowledge no OECD country has moved from dubbing to subtitling since World War II. Yet, our paper shows that such a move would be equivalent to increasing the mandatory English education by about ten years surely cheaper. What have they not changed, then? We have identified differences in the preferences for dubbing or subtitling in each country

type, which we attribute to habit: people like what they are used to and if this is dubbing they become very reluctant to accept subtitling. In addition, there are a industry and cultural elements that make the transition difficult, including the existence of a consolidated industry and even the fact that many experts consider dubbing as a superior translation mode. As a result, it is not clear to us whether dubbing countries can (or even should) change overnight their translation mode to subtitling. There are many factors one has to take into account including consumer preferences, .

Continental divide games can be a good metaphor of the dubbing or subtitling disjunctive in many countries. Path dependence coordination in "continental divide" games often illustrate social processes in which small historical accidents have a big long-run impact (see Camerer, 2003, for a discussion).³⁵ Although the initial conditions were quite similar, differences many years ago (economies of scale, patriotism, etc) meant that the film translation industry coordinated in the dubbing solution in some countries while in others it coordinated in subtitling. Citizens adapted accordingly and now have strong preferences for the translation method present in their country.³⁶

In this paper, we take an aggregate view of the problem and acknowledge that there is a lot of ground to cover. For example, econometric analyses at the micro-level would shed light on further interesting findings: When asked how they have learned or improved their language skills, many people refer to formal training at school, followed by holidays abroad and self-study (e.g. E.U. 2005). There are differences between men and women (52 per cent to 47 per cent) the young and the old (69 per cent versus 35 per cent), depending on education (20 per cent of those that finished their studies at the age of 15 are conversational in a foreign language, compared to 79 per cent of those who are still studying) and between city and countryside people (55 per cent and 47 per cent).

In any case, we believe the policy implications of our findings can be profound in many countries with little exposure to foreign television. Take the case of China. According to a recent report by consultants

³⁵These are coordination games with more than one Nash equilibria in which, when one starts from the dividing line, two infinitesimally close actions lead to different outcomes because each is attracted to a different Nash equilibrium (i.e. the equilibria operate as "basins of attraction" for the agents' behaviour, who deviate progressively more from the initial situation). In continental divide games people do not always gravitate towards the high payoff equilibrium even when the two outcomes are very different, because the situation reached is extremely sensitive to initial conditions. Although this games are often unsolvable by pure analytical reasoning, social conventions, communication and features of the game display all can have importance in determining the coordinating equilibrium. Moreover, once an equilibrium is reached, changes to the alternative equilibrium are very unlikely.

³⁶New digital technology has started to produce a slow convergence process. It is now possible both to watch original version films in traditionally dubbing countries and also dubbed versions in countries where subtitling is prevalent. Though slowly, new technologies seem to be bound to remove the differences.

McKinsey, fewer than 10 per cent of Chinese university graduates are suitable for international positions mainly because most do not speak English (Financial Times, 2005). We show that the decision to subtitle is more unlikely when the language is large and the political regime not democratic. If China were able to overcome those factors, we suggest that the impact of subtitles could be huge for the its people, both in terms of welfare and integration with Western societies.

Appendix: data sources

Quality of English survey: The data is published as tables in three Eurobarometers (European Commission, 2001, 2005 and 2006). The reports are freely downloadable from the E.U. website (<http://ec.europa.eu/>) and have also been used by Fidrmuc and Fidrmuc (2008). The surveys are quite large. For example, the 2005 issue was fielded in all 25 E.U. member states, plus accession (Bulgaria and Romania), candidate countries (Croatia and Turkey), and the Turkish Cypriot Community with a total of 29,328 interviews to people aged 15 years and over. Half of the citizens of the Member States claim to be able to speak at least one foreign language at a conversational level.

TOEFL: The data is freely downloadable from the exam administrator's website (<http://www.ets.org>). summarised in three Eurobarometer "Europeans and languages" surveys in 2001, 2005 and 2006. The question asked in the survey is: "Which languages do you speak well enough in order to be able to have a conversation, excluding your mother tongue?"

Dubbing / Subtitling: We have obtained the information through Wikipedia and complemented it with information from people resident in some of the countries.

Historical data: For measurements of GDP, population and GDP per capita, we use the Maddison dataset (<http://www.ggd.net/maddison/>). For trade openness, we use the data compiled by Barbieri (2005) (<http://people.cas.sc.edu/barbierk/databases.html>). For the dictatorship and democracy indices, we use the Polity IV dataset (<http://www.systemicpeace.org/polity/polity4.htm>).

PISA: The data is downloaded from the Programme for International Student Assessment (PISA) website (<http://www.pisa.oecd.org>).

Language similarity index: Data obtained from Dyen et al. (1992).

Education data: Data on the age at which pupils started learning foreign languages, teaching intensity (years and minimum hours learning foreign languages), as well as the percentage of them who learn English and how many additional languages they learn is taken from Eurydice (2005).

World Competitiveness Yearbook: The data can be purchased from IMD's website (<http://www.imd.ch/res>). WCY analyses the ability of countries to create and maintain their competitive advantage. It provides 312 ranking criteria for 53 countries. The data in the WCY are drawn from standard secondary sources and an annual opinion survey sent to over 4,000 executives around the globe. It includes information about economic performance (77 criteria, e.g. employment, price levels, currency stability), government efficiency (72 criteria, e.g. institutional framework, business legislation), business efficiency (68 criteria, e.g. productivity, management practices) and infrastructure (basic, technological, scientific...). Our data

encompasses the 1997-2007 period.

Other variables: The measure of national television density (number of television sets per 1,000 inhabitants) was obtained mainly through the European Audiovisual Laboratory website (<http://www.obs.coe.int/>). We calculate distances between national capitals and relevant English-speaking cities as follows: For European countries, the reference is London. For Mexico, it is Los Angeles. For Japan and South Korea, the average between the distance to London and Los Angeles. In all cases, we use the distances appearing in the Geobytes website (<http://www.geobytes.com/citydistancetool.htm>). International student mobility data was obtained through the Opendoors' Report of International Educational Exchange (<http://opendoors.iienetwork.org>). The "affinity of nations" data was compiled by Erik Gartzke and downloaded from his website (<http://dss.ucsd.edu/~egartzke/>).

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