Cardiff Economics Working Papers

Working Paper No. E2014/6

Firm-Level Evidence for the Language Investment Effect on SME Exporters

James Foreman-Peck and Peng Zhou

June 2014

Firm-Level Evidence for the Language Investment Effect on SME Exporters

James Foreman-Peck* and Peng Zhou[+]

Abstract

Both analysis of international trade and the knowledge resource theory of the firm imply that language skills should play a vital role in exporting. This may be apparent to large multinationals with sites in many different linguistic locations, but we show it is less obvious to smaller companies. With data on the language used by each of a large sample of European small and medium sized enterprises in their export markets we test and estimate the effects of language assets on language performance in export markets and on export sales. Controlling for the possibility that language skills may be acquired by exporting, we find a very substantial export return to linguistic expertise, indicative of unexploited gains from investment in languages. There is also evidence of greater under-investment in language skills in English-speaking Europe, which we show can be a prediction of Konya's (2006) trade model.

Keywords: Internationalisation, language skills, SMEs,

JEL codes: D22, F13, H52, R42

*Cardiff Business School, Cardiff University, Colum Drive, Cardiff CF10 3EU.
Foreman-peckj@cardiff.ac.uk

[+]Cardiff School of Management, Cardiff Metropolitan University, CF5 2YB.
 pzhou@cardiffmet.ac.uk.

Firm-Level Evidence for the Language Investment Effect on SME Exporters

Communication is a pre-requisite for trade, and language is a critical element of communication. Yet an enormous firm-level literature devoted to exporting and internationalisation (Miesenbock 1988; Dhanaraj and Beamish 2003; Andersson 2004; Ruzzier et al 2006) has yielded few systematic and quantitative conclusions on the contribution of language skills. Nonetheless there is circumstantial evidence to think these skills matter a great deal and more than some enterprises realise. Only a minority of firms export; of these, most only serve a few foreign markets, selling mainly to domestic customers (Bernard and Jensen, 1999; Eaton et al., 2004; Bernard et al., 2007; Mayer and Ottaviano 2007). The smaller the company the less likely it is to export (EC 2011 Table 1). Underpinning these characteristics, it has long been noted that lack of information, risks, and costly procedures have especially been barriers to exporting and reasons for restricted export performance (e.g. Verhoeven 1988).

Smaller businesses are disproportionately affected by the costs of entering foreign markets; such costs not only include conforming to foreign regulations but language and cultural difficulties as well (USITC 2010 6-2. 6-8). Consistent with this observation, an OECD/APEC international study found that a majority of smaller firms rated barriers related to internal capabilities and access as more significant obstacles to internationalisation than those to do with the business environment (Fliess and Busquets 2006). Among the most important barriers for such companies were identifying foreign business opportunities and limited information to locate/analyse markets (OECD 2009; EC 2011 Fig 37).

Such barriers are likely to stem significantly from cultural and linguistic differences. But unlike many other trade barriers, these can be reduced by investment in learning. Church and King (1993) point out that only one shared language is essential for communication and the collectively efficient language learning solution is for the smaller language group to learn the language of the larger group. This maximises the excess of communication benefits over learning costs. The communication benefits are the same whichever group becomes bilingual, and the costs are lowest if the fewest possible acquire the extra language skills. In Lazear's (1999) model individuals are randomly matched to trade with each other, with the consequence that communication difficulties reduce the efficiency of interactions. Casella and Rauch (2003) consider a search or network view of international trade in which imperfect information about foreign countries (caused partly by cultural differences) acts as a barrier to trade. Information–sharing networks can help overcome that barrier, but language learning is

2

not modelled explicitly. The language learning decision is determined by specialization in Choi's (2002) model. He finds that countries specialise in learning when their wages are low, except for small open economies. Konya (2006) allows that agents recognize the language investments of their trading partners – generally by reducing their own. He derives an expression for under-investment in learning, from which we extract one for the greatest under-investment by the largest language group, the Anglophones.

Many country-specific findings are consistent with information–based barriers to individual market entry being partly responsible for firms not becoming exporters or failing to extend exporting further (Miocevic and Crnjak–Karanovic 2011; Pinho and Martins 2010; Brouthers et al 2009; Brouthers and Nakos 2005). Although none of these country studies looked for it as an information barrier, potentially ignorance of relevant national languages is an obstacle to discovering and developing potential markets. This the European Commission's Lisbon Strategy (2000) asserted when identifying language skills as vital to boosting the competitiveness of Europe's economy. Since then, a variety of official reports and commissions have reinforced the message (EC 2005; Hagen et al 2006; Commission on Multilingualism 2008). Competence in more than one language is good for business and must be encouraged, according to the Commission, a stance apparently supported by a recent EC survey (EC 2011). This established that for enterprises with plans to become internationally active, language barriers were believed to be among the most important[1].

Bilateral aggregate international trade studies provide quantitative behavioural support for the importance of language, in the trade boost from a common official language. The other side of the coin is that not sharing a common language is a barrier to trade (Frankel and Rose 2002; Anderson and van Wincoop 2004; Helpman et al. 2009; Hutchinson 2002; Melitz 2002, 2008). Greater linguistic difference from English reduces an economy's trade with the US, controlling for migrants and networks (Hutchinson 2005). Conversely Ku and Zussman (2010) show that the ability to communicate in English has a strong effect in promoting trade across the world.

Estimates of the trade barrier of language for smaller businesses based on such aggregate national trade analysis could be too low. Generally big businesses are more likely than nationally confined SMEs to be sensitive to the linguistic needs of trade, by virtue of their multiple locations and multi-linguistic staff, as well as their greater resources (Barner-Rasmussen and Björkman 2005; Buckley et al 2005). Large multi-

---

[1]Scoring 2.9 compared with 3.1 for price and other high scoring barriers (on a 5 point scale ranging from not important 1 to very important 5).

national companies may choose to communicate across borders in the language of their headquarters country, as Siemens insisted on German. But even for large businesses there will be pressures to use the language native to the majority of participants in transactions (Loos 2007).

Disaggregated studies of language use and export performance by smaller enterprises are therefore vital for understanding whether and how there is adequate investment in language skills. The present paper undertakes such an exercise, examining the way in which language investment improves export performance of small and medium size enterprises (SME) and the extent to which it does. Because of the distinctive international role of English language, there is a special interest in the consequences for (here European) Anglophone SMEs' export performance. Section 1 outlines how language investment fits into a resource-based theory of the firm and the conditions under which under-investment emerges in trade theory. Section 2 discusses the EC language and exporting data set. Section 3 explains the analytical approach to testing the hypotheses and estimating the effects. Section 4 presents the results, while the concluding Section 5 discusses the implications of the estimates obtained.

1. LANGUAGE AS A KNOWLEDGE RESOURCE

A resource-based view of the firm (Wernerfeld 1984; Conner and Pralahad 1996; Westhead et al 2001; Dhanaraj and Beamish 2003) provides a partial framework to understand the contribution of languages to exporting and to formulate hypotheses. The distinctive ways in which a business utilises and acquires knowledge influence the capabilities that determine its competitive position (Makadok 2001; Grant 2003). Dynamic capabilities (Tallman 2003; Helfat et al 2007), the capacity of a firm to create, extend or modify its resource base, are the key to exporting, for most companies are not 'born global'. Firms that move into exporting or increase their export propensity are exhibiting dynamic capabilities; their growth potential is high because of their capabilities, as demonstrated by their exporting. Enterprises reporting product or service quality exhibited a higher propensity to export, reflecting dynamic capabilities in the continual upgrading of products (Westhead et al 2004). The centrality of knowledge to this process is supported by evidence about 'born global' firms and accelerated internationalising enterprises, most of which tend to rely on critical knowledge assets or belong to the knowledge-based and knowledge-intensive sectors (Harris and Li, 2005). Competitive advantage turns on knowledge resources, intangible assets.

4

To the extent that knowledge is 'tacit' rather than codified, it is embedded in the human capital of the firm's employees. Utilisation of this knowledge can be represented by the theory of the market–making entrepreneur (Casson 2003 pp99–100). The entrepreneur is one who overcomes deficiencies in the acquisition and processing of information. Dynamic capabilities of the firm are a form of either personal or institutional entrepreneurship. Knowledge of foreign markets is a component of these capabilities, an element of the firm's resource base, for language skills are often essential for acquiring information about opportunities and cultural constraints in other countries (Johanson and Vahlne 1977). Linguistic ability is a major stimulus for the positive use of export information (Williams and Chaston 2004). Experience of living and/or working overseas significantly affects both information–gathering and decision–making by export managers and, in foreign language markets, requires linguistic skills.

Without this experience it would be difficult to judge what opportunities are available; inadequate investment in languages could lose firms profitable opportunities. Adoption of a *lingua franca* is not necessarily a substitute; Henderson (2005) found that when English was the working language of multilingual management teams, members were vulnerable to miscommunication which damaged trust building. Nonetheless limited opportunities for specialisation in smaller firms and lack of understanding about communication failures explain why SMEs especially may adopt this approach and suffer from deficient language skills. They do not know what they would know if they had these skills, though they might suspect some of it (Peel and Eckhart 1993; Crick 1999). The consequential underinvestment in languages then suggests the hypothesis that

H1 firms with more language skills will show a more buoyant export performance.

In order to elucidate this link, it is desirable to subdivide the hypothesis so as to distinguish between the exercise of linguistic skills in export markets and the resources and capabilities that give rise to their effective use.

H1a Enterprises with more investment in language assets will achieve better language outcomes in export markets.

H1b Better language performance in export markets increases export intensity.

The knowledge resource theory implies that language assets that are not in-house sources of information, and therefore not integrated with decision taking, will be less effective. So external agents and outside translators as means of addressing foreign

markets with different languages are likely expand export sales and profits by less than employees, especially export managers, well trained both in languages and in the firm's distinctive advantages.

H1c Arms-length language assets will be less effective in enhancing exports than those closely integrated with the firms activities.

Supplementing the knowledge resource approach, the network effect of languages (Church and King 1993) at first sight implies that in contrast to continental European enterprises, Anglophone firms typically may not need to invest in languages. As member of the largest economic group measured by spending power (thanks to the United States) the English-speaking nations have an incentive not to acquire language skills; the payoffs to smaller linguistic groupings from learning English are greater than those to the Anglophone bloc. This means that perhaps

H2a *Anglophone firms invest less in language skills than the rest of Europe without adverse effects on exports.*

If they did invest as much they would have a competitive advantage in exporting because of the role of English as a *lingua franca*. But the 'socially optimum' solution may not be achieved. At the individual level there is a communication network externality with languages. If one person or firm invests in a language skill so that they can in principle communicate with all members of the language group, they confer a benefit upon all these other members of the group in the sense that there is now a greater chance of discovering worthwhile trading opportunities for all of them. Yet only the language learner bears the cost of opening up these prospects. In deciding whether it is worth investing in the language skill, the individual will only take into account their own prospective gains from trade, not those of the potential trading partners. So there will be cases where language investment is not undertaken because the learner does not obtain the full returns, which would warrant the acquisition of the language skill. Nonetheless the incentives to learn the language of a large economic group (Anglophones) will be greater than those to learn small groups' languages. This externality is typically exacerbated by strategic behaviour; if a large language group knows a small language group will undertake the investment in learning to communicate, they will reduce their own efforts (Konya 2006).

Under what conditions does the large linguistic group or 'country' under-invest more than the small language group or 'country'? Using Konya's (2006) model Figure 1 shows by how much the big language group's under-investment exceeds that of the small 'country'. On the vertical axis is plotted the difference between under-

investments of the two countries (large minus small).The delta signifies the difference between optimum and Nash equilibrium numbers of language learners, so that under-investment attracts a positive sign. When the larger language group has greater under-investment the vertical axis is positive.

There are two conditions required for the big country to have greater under-investment:

- The large language group must be large relative to the trade partner with a different language. In Figure 1, *L* represents the proportion of population accounted for by the big group.
- The language barrier also should be low relative to other trade barriers. In the figure the smaller is μ, the less is the relative importance of the language barrier.

Figure 1 Relative Magnitude of Underinvestment in Language Skills
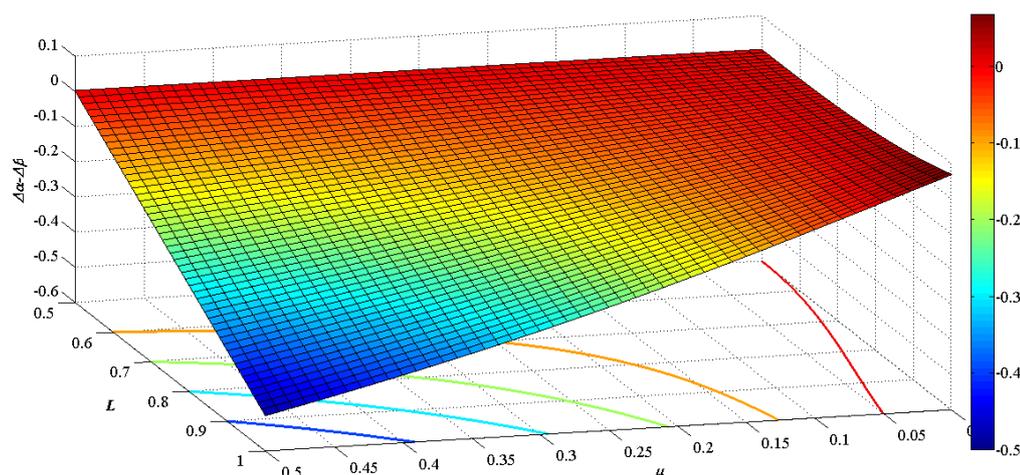
Both conditions hold in reality. On the one hand, the Anglophone countries are by far the largest language group, accounting for at least one quarter of world trade in 1990 and more than one fifth in 2012. On the other hand, many gravity models of bilateral trade testify to the magnitude of other trade costs and barriers; language is only one of many impediments.

Firms' specific knowledge of their own products will exacerbate this under-investment because of complementarities with language skills. If the barriers of language were completely eliminated there would be trades that members of the larger group would want to initiate because of their distinctive knowledge, but that would not occur if it was up to members of the smaller group to take action. Since members

of the smaller group do not know about such opportunities, their calculation of how much to invest in linguistic skills will be biased downwards. Where members of the larger group do have such distinctive knowledge- and as discussed above this is a critical element in a firms' competitive advantage– it is therefore in their interest to invest in the language of the smaller group. But they may be deterred by recognising the strong incentives for small linguistic groups to learn their language, missing out on trading opportunities with them.

Ignorance of the payoff to language skills and investment may therefore be particularly marked among Anglophone exporting firms that might mistakenly rely on a supposed universal knowledge of English language in foreign markets. If the Anglophone firms do not underestimate their optimum investment in languages because of their privileged position we would find that;

H2b Anglophone SMEs will show similar payoffs to language investment as those of other European countries.

Before testing these hypotheses we should note that most firm-level studies of exports have not been concerned to quantify the impact of language skills. But some findings have been obtained as a by-product of the pursuit of other objectives. Research usually investigates only single countries and so comparative evidence of the type required by H2 is not available. It also typically lacks the detail to test H1a–H1c.

For H1 there are more studies available, though some of these are indirect evidence, as is the descriptive World Bank research that observed the common language effect on Columbian SME exports (Berry and Escandon 1994) (the well-researched counterpart in aggregated studies of bilateral international trade was noted in the introduction). At the case study level language skills enhance exporting for Spanish SMEs (Stoian and Rialp-Criado, 2010). A logit analysis of Turkish exporter and non-exporter SMEs establishes that lack of language skills reduces export chances (Demirbas 2009). Crick et al's (2000) factor analysis of British agricultural exporters found language skills facilitated market access significantly (Table 2). But none of these elucidates the process by which languages influence exports, as required by the above hypotheses.

2. THE EC ELAN SURVEY OF SME EXPORTS AND LANGUAGE SKILLS

The hypotheses can be tested with the Elan survey of European exporting small and medium enterprises undertaken for the European Commission (Hagen et al 2006)[2]. This is the most ambitious survey of language use by business in that almost all European countries were included and up to 100 SMEs (with fewer than 250 employees) were sampled in each country. The Elan surveyors note that the sample was stratified for each country to match the national export profile as closely as possible. The export profile was identified as the pattern of trade destinations and sectors by country for exports of goods and services based on official trade figures. A cross-section of company sizes was selected that also reflected national rather than regional patterns. In one respect the sample cannot be representative – because the firms are SME exporters and as noted in the introduction the principal exporters in all countries are not SMEs. Almost two thirds of the sampled firms were in manufacturing, all employed fewer than 250 persons, just under one fifth were subsidiaries and the mean proportion of turnover exported was 43 percent. 60 percent of these SME exporters had adapted their website for foreign markets and the average national trade–GDP ratio for the sample was 105 percent (Appendix Table 4).

Language questions employed in the analysis fall into three groups; reasons for language investments, the investments themselves and language performance or outcomes. The 'reasons' questions are:

- *'Strategy'. In order to deal with customers abroad does your company have a formal language strategy?*
- *'Agents'. Have you ever used local agents and/or distributors who speak your own native language in your foreign markets?*
- *'Trans'. Have you ever employed external translators/interpreters for foreign trade?*

Obviously a firm with a language strategy has a reason to invest in language skills. But a firm that employs agents for foreign sales is likely to do so to <u>avoid</u> the expense of investing in languages and the same is true of the employment of external translators/interpreters.

The self-evident investment questions are:

---

[2] The use of this data set is licensed by Semantica Ltd. 1.7 percent of the sample indicated that they were not exporting at the time of the survey but they may be assumed to have formerly exported and/or were about to begin or resume exporting.

- *'Skills'. Have you acquired staff with specific language skills due to export needs?*
- *'Empnat'. Have you ever employed native speakers full time in your company who support your foreign trade?*
- *'Training' Has your company undertaken foreign language training of staff?*

The language performance or outcome questions are:

- *'Match' 'Does the language used in the principal foreign market match the principal language used there?'*
- *'Match_NonEng' 'Language other than English used in principal foreign market matches principal language used.'*
- *'Eng' 'Does the enterprise use English in its non-English speaking principal foreign market?'*[3]

An example of 'Match_NonEng' would be a UK exporter whose principal market was Germany using German for the selling in that market (but so would a German, or at least a Bavarian, selling to Austria using German).

The businesses in the present Elan sample were based in 29 European[4] countries. Their principal foreign markets were Germany for 17.1 percent of firms, UK for 10.6 percent, France for 9.5 percent and Russia for 5.9 percent (Appendix Table A1). Outside Europe the most common primary market was the US (for 6.4 percent). The proportion of SMEs with any other principal foreign market outside Europe was extremely small. The language used in the main market was overwhelmingly English (48 percent of companies) (Appendix Table A2). Then the ordering follows that of the markets; German 15 percent, French 9 percent and Russian 8 percent.

Almost half of the European sample have language strategies, employee language training and have acquired staff with specific language skills for export purposes (Table 1). By contrast, consistent with the results for English functioning as a world language, sampled SMEs from Anglophone European countries invest in language skills very differently from the European average. British firms for instance are only broadly comparable with Europe as whole in their employment of agents[5] (Table 1). In most other respects they do not compare at all with those of Europe. The proportions

---

[3] The great majority of firms in the sample are not Anglophone and therefore using English for selling in non-Anglophone markets is the consequence of investment in an 'open circuit' language or *lingua franca*. As we acknowledge with later specifications, for Anglophones of course no linguistic investment is needed for this purpose.

[4] Including Turkey but excluding Slovenia.

[5] A historical allegation is that agencies insulate exporters from market information, with adverse effects on competitiveness.

of enterprises claiming language skills, language strategies and using translators in Europe as a whole are much more than double those in the UK sample. A slightly higher proportion of Irish SMEs than British invested in language training for employees and claimed language skills – compare the Eurobarometer (2005) survey of language skills– but those that used translators and agents or employ foreign nationals for their language abilities are very much rarer. Maltese businesses show the same language characteristics as those of Britain and Ireland, except that a broadly similar proportion as the European average claims to have a language strategy for their foreign markets[6]. The 78 percent of the UK SMEs that use English in their main overseas market is matched by the Irish and Maltese businesses. In short, from table 1 it is apparent that Anglophone businesses in the sample probably rely on everyone else using English. Their lack of language investment is consistent with H2a only if their export performance does not suffer.

<TABLE 1 HERE>

This lower Anglophone demand for language services might simply reflect a lower need relative to the continent. But Anglophone firms focus more strongly on English-speaking customers (35 percent of UK SMEs have English speaking principal foreign markets) than other European countries (19 percent) – the common language effect (Table 2). More than two thirds of sampled Irish SMEs, and two fifths of the Maltese sample, supply the UK as their most important foreign market. So the Irish and Maltese dependence on English language for selling at first sight then is more justified than the British SMEs that are much more liable to employ English in non-Anglophone markets. On the one hand Anglophone enterprises might achieve higher sales were they less focussed on English speaking markets because of their lack of language skills. On the other, apparently non-mother tongue English European firms share the practice of using English for selling, according to Table 2, so why should not the Anglophones?

<TABLE 2 HERE>

3. TESTS AND ESTIMATION

In order to establish whether this extensive Anglophone use of English language in export markets is warranted, to test the hypotheses of Section 1 and to estimate the impact of language skills on enterprise performance, we need an empirical model to

---

[6] Malta is classified as Anglophone because English is one of the two official languages.

control for influences upon exporting that might otherwise be conflated with language investment.

Ideally language assets would be employed up to the point where the extra revenue they contribute through greater export sales was balanced by their extra costs. These assets would both improve sales in foreign language markets and encourage switches away from crowded and less profitable common language markets to foreign language destinations. They would increase export sales without detracting from domestic sales through a production function based on firm-specific knowledge assets. The production function in turn would create a derived demand for language assets. Assuming we can identify the 'export production function', from the language coefficient/s the optimal derived demand might be deduced. Although we do not know the price of the language investments, if their implied marginal productivity is very high relative to likely prices or costs then there is *prima facie* evidence of under-investment.

We embed our three types of language variables in a general model with a recursive structure, where $F(.)$ and $G(.)$ are link functions. Reasons for investing or not investing in languages determine actual investment, which in turn results in language performance, being able to speak the language of the chosen market with varying degrees of fluency. The principal interest lies in the contribution of language performance, or investments, or both, to exports. There are two possible routes by which inadequate language investment may make a difference to exporters. One is crowding them into common language markets where they cannot sell as much as if they could range equally freely across the world. The other is failing to communicate effectively in foreign markets and thereby exporting less to each market. Difficulties in measuring language performance render expedient allowing for this link to be implicit in a measured relationship simply between exports and language investment (as we do in three of the four specifications of Table 4)[7].

$Language_i$ is a vector of language outcomes or investments pertinent to export performance for the *i*th enterprise:

$$Language_i = F(\alpha' x_i) + \varepsilon_{i1} \tag{1}$$

$$Exports_i = G(\beta' Language_i + \gamma' z_i) + \varepsilon_{i2} \tag{2}$$

In equation (2), z_i is the vector of non-language determinants of 'exports', including 'Anglophone', market and sector dummies, 'subsidiary' status and national trade

---

[7] One limitation of the language performance matching variable is that, being restricted to firms' principal market, it fails to take full account of language performance by enterprises selling in several different language markets.

openness, while γ is the coefficient vector of z_i. Some elements of x_i, the determinants of language skills, outcomes and capacities, may be included in z_i (trade openness, subsidiary). Language investment in employing native speakers, other persons with special language skills and providing language training for personnel, gives rise to language outcomes or performance, here measured by 'match', matching the language of the principal export market for selling purposes. Because the quality of the language used in matching languages in foreign market, or in using a third language such as English for communication, is likely to be at least as important as the fact of matching, we include language investment variables in the export equation as well.

If the disturbance terms ϵ_1 and ϵ_2 are correlated, then observed associations between language skills and outcomes on the one hand and exports on the other could be misleading. This would occur for instance when unobserved more energetic management is more likely to engage in language investment and language matching in export markets, as well as to cultivate export markets more effectively. Then the associations would not only reflect the impact of language variables on exports; the language effect coefficient would not be identified. Similarly the possibility that exporting firms are more likely to acquire language skills in the course of exporting, rather than as a cause of exporting, must be taken into consideration in the estimation because this also would bias the coefficient estimates and invalidate the hypothesis tests[8]. That is, instead of the recursive structure postulated above, it could be simultaneous, with exports appearing as an explanatory variable in equation (1). In both of the above cases OLS estimates of the language coefficients in (2) would be upward biased. An export 'challenge and response' scenario generates the opposite bias; that is, when enterprises with poor exporting performances rise to the challenge by investing in language assets while already strong exporters feel no need to invest, OLS estimates are downward biased.

Using instrumental variables in the x vector of (1), in principle we can purge the language assets of such effects, bearing in mind that weak instruments bias IV estimators and their standard errors. A theoretically justified (by exogeneity) set of instruments in the present context are variables that determine language investment but do not themselves influence exports. The adoption of a language strategy is a potential instrument because it is a reason for investing in languages. So too is whether a firm employs agents for foreign sales, since they are likely to do so to save on investing in languages within the enterprise and themselves building up contacts in those markets.

---

[8] If firms choose markets regardless of language skills, language matching may be a matter of locational chance, rather than systematic influence as postulated by, and testable in, a version of equation (1). The main concern is with a version of equation (2); given that matching does or does not take place for whatever reason, how is export intensity affected?

Equally employment of external translators/interpreters is an exogenous influence, entailing a prior decision not to embed language skills in the enterprise.

Versions of equation (1) allows a test of the hypothesis (H1a) that investment in various language resources improves the language performance/outcome – matching the language of the principal foreign market or, for Anglophone firms matching language in non-English speaking principal markets, or simply having implemented language training. Equation (2) permits investigation of the hypothesis (H1b) that language outcomes influence export performance. The specification also lets us measure these effects. We must allow that the effectiveness of language matching or language training in promoting exports may depend on their quality, which in turn is likely to be influenced by the language resources committed to the exercises. H1c, the comparative effectiveness of embedded language assets (the ineffectiveness of agents and/or translators), is a special case of H1b.

Anglophone businesses demand fewer language skills than the rest of Europe because they can tap the widely understood English language without additional investment. This could confer an export advantage on them even if they invested less than their rivals in language skills. But they may under-invest in languages so that they have an export disadvantage. A test of H2a, a language shortfall, in export equation (2) is whether Anglophone SMEs have an advantage in exporting that compensates for their lower investment in language assets. A second test, utilising the principle of diminishing export returns to language investment, is whether estimated on the Anglophone-only sample, a larger language coefficient is obtained than for non-Anglophone SMEs. We can reject a version of H2b (a similar payoff for Anglophone SMEs from investing in language skills by training) if it is.

On similar grounds, a test for an Anglophone shortfall in equation (1) is whether the language investment coefficient in the language 'Matching' equations are similar between the two groups. If acquisition of staff with language skills is equally effective for matching between the groups again H2b can be rejected. Although Anglophone's skills are justifiably lower when they do acquire them, if the skills are more effective at the margin than those of other Europeans, it is likely that they have been under-investing; investing more in language skills would drive down the marginal and average returns in the form of language matching or export intensity to continental European levels.

Control variables in the model include a measure of national trade openness ('tradegdp' Appendix Table A3). The logic behind the inclusion of this variable is that a typical SME of a smaller economy, such as Belgium, that trades 165 percent of its

output is probably, like the economy in which it is located, more export–intensive than a firm based in a country, such as the UK, that trades only 55 percent. But openness is likely to stem primarily from the size and prosperity of the economy, rather than from investment in language human assets. We are able to employ the openness variable because we use random country effects after testing whether these results were consistent with fixed country effects estimates[9].

Another variable that might influence a company's exports independently of language skills is whether the business is a subsidiary. A subsidiary may be able to draw upon more knowledge resources, including language skills, than other similar sized independent companies and enhance export sales accordingly. Supplying larger markets (such as Germany) may also raise a firm's exports for a given investment in language skills, as might the sector in which the business operates[10].

Measuring the dependent variable for export performance as the ratio of exports to turnover creates the possibility that more investment in languages might merely switch from more profitable home markets to less profitable foreign markets. We control for this possibility by including domestic sales as an independent variable and keeping the ratio dependent variable. If the language coefficient is positive, holding constant domestic turnover, then language investment boosts exports without reducing domestic sales.

4. RESULTS

First we explore the data for equation (2) using random effects country panel estimation (Table 3). Equation 3.1 suggests that translators and agents do not increase export ratios (H1c), nor do SMEs of Anglophone economies achieve higher export intensities (contrary to H2a). Equation 3.2 indicates that the sum of the statistically significant positive language coefficients is 41.7. This implies that enterprises with all these language investments and performances would achieve an export ratio 41.7 percentage points higher than those with none of them, without reducing their domestic turnover (consistent with H1b). Increasing the coverage with equation 3.3, by dropping domestic turnover, the language coefficients sum to 36.0. Restricting the sample to non-Anglophones with domestic turnover the language coefficients sum to 44.36 (eqn 3.4).

---

[9] The openness variable is perfectly collinear with the country of location dummy variables.
[10] We distinguish five sectors: agriculture and mining, manufacturing, construction, retail and wholesale, plus other services (in that order). Given the sample size, a larger number cannot be specified with meaningful statistical results while also controlling for the considerable number of other variables in the model

Increasing the non-Anglophone sample by dropping domestic turnover (eqn 3.5) the sum is 44.1.

Turning to the Anglophone sample, including turnover leaves too few cases for credible inferences (only 39) and inclusion or exclusion in the full sample does not greatly alter the language coefficient estimates. So dropping the turnover variable, the language matching coefficient has a negative and significant coefficient (eqn 3.6) and employing native speakers is both negative and not significantly different from zero. By contrast the Anglophone training coefficient is significantly positive and large compared to the whole sample or to non-Anglophone equations. On the principle of diminishing returns this is consistent with higher export sales returns from language training in Anglophone SMEs because there is so little of it in the present sample. The significant negative effect of 'matching English' in Anglophone equation 3.7 shows what underlies the 'match' coefficient of equation 3.6; these firms are being pushed into Anglophone markets by their ignorance and are performing less well as a result – apparently with 15 percentage points poorer export ratios.

<TABLE 3 HERE>

In the preceding section we have suggested some reasons why these single equation estimates may be biased. Next we therefore establish the extent to which certain language outcomes and investments are influences upon export intensity, rather than responses to it. We begin with equation (2), sequentially estimating the response of exports to 'training', to 'employing a national' to 'employing language skilled workers' and to 'matching the language in foreign markets'. We adopt the sequential strategy because of a shortage of credible instruments, recognising that the individual language variables may also identify some of the total effect of the group[11]. Table 4 shows the instrumented individual language coefficients are very large – much larger than the OLS estimates. This finding is not affected by estimation with IV Tobit allowing for non-exporters, or by random country effect panel estimation. For instance equation 4.1 indicates that enterprises employing native language speakers for their foreign trade experienced 71 percentage point higher export ratios than those that did not, holding constant domestic sales. One interpretation might be that employing such people is extremely expensive and only possible when an enterprise is highly focussed on export markets. But this type of argument is much less compelling for equation 4.3

---

[11] Although they are not highly correlated;

	Emp.nat.	Skills	Training
Skills	0.2434		
Training	0.0834	0.2530	
Match	0.0702	0.1152	0.0442

where SMEs that train their staff in languages apparently achieve 57 percentage points higher export ratios than others. For all equations the language estimates are supported by instrument relevance confirmed by the highly significant (Kleibergen-Paap LM) ID stat, and by Hansen's J statistic not rejecting the null of lack of correlation with the disturbance term. The (Anderson-Rubin) first stage F statistics are all highly significant and greater than 10 for all equations of Table 4 (Staiger and Stock 1997). Even allowing for some bias in the estimated mean and the variance of the 2SLS estimators, the language coefficients are very large and statistically significant (accept H1b)[12]. The second clear result of Table 4 continues to be that the European Anglophone economies do not have an export advantage from speaking English that compensates for the much lower investment in languages, contrary to H2b.

<TABLE 4 HERE>

What determines language matching (equation 1 of the model)? In Table 5 Anglophone matching of non-English language to export market is compared with non-Anglophone firms' all language matching. Probit equations 5.1 and 5.2 show that staff with special language skills acquired to deal with export needs ('skills'), increase the chances of matching the language of the principal export market (H1a confirmed). For Anglophone SMEs (Table 5 equation 2), they raise the probability much more than for non-Anglophones (Table 5 equation1). Given the effectiveness for export intensity of language matching, this is evidence against H2b (similar payoffs to language investments), but the matter is examined further below.

Employing foreign nationals also has a significant effect on the chances of language matching for non-Anglophone companies (H1a). The positive coefficient is smaller for the Anglophones and not significantly different from zero[13]. The national trade-GDP ratio (SMEs in more open economies) in addition boosts the likelihood of matching for non-Anglophones. Table 6 shows the marginal effects at means of the language investment determinants of language matching for Anglophone and non-Anglophone enterprises. The coefficients that are significantly different from zero sum to a larger marginal effect for Anglophones (0.45) than for non-Anglophones (0.17). This is consistent with diminishing returns to language investment and under-investment by Anglophone SMEs[14].

---

[12] For the skills equation 4.2 the Stock–Yogo critical value for 5% maximal IV relative bias is 13.91 compared with a weak ID statistic of 21.6. For the training equation 4.3, the weak ID statistic of 12.92 exceeds the 10% maximal IV relative bias critical value of 9.08.
[13] Merely because a language investment does not increase the chances of language matching does not mean it is not effective, for it may improve the quality of the language matching of the communication.
[14] Using the 'Match' dependent variable in an Anglophone probit equation yields a significant

17

<TABLE 5 HERE>

<TABLE 6 HERE>

5. CONCLUDING DISCUSSION

The resource base theory of the firm points to firm-specific knowledge as the source of survival and growth potential. Especially for a stand–alone business, knowledge of foreign markets, and therefore export sales, are likely to be advanced by the language skills and foreign experience of the staff. There are stronger incentives for members of smaller linguistic groups to learn the language of larger groups because they are more likely to find profitable trades – when the groups' per capita incomes are broadly similar. But the network externality and strategic interaction in language investment will probably induce all market participants to under-invest in language skills, without appropriate policy intervention. Because the enterprise knows better than the public the value of what it has to sell, this under-investment tendency means that even for firms that are members of a dominant language group (here assumed to be Anglophones), it could well be profitable to invest in acquiring the language of smaller groups. Relying on the smaller group – who do not know what the firm has to sell – having learned the larger group language may reduce the volume of profitable trades; they will under-perform in exporting.

Language effects on exports can be broken down into language investments that promote useful linguistic performance in export markets and the effects of this performance on export intensity. For the first relationship single equation estimates show that staff with special language skills acquired to deal with export needs ('skills') always increase the chances of matching the language of the principal export market (H1a). Consistent with a knowledge resource base theory of the firm, we find arms-length relations that might be used to overcome the informational difficulties of different language markets to be ineffective (agents, translators), especially compared with in-house language assets (H1c).

For European SMEs as a whole single equation estimates imply that the combined effect of training staff in language, acquiring staff with language skills, employing native language speakers and matching the sales language to the market, is to increase the ratio of exports to sales by around 40 percent (H1b). This estimate is obtained by

---

'Skill' coefficient with a marginal effect of 0.265, considerably greater than the sum of the two coefficients in the non-Anglophone equation 2 Table 5.

controlling for domestic turnover and therefore for the average enterprise in the sample would entail a very large increase in total sales. Although these language assets may be costly it is unlikely that they are so expensive they would cancel out the profits from such an expansion. In this case a conclusion of under-investment in languages is warranted.

To eliminate the possibility that the estimated language effect is upward biased, each potential contributor is instrumented separately. Each yields a larger coefficient than the least squares total effects of the four language variables together. The three instruments are chosen on grounds of their exogeneity to the language investments – they are reasons for the investment or lack of it – and they pass the test of instrument relevance. For some language variables there is evidence that the instruments are weak but not for 'acquiring staff with language skills', with a coefficient of 46. On these grounds it must be judged that the language effect of exports for SMEs is large. This conclusion allows us to answer Mayer and Ottaviano's (2007) question at the end of their study of European firms; 'If superstars dominate international markets, is there any room for global SME's?' There is room for those SMEs that are prepared to invest substantially in languages.

European Anglophone exporting smaller companies use fewer language assets than those elsewhere in Europe (H2a) and are far more concentrated on English-speaking markets. When they do invest in language training and staff with language expertise they obtain a much larger return in terms of exports than continental Europe – consistent with their under-investment (H2b). The observation that English is a world language does not imply that Anglophone economies need not invest in language skills– as appears to be a widespread assumption among UK SMEs in this sample. As early as the 1890s, a keen observer bemoaned the unwillingness of British businessmen to make any linguistic concessions in overseas markets, thereby losing customers to the more accommodating foreign competitors (Gaskell 1897). We have provided evidence that this problem has not disappeared in the intervening century.

The SMEs were sampled on the basis that they were exporters and so the benefits of language skills for improving their export performance, estimated in the present paper, are likely to constitute only a portion of language investment payoffs. Some estimates of the gains from beginning exporting are large (for example Harris and Li 2007). Language assets and capabilities will often be helpful in this strategy as well. In any case the payoff in terms of greater exports from investing in language skills is substantial; compared with no language investments or knowledge utilisation the average

European SME with all the effective investments and outcomes has an export intensity around 36 percentage points greater.

Establishing a true private or social return to the payoffs from SME language investments requires estimates of the costs of the investment to take advantage of this opportunity. Few cases are available at the national level of the costs of language investment – Grin (2003) appears to be unusual in estimating a figure for Switzerland. So this is a task that is still to be undertaken. Yet the size of the impact of language investment and skills on SME exports demonstrated in the present study is *prima facie* evidence of substantial net returns and probable linguistic under-investment especially among enterprises of the European countries whose mother tongue is English.

References

Anderson J E and van Wincoop E (2004) 'Trade Costs', *Journal of Economic Literature*; 42, 3 . 691–751

Andersson, S. (2004) Internationalization in different industrial contexts, *Journal of Business Venturing*, 19 (6): 851–875.

Barner-Rasmussen, W. and Björkman, I. (2005) Surmounting Interunit Barriers, *International Studies of Management and Organization.* 35(1) 28–46.

Bernard, A., Jensen, J.B. Redding S. and Schott, P. (2007), Firms in International Trade, *Journal of Economic Perspectives*, 21(3), 105–130.

Bernard, A.B. and Jensen J.B.(1999), Exceptional Exporter Performance: Cause, Effect, or Both? *Journal of International Economics*, 47(1), 1–25.

Berry A and Escandon J (1994) Colombia's Small and Medium-Size Exporters and Their Support Systems, *The World Bank, Policy Research Working Paper Series*: 1401

Brouthers, L E and Nakos, G (2005) The Role of Systematic International Market Selection on Small Firms' Export Performance*, Journal of Small Business Management* 43(4), 363–381

Brouthers, L E, Nakos, G, Hadjimarcou, J. And Brouthers, K D.(2009) Key Factors for Successful Export Performance for Small Firms. *Journal of International Marketing*, 17(3) , p21–38,

Buckley, P. J., Carter, M. J., Clegg, J.and Hut, T.(2005) Language and Social Knowledge in Foreign–Knowledge Transfer to China *International Studies of Management and Organization.* 35 (1) 47–65

Casella, A. and J. E. Rauch, (2003) Overcoming Informational Barriers to International Resource Allocation: Prices and Group Ties, *Economic Journal* 113 21–42.

Casson, M (2003) *The Entrepreneur: An Economic Theory*, 2nd ed, Elgar: Cheltenham

Choi, E, (2002) Trade and the Adoption of a Universal Language*, International Review of Economics and Finance* 11 265–75.

Church, J and King, I (1993) 'Bilingualism and Network Externalities', *Canadian Journal of Economics* 26 2 337–345

Commission on Multilingualism (2008) 'Languages mean business: Companies Work Better with Languages' July .

Conner K R and Prahalad C K (1996) A Resource-Based Theory of the Firm: Knowledge versus Opportunism, *Organization Science* Vol. 7, No. 5 pp. 477–501

Crick, D. (1999) "An investigation into SMEs' use of languages in their export opera-tion*", International Journal of Entrepreneurial Behaviour & Research*, 5, 1, 19–31

Crick, D., Chaudry, S. and Batstone, S. (2000) Revisiting the Concentration versus Spreading Debate As a Successful Export Growth Strategy: The Case of UK SMEs Exporting Agricultural–Related Products, *Entrepreneurship and Regional Develop-ment*, v. 12, iss. 1, pp. 49–67

Demirbas, D. (2009) Political Economy of Government Programs on Export Success: A Logit Model for a Turkish Survey. *Journal of East–West Business*; Jul–Dec Vol. 15 Issue 3/4, p316–339.

Dhanaraj, C. and Beamish P. W. (2003). "A Resource-based Approach to the Study of Export Performance." *Journal of Small Business Management*, 41, 3 242–260

Eaton, J., Kortum, S.and Kramarz F. (2004), Dissecting Trade: Firms, Industries, and Export Destinations, *American Economic Review*, 94(2), 150–154.

Eurobarometer (2005) *Europeans and Languages*, European Commission DG Press and Communication

European Commission (2005) A New Framework Strategy for Multilingualism [COM (2005) 596 final]

European Commission (2011) *Study on the level of internationalisation of European SMEs ,*http://ec.europa.eu/enterprise/policies/sme/market–access/internationalisation/index_en.htm#h2–2

Fliess B. and Busquets C. (2006) The role of trade barriers in SME internationalisa-tion, *OECD Trade Policy Working Pape*r No. 45

Gaskell W S H (1897) *Our Trade in the World in Relation to Foreign Competition 1883–1893* cited in R J S Hoffman (1983) *Great Britain and the German Trade Rivalry 1875–1914* New York Garland

Grant R M (2003) 'The knowledge-based view of the firm' in D O Faulkner and A Campbell eds *The Oxford Handbook of Strategy*, Oxford, Oxford University Press

Greene, W. (2011), *Econometric Analysis* (7th edition), Prentice Hall.

Grin, F (2003) 'Language Planning and Economics', *Current Issues in Language Planning,* 4, 1, 1–66

Hagen, S., Foreman-Peck, J, and. Davila-Philippon S (2006) *ELAN: Effects on the European Economy of Shortages of Foreign Language Skills in Enterprise*. Brussels: European Commission. A report commissioned from CILT, the National Centre for Languages by the Directorate for Education and Culture of the European Commission and prepared by CILT in association with InterAct International Ltd.

Harris R and Li Q Cher (2007) Firm level empirical study of the contribution of exporting to UK productivity growth , *Final Report to UKTI*

Harris, R. and Li, C. (2005), "Review of the Literature: The Role of International Trade and Investment in Business Growth and Development", Final Report Submitted to the DTI, September (DTI Ref: UKTILITREV 05/01

Hausman, J. A. (1978). "Specification Tests in Econometrics". *Econometrica* **46** (6): 1251–1271.

Helfat C E , Finfelstein S., Mithell W., Peteraf MA., Singh, H., Teece D. J., and Winter S.G. (2007) *Dynamic Capabilities: Understanding Strategic Change in Organizations*, Oxford, Blackwell

Helpman, E., Melitz, M J and Yeaple, S R (2004) 'Export versus FDI with Heterogeneous Firms', *American Economic Review*, 94, 1, pp. 300–316

Helpman, E., Melitz, M. J., and Rubinstein, Y. (2009). 'Estimating trade flows: trading partners and trading volumes', *Quarterly Journal of Economics*, vol. 123, pp. 441–487.

Henderson, J. K. (2005) Language diversity in international management teams. *International Studies of Organization and Management*, 35(1) 66–82.

Hutchinson W K (2005) 'Linguistic Distance as a Determinant of Bilateral Trade', *Southern Economic Journal* 73(1) 1–15

Hutchinson, W.K, (2002). 'Does ease of communication increase trade? Commonality of language and bilateral trade', *Scottish Journal of Political Economy*, vol. 49, pp. 544–556.

Johanson, J. and Vahlne, J.-E. (1977). The internationalization process of the firm: A model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8(1): 23–32.

Konya, I (2006) 'Modeling Cultural Barriers in International Trade' *Review of International Economics,* 14, 3, 494–507

Ku H. and Zussman A. (2010) Lingua franca: The role of English in international trade, *Journal of Economic Behavior & Organization* 75 250–260

Lazear, E. P., (1999) Culture and Language, *Journal of Political Economy* 107 S95–126.

Loos, E (2007) 'Language Policy in an Enacted World: The Organization of Linguistic Diversity' *Language Problems and Language Planning* 31, 1, 37–60.

Makadok, R. (2001), Toward a Synthesis of the Resource-Based View and Dynamic–Capability Views of Rent Creation. *Strategic Management Journal*; 22, (5), pp. 387–401

Mayer T and Ottaviano G I P (2007) The happy few: the internationalisation of European firms. New facts based on firm-level evidence, Bruegel Blueprint Series III

Melitz J (2002) 'Language and Foreign Trade', University of Strathclyde, CREST–INSEE, and CEPR

Melitz, J. (2008). 'Language and foreign trade', *European Economic Review*, vol. 52, pp. 667–699.

Miesenbock K J (1988) Small Businesses and Exporting: A Literature Review, *International Small Business Journal*, January . 6 . 2 42–61

Miocevic D. and Crnjak-Karanovic B (2011) Cognitive and Information–Based Capabilities in the Internationalization of Small and Medium-Sized Enterprises: The Case of Croatian Exporters. *Journal of Small Business Management* 49(4), 537–557

OECD (2009), "Top Barriers and Drivers to SME Internationalisation", *Report by the OECD Working Party on SMEs and Entrepreneurship*, OECD.

Peel, M. J. and Eckart, H. (1993) "Export and Language Barriers in the Welsh SME Sector", *Journal of Small Business and Enterprise Development*, Vol. 4 Iss: 1, pp.31 – 42.

Pinho, J. C. and Martins, L. (2010) Exporting Barriers: Insights from Portuguese Small– and Medium-Sized Exporters and Non-exporters. J*ournal of International Entrepreneurship*, September, v. 8, iss. 3, pp. 254–72

Roper, S., Du, J and Love J H., (2008) Modelling the Innovation Value Chain, *Research Policy*, 37, 6–7, July 961–977

Rose A K and Wincoop E van (2001) 'National Money as a Barrier to International Trade: The Real Case for Currency Union', *American Economic Review* 91 2 386–390

Ruzzier, M., Hisrich R D and Antoncic B (2006) SME internationalization research: past, present, and future, *Journal of Small Business and Enterprise Development* Vol. 13 No. 4, pp. 476–497.

Staiger, D. and J.H. Stock (1997) Instrumental Variables Regression with Weak Instruments, *Econometrica*, 65, 557 – 586.

Stoian, M-C. And Rialp-Criado, A. (2010) Analyzing Export Behavior Through Managerial Characteristics and Perceptions: A Multiple Case–Based Research. *Journal of Global Marketing*, Sep/Oct, Vol. 23 Issue 4, p333–348.

Tallman S (2003) 'Dynamic capabilities' in D O Faulkner and A Campbell eds *The Oxford Handbook of Strategy*, Oxford, Oxford University Press

United States International Trade Commission, (2010) *Small and Medium-Sized Enterprises: Characteristics and Performance,* Investigation No. 332–510,USITC Publication 4189

Verhoeven, W. (1988) The Export Performance of Small and Medium-Sized Enterprises in the Netherlands, *International Small Business Journal* January vol. 6 no. 2 20–33

Wernerfelt, B. (1984), "A resource-based view of the firm". *Strategic Management Journal*, Vol.5, pp. 171–180

Westhead, P. Wright, M. and Ucbasaran, D. (2004) Internationalization of private firms: environmental turbulence and organizational strategies and resources *Entrepreneurship and Regional Development* 16 501–522

Westhead, P., Wright, M. and Ucbasaran, D. (2001) The internationalization of new and small firms: a resource-based view, *Journal of Business Venturing*, 16: 333–358.

Williams, J E M and Chaston I (2004) 'Links between the Linguistic Ability and International Experience of Export Managers and their Export Marketing Intelligence Behaviour', *International Small Business Journal* 22, 5, 463–486

TEXT TABLES

Table 1 Percentages of Enterprises with Language Investments and Planning

(Elan Sample)

	Skills	Strat-egy	Employ na-tive speaker	External Transla-tors	Agents	Training
Whole Europe sample	43.6	48.6	20.9	42.8	30.3	48.4
UK	15.0	3.1	15.8	15.5	29.3	16.0
Ireland Republic	21.5	1.3	2.6	3.8	9.0	19.2
Malta	10.8	37.8	5.4	18.9	5.4	11.1

Table 2 Language Use and Principal Foreign Market

	% SMEs with most common principal foreign market	% SME with most common used language in principal foreign market	% SMEs with Anglo-phone principal for-eign market
Europe (full sam-ple)	Germany 17%	English 48%	19%
UK	France 33%	English 78%	35%
Ireland	UK 68%	English 76%	72%
Malta	UK 39%	English 79%	79%

Table 3 Random Effects Panel Estimation of Export/Turnover Equations

	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)	(3.7)
Dep.Var. Export Ratio							
Sample	**All**	**All**	**All**	**Non-Anglophone**	**Non-Anglophone**	**Anglophone**	**Anglophone**
Empl. native speakers	6.576**	6.957**	6.073***	7.280***	6.565***	–0.0936	1.741
	(3.10)	(3.25)	(3.74)	(3.42)	(3.79)	(–0.01)	(0.34)
Skills	6.441***	6.610***	7.113***	6.629***	6.750***	4.470***	0.563
	(4.47)	(4.52)	(4.54)	(4.49)	(3.96)	(4.13)	(0.08)
Training	9.616***	10.18***	6.513***	10.21***	5.491**	20.34**	15.44***
	(5.00)	(5.41)	(3.80)	(5.30)	(3.28)	(3.24)	(3.62)
Match	3.039*	8.958***	7.211*	10.31***	12.29***	–17.74**	
	(2.30)	(3.64)	(2.07)	(4.13)	(6.18)	(–3.19)	
Eng		9.019***	9.102**	9.932***	13.04***		
		(3.91)	(2.70)	(4.12)	(5.15)		
Match_eng							–15.39**
							(–3.08)
Anglophone	–1.723	–1.064	–3.808				
	(–0.48)	(–0.33)	(–0.47)				
Subsid.	10.71***	9.722***	8.090***	9.072***	7.732***	2.368	5.881
	(5.36)	(4.08)	(4.05)	(3.65)	(3.41)	(0.29)	(1.42)
Trade/GDP	0.114***	0.119***	0.101**	0.117***	0.115***	0.0340	0.0164
	(5.17)	(5.03)	(3.17)	(4.80)	(3.29)	(0.29)	(0.19)
Ln domestic turnover	–5.759***	–5.714***		–5.689***			
	(–8.86)	(–9.19)		(–8.95)			
US mkt	4.751	5.407	10.96**	4.304	10.30*	22.60	23.79
	(1.26)	(1.45)	(2.59)	(1.17)	(2.54)	(1.19)	(1.24)
German mkt	6.407*	6.205*	11.91***	5.441*	10.27***	14.84	10.42
	(2.54)	(2.55)	(4.67)	(2.25)	(3.80)	(1.82)	(1.61)
External Transl./Interpret.	3.024						
	(1.47)						
Agents	1.156						
	(0.55)						
N	1064	1083	1576	1052	1401	175	204
r2_within	0.246	0.253	0.113	0.257	0.123	0.167	0.167
r2_between	0.742	0.728	0.323	0.609	0.373	0.961	0.954
r2_overall	0.302	0.303	0.144	0.296	0.160	0.186	0.183
chi2	1252.9	844.9	590.5	722.2	1471.5	.	.

* p<0.05 ** p<0.01 *** p<0.001"

Table 4 IV Estimates of Language Effects in Export/Turnover Equations

Dep. Var.: Export/Turnover IV (2SLS)	(4.1)	(4.2)	(4.3)	(4.4)
Empl. native speakers	71.03***			
	(4.77)			
Skills		46.55***		
		(5.54)		
Training			55.73***	
			(5.02)	
Match				56.47***
				(3.58)
Anglophone	–0.776	10.20	14.03	–18.94**
	(–0.13)	(1.65)	(1.93)	(–2.63)
Subsid.	9.644**	11.20***	4.328	9.419**
	(2.96)	(4.19)	(1.34)	(2.92)
Trade/GDP	0.0965***	0.0720**	0.09591***	0.0502
	(3.58)	(3.11)	(3.68)	(1.46)
Ln domestic turnover	–5.568***	–6.403***	–6.445***	–5.238***
	(–9.72)	(–11.92)	(–9.88)	(–8.89)
US mkt	1.764	1.809	6.972	–19.31*
	(0.42)	(0.45)	(1.62)	(–2.34)
German mkt	2.961	1.164	6.825*	–3.195
	(0.92)	(0.41)	(2.41)	(–0.76)
N	1118	1120	1168	1030

Industry sectors and constant included in both stages but not reported.

Instrumented	Emp.nat.	Skills	Training	Match
Excl.exog.	Strategy Agents Transl.	Strategy Agents Trans	Agents Trans Web	Strategy Agents
Weak id stat.	11.62	21.64	16.83	12.47
Id stat.	33.29	58.62	46.37	24.40
Id prob.	0.00000	0.0000	0.0000	0.0000
Hansen's J stat	1.384	2.045	0.498	0.566
J stat. prob.	0.501	0.360	0.779	0.452
Anderson-Rubin F stat	13.84	14.37	12.84	11.85

FIRST STAGE				
Subsid.	0.0581	0.0592	0.1842***	0.0471
	(1.64)	(1.58)	(5.07)	(1.27)
Trade/GDP	0.000392	0.00106***	0.000437	0.00135***
	(1.32)	(3.38)	(1.31)	(4.50)
Anglophone	–0.0906	–0.364***	–0.346***	0.222*
	(–1.76)	(–6.83)	(–5.41)	(2.51)
DEmkt	0.0579	0.122**	0.0022	0.183***
	(1.62)	(3.21)	(0.06)	(5.14)
USmkt	0.0381	0.0592	–0.0500	0.425***
	(0.75)	(1.00)	(–0.85)	(15.10)
Ln.dom.turn.	0.00203	0.0193**	0.0173**	–0.00696
	(0.34)	(2.80)	(2.61)	(–1.07)
Strategy	0.101***	0.197***		0.143***
	(4.10)	(6.67)		(4.8)
Agents	0.0769**	0.0836**	0.0688*	0.0364
	(2.71)	(2.64)	(2.21)	(1.16)
Translators	0.0734**	0.0825**	0.0806**	
	(2.91)	(2.84)	(2.77)	
Web			0.1629***	
			(5.21)	
N	1118	1120	1168	1030
R–sq	0.049	0.114	0.1053	0.1162

Table 5 Relation Between Language Matching and Language Investment: European Anglophone and Non-Anglophone SMEs (Probit)

Dep. Var.	(5.1) Match_noneng *Anglophone*	(5.2) Match *Non-Anglophone*
Training	0.735*	0.0609
	(2.45)	(0.89)
Skills	1.149***	0.275***
	(4.03)	(3.97)
Emp. nat. spkr.	0.117	0.165*
	(0.30)	(2.00)
Trade/GDP	0.00241	0.00366***
	(1.12)	(4.97)
Subsid	−0.374	0.0915
	(−1.27)	(1.02)
N	205	1516
r2_p	0.171	0.0317
p	0.0000868	1.86e−10

NB: t statistics in parentheses Industry sectors and constant included but not reported.

Table 6 Marginal Effects at Mean from Probit Match Equations

Anglophone	dy/dx	z	Pr.	[95%	Conf.
Training	0.1776	2.4600	0.0140	0.0358	0.3193
Skills	0.2773	3.9200	0.0000	0.1385	0.4162
Emp.nat. spkr.	0.0283	0.3000	0.7660	−0.1582	0.2148
Non-Anglophone					
Training	0.0234	0.8900	0.3750	−0.0283	0.0750
Skills	0.1055	3.9700	0.0000	0.0535	0.1576
Emp.nat. spkr.	0.0634	2.0000	0.0460	0.0012	0.1255

Appendix I: The Konya Model

The model consists of two 'countries' with populations L and $1 - L$. Each member of these populations provides labour and a demand for differentiated goods. Trading is possible for an individual with language learning. It is also possible if a person in the other country invests in language skills.

According to the Konya (2006) model, the Nash equilibrium shares of language learners of the big country (α) and the small country (β) are given by:

$$\alpha = \frac{\mu(1-L)(1-\mu L)}{1-\mu^2 L(1-L)}; \quad \beta = \frac{\mu L[1-\mu(1-L)]}{1-\mu^2 L(1-L)} \tag{1}$$
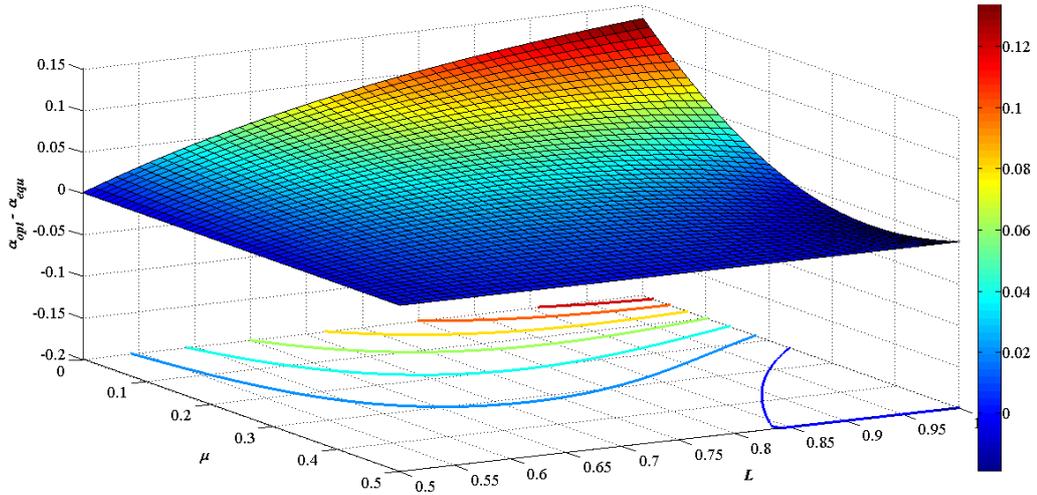
- $\mu \equiv \ln\frac{1+\rho+\theta}{1+\rho}$ measures the relative importance of language barrier (θ) relative to physical barrier (ρ);
- $L > 0.5$ is the relative size of the big country and $1 - L$ is that of the small country;

The optimal shares of language learners considered globally are given by:

$$\tilde{\alpha} = \frac{2\mu(1-L)(1-2\mu L)}{1-4\mu^2 L(1-L)}; \quad \tilde{\beta} = \frac{2\mu L[1-2\mu(1-L)]}{1-\mu^2 L(1-L)} \tag{2}$$
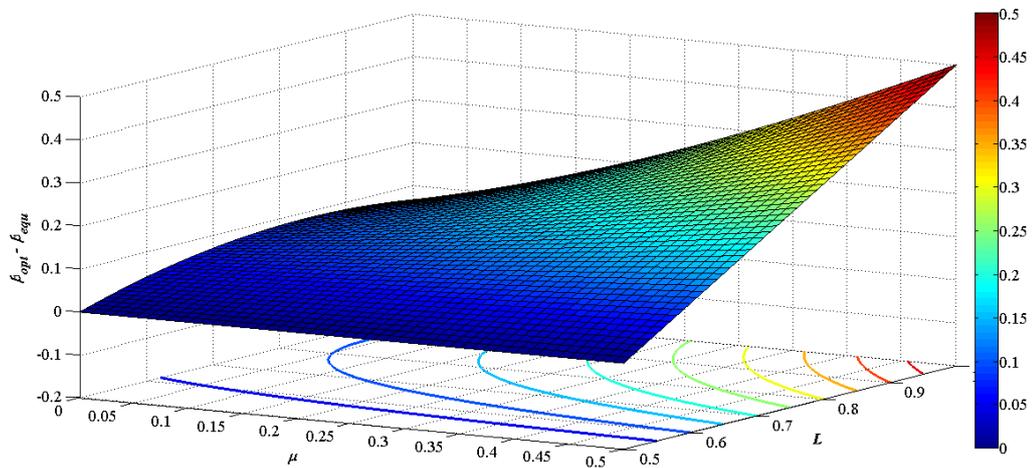
For the big country (Figure A1), the optimal share $\tilde{\alpha}$ is generally greater than the equilibrium share α—underinvestment in language skills, as long as the relative importance of language barrier is not too high. Moreover, the bigger the relative size of the bigger country (L), the higher the underinvestment tends to be.

Figure A1 Underinvestment of Language Skills for the Big Country

Similarly, the small country (Figure A2) also under-invests in language skills (i.e. $\beta < \tilde{\beta}$) as long as the difference in size between the two countries is not substantial. Likewise, the greater the relative size of the bigger country (L), the higher the under-investment tends to be.

Figure A2 Underinvestment of Language Skills for the Small Country

Appendix II: Tables

Table A1 Language Used by SME in Principal Market

MFL01	Freq.	Percent	MFL01	Freq.	Percent
Arabic	2	0.11	Italian	65	3.56
Bulgarian	3	0.16	Japanese	2	0.11
Chinese	4	0.22	Latvian	1	0.05
Czech	18	0.99	Lithuanian	2	0.11
Danish	8	0.44	Norwegian	10	0.55
Dutch	20	1.09	Polish	21	1.15
English	874	47.84	Portuguese	24	1.31
Estonian	4	0.22	Romanian	5	0.27
Finnish	16	0.88	Russian	145	7.94
French	164	8.98	Slovakian	26	1.42
German	279	15.27	Slovenian	1	0.05
Greek	8	0.44	Spanish	64	3.5
Hungarian	22	1.2	Swedish	30	1.64
Icelandic	1	0.05	Turkish	8	0.44

Table A2 SME's Principal Foreign Market

	Sample %		Sample %
Australia	0.45	Latin America	1.41
Austria	2.71	Latvia	1.64
Belgium	2.83	Lithuania	2.26
Brazil	0.45	Luxembourg	0.45
Bulgaria	0.68	Malta	0.11
Canada	0.28	Middle East	2.09
China	1.36	Netherlands	3.11
Czech Rep	2.37	Norway	1.41
Denmark	2.26	Poland	1.58
Egypt	0.11	Portugal	1.7
Estonia	0.96	Romania	1.92
Finland	1.36	Russia	5.88
France	9.5	Slovakia	0.96
Germany	17.07	Slovenia	0.17
Greece	1.24	South Africa	0.28
Hungary	1.19	South–East Asia	0.73
Iceland	0.23	Spain	3.11
India	0.23	Sweden	1.98
Ireland	1.07	Turkey	0.68
Italy	4.35	UK	10.63
Japan	0.79	USA	6.39

Table A3 Trade Openness of European Economies (%)

	Trade/GDP ratio 2003/5
Austria	106.9
Belgium	165.4
Bulgaria	126.1
Cyprus	95.8
Czech	138.6
Denmark	88.7
Estonia	165.5
Finland	74.7
France	51.9
Germany	71.3
Greece	52.9
Hungary	134.4
Iceland	78.5
Ireland	153.4
Italy	51.5
Latvia	104
Lithuania	115.2
Luxembourg	268.1
Netherlands	127.7
Norway	72.4
Poland	74.3
Portugal	69.2
Romania	78.1
Slovak	158.3
Spain	55.7
Sweden	86.9
Switzerland	94.3
Turkey	61.1
UK	55.3

Source: WTO A31statistics database, trade profiles, http://stat.wto.org/.

Table A4 Model Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Pabroad	1814	43.35656	32.68172	0	100
Turnover	1312	1.76E+07	9.58E+07	0	2.96E+09
Sub	1944	0.196502	0.397455	0	1
Tradegdp	1972	105.5822	48.15532	51.5	268.1
Web	1908	0.601153	0.48979	0	1
Skills	1934	0.435884	0.496	0	1
Strategy	1868	0.486081	0.49994	0	1
Empnat	1937	0.20857	0.406391	0	1
Agents	1937	0.303046	0.459694	0	1
Trans	1925	0.428052	0.494925	0	1
Training	1951	0.484367	0.499884	0	1
Match	1755	0.621083	0.485256	0	1
Aanglophone	2005	0.107731	0.310117	0	1
Eng	2005	0.241397	0.428037	0	1
Match_eng	2005	0.167581	0.373587	0	1
DEmkt	2005	0.149626	0.356793	0	1
Sector1	2005	0.041397	0.199255	0	1
Sector2	2005	0.64788	0.47775	0	1
Sector3	2005	0.019451	0.13814	0	1
Sector4	2005	0.092269	0.289478	0	1
Sector5	2005	0.199003	0.39935	0	1