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Inferring export orientation from corporate websites

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The purpose of this article is to infer indicators about the export orientation of firms from the analysis of their corporate websites. Using a dataset of manufacturing firms, two logistic regressions were performed and compared: one considering some firm structural variables, and another considering some web-based variables. Results showed that the website features are good predictors of the export orientation of firms, performing as well as the classic economic variables.

Keywords: Corporate websites; Export; Monitoring

JEL Classification: L25, L60, M29

I. Introduction

The Information and Communication Technologies (ICT) have remodelled the way firms deal with each other, with clients and suppliers, facilitating data extraction and analysis (Varian, 2010). Using electronic data to design and produce economic indicators can contribute to improve the monitoring of policies. The main concerns about conventional monitoring systems include the cost of producing the indicators, the over-aggregation of data and the lag between the implementation of the policy and its effect on overseas sales (Wholey and Hatry, 1992; Spence, 2003).

Among all the ICT resources that are available, the World Wide Web (WWW) emerges as the main potential source of economic information, as recent research shows. McLaren and Shanbhogue (2011) and Choi and Varian (2009) propose some indicators for unemployment and sector sales built on the popularity of some keywords in Google Search Engine. Other works employed this methodology to find indicators for investor attention (Da *et al.*, 2011), economic uncertainty (Dzielinski, 2011) and transaction volumes in the stock market (Preis *et al.*, 2010). Nonetheless, in spite of the importance of exports to the competitiveness of countries, no specific attention has been paid to obtain export indicators from the WWW.

There are two main factors that allow us to design export indicators built on web content. First, the corporate website constitutes a reflection of what the firm activity is; and second, they are publicly accessible. Thereby, the objective of this article is to obtain indicators of the export orientation of firms, by performing an analysis of their corporate websites that could be eventually automated. These indicators are provided in a firm-level granularity, are inexpensive to produce and do not suffer some of the lags that other indicators have.

II. Website Features as Export-related Indicators

At an aggregate level, Freund and Weinhold (2004) found that the growth in the number of websites in a country explained the export growth in the following year. Thereby, at an individual firm level, some website features could be linked to company export orientation. Some of these features are discussed below.

Domain name age. The domain name age is related to the firm's experience in the Internet. Since experimented firms are usually more likely to export (Nassimbeni, 2001), the domain name age is expected to be connected to company export orientation.

Top-level domain. The top-level domain (TLD), as part of the firm Internet name, is either an ISO country code (e.g. ".es" for Spain) or a generic code (e.g. ".com"). According to Murphy and Scharl (2007), using a country code or a generic one reflects local or global interests, respectively. Current exporters or companies that have the intention to start exporting in the near future would prefer to choose a generic TLD, which has a more international profile, to establish their presence on the Internet.

Linguistic availability. Offering websites in more than one language implies greater marketing effectiveness, as multi-language websites are useful to easily reach more potential clients (Lee and Morrison, 2010). Therefore, the languages in which a website is available could be related to the target markets of companies.

Keywords. When firms intend to sell abroad or reach new markets, it is likely that information about these intentions appears in their corporate websites. If this strategy emerges on the WWW, some export-related keywords will be found on the corporate websites.

III. Data Description

The sample for this study consisted of 1108 manufacturing firms (NACE Rev. 2 codes 10-33) established at the Region of Valencia, in Spain. The firm structural variables were collected from the companies' financial statements of year 2010 (accessed through SABI database¹) and the record of exporters of the Spanish Institute for Foreign Trade (ICEX). From these records, we obtained the variables that the literature usually considers to be related to export orientation (Bonaccorsi, 1992; Nassimbeni, 2001; Girma *et al.*, 2004): the size of the firm ($SIZE_i$), measured by number of employees; the labour productivity of the firm (LP_i), measured as value added per employee; the age of the firm (AGE_i), measured as number of

¹ SABI database: Sistema de Análisis de Balances Ibéricos. It is published by Bureau van Dijck.

years since it was established; and the industry of each firm ($INDUSTRY_i$), which is a vector of dummies for two-digit NACE Rev. 2 codes. The dependent variable, $EXPORT_i$, is a binary variable that takes value one if the firm is an exporter.

The web-based variables, which were manually retrieved, included: the age of the domain name ($DOMAIN_AGE_i$), which was computed from the information provided by the Internet WHOIS service and measured as the number of years since the corporate website domain was registered; the generic top-level domain (TLD_i), which is a dummy with value one if the TLD of the corporate website is generic; the availability of the website in English (ENG_i), which is a dummy set equal to one when the website content has an English version; and the presence of terms related to exportation in the website ($KEYWORDS_i$), which is a dummy taking value one if the website contained any of the terms included in a prepared word list².

Some descriptive statistics for the whole dataset and for exporters and non-exporters are reported in Table 1. Firms with export activities accounted for 21.48% of the sample. As expected, exporters have a larger size, are more experienced and have higher labour productivity. The same effect was observed in all the website variables. While 60% of exporters have the English version of their websites, this percentage falls to 5% within non-exporters. A similar magnitude in the difference was found with the presence of keywords. It is remarkable that the domain name age for exporters is more than four times older than that of the non-exporters.

² The terms we included in the word list (mostly Spanish) were: *Continental; continente; continentes; export; exporta; exportación; exportaciones; exportamos; exportando; exporter; extranjero; globalización; internacional; internacionales; internacionalización; mundial; países.*

Table 1. Summary statistics of the data

	All firms		Exporters		Non-exporters	
	Mean	SD	Mean	SD	Mean	SD
$\log(SIZE_i)$	1.79	1.10	2.72	1.09	1.52	0.95
LP_i	31.63	40.10	43.62	48.42	28.16	36.65
AGE_i	15.63	9.35	21.39	10.89	14.06	8.21
TLD_i	0.31	0.46	0.56	0.50	0.24	0.42
ENG_i	0.17	0.38	0.59	0.49	0.05	0.23
$KEYWORDS_i$	0.17	0.38	0.54	0.50	0.07	0.25
$DOMAIN_AGE_i$	2.92	4.23	7.12	4.68	1.77	3.27

IV. The Predictive Models

To predict the firm orientation towards exports, two logistic regression models are proposed and compared. The first model considers the firm structural variables, and it is the following:

$$EXPORT_i = \beta_0 + \beta_1 \cdot \log(SIZE_i) + \beta_2 \cdot LP_i + \beta_3 \cdot AGE_i + \gamma \cdot INDUSTRY_i$$

While the second model considers the WWW variables:

$$EXPORT_i = \beta_0 + \beta_1 \cdot TLD_i + \beta_2 \cdot DOMAIN_AGE_i + \beta_3 \cdot ENG_i + \beta_4 \cdot KEYWORDS + \gamma \cdot INDUSTRY_i$$

The results from the first model, which includes the firm structural variables, are reported in Table 2. The coefficients on the three continuous variables are positive and significant, as well as it happens with the industry dummies. These results confirm what has been frequently described in the literature. Export propensity increases when firm's own resources increase ($SIZE_i$), with firm's experience (AGE_i) and with the labour productivity (LP_i). The firm structural variables explain relatively well the export orientation of the firm, with a pseudo- R^2 of 0.400.

Table 2. Prediction of export propensity with firm structural variables

Dependent variable: $EXPORT_i$		
$\log(SIZE_i)$	1.024***	(0.102)
LP_i	0.008***	(0.002)
AGE_i	0.055***	(0.01)
$INDUSTRY_i$	***	
Constant	-5.413***	(0.642)
Pseudo- R^2	0.400	

Notes: *** p -value < 0.01

The results from the second model, which includes the website variables, are shown in Table 3. In this case, all the considered variables are significant. As expected, the availability of an English version of the website reveals a significantly higher probability of exporting. The presence of keywords related to export in the corporate website is also indicative, multiplying the probability of exporting by 5. The age of the Internet domain name, as it happened with the age of the firm, is also associated with higher propensity to export. Thus, the firm's experience in the Internet is positively related to its exporting attitude. About the top-level domain used, the estimation results showed a direction opposite to what we expected. Employing a generic TLD is indicative of not exporting. We speculate that this is due to the legal restrictions on registering Spanish national domains which were effective until 2005, making the registration of national TLDs affordable only to relatively large companies (Domenech *et al.*, 2012). The fit of the model that includes only website variables is relatively good, as the pseudo-R² shows (0.535). This means that the corporate website variables contain as much information about firm's export engagement as the firm size, age and labour productivity do.

Table 3. Prediction of export propensity with WWW variables

Dependent variable: $EXPORT_i$		
ENG_i	2.003***	(0.269)
$KEYWORDS_i$	1.694***	(0.257)
$DOMAIN_AGE_i$	0.186***	(0.032)
TLD_i	-0.541***	(0.276)
$INDUSTRY_i$	***	
Constant	-3.737***	(0.619)
Pseudo-R ²	0.535	

Notes: *** p -value <0.01

V. Conclusions

This article has analysed and revealed the relation between firm's export orientation and the contents of its corporate website. Although more research with longitudinal and multi-region

data is required, our results open up a new way to explore and monitor the export orientation of firms, regions and countries. Furthermore, it should be kept in mind that the production of the proposed web-based indicators can be easily automated, allowing them to be available in a quickly and timely manner.

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