

TV or not TV?

The Economic Impact of 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 OECD, and the subsequent impact of English skills on measures of economic performance. We identify a large positive effect for subtitled original version broadcasts, as opposed to dubbed television, on English proficiency scores, which loosely corresponds to one and a half to four years of English education at school. We show that the translation mode and the resulting foreign language skills increase significantly the foreign direct investment inflows and outflows, as well as the exports of goods and services.

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I Introduction

English is the language of the globalized world, and the lingua franca for the international communities in, among others, science, finance, advertising, culture, tourism, and technology. 68% of citizens in the EU rate English as the most useful foreign language –far above the second position of French with 25% (European Commission, 2006). English is also the dominant business language and the working language of many multinationals based in non-English speaking countries, such as Arcelor Mittal [India], Cemex [Mexico], Nestlé [Switzerland] and Nokia [Finland].

Not surprisingly, English 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 (1997) estimates that about one billion people are currently learning English worldwide, 200 million in China alone.¹ 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 non-English speaking EU (Eurydice, 2005).² In comparison, pupils in England and Wales have foreign languages for five and three years, respectively, and there are no requirements in Ireland and Scotland.³

Despite the huge amounts of time and money spent, disparities in the quality of English across the countries of the Organisation for Economic Cooperation and Development (OECD) are very large. In places such as the Netherlands, Denmark and Sweden, more than 80% of citizens state that they are able to hold a conversation in English, but the proportion is below 60% in some of their neighbouring countries like Belgium, Austria and Finland (European Commission, 2006). Japanese TOEFL exam takers score less than 60 on average, compared to more than 65 by their Korean counterparts. The reasons for these disparities do not seem straightforward.

In this paper, we show that the method used to translate foreign films and programs on television is an important driver of the quality of English spoken in non-English speaking countries, and that the level of English skills affects in turn economic performance. Subtitled original version programmes provide continuous exposure to foreign languages as spoken by natives, which, we argue, is bound to improve the listeners’ English skills. The U.S. controls about 85% of the

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

²The 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.

³In 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).

world market for fiction (Crystal, 2007), so that when someone watches television, the source language is very likely to be English. Thus, the citizens of countries where television is broadcast in the original version would have better vocabulary, grammar and, particularly, listening comprehension, than those where programs are dubbed. Surprisingly, in a 2006 EU survey only 12% of Europeans think that television is useful in learning foreign languages.⁴

We divide our analysis into three questions. We first ask “Why are there subtitles in some countries and dubbing in others?” Following the history of cinema literature, we identify and systematically analyze the historical circumstances under which countries opted for one of the alternatives in the years around World War II (WWII). The use of subtitles was not due to a higher ability to understand the English language, nor to the idea that it would be beneficial for people to hear the actors speak foreign languages (Crystal, 2007). Rather, limited box office receipts and a significant number of imported films induced small countries to choose the low cost subtitling option. Additionally, some authoritarian regimes felt that using their own language in films would strengthen national pride. We show empirically that dubbing tended to be adopted in larger countries, those whose national languages were widely used internationally, and those with dictatorial regimes. Smaller, democratic countries tended to adopt subtitling. No OECD country has moved from one to the other mode since WWII.

The second question that we ask is “What is the influence of the translation mode on English skills?” We find that the quality of English in a country depends on its linguistic similarity to the local language, the number of years of compulsory foreign languages at school and the quality of the education system. However, the most important explanatory factor is the film translation mode. We therefore provide empirical evidence that, *ceteris paribus*, English is better in countries where television films and programs are subtitled. The magnitude of the effect is large, corresponding to between one and a half and four years of compulsory learning at school. We disaggregate the results by types of skills –listening comprehension, speaking, reading and writing– and find that television mainly works through the listening comprehension channel. We show that our results are robust if we control for a possible endogeneity of the

⁴Europeans think that the best way to learn English is either at school (57% of the interviewed) or through lessons with a teacher, either one-to-one or in groups (40 and 42%, 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%), or through conversation with native speakers, both through language exchanges and informally (36 and 33%).

subtitles indicator by instrumenting it with the historical variables that determined the choice of translation technology.

Third, we ask, "Is the television translation mode, and the quality of English spoken, linked to economic performance?" Previous literature has shown that the quality of English may have economic consequences. Unfortunately, because the level of English-language skills is highly correlated with other economic variables (e.g. GDP per capita) and institutional variables (e.g. the legal origin), it is difficult to isolate the pure effect of English skills. In this paper we provide convincing evidence of such relationship because the decision to subtitle or dub is exogenous to measures of economic development. Therefore, by means of instrumental variable regressions, we are able to identify a positive correlation between English skills and aggregate measures of economic development, such as inflows and outflows of Foreign Direct Investment (FDI) and exports of goods and services. We show that a one-standard deviation increase in the percentage of the population who speak English increases FDI net inflows by 0.1 standard deviations (= 0.16% of GDP); outflows by 0.14 standard deviations (= 0.28% of GDP), and exports by 0.52 standard deviations (= 0.28% of GDP).

The quality of the English spoken in a given country is deemed to have important economic consequences, both at the micro and at the macro level.⁵ Indeed, sharing a common language has been found to be a key determinant of foreign trade flows (Frankel and Rose, 2002), cross-border activity (Coeurdacier et al., 2008), and cross-listings (Pagano et al., 2002). The widespread knowledge of foreign languages, particularly English, also improves trade (Fidrmuc and Fidrmurc, 2009). At the micro level, the literature has shown that better English skills allow immigrant populations in the US to earn more (Bleakley and Chin, 2004 and 2007; McManus 1985; McManus, Gould and Welch 1983). The ability to speak foreign languages also generate positive returns for non-immigrants, in the EU (Ginsburgh and Prieto-Rodriguez, 2006), the US (Saiz and Zoido, 2005) and South Africa (Levinshon, 2004).⁶

⁵Proficiency in foreign languages also has a direct impact on business performance. A survey conducted by the European Commission among nearly 2,000 European small and medium enterprises (European Commission, 2007) reports that a significant amount of business is being lost as a result of a lack of language skills.

⁶Our paper is also related to an emerging literature on the effects of television on educational and social phenomena. Gentzkow and Shapiro (2007) find a positive effect of television on verbal skills in the US, which is particularly strong for those children whose mother tongue is not English. Television also influences violent crime (Dahl and DellaVigna, 2006), voting turnout (Gentzkow, 2006), democratic/republican patterns (DellaVigna et al, 2007) and international policy (Eisensee and Stromberg, 2007). There is further research on television and

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 three research questions and in Section VII we offer a conclusion.

II Television, subtitling and dubbing

English is the original language of most films, made-for-tv movies and series around the world, and particularly of the most widely watched ones. In 1995, the EU⁷ imported US audiovisual products for 6.8 billion dollars. In comparison, US television imports amounted to 532 million (Ávila, 1997). On commercial channels, the percentage of US fiction programs ranges from 60.7% of the total in France to 79.5% in the Belgian region of Flanders. On public channels, US fiction productions range from 19.6% in Germany to 52.9% in France (De Bens and de Smaele, 2001). To these numbers one would have to add a significant number of British series and films. Even national programs often have less presence than English speaking ones in certain countries.

A Film translation modes

There are three main foreign film translation traditions: dubbing, voice-over and subtitling. Dubbing is the method by which the foreign dialogue is translated, adjusting to the mouth movements of the actors in the film so that the audience feels as if they are listening to actors speaking the target language. In voice-over, the translation is provided by a single person who 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 sound is in original version. Hence, we use the terms "subtitled" and "original version" interchangeably.

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 in the 1920s, inter-titles interrupted the course 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).

⁷Including Ireland and the UK.

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-language text.

In those times, illiteracy was high, and those in Europe with access to education overwhelmingly chose to learn either French or German. French was considered the language of diplomacy and widely learned by wealthy classes in Southern Europe. German was predominant in Northern Europe due to the region's connections with Germany and the influence of historical figures such as Otto von Bismarck. Wide-spread English language learning did not start taking place until the 1960s (Crystal, 2007). Hence, the US studios quickly understood that one could not force audiences to watch films in a language they did not understand with the introduction of sound in the early 1920s:

“The language problem was great during the first years of sound film, and this was one of the reasons why in the 1920's it took so long before the major production companies turned to sound. Hollywood was simply afraid of losing its leading position in the world market. Only 5% of the world's population speak English D.W. Griffith said in 1923. "Why should I lose 95% of my audience?" Film had developed into a universal language which all of a sudden would be shattered into a thousand dialects when sound was added." (cited by Gottlieb, 1997).

Therefore, US studios quickly started to promote dubbing around the world. In the 1930s, Paramount Pictures, for example, used the Des Reservoirs facilities outside Paris to dub films into fourteen European languages, including French and Spanish, but also Dutch and Swedish. A few years later, some countries moved on to use captioned translations while others continued dubbing. The film history literature discusses three reasons for this shift.

First, there are scale economies arguments. Countries with small languages, like the Netherlands, Sweden, Greece or Portugal, moved to 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). Limited box office receipts, combined with the relative low cost of subtitling, and a significant number of imported films, meant that “the production of movies started to require much higher budgets than most of these countries could afford” (Danan, 1991). Note that some small countries who share large languages (e.g. Austria, Switzerland or the French-speaking Wallonia region in Belgium) adopted dubbing.

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 the usage of the local language in films would strengthen national pride and therefore seem to have tended to favor dubbing. For example, Franco of Spain ruled against any non-dubbed version and, between 1936 and 1975, there were over ninety ministerial guidelines (*órdenes*) published to make showing films in a foreign language difficult “because of the evil effects that film release can produce on society” (Szarkowska, 2005). The German and Italian governments also 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 with their own local dialects. 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 creating a common language (Szarkowska, 2005).

Third, the film history literature proposes an element of preservation of the cultural identity. Countries like France or Japan have been traditionally concerned with the protection of their culture from foreign (mostly US) influence, and one way is the diffusion of dubbed films. According to the Académie Française, “this is another task awaiting the Académie. [...] 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 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.”⁸

According to the standard account provided by film historians, the combination of these three factors would have resulted in the development of either dubbing or subtitling industries in the 1930-1950 period. The introduction of sound was parallel to the expansion of US cinema around the world. The US monopoly in recording equipment led to the globalization of Hollywood-made cinema. The US share of the European market was at its strongest between 1945 and the mid-1950s (Danan, 1991), as the markets were flooded with thousands of new films, often backlogged movies produced during the war. Television followed the cinema translation choice in each country upon its introduction in the 1950s (Ávila, 1999). In particular, US “telefilms”

⁸Source: Official web site of the Académie française, <http://www.academie-francaise.fr/role/defense.html>. Translation is ours)

and series became very popular and seem to have created the demand necessary for the growth of national translation industries.

These events consolidated dubbing or subtitling in each country (Szarkowska, 2005), an influence that has persisted up to the present. No OECD country has moved from one to the other since WWII. This even applies to countries that later endured dictatorships, such as Greece, to the extent that pan-European channels like Canal + use dubbing in some countries and original version in others.

C The costs of changing the translation technology

Schreyogg and Blinn (2008) explain the persistence in the translation technology with "continental divide game" arguments.⁹ 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 dubbing in some countries while in others it coordinated in subtitling. The costs of changing the translation mode are now substantial.¹⁰

On the demand side, viewers now have strong preferences for the translation method used in their country. According to a recent European Commission (2006) survey, more than 90% of the respondents in Sweden, Finland, Norway, Denmark and the Netherlands agree with the following statement: "I prefer to watch foreign films and programmes with subtitles, rather than dubbed". Around 30% of the French, Spanish and Italian and less than 20% of the Germans agree with this statement. A recent attempt from the Polish government to change from voice over to original version in the public television has met with strong opposition, and a recent poll found that only 19% of Poles would welcome subtitled films.

On the supply side, the existence of a consolidated industry also makes the change difficult. Countries have created and organised their local translation industries. In total, the turnover of the EU film translation market is estimated to range between 372 and 464 million euros in 2006. The subtitling costs are double the European average in France, Germany, Spain, and

⁹These are coordination games with more than one Nash equilibria. These equilibria operate as "basins of attraction" for the agents' behaviour, who deviate progressively more from the initial situation. Agents do not always move towards the high payoff equilibrium because the game is highly sensitive to initial conditions, and, once an equilibrium is reached, changes to the alternative equilibrium are very unlikely (Camerer, 2003).

¹⁰New 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.

Italy, where dubbing is prevalent. In contrast, dubbing costs are 66% more expensive than the European average in subtitling Scandinavia and the Netherlands (MCG, 2007).

Thus, the standard historical account implies that national media markets became coordinated according to different translation technologies, depending on events that occurred between 1930 and 1950 (Gottlieb, 1997) and have not deviated since then. According to this view, dubbing today would be more frequent in large countries, those with large languages, and those suffering authoritarian or nationalistic governments in the 1930 - 1950 period. If this case, the translation choice would be exogenous to the current quality of the English in the different countries. The English level would be a consequence of technology choices made many years ago, rather than a cause of it. To our knowledge, we are the first to quantitatively examine these claims, though.

III Data

We use a data panel combining aggregate measures of English skills, historical and contemporary economic and educational variables. 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).¹¹ In most of our sample, English is the most widely spoken foreign language. Moreover, in every country, except multi-lingual Luxembourg, English is in the top two.

A Translation mode

Table 1 shows the country list, together with the translation modes and average measurements of English quality. Twelve countries use dubbing as the preferential translation method and four use voice-over. Fifteen countries use subtitles. Belgium is an interesting case as dubbing is used in the French-speaking Wallonia region but subtitling in the Dutch-speaking Flanders. A priori, 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. Small language (e.g.

¹¹We focus in these countries because they are relatively homogeneous. Although we have data for many more countries, we have chosen to leave them out because we feel historical issues like colonial status would make our empirical implementation more involved.

Finnish, Dutch, Greek) and Northern European countries mainly subtitle.¹²

<<TABLE 1: TELEVISION TRANSLATION AND QUALITY OF ENGLISH>>

Our main explanatory variable is dichotomous, taking the value of one if foreign television programmes are mainly in subtitled original version, and a value of zero if they are dubbed or with voice-over. We consider voice-over to have the same effects as dubbing because the viewer mainly hears his own language. 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 most foreign programs are subtitled.

B English skills

We use two measurements of the quality of English.¹³ The first consists on EU data on the percentage of people who declare themselves able to hold a conversation in English, as reported by 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, it has two potential shortcomings: It has been collected only in three occasions for at most 28 countries, and it is clearly subjective. For example, the 60% of people that state they are able to use English in subtitling countries might be disproportionate to the 31% in dubbing countries.

Therefore, we also use national averages of the Test of English as a Foreign Language (TOEFL) scores to assess the quality of English. The TOEFL is an English-as-a-foreign-language exam accepted by most colleges and universities in the world. Its standardization means that it is relatively fair and accurate: The fact that everybody takes a similar test eliminates the inconsistency of interviews and other softer methods. The $TOEFL_{i,t}$ variable, thus, addresses the missing data and subjectivity concerns with the variable $Survey_{i,t}$ and allows us to increase the sample size with non-EU countries. The correlation between $Survey_{i,t}$ and $TOEFL_{i,t}$ is .4409 (statistically different from zero with a p-value below .01). An additional advantage is that

¹²The dubbing / subtitling dichotomy is a simplification. For example, children programmes are dubbed in most countries and some late-night, less commercial films are sometimes broadcast in the original version in France or Spain.

¹³Ideally, 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.

the TOEFL provides data on four types of skills: listening, speaking, reading and writing, which we will exploit in the analysis.

One potential concern 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, $TOEFL_{i,t}$ might not measure the quality of the English in the whole population but in a sub-sample of those with sufficient educational attainment or income to study overseas. Exam takers are likely to be better at speaking English than the country average. The question is whether the different national sub-samples are biased to different degrees, i.e. whether some are more representative than others. Thus, we do robustness checks for the scores corrected by the proportion of the national population who took the test each year:

$$TOEFL_{i,t}^{corrected} \equiv TOEFL_{i,t} \cdot \frac{toefl_takers_{i,t}}{population_{i,t}}, \quad (1)$$

where $toefl_takers_{i,t}$ is the number of people who took the exam and $population_{i,t}$ is the population of the country. The larger the ratio, the better $TOEFL_{i,t}$ represents the overall population.

None of our English quality measurements is perfect. However, to our knowledge these are the best available. Moreover, each of them is imperfect due to different reasons so that they might complement each other and, together, provide a good sense of the English quality differences across countries.

As we can observe at the bottom of the table, there are striking differences between subtitling and dubbing countries. Subtitling countries score 3.02 points higher in the TOEFL, and obtain 28.38 points more in the EU Survey of English proficiency. The TOEFL differences are most pronounced for the listening comprehension tasks (4.78 points) and the least pronounced in the case of reading comprehension (1.69 points). All performance differences are statistically different from zero ($p < .01$)

C Other variables

The remaining explanatory variables are summarised in Table 2. 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 have a common root between two languages. We re-scale it from 0 to 1,000. It is 608 with English and Dutch, with German 578, and 240 with Spanish. We assign a value of 0 to non-Indoeuropean languages (Finnish, Hungarian, Korean

and Japanese) because they are not in the index and they are very distant from English.¹⁴

<<TABLE 2: EXPLANATORY VARIABLES>>

We use standard economic, and geographical indicators such as the gross domestic product and population. The number of years of compulsory English education at school is mainly taken from the European Union website and Eurydice (2005). We also use the overall national Programme for International Student Assessment (PISA) score to measure the quality of the national educational systems. Subtitling and dubbing countries do not differ significantly in wealth per capita or in the quality of their educational systems, although the former have more compulsory foreign language learning at school.

Our first research question relates to the causes of the introduction of the translation mode in the different countries. Hence, we use historical variables like GDP, population, GDP per capita with 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 with the standard Polity IV definitions, and also include a raw democracy index, which goes from -10 to +10.

As a robustness test, we measure the actual exposure to subtitled versions of films and television programs with data on television penetration and cinema audiences. The CIA world factbook provides estimates of the number of televisions per 10,000 inhabitants in each country.

IV The determinants of the translation mode

In Table 3 we empirically examine the historical account of the dubbing / subtitling decision. Positive parameter estimates indicate that the variable is more conducive to subtitling, while negative estimates suggest propensity to dubbing. No country has changed translation modes since they were introduced, so we have one observation per country. Therefore, we use one explanatory variable in most regressions.

<<TABLE 3: THE DETERMINANTS OF SUBTITLING>>

All variables have the expected signs. Less geographical and linguistical distance favour subtitling, but the coefficients are not significant. The language and country size estimates, instead, are negative and significant ($p < .01$). Larger countries and those with larger languages

¹⁴Our results are robust to excluding them from the analysis.

tend to adopt dubbing, while smaller countries and those with smaller languages favour subtitling. The language and population size variables are correlated (corr. 0.584, $p < .01$). Trade-openness in 1933 favors subtitling, but the coefficient is not significant.

We also find support for less democracy being conducive to dubbing, both with the dictatorship indicator and the raw democracy index. The variables display the predicted signs both pre- and post-WWII. In addition, the dictator dummy is significant ($p < .05$) in the 1940-45 period, and Polity IV is marginally significant in 1930-39. Their correlation is very high (corr. 0.7498, $p < .01$), so that the latter loses its significance when combined with the dictatorship variable (unreported regression). These results are widely supportive of the mechanisms discussed in the history of cinema literature.

In the last model, we report on the specification most directly connected to the literature, where the translation modes depend on the 1933 size of the national language and the dictatorship dummy (pseudo-R square of 24%). We will use this regression as a first stage to the translation mode in the following section. This should be a valid instruments for the subtitle indicator inasmuch as one believes that the political conditions around WWII (dictatorship / democracy) and size of the local language are exogenous to current English skill levels.

V The determinants of English proficiency

A Main results

Table 4 reports panel regressions on several factors that could plausibly influence the English quality in a country. The dependent variables are $Survey_{i,t}$, $TOEFL_{i,t}$, and $TOEFL_{i,t}^{corrected}$. The first four columns include different variations of OLS models. The fifth to eighth columns report the 2SLS results.

<<TABLE 4: FACTORS INFLUENCING ENGLISH QUALITY>>

As expected, similarity with the local language significantly improves English skills. The survey results increase by $0.91 (= (.065 / .003) / 23.6)$ standard deviations (s.d.) on average when increasing the similarity coefficient by one s.d. The number of English years at school is statistically positive except for the $TOEFL_{i,t}^{corrected}$ cases. When positive, one additional year increases scores by between 0.55 s.d. ($Survey_{i,t}$) and 2.41 s.d. ($TOEFL_{i,t}$). Moving from the country with the fewest years (three) to the most (thirteen) increases TOEFL scores by about 20 s.d.

The subtitles indicators are positive and significant in all specifications, irrespective of whether they are instrumented or not. The effect is very large – equivalent to between 1.36 and 3.97 years of English at school in the OLS regressions. Controlling for a number of relevant variables, original versions increase the raw TOEFL results by 3.74 s.d. The effect is even stronger on people’s self assessment of how well they speak (17.23 s.d. for *Survey_{i,t}*). The 2SLS regressions are supportive of these patterns. This evidence supports a large, significant, effect of original version television on English quality.

The proportion of TOEFL takers is greater in subtitling countries (means .000725 and .0000352). Hence, the possibility of a selection bias would at most imply that the estimated skill differences are a lower bound. Suppose that there is an unobserved distribution of English skills in the population and that only the most able (those beyond a certain common threshold) take the exam. Then, the true mean in dubbing countries, where proportionally fewer people take the TOEFL, would be biased upwards relative to the subtitling countries’ mean. Controlling for selection bias would then yield higher dubbing estimates relative to those of subtitling, as in the $TOEFL_{i,t}^{corrected}$ regressions.

B Types of language skills

Table 5 reports regressions for national averages of the four TOEFL parts: listening comprehension, verbal, reading comprehension and writing. The first four columns provide the OLS estimates with controls for similarity between the local language and English, education quality and current language size. The effect of original version films and television programs is strongest for the two oral skills. The listening coefficient (2.299, $p < .01$) is the highest, about 30% larger than the speaking estimate, 61% larger than the reading one ($p < .01$) and 460% higher than that for writing. The speaking variable is not significant, but note that it has been introduced only recently, and we have fewer observations about it. Original version television is equivalent to almost two years of school in terms of listening comprehension, 1.5 in reading, about 14 months for speaking and only about half a year for writing skills.

The last four columns provide 2SLS estimates. The listening coefficient (5.259, $p < .01$) is higher than the others (none significant) by at least 500%. In this case, the original version effect is equivalent to about five years at school. The OLS and 2SLS specifications are consistent and suggest that original version television has a strong impact on English skills and specially on listening comprehension.

C Subtitled television as a complement to formal education

In Table 5, we interact the subtitling indicator with the years of English to measure “*the value of one year of English education*” in original version vs. dubbing countries. The interaction term, which measures the difference between the two country clusters in terms of the average value of one year, is negative and significant in all regressions. In the aggregate score, subtitling countries derive $1.856 - 1.318 = 0.538$ extra points per school year while dubbing countries derive 1.856 points per year. That is, pupils in original version countries learn less English in one additional year at school on top of what they have learnt by watching television (13.359 points). The largest difference is in the speaking component (-1.66) and the smallest in the writing component (-1.055). In dubbing countries, formal learning is especially important in gaining oral skills (2.482).

We can also use our estimates to compare the effects of schooling and television effects. Pupils in dubbing countries learn English at school but not by watching television. Under a linearity assumption,¹⁵ we can calculate a break even point (y) on the English teaching variable. Taking the aggregate scores, y satisfies: (Dubbing) $1.856y = 13.359 + (1.856 - 1.318)y$ (Subtitling), and therefore $y = 10.13$. Ceteris paribus, dubbing countries on average outperform their original version counterparts as long as they have more than 10.13 years of compulsory English education at school. Only Austria (11 years) and Luxembourg (13 years) fulfil this condition. Notice that their scores are higher than those of Norway and Sweden, and only slightly lower than in the Netherlands, all of whom make similar English educational efforts. Also note that the average number of years of English at school is substantially lower, in dubbing than in subtitling countries (8.81 vs. 9.44 years, see Table 2).

D The effect of media exposure

Table 6 examines the mediating role of television penetration and cinema attendance. We interact this variable with the subtitles dummy to derive the differential effect between original

¹⁵If we allow for a quadratic term, the break even satisfies: (Dubbing) $3.431y - .098y^2 = 20.064 + .358y + .01y^2$ (Subtitling). The solutions are $y = 11.18$ and $y = 20.17$. The estimates imply a relationship that is concave for dubbing countries and convex for those with original versions. While the second root is clearly out of the range in the years at school variable, the first root is qualitatively similar to the linear solution.

version and dubbing countries in OLS and 2SLS specifications. We report overall, listening comprehension and writing scores, as these provide the extreme values. The interaction between subtitles and media exposure is positive and significant in all cases ($p < .01$). The effects on listening comprehension are higher than the overall scores, and particularly in writing. For the latter, the differences are 45.6% (OLS) and 93.8% (2SLS). We do not have an a priori explanation for the positive effects of dubbed television in some of our specifications, but the effects generally disappear in the 2SLS regressions.

<<TABLE 6: EXPOSURE TO SUBTITLING>>

VI The economic impact of English skills

In this section, we quantify the impact of English skills on measures of economic development. We select three measures of economic development that are common in the literature: foreign direct investment (FDI) and exports. We obtain data on FDI from the World Bank Development Indicators, and also use information on the exports of goods and services. All variables are expressed as GDP percentages. Our basic model relates FDI levels and exports to English skills by estimating simple OLS regressions:

$$Y_{it} = f(\text{Controls}_{it}, \text{English Skills}_{it}), \quad (2)$$

where Y_{it} are variables measuring FDI inflows and outflows, as well as exports of goods and services (all relative to GDP); we control for the log of GDP per capita and estimate the regressions with year-fixed effects. Additionally, we estimate the following two-stage, instrumental variables model:

$$Y_{it} = f(\text{Controls}_{it}, \text{English Skills}_i) \quad (3)$$

$$\text{where: English Skills}_{it} = g(\text{Subtitling}_i, \text{Controls}_{it})$$

As before, we measure English skills by the percent of English speakers in the country, as well as the average (adjusted) TOEFL scores. To avoid endogeneity of English skill—which could be caused by an economic exposure to the country to the foreign sector—we instrument it with the subtitling dummy. This is a valid instrument because there is no significant relationship between

the translation mode and economic development (Table 2), and the choice between subtitling and dubbing depends on historical factors dating back to the 1930s (Table 3).

Table 7 displays panel regressions of economic measures of openness on GDP per capita, and indicators of English skill. For instrumental-variables regressions, we only report second-stage estimators because results in the first stage are similar to the ones in the previous sections.

<<TABLE 7: ECONOMIC IMPACT OF ENGLISH SKILLS>>

First, we report a positive and significant relationship between English skills and FDI flows. In OLS regressions, a one s.d. increase in the percentage of population who speak English (23.58%) increases FDI net inflows by 0.1 s.d. (=0.16% of GDP); FDI net outflows by 0.14 s.d. (=0.28% of GDP), and exports by 0.52 s.d. (=0.28% of GDP). The results are all statistically significant at the 1% level and do not change when we instrument the TOEFL scores with the translation technology variable. In fact, once we instrument by the subtitling variable, we find that a one s.d. increase in the percentage of the population who speak English is related to an increase in FDI outflows of 0.33% of GDP; an increase in FDI inflows of 0.4%; and an increase in exports of goods and services of 0.18%.

Second, when we use the average of total TOEFL scores, results are qualitatively similar: a one s.d. increase in scores (6.59 points) increases FDI net inflows by 0.21 s.d. (=0.34% of GDP), FDI net outflows by 0.36 s.d. (=0.67% of GDP), and exports of goods and services by 0.58 s.d. (=0.30% of GDP). Again, these results are significant at the 1% level. We consistently find that, when we instrument TOEFL scores, the relationship between English skills and economic variables becomes stronger.

Overall, countries seem to derive important economic advantages from subtitling, which are not enjoyed by those who dub their films. Television can thus be an effective means of increasing national language skills and, as a result, trade and wealth per capita.

VII Conclusions

The general message in this paper is simple. Television programs that are broadcast in the original version help people learn English and, thus, the citizens of countries where films are shown in the original version speak on average better English than those where television is dubbed. In turn, better English language skills improve economic performance.

We show that dubbing and subtitling countries do not differ substantially in wealth or in the quality of their educational systems. Yet there are striking differences in their English skills. Subtitling countries score 5 points higher in the listening part of the TOEFL, and obtain 23 percentage points more in the EU Survey of English proficiency. We show in panel regressions that the film translation methods can explain part of the skills gap. We identify a subtitling effect equivalent to between one and a half and four years of English at school. Our results are robust to the inclusion of other determinants of language skill, like language similarity and school quality.

The findings are robust to the use of historical instruments for the subtitles variable. We have used discrete choice models to analyse the reasons why some countries use subtitling and others dubbing, and have found that large countries and those with a dictatorship in the 1930s were more prone to adopt subtitling than smaller, democratic countries. This corresponds to the accounts provided by film history scholars, but, to our knowledge, this is the first time that such findings have been checked econometrically.

We also quantify the impact of English skills on measures of economic development. We show that subtitling, through better English skills, increases foreign direct investment and exports. The linkage between language skills and economic activity is currently receiving attention in many countries. For example, the European Commission (2007) maintains in a recent report that: “Strong views were expressed about the need for work experience in other countries for employees to improve not only linguistic skills but also awareness of different business cultures”.

Television translation effects are correlated with those of other high English-speaking penetration media like music, film or the internet. Focusing on television is especially useful due to two reasons. First, it has traditionally been more prevalent than the other channels. Second, historical circumstances made the television translation mode exogenous to English skills, which simplifies the methodology. We view our analysis as reflecting the wider influence of English-speaking media on language skills, with television being both the most representative media and the one with the cleanest econometric implementation.

Our paper is a first attempt to measure the economic consequences of proficiency in foreign languages using a robust instrumental variable approach, but there is still a lot of ground to cover. For instance, we have taken an aggregated national view. Some analyses (e.g. European Commission, 2005) find substantial foreign language skill differences between men and women (52% to 47%), the young and the old (69% versus 35%), city and countryside people (55% and

47%) and across education attainment levels (20% of those that finished their studies at the age of 15 are conversational in a foreign language, compared to 79% of those who are still studying). We believe this could be a fruitful area for future research.

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Country	Subtitles	EU survey	TOEFL overall	TOEFL listening	TOEFL speak	TOEFL read	TOEFL Writing
Austria	Dubbing	53,00	82,47	82,85	82,22	80,22	82,41
Belgium	Subtitling#	52,00	82,47	82,09	80,00	82,19	81,37
Bulgaria	Voice-over	15,00	77,23	76,63	70,00	76,00	78,44
Cyprus	Subtitling	71,00	67,15	6,98	66,67	63,93	69,35
Czech Rep	Dubbing	24,00	75,38	76,20	74,44	74,56	74,78
Denmark	Subtitling	83,00	83,92	86,37	86,67	80,39	82,32
Estonia	Subtitling^	41,00	76,91	78,44	76,67	75,26	76,74
Finland	Subtitling	60,00	81,60	84,46	76,67	79,70	79,28
France	Dubbing	34,00	74,05	71,26	70,00	76,93	74,89
Germany	Dubbing	51,00	81,16	81,80	80,00	79,18	80,92
Greece	Subtitling	44,00	72,61	74,19	67,78	70,61	73,50
Hungary	Dubbing	16,00	75,26	76,78	73,33	74,26	74,41
Iceland	Subtitling	,	80,43	84,82	75,56	76,81	78,98
Italy	Dubbing	29,00	71,78	65,52	60,00	77,26	72,82
Japan	Dubbing	,	59,83	59,48	51,11	61,35	61,76
Korea	Subtitling	,	65,18	62,80	58,89	68,61	66,33
Latvia	Voice-over	34,00	73,00	74,63	73,33	71,30	72,70
Lithuania	Voice-over	26,00	73,63	75,56	73,33	71,72	73,24
Luxembourg	Dubbing	66,00	82,20	81,76	77,78	81,33	82,35
Malta	Subtitling*	89,00	74,07	74,00	,	72,00	75,00
Mexico	Subtitling	,	72,58	73,61	70,00	73,15	70,35
Netherlands	Subtitling	87,00	85,13	87,45	83,33	82,89	83,78
Norway	Subtitling	,	80,11	83,69	81,11	76,57	78,63
Poland	Voice-over	25,00	73,24	75,69	73,33	71,63	72,15
Portugal	Subtitling	26,00	79,31	80,85	76,67	79,52	76,52
Romania	Subtitling	26,00	78,67	78,15	74,44	79,07	77,44
Slovak Republic	Dubbing	,	75,05	76,70	73,33	73,52	75,15
Slovenia	Subtitling	56,00	80,03	81,90	77,78	78,27	78,49
Spain	Dubbing	20,00	74,09	72,57	70,00	76,61	73,65
Sweden	Subtitling	85,00	79,84	84,82	80,00	76,28	77,24
Switzerland	Dubbing	,	79,02	80,00	76,67	78,31	78,24
Turkey	Dubbing	18,00	67,29	68,00	62,22	67,44	68,67
Total		45,24	76,12	77,02	73,33	75,28	75,68
Dubbing countries							
	No. obs.	377	287	287	48	287	287
	Mean	31,62	74,64	74,69	71,32	74,45	74,76
	Median	26,00	74,76	76,00	73,33	74,00	74,00
	Std. Dev.	15,23	62,78	68,83	78,32	63,28	57,81
	Min	15,00	55,81	56,67	50,00	56,00	60,00
	Max	66,00	87,33	86,67	83,33	86,67	86,67
Subtitling countries							
	No. obs.	348	273	273	45	273	273
	Mean	60,00	77,67	79,47	75,48	76,15	76,66
	Median	58,00	78,84	82,00	76,67	76,67	76,67
	Std. Dev.	22,12	65,69	74,71	70,77	67,65	56,48
	Min	26,00	59,07	56,00	56,67	56,00	62,00
	Max	89,00	88,33	90,00	86,67	86,67	86,67
Two-sample t test with unequal variances							
	Diff. Means	-28,38***	-3,02***	-4,78***	-4,16***	-1,69***	-1,89***
	S.E.	1,421	0,543	0,607	1,546	0,554	0,483

Table 1: TELEVISION TRANSLATION AND QUALITY OF ENGLISH

Translation techniques are taken from the MCG (2007) report for the EU Commission and Wikipedia. The TOEFL scores are overall averages for test-takers resident in each country in the sample period. 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.

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.

	Language similarity	Size language (# people)	GDP capita (USD)	GDP total	Years English school	PISA score	Public education exp./capita	Pupil / teacher ratio	Polity II index	TV sets / capita	GDP total, USD (1933)	GDP capita, USD (1933)	Trade openness (1933)
Dubbing countries													
No. obs.	464	464	464	464	464	464	101	135	464	464	435	435	377
Mean	253,71	38.721,21	12.994,27	508,66	8,81	497,38	24,98	16,17	4,31	482,11	61.447,6	2.638,3	31,17
Median	239,50	35.587,00	8.575,00	100,46	9,00	499,79	25,10	16,70	3,50	477,52	24.592,6	2.450,4	20,61
Std. Dev.	169,97	30.709,64	12.817,43	869,04	2,04	30,98	4,30	4,48	4,03	104,95	70.113,9	1.181,2	34,55
Min	0,00	1.913,10	400,00	1,31	3,00	416,54	10,10	10,00	0,00	300,26	3.325,8	1.341,6	5,13
Max	578,00	78.994,00	72.032,00	5.043,81	13,00	567,50	33,30	30,50	10,00	678,87	234.778,0	5.966,2	142,71
Subtitling countries													
No. obs.	464	435	464	464	464	464	94	117	464	464	406	406	290
Mean	312,50	21.405,65	14.875,02	162,02	9,44	498,30	23,92	14,17	6,19	417,32	17.027,9	3.503,6	62,07
Median	244,50	6.591,00	12.600,00	99,18	9,50	504,00	24,90	13,40	10,00	417,79	16.615,7	2.548,2	63,09
Std. Dev.	233,61	35.443,58	10.941,98	221,29	2,40	39,18	3,37	2,79	4,60	134,76	11.883,5	2.714,1	45,38
Min	0,00	111,56	1.000,00	0,93	4,00	393,54	17,50	10,10	0,00	235,11	1.340,0	1.184,5	9,45
Max	608,00	138.789,00	65.000,00	1.408,54	13,00	575,00	33,60	21,10	10,00	702,58	40.826,4	12.012,0	128,45
Two-sample t test with unequal variances													
Diff. Means	-58,78***	17315,56***	-1880,75	346,64***	-0,625***	-0,92	1,06*	1,99***	-1,87***	64,78***	44.419,7	-865,20***	-30,89***
S.E.	13,412	2218,204	7823,671	41,632	0,146	2,319	0,551	0,464	0,284	7,929	3413,044	146,120	3,204

Table 2: EXPLANATORY VARIABLES

The language similarity is from Dyen et al. (1992) for indoeuropean languages, and ranges from 0 (no similarity) to 1000 (identity). The variable takes a value of zero (minimum similarity) for non-indoeuropean languages. The data on pupil to teacher ratios, 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 at school, PISA scores and Polity II data are taken from the EU, PISA and Polity II websites. GDP data is in 1980 real dollars.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	2SLS
Similarity between local language and English	0.001 [0.001]										
Distance from capital to English-speaking area		0.469 [0.740]									
Language size 1933 (logs)			-0.376** [0.165]								-0.359* [0.192]
Pop. size 1933 (logs)				-0.533*** [0.202]							
GDP capita 1933 (logs)					0.349 [0.447]						
(Imports + Exports)/Pop 1933						0.011 [0.008]					
The country has a dictator in 1930-1939							-0.754 [0.504]				
The country has a dictator in 1945-1950								-1.339** [0.532]			-1.250** [0.511]
Polity IV index, 1930-39									0.057* [0.034]		
Polity IV index, 1945-1950										0.033 [0.032]	
Constant	-0.246 [0.393]	-1.482 [2.354]	3.487** [1.579]	4.693** [1.852]	-2.789 [3.534]	-0.658 [0.420]	0.524 [0.423]	0.908** [0.447]	-0.056 [0.245]	-0.083 [0.245]	4.239** [1.787]
Observations	32	32	31	29	29	23	32	32	31	29	31
Pseudo R-Squared	0.0148	0.0103			0.0151	0.0959	0.0536	0.162	0.0678	0.0279	0.244
Robust standard errors in brackets											
*** p<0.01, ** p<0.05, * p<0.1											

Table 3: THE DETERMINANTS OF SUBTITLING

This table reports probit regression results on the countries' cross-section, where the dependent variable is an indicator (1 = subtitles, 0 = dubbing). The 1933 economic and demographic data was downloaded from 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 country population. We include four measurements of democracy. The two Polity IV variables are average scores for each country in the periods immediately before and after WWII. The dictatorship variables are dummies (0 = Polity IV \geq +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.

	TOEFL I	TOEFL II	EU Survey	TOEFL x proportion takers	2SLS TOEFL I	2SLS TOEFL II	2SLS EU Survey	TOEFL * proportion takers
Subtitles (Y/N)	2.535*** [0.430]	1.525*** [0.407]	16.321*** [0.947]	25.715*** [5.750]				
Instrumented subtitles					8.013*** [1.270]	2117 [1.474]	57.427*** [1.843]	87.311*** [22.745]
Size of the language 1933 (logs)	0.252 [0.157]	-0.004 [0.104]	-1.490*** [0.334]	-8.136*** [1.472]	0.742*** [0.171]	0.021 [0.165]	2.399*** [0.369]	-2653 [2.359]
Years of English education at school	1.511*** [0.095]	1.120*** [0.083]	4.107*** [0.315]	-10.046*** [1.060]	1.223*** [0.117]	1.055*** [0.093]	2.273*** [0.165]	-12.175*** [1.302]
Similarity between local language and English		0.011*** [0.001]	0.065*** [0.003]	0.078*** [0.018]		0.011*** [0.001]	0.052*** [0.002]	0.050*** [0.011]
PISA education quality assessment		0.006 [0.006]	0.045*** [0.016]	0.060 [0.090]		0.003 [0.006]	0.000 [0.011]	-0.046 [0.108]
Constant	58.843*** [2.065]	59.055*** [3.404]	-30.475*** [7.500]	138.850*** [49.551]	54.141*** [2.071]	60.702*** [3.376]	-44.009*** [7.337]	137.074*** [45.793]
Observations	556	556	696	494	556	556	696	494
Number of years	18	18	29	16	18	18	29	16
R-squared	0.375	0.500	0.812	0.187	0.395	0.489	0.875	0.196

Table 4: FACTORS INFLUENCING ENGLISH QUALITY

Subtitles instrumented with a model of language size (1933) and a dictator dummy for the 1940-45 period (0 = Polity IV \geq +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 language similarity is from Dyen et al. (1992) for indoeuropean languages. The variable takes a value of zero (minimum similarity) for non-indoeuropean languages. The data on pupil to teacher ratios, and population are 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 at school, PISA scores and Polity II data are taken from the EU, PISA and Polity II websites, respectively. The data on language size is obtained by computing the sum of the populations of the countries in which each language is spoken. The TOEFL data is from <http://www.toefl.org>.

	Listening	Speaking	Reading	Writing	Listening (instr.)	Speaking (instr.)	Reading (instr.)	Writing (instr.)	TOEFL	Listening	Speaking	Reading	Writing
Subtitles (Y/N)	2.299*** [0.471]	1.785 [1.162]	1.421*** [0.396]	0.496 [0.349]					13.359*** [1.881]	14.050*** [2.303]	16.719*** [5.046]	13.134*** [1.809]	9.981*** [1.601]
Instrumented subtitles					5.259*** [1.559]	0.693 [3.685]	0.081 [1.450]	0.937 [1.222]					
Years of English education at school	1.196*** [0.082]	1.570*** [0.249]	0.944*** [0.097]	1.028*** [0.077]	1.056*** [0.094]	1.529*** [0.291]	0.920*** [0.106]	1.002*** [0.081]	1.856*** [0.117]	1.927*** [0.137]	2.482*** [0.350]	1.672*** [0.136]	1.618*** [0.105]
Subtitles (Y/N)*Years of English education at school									-1.318*** [0.185]	-1.309*** [0.221]	-1.667*** [0.488]	-1.305*** [0.186]	-1.057*** [0.162]
Similarity between local language and English	0.014*** [0.001]	0.016*** [0.003]	0.007*** [0.001]	0.011*** [0.001]	0.013*** [0.001]	0.017*** [0.003]	0.008*** [0.001]	0.010*** [0.001]	0.011*** [0.001]	0.014*** [0.001]	0.016*** [0.003]	0.007*** [0.001]	0.010*** [0.001]
PISA education quality assessment	0.002 [0.007]	0.010 [0.018]	0.012* [0.006]	0.008 [0.005]	-0.004 [0.007]	0.009 [0.020]	0.011* [0.007]	0.006 [0.005]	0.024*** [0.008]	0.020** [0.009]	0.026 [0.020]	0.030*** [0.007]	0.022*** [0.006]
Current size of the language	-0.647*** [0.103]	-0.221 [0.243]	0.668*** [0.121]	0.006 [0.101]	-0.406** [0.160]	-0.365 [0.410]	0.506*** [0.181]	0.039 [0.149]	-0.062 [0.090]	-0.705*** [0.092]	-0.370 [0.267]	0.610*** [0.104]	-0.040 [0.091]
Constant	65.816*** [3.660]	50.423*** [8.933]	51.970*** [3.359]	59.133*** [2.954]	67.137*** [3.566]	53.198*** [9.121]	54.568*** [3.444]	59.530*** [2.845]	44.161*** [4.961]	51.026*** [5.797]	36.244*** [12.059]	37.229*** [4.406]	47.196*** [4.121]
Observations	556	93	556	556	556	93	556	556	556	556	93	556	556
Number of years	18	3	18	18	18	3	18	18	18	18	3	18	18
R-squared	0.572	0.606	0.319	0.503	0.562	0.595	0.304	0.502	0.548	0.605	0.658	0.377	0.543

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

Table 5: SUBTITLES AND TOEFL SCORES BY SKILL

Subtitles instrumented with a model of language size (1933) and a dictator dummy for the 1940-45 period (0 = Polity IV \geq +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 language similarity is from Dyen et al. (1992) for indoeuropean languages. The variable takes a value of zero (minimum similarity) for non-indoeuropean languages. The data on pupil to teacher ratios, and population are 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 at school, PISA scores and Polity II data are taken from the EU, PISA and Polity II websites, respectively. The data on language size is obtained by computing the sum of the populations of the countries in which each language is spoken. The TOEFL data is taken from <http://www.toefl.org>).

	<u>TV sets per capita</u>						<u>Cinema attendance</u>					
	<u>OLS</u>			<u>2SLS</u>			<u>OLS</u>			<u>2SLS</u>		
	TOEFL	TOEFL listening	TOEFL writing	TOEFL	TOEFL listening	TOEFL writing	TOEFL	TOEFL listening	TOEFL writing	TOEFL	TOEFL listening	TOEFL writing
TV sets per capita	0.008*** [0.003]	0.007** [0.003]	0.010*** [0.002]	-0.004 [0.003]	-0.012*** [0.003]	-0.000 [0.003]						
Cinema attendance							1.329*** [0.264]	0.505 [0.307]	1.459*** [0.245]	0.043 [0.305]	-1.876*** [0.350]	0.289 [0.292]
Interaction subtitles (Y/N) & TV sets per capita	0.010*** [0.001]	0.015*** [0.001]	0.007*** [0.001]	0.022*** [0.002]	0.033*** [0.002]	0.017*** [0.002]						
Interaction subtitles (Y/N) & Cinema attendance							1.019*** [0.237]	2.407*** [0.281]	0.464** [0.220]	2.491*** [0.368]	5.042*** [0.427]	1.871*** [0.346]
Constant	70.433*** [0.984]	71.222*** [1.079]	69.941*** [0.884]	73.128*** [1.031]	75.111*** [1.059]	71.934*** [0.917]	73.207*** [0.434]	74.264*** [0.454]	73.026*** [0.384]	73.943*** [0.431]	75.692*** [0.441]	73.645*** [0.381]
Observations	560	560	560	556	556	556	560	560	560	556	556	556
Number of years	18	18	18	18	18	18	18	18	18	18	18	18
R-squared	0.163	0.216	0.138	0.240	0.363	0.216	0.139	0.190	0.118	0.175	0.265	0.156
Robust standard errors in brackets												
*** p<0.01, ** p<0.05, * p<0.1												

Table 6: EXPOSURE TO SUBTITLING

Television sets per capita are downloaded with the EU media report at

http://ec.europa.eu/information_society/media/overview/evaluation/studies/index_en.htm

The per capita cinema attendance was obtained at www.nationmaster.com

	Dependent Variable: FDI Net Outflows (% of GDP)				Dependent Variable: FDI Net Inflows (% of GDP)				Dependent Variable: Exports of Goods and Services (% of GDP)			
	OLS	English Skill Variable Instrumented	OLS	English Skill Variable Instrumented	OLS	English Skill Variable Instrumented	OLS	English Skill Variable Instrumented	OLS	English Skill Variable Instrumented	OLS	English Skill Variable Instrumented
GDP per capita, logs	0,119 [17.31]**	0,109 [13.52]**	0,091 [17.68]**	0,082 [10.35]**	0,004 [0.58]	-0,003 [0.42]	-0,02 [4.17]**	-0,018 [2.52]*	-0,003 [1.60]	0,002 [0.62]	-0,004 [2.43]*	-0,002 [0.76]
% people who speak English	0,007 [2.36]*	0,014 [3.35]**			0,012 [4.50]**	0,017 [4.33]**			0,012 [13.08]**	0,008 [5.87]**		
Average of total TOEFL scores			0,052 [5.14]**	0,103 [2.82]**			0,103 [10.91]**	0,094 [2.55]*			0,047 [14.38]**	0,037 [2.66]**
Constant	-6,898 [52.64]**	-7,103 [45.15]**	-10,168 [13.55]**	-13,909 [5.18]**	-4,716 [39.42]**	-4,871 [32.93]**	-11,377 [16.22]**	-10,675 [3.96]**	-1,436 [36.50]**	-1,328 [27.02]**	-4,445 [18.47]**	-3,701 [3.66]**
Observations	498	498	466	466	577	577	507	507	632	632	538	538
Number of Year	29	29	18	18	29	29	18	18	29	29	18	18
R-Squared Within	0,53	0,52	0,5	0,47	0,06	0,05	0,2	0,2	0,27	0,24	0,29	0,28
R-Squared Between	0,86	0,86	0,86	0,81	0,34	0,75	0,43	0,42	0,77	0,17	0,43	0,46
R-Squared Total	0,56	0,55	0,54	0,52	0,02	0,01	0,23	0,23	0,21	0,23	0,3	0,3

* significant at 5%; ** significant at 1%

Absolute value of t statistics in brackets

Table 7. Economic Impact of English Skills

Panel regression of Foreign Direct Investments and Exports on GDP per capita and level of English in the country. English-level variables are instrumented using the subtling (Y/N) dummy as an instrument. Data on FDI Outflows and Inflows, and Exports to GDP are from the World Bank Development Indicators. Regressions are estimated with year-fixed effects.