

**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 EU and OCDE. We identify a large positive effect for subtitled original version as opposed to dubbed television, which loosely corresponds to between four and twenty years of compulsory English education at school. We also show that the importance of subtitled television is robust to a wide array of specifications. We then find that subtitling and better English skills have an influence on high-tech exports, international student mobility, and other economic and social outcomes.

# 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, 200 million in China alone (British Council, 1997). Sixty-eight percent of the citizens of the European Union (EU) rate English as the most useful foreign language –far from the second position of French with twenty-five per cent (European Commission, 2006).

The prevailing teaching model is to ensure that students gain some basic proficiency in primary school and improve it in secondary school and university, sometimes by using it as a language of instruction for other subjects.<sup>1</sup> More than 80 per cent of the EU’s pupils learn English. The duration of foreign language as a compulsory subject ranges between six and thirteen years in the non-English speaking EU countries (Eurydice, 2005).<sup>2</sup> In comparison, pupils in England and Wales have foreign language compulsory for five and three years, respectively, and there are no compulsory foreign language requirements in Ireland and Scotland.<sup>3</sup>

Despite the huge amounts of time and money spent, disparities in the quality of English across the Organisation for Economic Cooperation and Development (OECD) countries are very large. In places such as the Netherlands, Denmark and Sweden, about 80 per cent of citizens declare to be able to hold a conversation in English, but the proportion is only about 60 per cent in some of their neighbouring countries such as Belgium, Austria and Finland (European Commission, 2006). Japanese TOEFL exam takers score 192 on average, compared to 218 by their Korean counterparts. 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. 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. Since the US and the UK are the largest producers of fiction programmes, when someone watches a television film in original version, it

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<sup>1</sup>Japan has just created one hundred “super English high schools” where classes are taught exclusively in that language (Newsweek, 2007).

<sup>2</sup>The minimum is in the region of Flanders in Belgium and the maximum in the Netherlands, Norway, and Luxembourg. Spain is currently introducing additional years for a total of fifteen, starting at the age of three.

<sup>3</sup>In 2004 a British survey discussed by the BBC showed that only one in ten UK 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](http://news.bbc.co.uk/2/hi/uk_news/3930963.stm)).

is likely that the source language 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. Interestingly, however, a recent survey of the European Commission (2006) shows that only 12 per cent of Europeans think that watching films in original version is important for their foreign language skills.<sup>4</sup>

In this paper we address three inter-related issues. The first question is “why are there subtitles in some countries and dubbing in 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 tended to be adopted in countries with dictatorial (and nationalistic) regimes during the period, and those whose national languages were widely used internationally. Smaller countries tended to adopt subtitling, but essentially we find that the “size” of the language, and not the size of the country, determines the adoption of one or the other translation mode.

To our knowledge, no OECD country has moved from dubbing to subtitling since World War II. Schreyogg and Blinn (2008) use path dependence arguments for the case of Germany.<sup>5</sup> Although the initial conditions were quite similar, “small” differences many years ago (economies of scale, political regime, 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 (European Commission, 2006). In addition, there are industry and cultural elements that make the transition difficult, including the existence of a consolidated industry and also the, controversial, opinion of many experts who consider dubbing as a superior translation mode (see e.g. Mera, 1998).<sup>6</sup>

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<sup>4</sup>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 or in groups (40 and 42 per cent, respectively). Other ways in which they think they can learn the language is by visiting the country, either as a tourist or while taking a language course (50 and 44 per cent), or through conversation with native speakers, both through language exchanges and informally (36 and 33 per cent).

<sup>5</sup>See Camerer (2003) for a discussion on the related continental divide games. These 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.

<sup>6</sup>New digital technology has started to produce a slow convergence process and it is now possible both to watch original version films in traditionally dubbing countries and dubbed versions in countries where subtitling is prevalent. In spite of that, though, we expect the current state of affairs to perdure in the medium term.

The second question is: “what is the influence of the translation mode on the English skills?” Using Ordinary Least Squares (OLS) and treatment regressions, we find that most variables one would a priori have considered, such as the number of years of compulsory English education at school, turn out not to be too important. In our regressions, the quality of the English depends on the linguistic similarity with the local language, the expenditure of education per capita and the quality of the education system. 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 twenty 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 that we explore is: “How does subtitling influence a country’s economic and social outcomes?” We posit that the effects of subtitling for individually acquired English skills might spill over to society as well, accruing at higher aggregation levels and affecting the country’s economic, political and social stance in several issues. First, we link the use of subtitles to a country’s exports. Our estimates suggest that subtitling increases the ratio of high-tech exports to total exports by 0.5 standard deviations whereas the number of year of compulsory English education is not significant. Second, we find support for the fact that subtitling countries send more students to the US, relative to the total population. We also show that subtitles and English at school are positively related to mergers and acquisitions of US and UK firms, international cross-listing patterns and foreign direct investment from the United States.

Our paper is part of an emerging literature on the effects of television on social phenomena.<sup>7</sup> In the context of this paper, though, television translation effects are correlated with those of other high English-speaking penetration media like music, film or the Internet. We think focusing on television is specially useful due to two reasons. First, it has historically been more widely used than other media. Second, historical circumstances made the television translation mode exogenous to the English quality, which simplifies the methodology. We view our analysis as reflecting the wider influence of English-speaking

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<sup>7</sup>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 (Eisenstein 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.

media on language skills, with television as both the most representative media and the one with the cleanest econometric implementation.

The rest of the paper proceeds as follows. In the next section we provide an overview of the current translation modes in the OECD countries and a brief history of dubbing and subtitling. The data is introduced in Section III. In Sections IV, V and VI we present the results related to our main three research questions. In Section VII we conclude.

## II Television, subtitling and dubbing

### A Foreign film translation in the EU and OECD

There are three main foreign film translation traditions: dubbing, voice-over and subtitling. Dubbing is the method in which the foreign dialogue is adjusted to the mouth movements of the actors in the film so that the audience feels as if they are listening to actors actually speaking the target language. In voice-over the translation is provided by a single person that does not imitate the action. Finally, 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.

Table 1 provides a list of the translation modes of the countries which are members of the OECD or the European Union and do not have English as their main official language. Twelve countries use dubbing as the preferential translation method and four use voice-over. Fourteen 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- (Wallonia, France, Luxembourg, Switzerland) and German-speaking countries (Austria, Germany, Switzerland) all use dubbing. Eastern and, to a lesser extent, South European countries use dubbing or voice-over. In contrast, small language (e.g. Finnish, Dutch, Greek) and Northern European countries mainly subtitle.<sup>8</sup>

<<TABLE 1: FOREIGN TRANSLATION METHOD ACROSS COUNTRIES>>

The pre-eminence of US and UK programmes is essential if the translation mode has to have any influence in the quality of the local English. Table 2 reports the broadcasting time shown in several European countries by country of origin, as a percentage of the total devoted to fiction during January

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<sup>8</sup>The 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.

1997.<sup>9,10</sup> The importance of US fiction is clear, especially 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 EU (including Ireland and the UK) imported US audiovisual products for a total of 6,795 million dollars. For comparison, US imports amounted to 532 million dollars (Ávila, 1997).<sup>11,12</sup>

<<TABLE 2: ORIGIN OF FICTION IN SOME EUROPEAN COUNTRIES>>

## B History of subtitling and dubbing

The film history literature provides a detailed account of the introduction of dubbing and subtitling in the cinema. 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. But, 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 teaching of English at school was not generalised before the 1960s (Crystal, 2007).<sup>13</sup>

“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

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<sup>9</sup>Foreign 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.

<sup>10</sup>We 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.

<sup>11</sup>Europe 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).

<sup>12</sup>The 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).

<sup>13</sup>In 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 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).

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, even if the first ever sound film, *The Jazz Singer* (1927), was shown in non-English speaking countries with subtitles (Gottlieb, 1997), US film studios quickly 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.

However, despite the early modest success of subtitling (Gottlieb, 1997), some countries moved on to use this type of captioned translations while others continued dubbing. The film history literature discusses three reasons of why that happened:<sup>14</sup>

First, the literature includes scale economies arguments. In contrast to larger languages, those countries in which small languages are spoken, like the Netherlands, Sweden, Greece or Portugal, seem to have tended to use 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). Note that small countries who shared large languages (e.g. Austria, Switzerland or the French-speaking Wallonia 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.

Second, there seem to be 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 and therefore seem to have tended to favour dubbing. For example Franco of Spain ruled against any non-dubbed version and, between 1936 and 1975, there were over ninety ministerial guidelines (*órdenes*)

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<sup>14</sup>For an excellent overview for the Spanish case, see Ballester Casado (2001).

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. Mussolini introduced a “Law in Defense of our Language” which ruled that all imported films had to be dubbed into standard Italian, with the idea of using cinema as a means of standardising the language (Szarkowska, 2005).<sup>15</sup> It is interesting to note countries which later suffered dictatorships such as Greece did not reverse the subtitling industry standard.

Third, the film history literature proposes an element of cultural identity. Even today, some countries like France or Japan seem to be more concerned about the purity of their culture and they strive to protect it from foreign (mostly US) influence. One way in which cultural identity could be reinforced is by promoting the diffusion of dubbed films. The Académie Française perceives its role today in a similar manner:

“At the end of the 20th century, it is another task awaiting the Académie. The language achieved the fulfillment of its qualities, which made it from two hundred years ago the elite language around the world. The splendour of the French language is today threatened by the expansion of the English, more precisely the *American*, which has a tendency to invade the spirits, the writings, the media. The development of the English is often favoured by the development of new techniques, the accelerated development of sciences, the unprecedented reconciliation allowed by the media and the other communication methods, all factors which push the traditional vocabulary and impose at a high speed the adoption of new words. On August, 4th, 1994, a law relative to the use of the French language (so-called « law Toubon »), which favoured the use of French in the inscriptions, public documents or contracts, public services, congress, media, etc, was voted. ”(Source: Official web site of the Académie française, <http://www.academie-francaise.fr/role/defense.html>)<sup>16</sup>

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

<sup>16</sup>“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, 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

According to the historical account, the combination of these three factors would have resulted in the development of national translation industries. This development would have been parallel to the expansion of US cinema around the world and dependent on the technology adopted in each country.<sup>17</sup> The control exerted by US companies on the film industry continued in the post-war period, mainly because they monopolised the recording equipment and led to the globalisation of Hollywood-made cinema. American domination of the European market was at 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 and the system consolidated. This is often considered the “golden age” of dubbing in the countries that chose it (e.g. Ávila, 1999).

Upon its introduction in the 1950s, television followed the choice made by commercial cinema in each market (Ávila, 1999).<sup>18,19</sup> Soon, television required several hours a day of foreign programmes, which had to be translated using either subtitles or dubbing. In particular, the introduction of US “telefilms” and series<sup>20</sup> became very popular and seems to have created the demand necessary for the growth of national translation industries. This process consolidated the different translation modes in each country (Szarkowska, 2005), an influence that seems to have persisted to our days. For example, some of the main European channels show up to 4,000 hours of translated programmes per year. The same channel might even show dubbed versions in one country and subtitled versions in another (Ávila, 1999).<sup>21</sup>

This prevailing description of events implies that national audiences have become accustomed to different translation technologies depending on events that occurred in the 1930s (Gottlieb, 1997). If that were the case, the choice would be exogenous to the present quality of the English spoken in the different countries. Dubbing today would be more frequent in large language countries, and those suffering authoritarian or nationalistic governments in the 1930s - 1950s. Their eventual poor English would be a consequence of dubbing, rather than a cause for it.

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publics ou contractuels, les services publics, les congrès, les médias, etc.” Translation is ours.

<sup>17</sup>In 1931, Germany started to develop its dubbing industry with its own technology, known as Nachsynchronisierung Gerst-Thun, 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.

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

<sup>19</sup>For example, television was introduced in Denmark in 1951 and Spain in 1957.

<sup>20</sup>Including, for example, *Perry Mason* (television’s most successful and longest-running lawyer series of all times), *Bonanza* or, in the late 60s and early 70s *Ironside* and *Little House on the Prairie*.

<sup>21</sup>e.g. Canal + present in most European countries.

## C The dubbing/subtitling market

The discussion 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. According to the MCG (2007) report, in dubbing countries such as France, Germany, Spain, and Italy the subtitling costs are double of the European average. On the other hand in subtitling countries such as the Scandinavian countries and the Netherlands, dubbing costs are 66% more expensive than the European average. In total, the turnover of the EU dubbing/subtitling market is estimated to range between 372 and 464 million euros in 2006. The four major countries in the EU represent 85% of the market, with the United Kingdom accounting for a significant portion of the work, carried out on request from the American majors as well as European companies.<sup>22</sup>

On the demand side, the use of the native language determines the current preference for one translation technology over the other. According to the latest survey of the European Commission (2006), more than 90% of the respondents in Sweden, Finland, Norway, Denmark and the Netherlands agree with the sentence “I prefer to watch foreign films and programmes with subtitles, rather than dubbed”. On the other hand, around 30% of the French, Spanish and Italian and less than the 20% agree with the same sentence. A recent attempt from the Polish government to change from voice over to subtitling in the public television has received strong opposition. According to TNS OBOP polling center, only 19% of Poles would welcome subtitled movies.

## III Data

We use a data panel combining aggregate measures of English skills and historical and contemporary economic and educational variables (the data sources are described in the appendix). Our data set includes the 32 countries that are members of the OECD or the EU and that 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 country covered, except Luxembourg, English is one of the two most widely spoken.

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<sup>22</sup>Germany’s estimates are between 90 and 110 million, France’s between 80 and 85 million, Italy’s between 55 and 65 million and the United Kingdom’s between 90 and 110 million.

## A English skills

Table 3 reports the country list, together with the measurements of the quality of the English spoken in each of them. We use two measurements of the quality of English in each country.<sup>23</sup> The first consists on EU data on the percentage of people who declare themselves able to hold a conversation in English, as measured in the EU Eurobarometer surveys. This variable,  $Survey_{i,t}$ , is a first approximation and has already been used in previous literature (e.g. Fidrmuc and Fidrmuc, 2008). 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 3: ENGLISH PROFICIENCY BY COUNTRY: EU SURVEY AND TOEFL SCORES>>

Therefore, we complement  $Survey_{i,t}$  with an alternative measurement. Specifically, we use the yearly averages of the Test of English as a Foreign Language (TOEFL) scores obtained by residents in each country. The TOEFL is a standard English as a foreign language exam accepted by most colleges and universities in the world. It is based on multiple-choice and it is intended to measure the ability to communicate in English in colleges and universities. 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. This  $TOEFL_{i,t}$  variable, thus, addresses the missing data and subjectivity concerns with the variable  $Survey_{i,t}$  and allows us to increase the sample size by adding non-EU OCDE countries.

One potential problem with  $TOEFL_{i,t}$  is that it might suffer from 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 of those with sufficient educational attainment or income to study overseas, so that TOEFL takers are likely to be better at speaking English than the country average.

The issue is whether the different national sub-samples are biased to different degrees, i.e. whether some are more representative than others. We think it is plausible 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 have similar levels in math or science. In contrast, in countries with less egalitarian income distribution, wealthy people are likely to speak foreign languages better than poor people and are more likely to study abroad and thus should take the TOEFL more often.

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<sup>23</sup>Ideally, one would like to work with individual-level data to account for personal variables that are likely to influence English level such as education, income, etc. Unfortunately, we are not aware of any dataset with these characteristics.

In our regressions, we will use besides the original scores, a transformed version of the scores:

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

$TOEFL_{i,t}^A$  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, 0 would correspond to perfect equality, when everyone had exactly the same income and  $TOEFL_{i,t}$  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.

None of our measures of English quality is perfect. However, to our knowledge these are the best measurements available. In addition, each of them is imperfect due to different reasons so that, they might complement each other and together provide a good sense of the quality of the English spoken in different countries. We feel that we would strengthen our arguments by showing that our results appear in both specifications and, as a result, we will show all our main regressions for  $Survey_{i,t}$  and  $TOEFL_{i,t}^A$ .

## B Economic and educational variables

Our main explanatory variable is a dichotomous variable taking the value of zero if foreign television programmes are mainly showed dubbed or using voice over in a given country and one if they are mainly subtitled.<sup>24</sup> We give a value of one to Belgium because the population in the subtitling region (Flanders) is larger than in the dubbing region (Wallonia). Similarly, we give a value of one to Estonia because the majority of all foreign programmes are subtitled.

As an attempt to measure the actual exposure to subtitled original version programming, we have also collected information on TV penetration and on TV and cinema audience. The CIA world factbook provides estimates of the number of TVs per 10,000 inhabitants in each of the countries in our dataset. A report for the EU of Media Consulting Group provides information on the average number of hours of TV watched in a year, the number of homes with TV and the average annual cinema attendance per person and the percentage of films which are only shown subtitled in the cinemas.

The remaining variables are presented in Table 4. We use Dyen et al. (1992)'s lexicostatistical index of language similarity between English and the local language. The index is the percentage of words in a given list that are common/similar between two languages and we re-scale it between 0 and 1,000. For

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<sup>24</sup>Most countries offer a mixed system with strong predominance of one translation mode. For example, it is possible to watch original version films shown at late night in French channels and children programmes are often dubbed in Sweden.

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.<sup>25</sup>

<<TABLE 4: EXPLANATORY VARIABLES --DESCRIPTIVE TABLE>>

Since English is mostly taught at school, educational variables are likely to play an important role. We use first the number of years of English education at school, which is mainly taken from the European Union website. We also 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). Finally, we use the overall national Programme for International Student Assessment (PISA) score to measure the quality of the educational systems.

English quality might also depend on the public investment in education. We obtained pupil/teacher ratios and public education expenditure data for each country from the IMD's World Competitiveness Yearbook (WCY) database. This database also provides us with economic, social and geographical indicators such as gross domestic product (GDP), population, the employment in services as a percentage of the total, tourist receipts, remunerations, internet usage, high-tech exports and R&D personnel per capita.

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. We use 1933 – the year in which Adolf Hitler became Germany's Chancellor – as the measurement date. Finally, we classify each country as a dictatorship or democracy in 1933 using the standard definitions in the Polity IV dataset, and also use the raw index (Democracy index) bounded between -10 and +10.<sup>26</sup>

In the implications part, we also 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 US. This measurement is well-known in the international relations literature (e.g. Gartzke 1998; Gartzke 2000; Kim

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<sup>25</sup>Non-indoeuropean languages in our dataset are Finnish, Hungarian, Korean and Japanese. Our results are robust to excluding them from the analysis.

<sup>26</sup>Polity IV is the most widely used data resource for studying regime change and the effects of regime authority. It carries data through 2007 and is currently under the direction of Monty G. Marshall at the Center for Systemic Peace and George Mason University. ([www.systemicpeace.org](http://www.systemicpeace.org))

and Russett, 1996).<sup>27</sup> <sup>28</sup> The authors code the affinity data 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 US and each of the countries' votes under two specifications: one in which we only correlate the "yes" and "no" votes and a second index in which we also use "abstention". By definition, both  $S$  values range between  $-1$  (least similar interests) to  $1$  (most similar interests).<sup>29</sup>

## C Descriptive Statistics

Table 5 provides descriptive statistics of economic and educational variables for dubbing and subtitling countries. Countries which subtitle do not differ significantly from dubbing ones in wealth per capita. Interestingly, although they spend significantly more in education (\$512 per capita) and obtain better PISA scores (8 points), they do not differ 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 EU Survey of English proficiency.

<<TABLE 5: DESCRIPTIVE STATISTICS>>

## IV The determinants of the translation mode

In this section we examine empirically the historical account of the spoken-films introduction in the 1930's. Table 6 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. Therefore, with the exception of the last three models, we use one single explanatory variable in each regression. In the last three models, we combine the explanatory variables that have a significant effect in isolation.

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<sup>27</sup>We thank Erik Gantzke for providing the data through his website <http://dss.ucsd.edu/~egartzke/>

<sup>28</sup>The dataset ranges between the year in which each country joined United Nations, mostly upon its creation in 1946, and 2002.

<sup>29</sup>We 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.

<<TABLE 6: HISTORICAL CAUSES OF DUBBING AND SUBTITLING>>

The language size estimates are consistently negative and significant (Models I, IX, X and XI). This suggests that countries in which larger languages were spoken tended to adopt dubbing, while countries with smaller languages adopted subtitling. Although the size of the economy has also a negative and significant effect in isolation, it loses its significance when combined with the size of the language (Models II and IX). This suggests that it is the size of the language rather than the size of the economy that helps explaining the decision to dub or subtitle. The coefficients for the level of imports and exports and the level of material well-being (GDP per capita) are positive but not significant (Models III and IV).

We also find support for less democracy being conducive to dubbing, both with the Dictatorship indicator, or the raw Democracy index values (Models V and VI). The democracy index, though, is only significant at a ten percent level and loses its significance when combined with the dictatorship variable (Model IX). Finally, although being more distant in geographic terms and closer in linguistic terms seem to favour dubbing, these coefficients are not significant (Models VII and VIII).

In the last model we report our preferred specification (pseudo-R square of 48%), where the dubbing is explained by the size of the national language and the dictatorship dummy. 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 7 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.<sup>30</sup> 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

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<sup>30</sup>Heckman (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.<sup>31</sup> 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 subtitles indicator is positive and significant in all specifications, irrespective of whether it instrumented or not. The effect is very large – equivalent to about twenty years of English teaching on average in OLS regressions, and to about forty years under treatment effects. In economic terms, subtitling increases the EU Survey results by 0.78 standard deviations on average. For comparison, a country would need to increase its expenditure in education per capita by \$1849 (the average expenditure in education per capita is \$926), or equivalently 200 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 \$582 billion of annual education expenditure. For countries like Spain, it is about \$81 billion annually, approximately 54 per cent of the State budget. When we instrument the subtitles indicator, the magnitude of its coefficient increases even further.

There are other less important determinants of English quality. The similarity of the local language and English is highly significant in all the regressions. But, by increasing the similarity coefficient by one standard deviation, it only increases the survey results by 0.47 standard deviations on average. The number of English education at school is marginally significant in only one regression. When significant, one additional year of English education at school increases English skills by 0.06 standard deviations. Moving from the country with the fewest years of English education (seven) to the most (eleven) increases English skills by 0.24 standard deviations. The quality of the education system (PISA assessment) is significant in all the regressions. A one-standard deviation increase in the PISA score (=30.12 points) increases English skills by 0.34 standard deviations. The pupil-to-teacher ratio is however insignificant, possibly because its effect is subsumed in the expenditure in education or the PISA score variables.

<<TABLE 7: FACTORS INFLUENCING ENGLISH QUALITY, with EU Survey>>

Table 8 reports regressions with  $TOEFL_i$  and  $TOEFL_i^A$  as dependent variables. The results are similar. Subtitling increases unadjusted and adjusted TOEFL scores by 0.06 and 0.03 standard deviations, which is equivalent to 3.4 and 0.75 years of English education. The first three columns include different

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<sup>31</sup>In 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.

variations of OLS models. The quality of the educational system is clearly significant only when using the adjusted scores. The economic significance of the expenditure in public education per capita is even lower than in Table 7. The magnitude of its coefficient at least multiplies two-fold once it is necessary to instrument for the subtitles indicator. In these regressions the Inverse Mills Ratio is only significant in the first model.

<<TABLE 8: FACTORS INFLUENCING ENGLISH QUALITY, with non-adjusted and adjusted TOEFL>>

Together, Tables 7 and 8 provide evidence of a significant and very large effect of subtitling on the quality of the English. The effect is equivalent to at least twenty years spend learning the language at school when English skill is measured with  $Survey_{i,t}$ , more than three when it is measured with  $TOEFL_i$  and a bit less than one if it is measured with  $TOEFL_i^A$ . As one would expect, the expenditure in education and class sizes are also positively related to English quality, although the coefficients are not always significant.

Table 9 provides further evidence from another data set. Bonnet (2002) reports English evaluations in eight European countries evaluations, but disaggregated in four different types of skills: listening comprehension, written production, reading comprehension and linguistic competence (i.e. grammar). Subtitling countries perform better than dubbing countries across skills. However, there is wide variation in the differences. Pupils in subtitling countries score almost twice as high in the listening comprehension test (66.29 vs. 34.65) but only about 18% higher in linguistic competence (63.42 vs. 53.38). The differences in writing and reading comprehension are somewhere intermediate. We interpret this evidence as consistent with our regression findings. One would expect that original version television improves a lot the skills one gains by listening frequently to English speakers (e.g. listening comprehension), but not as much the skills requiring formal school training (e.g. grammar).

<<TABLE 9: DISAGGREGATING BY TYPE of ENGLISH SKILLS Source: Bonnet (2002)>>

## B Subtitles as a complement to formal education

Recall that dubbing and subtitling countries do not statistically differ in terms of years of formal education (see Table 5). In dubbing countries there are on average 9.7 years of formal English education; in subtitling countries there are 10. 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. Table 10 provides estimates of the full model using the two dependent variables in OLS and Treatment Effect regressions.

<<TABLE 10: INTERACTION BETWEEN FORMAL EDUCATION AND SUBTITLES>>

In the EU survey regressions, the subtitles dummy has a negative and significant coefficient (-56.7) and the interacted dummy a significant and positive coefficient (7.2). This 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 7.2 points in the endogenous variable. Although the results are similar, it is not necessary to instrument the subtitle dummy because the Inverse Mills ratio is not significant.

In the Adjusted TOEFL results, the subtitles dummy has a positive and significant coefficient (19.43) and the interacted dummy a marginally significant and negative coefficient (-1.43). This means that a subtitling country with 13 or less years of formal education in English would score more than a dubbing country.<sup>32</sup>

In subtitling countries, the value of one year of English education results in 5 EU survey points (7.2 - 2.2) and 4.12 points (5.55-1.43) in the Adjusted TOEFL score. In contrast, in dubbing countries, one year of English does not significantly affect their EU survey results, but increases the adjusted TOEFL score by 5.5 points. Overall, the regressions suggest that subtitles increase more the marginal productivity of one additional year of English at school.

## C The effect of television penetration and viewing

In Panel 1 of Table 11, we report regressions with an additional interaction between television penetration and subtitling. English skills are 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 0.02 standard deviations on average, and an increase in the adjusted TOEFL score of 0.01 standard deviations. Once we instrument the interaction between penetration and subtitling (Model 5), its coefficient is still positive, although not significant. The coefficients for the rest of explanatory variables are similar to those obtained in Tables 7 and 8.

<<TABLE 11: ENGLISH QUALITY AND TV PENETRATION AND VIEWING>>

In Panel 2, we show the results with an interaction between television viewing and subtitling. Surprisingly, in subtitling countries, higher viewing levels seem to be negatively associated with English skills. The interaction coefficient is negative and significant in all the regressions, both when using the EU scores and

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<sup>32</sup>A dubbing country with  $Y$  years of English education obtains an adjusted TOEFL score of  $5.55 \times Y$ . A subtitling country with  $Y$  years of English education obtains an adjusted TOEFL score of  $19.43 + (5.5 - 1.43) \times Y$ . At  $Y = 13.12$  both scores are equal.

the TOEFL results. The difference between the two panels can be explained by the correlation between TV penetration and TV viewing variables, which is significantly negative (-0.3). In addition, it is important to note that many observations are dropped in the regressions of the second panel (including all non-EU), given that we have less data on TV viewing than on TV penetration.

## D Additional robustness checks

In Table 12 we control for additional measures of financial and economic development, and alternative determinants of the translation method. The sign of the Subtitles indicator is robust to the inclusion of the additional variables, even after controlling for endogeneity. The coefficient is insignificant in the case of the adjusted TOEFL results but becomes significant once controlling for endogeneity. The years of English education lose explanatory power with respect to Tables 7 and 8.

<<TABLE 12: ADDITIONAL CONTROLS>>

Richer countries speak better English, as GDP per capita is correlated with education expenditures (correlation coefficient is 0.63, significant at the one-percent level). The effect, however, is only significant in one of the four regressions. Larger countries obtain worse English results, especially TOEFL scores. Trade to GDP and the percentage of exports that are high tech are also positively related to TOEFL scores, although the direction of the causality deserves further investigation. The percentage of people employed in the services sector affects positively the EU survey results but negatively the TOEFL scores. Countries that are more dependent on touristic activities speak worse English.

As a second robustness check, we use, as alternative explanatory variables, cinema subtitling variables as opposed to the TV subtitling ones. Specifically, Table 13 shows regressions of the English skills on the percentage of movies subtitled and on the average number of watched subtitled movies (i.e. the interaction of the percentage of movies subtitled and the average cinema attendance per person). In the case of the EU survey results, both variables are highly significant, the first with a negative sign and the second with a positive one. At the mean average attendance (1.5 movies per year), the effect is highly positive ( $23.5 = -8 + 1.5 * 21$  units in model 1). In the case of the TOEFL results, the interaction term is sometimes negative (models 2 and 4). However, even at the maximum level of attendance (3 movies per year), the effect is highly positive ( $8 = 26 - 6 * 3$  in model 2 and  $10 = 25 - 3 * 5$  in model 4). Summarising, we can claim that subtitling, and in most cases watching subtitled programming, that is important for English skills.

<<TABLE 13: SUBTITLING IN CINEMAS>>

## VI English, economic and social outcomes

The economics literature explores some implications of speaking English well. A large part has focused on immigrant populations in the US and concluded that better English conduces to higher earnings (Bleakley and Chin, 2004 and 2007; McManus 1985; McManus, Gould and Welch 1983). 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. The issue probably deserves several papers and in this section our only intention is to sketch some of the possible implications, rather than providing a full-fledged econometric analysis. Table 14 summarises the empirical results.

<<TABLE 14: ENGLISH, ECONOMIC and SOCIAL OUTCOMES>>

**High-tech exports** Most top scientific journals are published in English so that, nowadays, it is almost impossible to become a scientist without a significant knowledge of the language. In addition, English is the language of international commerce. It is even the working language in many multinationals based in non-English speaking countries (e.g. Arcelor Mittal (India), Cemex (Mexico), Nestlé (Switzerland) and Nokia (Finland)). Hence, 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 models suggest that subtitling increases the ratio of high-tech exports to total exports by 0.5 standard deviations, whereas the number of years of English education do not affect significantly the level of high-tech exports.

**Student mobility** Television might be conducive to cultural affinity and one of the ways in which this might express itself is in a preference towards receiving education in English-speaking countries. Given the current pre-eminence of US universities, one could conjecture that knowing more English might tend to make studies in the US more attractive. In our regressions, subtitling countries seem to be more likely to send their students to the US (the economic effect is only 0.01 standard deviations). Larger but poorer countries are also relatively more likely to export students to the US

**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-US 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-US information sources could reduce hostility to America. In that case, knowledge of the English language – use of subtitles and learning at school – could be correlated with more international political affinity between the US and that country. The regressions suggest, however, that the relationship between, on the one hand, subtitles and years of English and, on the other, affinity with US international policy is negative, although the effect disappears once controlling for endogeneity. Those countries that trade more and those with higher total GDP seem to have higher affinity.

**Cross-border mergers** 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 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. As the table shows, subtitling yields ten additional acquisitions of US/UK firms per year or around twenty standard deviations.

**Cross-listings** 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 vice versa. Most of the foreign firms listed in the US come from the UK. 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. As shown in the table, subtitling yields an additional 2.6 additional cross-listings per year.

**Cross-border trade and equity flows** 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 US will be

larger in those countries who speak better English. Again, subtitling countries seem to be more likely to receive foreign direct investment (FDI) from the US, although the economic effect is of only 0.45 standard deviations.

## VII Conclusions

The general message in this paper is simple. Subtitled original version fiction provides continuous exposure to foreign languages. The US is by far the largest producer of fiction programmes shown around the world, 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.

We show that dubbing and subtitling countries do not differ significantly in wealth per capita or length of formal English education. Yet there are striking differences in their English skills. Subtitling countries score 77 points higher in the TOEFL, and obtain 23 points more in the EU 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. We identify an effect equivalent to between four and twenty years of English education at school. Our results are robust to the inclusion of other determinants of English skill, like wealth or economic development.

These findings are also robust if we use we instrument the subtitles variable with historical variables. We use discrete choice models to analyse the 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. Our analysis finds support for the film history account. To our knowledge, this is the first econometric analysis of those findings.

In economic terms, the subtitles effect is sizeable. A country that uses dubbing would need to increase its expenditure in education per capita by 200 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 \$582 billion per year.

Subtitling, via an increased ability in English language skills, has a positive impact along all sorts of economic and social dimensions. The paper also sketches some evidence of a number of these effects. Subtitling seems to increase the ratio of high-tech to total exports, the number of takeovers by UK or US

firms, the cross-listings of domestic firms in the US, and the US foreign direct investment. We have also shown that subtitling might facilitate student mobility.

We believe that our findings can be profound in countries with little but growing exposure to English-speaking media. Take the case of China. According to a recent report by consultants 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 use subtitles is more unlikely when the language is large and the political regime not democratic. But, if China were to increase the use of subtitling as translation mode, the impact could be huge both in terms of welfare and integration with Western societies.

This paper is a first attempt to measure the impact of subtitling on the quality of English spoken. But, of course, there is still a lot of ground to cover. For instance, we have taken here an aggregated national view. Some analyses (e.g. European Commission, 2005), though, find significant differences of language skills between men and women (52 per cent to 47 per cent), the young and the old (69 per cent versus 35 per cent), city and countryside people (55 per cent and 47 per cent) and across levels of 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). Econometric studies at the micro-level should probably shed light on those findings.

## Appendix: data sources

**English skills:** The data is published as tables in three Eurobarometers (European Commission, 2001, 2005 and 2006). The reports are freely downloadable from the EU website (<http://ec.europa.eu/>). The surveys are quite large. The 2005 issue was fielded in all 25 EU 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. 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?”

**TOEFL:** The data is freely downloadable from the exam administrator’s website (<http://www.ets.org>).

**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/research>). 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.

**TV and cinema variables:** The average number of hours of TV watched in a year, the number of homes with TV, the average annual cinema attendance per person and the percentage of films which are only shown subtitled in the cinemas are from a report for the EU of Media Consulting Group, which is available at [http://ec.europa.eu/information\\_society/media/overview/evaluation/studies/index\\_en.htm](http://ec.europa.eu/information_society/media/overview/evaluation/studies/index_en.htm).

**Other variables:** 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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<b>Country</b>	<b>Film translation mode</b>
Austria	Dubbing
Belgium	Dubbing / Subtitling*
Bulgaria	Voice over
Cyprus	Subtitling
Czech Rep	Dubbing
Denmark	Subtitling
Estonia	Subtitling/Dubbing**
Finland	Subtitling
France	Dubbing
Germany	Dubbing
Greece	Subtitling
Hungary	Dubbing
Iceland	Subtitling
Italy	Dubbing
Japan	Dubbing
South Korea	Subtitling
Latvia	Voice over
Lithuania	Voice over
Luxembourg	Dubbing
Malta	Subtitling***
Mexico	Subtitling
Netherlands	Subtitling
Norway	Subtitling
Poland	Voice over
Portugal	Subtitling
Romania	Subtitling
Slovak Republic	Dubbing
Slovenia	Subtitling
Spain	Dubbing
Sweden	Subtitling
Switzerland	Dubbing
Turkey	Dubbing

**Table 1. Foreign Translation Mode across EU and OECD**

**Countries**

Sources: MCG (2007) report for the EU Commission and Wikipedia. \* Dubbing in Wallonia, subtitling in Flanders. \*\* Subtitles for 2/3 of the programs and voice over for 1/3 of the programs. \*\*\* Most films are in original English version without subtitles.

		National		Non-national (other European)		USA		Other	
		Total	Prime-time	Total	Prime-time	Total	Prime-time	Total	Prime-time
<b>Flanders - Belgium</b>	<b>Public</b>	11.6	25	26.2	27.2	44.4	38.2	17.8	9.6
	<b>Commercial</b>	5.1	11.9	10	4.4	79.5	82.3	5.4	1.4
<b>Wallonia - Belgium</b>	<b>Public</b>	-	-	53.5	85.4	35.4	14.6	11.1	-
	<b>Commercial</b>	-	-	21	37	75.6	63	3.4	-
<b>Netherlands</b>	<b>Public</b>	28.3	44.6	30	21.7	36.1	31.6	5.6	2.1
	<b>Commercial</b>	12.6	20.2	6.4	9	78.8	67.6	2.2	3.2
<b>Germany</b>	<b>Public</b>	50	77.4	25	18.5	19.6	4.1	5.4	-
	<b>Commercial</b>	11	21.8	9.6	7.7	76.3	69.2	3.1	1.3
<b>France</b>	<b>Public</b>	22	57.7	25.1	22.1	52.9	20.2	-	-
	<b>Commercial</b>	29.9	47.3	8.2	-	60.7	52.7	1.2	-
<b>Italy</b>	<b>Public</b>	28	16.2	29.3	31.6	42.3	52.2	0.4	-
	<b>Commercial</b>	19.8	19	7.5	5.3	61.9	73	10.8	2.7

**TABLE 2: Origin of fiction**

Percentage of broadcasting time devoted to fiction: January 1997

Source: De Bens and de Smaele (2001)

		EC (2006) Survey		TOEFL (2006)	
		Raw Score	Ranking	Raw Score	Ranking
DK	Denmark	86	4	265	1
NL	Netherlands	87	3	262	2
IS	Iceland	.		262	3
AT	Austria	58	9	258	4
BE	Belgium	59	8	257	5
NO	Norway	.		257	6
SI	Slovenia	57	10	256	7
FI	Finland	63	6	255	8
SW	Sweden	89	1	254	9
CH	Switzerland	.		252	10
DE	Germany	56	11	251	11
PT	Portugal	32	16	251	12
RO	Romania	29	19	251	13
LV	Latvia	39	14	245	14
EE	Estonia	46	13	243	15
SK	Slovak Republic	32	17	243	16
BG	Bulgaria	23	24	242	17
CZ	Czech Rep	24	23	239	18
FR	France	36	15	238	19
HU	Hungary	23	25	237	20
LT	Lithuania	32	18	234	21
PL	Poland	29	20	234	22
MX	Mexico	.		234	23
EL	Greece	48	12	233	24
SP	Spain	27	22	233	25
CY	Cyprus	76	5	225	26
KR	Korea	.		218	27
TR	Turkey	17	26	212	28
IT	Italy	29	21	196	29
JP	Japan	.		192	30
MT	Malta	88	2		
LU	Luxembourg	60	7		

**Table 3. English Levels by Country**

The TOEFL scores are overall averages for test-takers resident in each country in 2006. Source: TOEFL web-site (<http://www.toefl.com>)

The EU Survey variable is the percentage of people in each country that mentions English when asked “Which languages do you speak well enough in order to be able to have a conversation, excluding your mother tongue?”, as reported in EU (2006) “Eurobarometer 243: Europeans and their Languages” (pg. 13). Source: European Union web-site: [http://ec.europa.eu/public\\_opinion/archives/ebs/ebs\\_243\\_en.pdf](http://ec.europa.eu/public_opinion/archives/ebs/ebs_243_en.pdf).

	Country	Language similarity	Years of English education at school	Pupil teacher ratio	Public education capita	GDP Total (\$billion)	Population	GDP per capita (\$)	Trade to GDP ratio	Tourism receipts as percentage of GDP	TV Sets per 10,000 inhabitants	Average Annual TV viewing (hours)	Average Annual Cinema Attendance per Person	Percentage of movies subtitled in the cinema
AT	Austria	578	13	12.41	2,053.3	\$238	8.2	\$29,436	56.85	5.08	519.242	955	2.09	7%
BE	Belgium	415	8	11.49		\$289	10.5	\$27,892	106.39	2.66	455.423	1194	2.26	59%
BG	Bulgaria	228	8	16.23	135.1	\$42	7.67	\$5,359	74.72	8.83	444.295	1204	0.31	
CY	Cyprus	581	9			.	0.85	.			.	979	.	100%
CZ	Czech Rep	241	10	16.25	446.4	\$172	10.28	\$16,759	73.57	3.7	332.568	1253	.	100%
DK	Denmark	593	9		3,712.5	\$160	5.44	\$29,863	49.49	2.13	574.558	930	2.32	89%
EE	Estonia	0	12	11.4	513.9	\$16	1.32	\$11,780	85.56	6.89	453.863	1350	1.18	94%
FI	Finland	0	12	15.53	2,700.0	\$139	5.23	\$26,785	42.07		612.675	1028	1.27	82%
FR	France	236	8		2,105.7	\$1,574	64.1	\$26,401	27.66	1.98	573.727	1253	2.99	14%
DE	Germany	578	9	14.12	1,403.4	\$2,173	82.4	\$26,397	41.21	1.05	623.552	1283	1.66	25%
EL	Greece	162	9	11.06	656.5	\$208	11.12	\$19,008	21.95	4.84	238.095	1490	.	96%
HU	Hungary	0	9			.	10.06	.			441.691	1590	1.16	64%
IS	Iceland	546	.	10.44	3,445.7	\$9		\$30,176	77.16	3.86	330.259	.	.	
IT	Italy	247	7	10.62	1,470.1	\$1,489	59.09	\$25,879	41.17	3.88	521.488	1624	1.83	7%
JP	Japan	0	.	10.49	1,417.5	\$3,462		\$27,210	28.28	2	678.873	.	.	
LV	Latvia	197	10			.	2.29	.			532.751	1241	0.9	
LT	Lithuania	216	9	29.02	387.8	\$10	3.57	\$3,018	42.39	0.72	472.616	1210	0.73	100%
LU	Luxembourg	350	13	14.07	4,228.0	\$25	0.48	\$56,486	65.37		608.232	.	2.7	
MT	Malta		11			.	0.4	.			702.575	.	.	100%
MX	Mexico	240	.	11.33		\$927		\$9,110	152.59		241.048			
NL	Netherlands	608	13		1,953.4	\$468	16.57	\$29,190	77.4	1.66	493.692	1186	1.38	96%
NO	Norway	548	.		3,453.5	\$160		\$35,258	37.06	1.14	441.977	942	2.59	89%
PL	Poland	239	9	11.54	365.0	\$428	38.51	\$11,118	39.88	2.07	338.451	1466	0.84	87%
PT	Portugal	240	7	10.53	1,236.9	\$189	10.64	\$18,187	35.45	4.29	313.269	1289	1.15	93%
RO	Romania	227	10	16.99		\$155	22.27	\$7,061	40.05		235.11	1478	0.13	100%
SK	Slovak Republi	250	9	17.51	330.8	\$69	54.47	\$12,875	87.91		482.416	1222	0.63	100%
SI	Slovenia	249	10	15.55	974.8	\$37	20.09	\$18,297	71.88	5.15	353.058	1046	1.34	100%
KR	South Korea	0	.	18.9	655.4	\$830		\$17,479	17.07	0.27	326.885			
SP	Spain	240	10	13.75	1,050.1	\$945	45.06	\$22,462	28.51	4.25	401.577	1320	2.78	8%
SW	Sweden	591	12	10.05	2,890.7	\$240	9.12	\$26,832	47.22		510.998	894	1.64	100%
CH	Switzerland	426	.	12.78		\$226		\$31,051	47.13	2.97	441.982	1064	2.2	25%
TR	Turkey	0	.		163.4	\$474		\$6,865	31.91	5.02	300.259			

**Table 4. Sample Description**

Sources: The language similarity is taken from Dyen et al. (1992) for indoeuropean languages. The variable takes a value of zero (minimum similarity) for non-indoeuropean languages. The trade to GDP ratio, tourism receipts, pupil / teacher ratios, data on public education expenditure per capita, GDP, population are all taken from the IMD world competitiveness yearbook data set (<http://www.imd.ch/research/publications/wcy/index.cfm>), and are reported as averages per country over the sample period. The years of English variable is taken from Eurostat (<http://epp.eurostat.ec.europa.eu>).

	GDP per Capita	Pisa Score	Public Expenditure in Education per Capita	Years of Formal English Education	TOEFL Score	Adjusted TOEFL Score	EU Survey Scores	Pupil-to-Teacher Ratio	TV sets per Capita	Average Annual TV Viewing (hours)	Average Annual Cinema Attendance per person
<b>Dubbing Countries</b>											
Number of Countries	16	18	16	14	18	17	15	16	18	13	13
Mean	22186.1	486.5	713.4	9.7	298.0	160.6	32.0	14.1	471.9	1285.8	1.5
Median	22100.3	488.5	324.9	9.0	237.0	160.4	29.9	14.2	463.2	1253.0	1.2
Standard Deviation	0.6	24.6	852.0	1.8	134.3	18.9	14.0	8.3	105.4	181.0	0.8
Min	5735.7	402.0	0.0	7.0	183.0	116.6	7.1	0.0	300.3	955.0	0.3
Max	69806.2	556.0	4321.9	13.0	602.0	190.9	66.0	32.2	678.9	1624.0	3.0
<b>Subtitling Countries</b>											
Number of Countries	12	12	12	11	13	12	11	12	13	9	8
Mean	23138.1	488.5	1209.4	10.0	312.4	176.1	58.6	10.3	423.3	1119.1	1.6
Median	24608.4	497.0	836.7	10.0	252.0	186.3	60.0	11.7	442.0	1046.0	1.4
Standard Deviation	0.5	36.9	1123.1	1.8	135.3	22.7	22.2	6.0	147.1	173.5	0.8
Min	5163.0	396.0	0.0	7.0	210.0	126.4	21.0	0.0	235.1	930.0	0.1
Max	42467.7	547.0	4107.6	13.0	616.0	201.4	89.0	20.6	702.6	1478.0	2.6
Difference in Median (Dubbing minus Subtitling)	-2508.0 *	-8.5 **	-511.7 ***	-1.0	-15.0 ***	-25.9 ***	-30.1 ***	2.5 ***	21.3 ***	207.0 ***	-0.2 *
p-value	(0.0575)	(0.0226)	(0.0016)	(0.1300)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0012)	(0.0000)	(0.0856)

\*, \*\*, \*\*\*: significant at the 10%, 5%, 1% level.

**TABLE 5: Characteristics of the Sample, depending on the Translation Method**

Sources: GDP per capita is from the IMD world competitiveness yearbook data set (<http://www.imd.ch/research/publications/wcy/index.cfm>). The years of English variable is taken from Eurostat (<http://epp.eurostat.ec.europa.eu>). Data on film translation mode is from Wikipedia. Tests of differences in medians are based on a non-parametric Wilcoxon test.

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)
Size of the national language(s) in 1933, in logs	-0.697** [0.288]								-0.655* [0.371]	-0.989*** [0.290]	-0.928*** [0.328]
Size of the economy, 1933		-0.000* [0.000]							0 [0.000]		
(Imports + Exports)/Pop 1933			0.011 [0.008]								
GDP per capita, 1933, logs				0.085 [0.570]							
Country suffered dictatorship 1930-50					-1.915*** [0.634]				-4.368* [2.277]		-2.452*** [0.839]
Democracy Index						0.070* [0.041]			-0.154 [0.140]	0.122** [0.056]	
Similarity between local language and English							0.001 [0.001]				
Distance to relevant English speaking area, logs								0.204 [0.321]			
Constant	6.741** [2.769]	1.046* [0.633]	-0.658 [0.420]	-0.77 [4.485]	1.282** [0.550]	-0.152 [0.276]	-0.256 [0.394]	-1.482 [2.354]	9.601** [3.790]	9.794*** [3.066]	10.906*** [3.647]
Observations	24	24	23	24	29	24	32	32	21	21	24
Pseudo R-squared		0.246	0.0959	0.000727	0.293	0.099	0.016	0.0103	0.571	0.449	0.483

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### **Table 6. Determinants of Subtitling**

This table reports probit regression results on the countries' cross-section, where the dependent variable is an indicator (0=subtitles, 1=dubbing). The 1933 economic and demographic data was downloaded Maddison's historical statistics (<http://www.ggd.net/maddison/>): Size of the national language is obtained by computing the sum of the populations of the countries in which each language is spoken. Trade openness is calculated as the sum of imports and exports relative to GDP of the country. The democracy index is the Polity IV 1933 score for each country. The dictatorship score is a dummy variable (0=Polity IV >= +6 "democracy", 1=Polity IV < +6 "dictatorship") following the standard Polity IV definitions: democracies ("no-dictatorships") are those countries between +6 and +10 in the -10 to +10 spectrum. The distance to the relevant English speaking area is computed as follows. For European countries, distance between the country's capital and London. For Mexico, distance between the capital and Los Angeles. For Asian countries, the variable is the average of the distance between London and Los Angeles and the respective capital.

	EU Survey - OLS Model 1	EU Survey - OLS Model 2	EU Survey - OLS Model 3	EU Survey - OLS Model 4	EU Survey – Treatment Effects Model 1	EU Survey – Treatment Effects Model 2	EU Survey – Treatment Effects Model 3	EU Survey – Treatment Effects Model 4
Subtitles (Y/N)	15.683*** [1.010]	12.942*** [3.311]	15.075*** [1.349]	13.424*** [3.011]				
Subtitles (Y/N) - Instrumented					25.154*** [2.945]	17.754*** [3.202]	20.405*** [3.605]	18.399*** [3.235]
Similarity between local language and English	0.057*** [0.001]	0.051*** [0.003]	0.060*** [0.002]	0.053*** [0.002]	0.053*** [0.003]	0.048*** [0.005]	0.056*** [0.005]	0.050*** [0.005]
Years of English education at school	1.459* [0.779]	0.49 [0.892]	0.946 [1.014]	0.408 [0.919]	0.944 [0.663]	0.382 [0.600]	0.803 [0.717]	0.286 [0.595]
PISA education quality assessment	0.250*** [0.020]	0.252*** [0.026]	0.278*** [0.019]	0.251*** [0.023]	0.137*** [0.022]	0.187*** [0.048]	0.206*** [0.045]	0.185*** [0.048]
Expenditure in public education per capita		0.007*** [0.002]		0.007*** [0.001]		0.007*** [0.001]		0.007*** [0.001]
Pupil to teacher ratio			0.275 [0.242]	0.221 [0.224]			0.307 [0.250]	0.252 [0.250]
Inverse Mills Ratio					-10.584*** [1.579]	-7.794*** [1.884]	-8.570*** [2.041]	-7.949*** [1.828]
Constant	-119.316*** [5.180]	-118.667*** [7.405]	-134.971*** [6.737]	-120.810*** [6.365]	-62.142*** [11.229]	-86.210*** [23.911]	-99.313*** [22.678]	-88.009*** [23.539]
Observations	169	115	115	115	143	115	115	115
Number of year	11	9	9	9	11	9	9	9
R-squared	0.725	0.721	0.646	0.723	0.782	0.759	0.694	0.761
St.Dev. of Dependent Variable	22.37	22.37	22.37	22.37	22.37	22.37	22.37	22.37

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### **Table 7: Factors influencing English quality --EU survey**

This table reports panel regressions in which the left hand side variable is the EU survey quality of English measurement. We estimate year fixed effects in all the regressions. Robust standard errors are in parentheses. In models 1, 2, 3 and 4 the subtitles dummy is assumed to be exogenous to English quality. In models 5, 6, 7 and 8, the subtitles variable is instrumented with a model including the dictatorship dummy and the size of the local language in 1933 (no constant).

	TOEFL- OLS Model 1	TOEFL- OLS Model 2	TOEFL- OLS Model 3	TOEFL – Treatment Effects Model 1	TOEFL – Treatment Effects Model 2	TOEFL – Treatment Effects Model 3	Adjusted TOEFL- OLS Model 1	Adjusted TOEFL- OLS Model 2	Adjusted TOEFL- OLS Model 3	Adjusted TOEFL – Treatment Effects Model 1	Adjusted TOEFL – Treatment Effects Model 2	Adjusted TOEFL – Treatment Effects Model 3
Subtitles (Y/N)	8.168*** [0.645]	8.352*** [0.852]	8.400*** [0.804]				3.240*** [0.616]	3.113*** [0.906]	3.299*** [0.922]			
Subtitles (Y/N) - Instrumented				18.469*** [3.867]	11.098*** [3.710]	11.347*** [3.813]				8.739** [4.373]	3.332 [3.632]	4.056 [3.791]
Similarity between local language and English	0.054*** [0.004]	0.063*** [0.006]	0.063*** [0.005]	0.053*** [0.007]	0.061*** [0.008]	0.062*** [0.009]	0.055*** [0.004]	0.060*** [0.008]	0.062*** [0.006]	0.047*** [0.007]	0.060*** [0.006]	0.061*** [0.006]
Years of English education at school	1.925*** [0.337]	2.576*** [0.463]	2.550*** [0.517]	0.409 [0.756]	2.563*** [0.802]	2.532*** [0.802]	4.295*** [0.765]	4.362*** [1.052]	4.258*** [1.123]	3.092*** [0.950]	4.362*** [1.003]	4.255*** [1.023]
PISA education quality assessment	-0.055** [0.018]	-0.026 [0.015]	-0.027* [0.014]	-0.032 [0.038]	-0.038 [0.042]	-0.041 [0.042]	0.216*** [0.047]	0.213*** [0.050]	0.207*** [0.054]	0.243*** [0.056]	0.212*** [0.059]	0.204*** [0.059]
Expenditure in public education per capita		0 [0.001]	0 [0.001]		0 [0.001]	0 [0.001]		0.003** [0.001]	0.003** [0.001]		0.003** [0.001]	0.003** [0.001]
Pupil to teacher ratio			0.077 [0.235]			0.094 [0.223]			0.247 [0.267]			0.252 [0.257]
Inverse Gini index	16.452 [9.191]	-29.345* [13.093]	-30.259* [13.652]	8.085 [24.295]	-28.027 [27.174]	-29.046 [27.880]						
Inverse Mills Ratio				-8.118*** [2.459]	-2.248 [2.500]	-2.404 [2.513]				-5.559* [3.017]	-0.18 [2.571]	-0.621 [2.722]
Intercept	275.592*** [7.568]	290.050*** [8.326]	290.335*** [8.546]	280.265*** [16.833]	294.863*** [17.904]	295.543*** [18.059]	41.163 [29.897]	41.858 [34.045]	42.286 [32.988]	39.043 [26.589]	42.262 [29.175]	43.682 [28.768]
Number of Observations	244	197	197	209	197	197	244	197	197	209	197	197
Number of Years	10	9	9	10	9	9	10	9	9	10	9	9
R-Squared	0.502	0.543	0.543	0.989	0.99	0.99	0.493	0.585	0.587	0.964	0.97	0.97
St.Dev. of Dependent Variable	134.6	134.6	134.6	134.6	134.6	134.6	95.08	95.08	95.08	95.08	95.08	95.08

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 8: Factors influencing English quality adj. TOEFL and unadj. TOEFL**

This table reports panel regressions in which the left hand side variable of the first six models is the adjusted TOEFL English quality measurement and the last six is the unadjusted TOEFL. We include year fixed effects in all the regressions. Robust standard errors are in parentheses. In models 1, 2, 3, 7, 8 and 9 the subtitles dummy is assumed to be exogenous to English quality. In models 4, 5, 6, 10, 11 and 12, the subtitles variable is instrumented with a model including the dictatorship dummy and the size of the local language in 1933 (no constant).

	Listening comprehension	Written production	Reading comprehension	Linguistic competence
Denmark	64.77 20.07	46.17 29.33	78.32 26.26	53.95 22.1
Finland	59.65 24.52	47.7 29.47	80.29 23.07	67.59 20.63
France	30.6 20.39	14.55 17.81	56.84 21.85	48.01 21.41
Netherlands	61.63 21.44	46.04 25.67	77.47 21.54	65 22
Norway	73.26 19.6	56.3 29.69	82.03 26.82	66.36 20.4
Spain	38.33 23.08	23.41 25.5	63.57 21.66	58.75 23.3
Sweden	72.18 19.65	55.39 28.04	85.88 22.31	64.23 20.43
Average subtitling countries	66.298	50.32	80.798	63.426
Average dubbing countries	34.465	18.98	60.205	53.38
Difference subtitling-dubbing	31.833	31.34	20.593	10.046

**TABLE 9: Disaggregating by type of English skills**

The source for this table is Bonnet (2002). It summarizes the results of tests carried out amongst about 1,500 school pupils in the 14-to-16 age bracket by national authorities in the different countries. The tests are homogeneous across countries and were administered in 2001.

Dubbing countries are France and Spain. Subtitling countries are Denmark, Finland, Netherlands, Norway and Sweden.

	EU Survey - OLS	EU Survey – Treatment Effects	Adjusted TOEFL - OLS	Adjusted TOEFL – Treatment Effects
Subtitles (Y/N)	-56.685** [18.737]		19.436** [6.210]	
Subtitles (Y/N) Instrumented		-53.787*** [14.979]		-7.997 [90.499]
Subtitles (Y/N) x Years English	7.195*** [1.683]		-1.413* [0.736]	
Subtitles (Y/N) Instrumented x Years English		7.369*** [1.415]		-0.476 [8.667]
Similarity between local language and English	0.056*** [0.004]	0.053*** [0.006]	0.039*** [0.005]	-0.008 [0.049]
Years of English education at school	-2.178 [1.290]	-2.216*** [0.828]	5.550*** [0.919]	8.854 [5.480]
PISA education quality assessment	0.113** [0.048]	0.021 [0.062]	0.061 [0.035]	0.36 [0.357]
Expenditure in public education per capita	0.007*** [0.001]	0.007*** [0.001]	0.004*** [0.001]	-0.01 [0.009]
Pupil to teacher ratio	-0.052 [0.128]	0.249 [0.176]	0.209 [0.189]	-8.082*** [1.468]
Inverse Mills Ratio		-1.962 [2.483]		-0.374 [16.393]
Constant	-26.436 [31.577]	15.896 [31.000]	109.704*** [18.570]	61.214 [188.163]
Observations	115	115	139	139
R-squared	9	9	9	9
Number of year	22.37	22.37	95.08	95.08
St.Dev. of Dependent Variable	0.817	0.745	0.534	0.319

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 10: Interaction between formal education and subtitles effects OLS models EU survey and adj. TOEFL**

This table reports panel regressions in which the left hand side variables are the EU survey and adjusted TOEFL quality of English measurements. We include year fixed effects in all the regressions. The treatment effect regressions are carried out with a model including the dictatorship dummy and 1933 language size variables (no constant). In all models, robust standard errors are in parentheses

**Panel 1: Controlling for TV Penetration (Number of TV Sets Per Capita)**

	OLS Model 1 - E.U. survey	OLS Model 2 - E.U. survey	OLS Model 3 - E.U. survey	OLS Model 4 - E.U. survey	Treatment Effects - EU Survey	OLS Model 1 - Adj. TOEFL	OLS Model 2 - Adj. TOEFL	OLS Model 3 - Adj. TOEFL	OLS Model 4 - Adj. TOEFL	Treatment Effects - Adj. TOEFL
Subtitles (Y/N)	-4.707**	0.586	-7.289	1.508		-29.574***	-27.480***	-28.251***	-27.956***	
Subtitles (Y/N) Instrumented					12.268 [7.825]	[5.887]	[6.003]	[6.261]	[6.315]	-27.980*** [9.001]
Subtitles (Y/N) x TV penetration	0.048***	0.030***	0.052***	0.029**		0.083***	0.077***	0.081***	0.079***	
Subtitles (Y/N)- Instrumented x TV penetration					0.015 [0.016]	[0.014]	[0.016]	[0.015]	[0.016]	0.079*** [0.017]
Similarity between local language and English	0.055***	0.048***	0.056***	0.051***	0.049***	0.052***	0.056***	0.062***	0.059***	0.059***
Years of English education at school	2.185***	1.595**	1.929**	1.526*	1.399**	2.852***	3.128***	3.210***	2.966***	2.966***
PISA education quality assessment	0.141***	0.161***	0.156***	0.164***	0.134**	0.106***	0.107**	0.108**	0.096*	0.096
Pupil to teacher ratio			0.227	0.244	0.257			0.276	0.313	0.313
Expenditure in public education per capita		0.005***		0.005***	0.006***		0.002		0.002	0.002*
Inverse Mills Ratio					-7.249*** [1.742]		[0.001]		[0.001]	[0.001]
Intercept	-73.692***	-82.852***	-83.862***	-87.422***	-72.583***	109.468***	107.246***	102.705***	109.311***	109.273***
Observations	175	119	119	119	119	244	197	197	197	197
R-squared	11	9	9	9	9	10	9	9	9	9
Number of year	0.779	0.751	0.716	0.754	0.78	0.532	0.618	0.617	0.622	0.972
St.Dev. of Dependent Variable	22.37	22.37	22.37	22.37	22.37	95.08	95.08	95.08	95.08	95.08

**Panel 2: Controlling for TV Viewing (Number of TV Hours per Capita)**

	OLS Model 1 - E.U. survey	OLS Model 2 - E.U. survey	OLS Model 3 - E.U. survey	OLS Model 4 - E.U. survey	Treatment Effects - EU Survey	OLS Model 1 - Adj. TOEFL	OLS Model 2 - Adj. TOEFL	OLS Model 3 - Adj. TOEFL	OLS Model 4 - Adj. TOEFL	Treatment Effects - Adj. TOEFL
Subtitles (Y/N)	503.540***	465.724***	593.659***	477.501***		618.782***	683.805***	592.003***	674.855***	
Subtitles (Y/N) Instrumented					438.729*** [120.164]	[101.214]	[146.169]	[110.773]	[145.143]	678.092*** [139.167]
Subtitles (Y/N) x TV viewing (hours per capita) in logs	-69.219***	-64.353***	-82.240***	-65.927***		-86.636***	-95.893***	-82.850***	-94.472***	
Subtitles (Y/N)- Instrumented x TV viewing (hours per capita) in logs					-60.037*** [17.236]	[14.530]	[20.920]	[15.911]	[20.859]	-95.202*** [19.936]
Similarity between local language and English	0.052***	0.048***	0.052***	0.051***	0.049***	0.026***	0.039***	0.042***	0.043***	0.044***
Years of English education at school	2.638***	2.349**	2.236**	2.247**	2.123**	-0.497	0.091	-0.257	-0.225	-0.223
PISA education quality assessment	0.107***	0.110**	0.104**	0.112**	0.079	0.141	0.182	0.184	0.182	0.196
Pupil to teacher ratio			0.3	0.268	0.268			0.531*	0.516*	0.514
Expenditure in public education per capita		0.003*		0.003**	0.003**		-0.002		-0.002	-0.002
Inverse Mills Ratio					-3.571 [2.927]		[0.001]		[0.002]	[0.001]
Intercept	-60.694***	-63.578*	-61.638*	-67.736*	-50.53	131.353**	108.268	101.245	103.309	96.824*
Observations	130	84	84	84	84	160	121	121	121	121
R-squared	11	9	9	9	9	10	9	9	9	9
Number of year	0.796	0.73	0.725	0.735	0.756	0.42	0.509	0.519	0.525	0.979
St.Dev. of Dependent Variable	22.37	22.37	22.37	22.37	22.37	95.08	95.08	95.08	95.08	95.08

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 11: Subtitles channelled through television penetration and viewing - EU survey and adj. TOEFL**

These tables report panel regressions in which the left hand side variables are the EU survey and adjusted TOEFL quality of English measurements. We include year fixed effects in all the regressions. The treatment effect regressions are carried out with a model including the dictatorship dummy and 1933 language size variables (no constant). In all models, robust standard errors are in parentheses.

	Robustness to technology and economic variables - EU Survey	Treatment Effects – EU Survey	Robustness to technology and economic variables - Adj. TOEFL	Treatment Effects – Adj. TOEFL
Subtitles (Y/N)	19.278*** [1.103]		3.307 [1.748]	
Subtitles (Y/N) - Instrumented		24.378*** [2.667]		12.770*** [4.218]
Similarity between local language and English	0.042*** [0.004]	0.043*** [0.005]	0.041*** [0.009]	0.040*** [0.008]
Years of English education at school	2.605** [0.720]	2.134*** [0.601]	0.426 [0.964]	-0.486 [0.902]
GDP per capita, logs	0.38 [1.978]	5.741 [4.408]	4.967 [5.142]	13.679** [5.292]
Country area in Square Kms2 / 1000	-0.331 [7.981]	-0.644 [6.580]	-19.314** [7.571]	-19.872** [8.479]
Trade to GDP	-0.641 [1.653]	-1.736 [3.042]	12.376*** [2.495]	12.152*** [4.342]
% of people employed in service sector	41.869*** [5.566]	13.992 [13.735]	-33.153** [11.199]	-70.869*** [15.435]
% GDP from touristic activity	-0.954** [0.322]	-1.241*** [0.442]	-3.009*** [0.715]	-3.330*** [0.620]
% workforce in R%D activities	0.023 [0.204]	-0.067 [0.351]	0.331 [0.195]	0.188 [0.641]
Internet penetration	0.006 [0.011]	0.008 [0.010]	-0.007 [0.016]	-0.005 [0.014]
% of exports that are hightech	1.482 [1.333]	1.995 [2.235]	13.057** [3.796]	13.654*** [2.880]
Inverse Mills Ratio		-8.435*** [2.458]		-13.108*** [3.714]
Constant	-182.809*** [26.285]	-114.980** [50.808]	201.685*** [24.608]	276.210*** [49.739]
Observations	96	96	121	121
R-squared	7	7	7	7
Number of year	22.37	22.37	95.08	95.08
St.Dev. of Dependent Variable	0.856	0.872	0.628	0.979

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 12: Many more explanatory variables: EU survey and adjusted TOEFL**

This table reports panel regressions in which the left hand side variables are the EU survey and adjusted TOEFL quality of English measurements. We include year fixed effects in all the regressions. The treatment effect regressions are carried out with a model including the dicatatorship dummy and 1933 language size variables (no constant). GDP, trade, employment in service sector, touristic activity, R&D, internet penetration and high-tech exports are all contemporary data obtained from the IMD World Competitiveness Yearbook. In all models, robust standard errors are in parentheses.

	OLS Model 1 - E.U. survey	OLS Model 2 - E.U. survey	OLS Model 3 - E.U. survey	OLS Model 4 - E.U. survey	OLS Model 1 - Adj. TOEFL	OLS Model 2 - Adj. TOEFL	OLS Model 3 - Adj. TOEFL	OLS Model 4 - Adj. TOEFL
Percent of Movies Only Subtitled in 2006	-8.255*** [2.277]	-7.751** [2.969]	-17.036*** [3.479]	-11.815*** [3.512]	9.748*** [2.285]	26.532*** [4.926]	17.792** [6.038]	25.557*** [5.872]
% Of Subtitled Films x Average Annual Cinema Attendance per Capita	21.366*** [0.533]	18.407*** [3.049]	26.979*** [2.575]	21.956*** [3.003]	6.452*** [1.467]	-6.718*** [1.866]	1.062 [3.171]	-5.661* [2.690]
Similarity between local language and English	0.044*** [0.005]	0.037*** [0.007]	0.038*** [0.006]	0.039*** [0.007]	0.035*** [0.004]	0.068*** [0.013]	0.068*** [0.015]	0.070*** [0.014]
Years of English education at school	4.389*** [0.228]	3.901*** [0.666]	4.329*** [0.469]	3.965*** [0.700]	1.021** [0.345]	0.261 [0.643]	0.514 [0.644]	0.048 [0.654]
PISA education quality assessment	0.110*** [0.031]	0.098 [0.064]	0.075 [0.054]	0.087 [0.056]	0.254** [0.079]	0.490** [0.165]	0.467** [0.182]	0.482** [0.167]
Expenditure in public education per capita		0.004** [0.002]		0.003** [0.001]		0.005*** [0.001]		0.005*** [0.001]
Pupil to teacher ratio			0.568 [0.353]	0.47 [0.344]			0.419 [0.236]	0.396 [0.298]
Constant	-81.634*** [18.663]	-73.895* [36.818]	-70.574* [32.284]	-74.888* [33.121]	51.499 [40.781]	-70.714 [84.542]	-61.934 [91.507]	-69.818 [85.068]
Observations	115	79	79	79	138	111	111	111
Number of year	0.768	0.71	0.71	0.723	0.397	0.582	0.565	0.59
R-squared	11	9	9	9	10	9	9	9
St.Dev. of Dependent Variable	22.37	22.37	22.37	22.37	22.37	22.37	22.37	22.37

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**TABLE 13: Robustness Test: Subtitling in Cinemas instead of TV Subtitling**

This table reports panel regressions in which the left hand side variables are the EU survey and adjusted TOEFL quality of English measurements. We include year fixed effects in all the regressions. The treatment effect regressions are carried out with a model including the dictatorship dummy and 1933 language size variables (no constant). In all models, robust standard errors are in parentheses.

	OLS – High-Tech Exports	Treatment Effects – High-Tech Exports	OLS – Students going to US	Treatment Effects – Students going to US	OLS – UN votes	Treatment Effects – UN votes	OLS – Acquisitions of US/UK Firms	Treatment Effects – Acquisitions of US/UK Firms	OLS – Listings in the US	Treatment Effects – Listings in the US	OLS – US FDI	Treatment Effects – US FDI
Subtitles (Y/N)	0.329*** [0.038]		0.053** [0.015]		-0.041*** [0.007]		10.712*** [1.282]		2.673*** [0.607]		21.293*** [4.807]	
Subtitles (Y/N) - Instrumented		0.465*** [0.133]		0.079*** [0.020]		0 [0.047]		13.955*** [3.010]		2.985* [1.599]		21.175* [11.296]
Similarity between local language and English	0.000*** [0.000]	0 [0.000]	0.000*** [0.000]	0.000*** [0.000]	0 [0.000]	-0.000* [0.000]	-0.001 [0.006]	-0.003 [0.008]	-0.003* [0.002]	-0.003 [0.003]	-0.021** [0.008]	-0.02 [0.019]
Years of English education at school	0.003 [0.022]	-0.011 [0.032]	0.011* [0.005]	0.009* [0.005]	-0.039*** [0.007]	-0.045*** [0.010]	-2.002 [1.200]	-2.307 [1.416]	0.038 [0.386]	0.008 [0.619]	12.197*** [1.665]	12.266*** [4.170]
PISA education quality assessment	0.008** [0.003]	0.006** [0.003]	-0.001*** [0.000]	-0.001** [0.001]	0.002 [0.001]	0.001 [0.001]	-0.088*** [0.022]	-0.122** [0.047]	-0.053*** [0.005]	-0.056*** [0.020]	-0.448*** [0.106]	-0.459** [0.198]
GDP per capita, logs	0.811*** [0.130]	0.834*** [0.160]	-0.077*** [0.013]	-0.074*** [0.018]	0.086* [0.037]	0.096** [0.048]	21.019*** [3.972]	21.502*** [4.492]	9.272*** [0.982]	9.319*** [1.871]	31.166*** [3.576]	30.942*** [10.516]
Country area in Square Kms2 / 1000000	0.478 [0.328]	0.448 [0.300]	0.451*** [0.045]	0.438*** [0.079]	0.1 [0.065]	0.108 [0.135]	102.300*** [15.907]	101.096*** [15.461]	15.960*** [3.776]	15.844*** [5.760]	-36.923** [14.876]	-35.357 [33.490]
Trade to GDP - logs	0.022 [0.137]	0.023 [0.230]	0.015 [0.015]	0.008 [0.027]	0.049** [0.018]	0.072 [0.058]	24.666*** [4.252]	24.373*** [5.228]	5.044*** [1.071]	5.016** [2.331]	39.349*** [5.127]	40.083*** [12.567]
GDP total - logs	0.029 [0.033]	0.023 [0.053]	-0.067*** [0.005]	-0.068*** [0.008]	0.029** [0.010]	0.027 [0.022]	0.006 [1.443]	-0.086 [2.181]	3.976*** [0.429]	3.967*** [1.080]	34.147*** [3.186]	34.079*** [9.526]
Inverse Mills Ratio		-0.198** [0.087]		-0.037* [0.022]		-0.052** [0.025]		-4.493** [1.785]		-0.432 [0.690]		2.839 [9.896]
Intercept	-10.083*** [2.136]	-9.351*** [1.732]	1.338*** [0.052]	1.490*** [0.335]	-2.209*** [0.180]	-2.070*** [0.420]	-252.704*** [38.268]	-236.419*** [42.319]	-105.448*** [9.797]	-103.881*** [16.120]	-522.739*** [77.370]	-518.593*** [108.625]
Observations	115	115	114	114	76	76	150	150	150	150	125	125
R-squared		0.764		0.58		0.418		17.46		8.388	0.496	0.514
Number of year	8	8	7	7	6	6	10	10	10	10	8	8
St.Dev. of Dependent Variable	0.65	0.668	0.585	0.622	0.474	0.844	0.542	0.571	0.551	0.56	46.02	46.02

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

#### Table 14: Consequences of subtitling

This table reports panel regressions with three dependent variables: a. the country's high-tech exports (Source: IMD Competitiveness Yearbook); b. the ratio between the number of nationals of the country pursuing higher education in the US to total population (Source: Opendoors' Report of International Educational Exchange <http://opendoors.iienetwork.org>), and; c. the correlation the US and each country votes in the United Nations (Source: Erik A. Gartzke). GDP, trade, employment in service sector, touristic activity, R&D, internet penetration and high-tech exports are all contemporary data obtained from the IMD World Competitiveness Yearbook. We include year fixed effects in all the regressions. The treatment effect regressions are carried out with a model including the dictatorship dummy and 1933 language size variables (no constant). In all models, robust standard errors are in parentheses.