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Diplomatic representation, service exports and goods exports

Robin Visser
Deakin University

Abstract

This research note analyses the effect of diplomatic representations on service and goods exports. Using a gravity model for 2002 and 2003, the results of the Poisson pseudo-maximum likelihood and instrumental variables estimations show that diplomatic representation positively and significantly affects service exports and goods exports. The average effect is larger for service exports than for goods exports, but a Chow test suggests there is no difference between the coefficients. Diplomatic representation affects exports in travel, transport and communication services but not in government, personal and business services.

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Contact: Robin Visser - robin.visser@deakin.edu.au.
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1. Introduction

Research into the effect of diplomatic representation on international trade has attracted a substantial amount of interest since Rose (2007), who demonstrated that opening an additional consulate in a country increases exports to that country by six per cent based on an instrumental variables analysis. Since his seminal study, others have examined whether diplomatic representations affect trade in different types of goods differently (e.g. Volpe Martincus *et al.*, 2010; Gil-Pareja *et al.*, 2015), whether they affect the extensive and intensive margins of trade differently (e.g. Gil-Pareja *et al.*, 2015; Volpe Martincus *et al.*, 2010; Volpe Martincus *et al.*, 2011), and whether they affect individual firm export decisions (Creusen & Lejour, 2013).

The idea behind embassies and consulates as trade facilitators is that they perform matching, search and information provision activities aimed at reducing trade barriers that arise from information asymmetry (Copeland, 2007), as a result of which firms' costs of exporting decrease. In a meta-analysis, Moons and Van Bergeijk (2016) note that evidence is in favour of a positive and significant effect of diplomatic representation on trade. However, the literature has so far focused mostly on goods trade. Only Gil-Pareja *et al*. (2007) have looked specifically at a particular component of service exports in the form of tourism. Other studies that assess total trade may include service trade in this measure as well, though this is never explicitly specified. This short note contributes to the literature by disaggregating the effect of diplomatic representation on service exports for the first time. It thereby fits in the continuing work that looks into the heterogeneous nature of diplomatic representation's effect on trade.

The rationale for assessing the relationship between diplomatic representation and service exports lies in the characteristics of service exports. As much as barriers to trade affect goods, they also affect services. Moreover, service exports face larger relative and absolute trade barriers than goods exports (Anderson *et al.*, 2014), and firms exporting services rather than goods experience lower probabilities of survival (Ariu, 2016).

Hence, within the context of the increasing share of service exports in total exports, and the increasing emphasis that countries place on trade promotion activities via their diplomatic missions, this study asks whether diplomatic representation significantly and positively affect service exports, how this compares with their effect on goods exports, and which service export types are most affected by diplomatic representation.

2. Data and estimation

Except for service exports, all data for the dependent and independent variables in the dataset come from Rose (2007), who has made his data freely available on his website. From his dataset key variables of interest are goods exports as the dependent variable, and the number of foreign missions (embassies, consulates and official foreign missions) as the independent variable. Control variables are standard gravity model variables: distance, GDP per capita, population sizes, membership of free or regional trade agreements, common language, and contiguity. This study pools the data for 2002 and 2003 to ensure that the study works with real data rather than constructed data.

Data on service exports comes from the dataset developed by Francois and Pindyuk (2013), whose dataset is the most comprehensive one available. They consolidate data from the OECD, Eurostat, UN and IMF databases, making data availability adjustments where necessary by means of mirrored data. In terms of service types, this note adopts and aggregates some of the major service exports subtypes (transport, travel and communication services, and government services, personal, cultural and recreational services and other business services) in order to give a first indication of whether diplomatic representation is effective across two different ranges of service exports types.

The dataset is reduced to match the observations for which there is information on both goods and services exports to ensure comparability of the estimates. This yields 3,886 observations for 20 exporters and all possible importers[1] - around half of Rose's (2007) pooled dataset. Of these, 20 per cent of service exports are zero trade flows, while for goods trade this is just over one per cent. Within the service export subgroups the number of observations ranges from 2,041 and 2,100.

In estimating the relationship of interest this study follows the international trade literature convention by adopting a gravity model setting, first developed by Tinbergen (1962). A cross-sectional model is usually estimated by means of a log-linear equation and in Rose (2007) this is the baseline model as well. The extension for goods and services exports is:

$$\text{lgoods}_{ij} = \beta_0 + \beta_1\text{embcon}_{ij} + \beta_2\text{ldist}_{ij} + \beta_3\text{lgdppc}_{ij} + \beta_4\text{lpop}_{ij} + \beta_5\text{rta} + \beta_6\text{comlang} + \beta_7\text{border} + \beta_8\text{y2002} + \varepsilon_{ij} \quad (1)$$

$$\text{lservices}_{ij} = \beta_0 + \beta_1\text{embcon}_{ij} + \beta_2\text{ldist}_{ij} + \beta_3\text{lgdppc}_{ij} + \beta_4\text{lpop}_{ij} + \beta_5\text{rta} + \beta_6\text{comlang} + \beta_7\text{border} + \beta_8\text{y2002} + \varepsilon_{ij}, \quad (2)$$

where subscripts *i* and *j* indicate the exporter and importer; $lgoods_{ij}$ is the log of real goods exports (in US$ million) from *i* to *j*; $lservices_{ij}$ is the log of real service exports from *i* to *j*; $ldist_{ij}$ is the log of geographic distance between *i* and *j*; $embcon_{ij}$ is the number of diplomatic missions that *i* has in *j* (excluding honorary consulates) and thereby represents the extent to which *i*'s diplomatic apparatus promotes trade in *j*; $lgdppc_{ij}$ is the product of real GDP per capita between *i* and *j*; $lpop_{ij}$ is the product of population sizes of *i* and *j*; *rta* denotes whether or not *i* and *j* are members of the same regional trade agreement; *comlang* denotes whether *i* and *j* have a common language; *border* indicates whether *i* and *j* are contiguous, *y2002* is a year dummy, and; ε_{ij} represents the error term.

Zero trade flows exist in the data at different levels for goods and services exports. These zeroes indicate economically meaningful values due to (for example) fixed costs rather than reporting artefacts (Anderson, 2010). Assessing the relationship in equations (1) and (2) necessitates accounting for these zero trade flows. The Poisson pseudo maximum likelihood (PPML) estimator developed by Santos Silva and Tenreyro (2006) allows for this. The following two models hence serve as the baseline:

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[1] The absence of countries with lower development levels in the set of exporters for 2002 and 2003 should have little effect on the estimates because for many such countries no service trade data exists for those years. When using a dataset in a later year it is likely that the effect of diplomatic representation on service exports decreases due to the inclusion of lower income countries which continue to rely little on service exports compared with goods exports.

$$goods_{ij} = \exp(\beta_0 + \beta_1 embcon_{ij} + \beta_2 ldist_{ij} + \beta_3 lgdppc_{ij} + \beta_4 lpop_{ij} + \beta_5 rta + \beta_6 comlang + \beta_7 border + \beta_8 y2002 + \varepsilon_{ij}) \quad (3)$$

$$services_{ij} = \exp(\beta_0 + \beta_1 embcon_{ij} + \beta_2 ldist_{ij} + \beta_3 lgdppc_{ij} + \beta_4 lpop_{ij} + \beta_5 rta + \beta_6 comlang + \beta_7 border + \beta_8 y2002 + \varepsilon_{ij}), \quad (4)$$

where all variables and notations are as before with the exceptions of $goods_{ij}$ and $services_{ij}$, both of which are now given in levels.

An additional hurdle in estimating equations (3) and (4) is the endogeneity problem: countries may set up embassies and consulates where more trade takes place. This is approached by means of instrumental variables. Rose (2007) uses a set of five instrumental variables that measure the geopolitical importance of a country and the attractiveness of residing there. However, his set of instruments does not pass a Hansen *J*-test for over-identifying restrictions so only two of the instruments are used here. The *number of Condé-Nast top 100 destinations* and the *number of Economist city guides* of the importers are both consistently significant in Rose's (2007) first stage regressions and satisfy a Hansen *J*-test as well. Equations (3) and (4) are re-estimated utilising this set of instruments.

Lastly, in order to assess the effect of diplomatic representation on different types of services exports Equation (4) is estimated for two groups of service export flows, utilising only the instrumental variables model. No formal theoretical model exists as yet to identify the direction of the relationship between diplomatic representation and the service exports subgroups making this an exploratory first step in this area. The two subgroups (transport, travel and communication services, and government services, personal, cultural and recreational services and other business services) aggregate service export flows that are distinctly different from each other and represent similar activities within the groups – the movement of persons on the one hand, and the provision of services to businesses, persons and government entities. Additionally, despite the use of an instrumental variables approach the results will indicate a correlational rather than causational relationship.

3. Results

The results in Table I suggest that on average, diplomatic representation is more effective in stimulating service exports than goods exports. However, Chow tests of the difference between regression coefficients indicate that there is no difference between the coefficients.

Columns (a) and (b) contain the PPML estimations of equations (3) and (4). They show economically plausible coefficients for the $embcon_{ij}$ variable on goods and services exports, where the average effect of $embcon_{ij}$ is higher on service exports than it is on goods exports although a Chow test indicates that there is no difference between the coefficients from the two regressions (p=0.562). In column (a), an additional consulate increases goods exports by 2.7 per cent, while in column (b) it increases service exports by 3.1 per cent. These results are in line with the previous literature. The estimates are lower than in Rose (2007), where they range between six and ten per cent. This is due in part to a reduced sample that retains more developed countries on average.

To also account for the endogeneity problem, columns (c) and (d) show the results to the instrumental variable estimations. Both models satisfy a Hansen *J*-test of over-identifying restrictions. The results in these columns follow the same pattern as in columns (a) and (b): holding all else constant, $embcon_{ij}$ has a larger average effect on service exports than on

goods exports. However, the coefficients are now much closer together: the effect on goods exports is 4.4 per cent, while for service exports it is 4.5 per cent. Indeed, the Chow test again indicates that there is no difference between the regressions' coefficients (p=0.929). Lastly, the control variables behave as expected within a gravity model setting.

Across the estimates there is weak evidence to suggest that the effect of diplomatic representation is larger on service exports than on goods exports. While this is true for the average effects, the results of Chow tests are such that the coefficient for the $embcon_{ij}$ variable cannot be said to be as dissimilar between goods and services exports.

Table I: Main estimation results.

	(a) Goods exports PPML	(b) Service exports PPML	(c) Goods exports IV-PPML	(d) Service exports IV-PPML
$embcon_{ij}$	0.027***	0.031***	0.043***	0.044***
	(0.004)	(0.005)	(0.007)	(0.007)
$ldist_{ij}$	-0.433***	-0.420***	-0.470***	-0.437***
	(0.053)	(0.042)	(0.039)	(0.033)
$lgdppc_{ij}$	0.661***	0.902***	0.643***	0.882***
	(0.034)	(0.037)	(0.025)	(0.029)
$lpop_{ij}$	0.749***	0.640***	0.712***	0.612***
	(0.025)	(0.029)	(0.020)	(0.025)
rta	0.730***	0.502***	0.624***	0.496***
	(0.121)	(0.113)	(0.088)	(0.088)
comlang	0.518***	0.771***	0.561***	0.729***
	(0.102)	(0.116)	(0.077)	(0.083)
border	0.654***	-0.056	0.538***	-0.141
	(0.133)	(0.136)	(0.109)	(0.097)
y2002	-0.116***	-0.218***	-0.121**	-0.225***
	(0.011)	(0.015)	(0.061)	(0.060)
Hansen *J*-test			0.198	0.142
Observations	3,886	3,886	3,886	3,886
R-squared	0.853	0.771	0.811	0.701

*** p<0.01, ** p<0.05. Robust standard errors in parentheses. Intercepts included but not recorded.

Table II shows the results from estimating Equation (4) using the instrumental variables approach. The results suggest that there is a positive and significant correlational relationship between diplomatic representation and exports in travel, transport and communication services: the coefficient for $embcon_{ij}$ is positive and significant, and the regression passes a Hansen *J*-test. This is not the case for the set of business, personal and government services.

Note that the positive and significant results for travel, transport and communications services is in line with Salahodjaev (2016), where Ukrainian diplomatic representation positively and significantly affects tourism flows as well as with Gil-Pareja *et al*. (2007) who find that embassies and consulates have a positive and significant effect on tourism. As for government, business and personal services, the results in Table II indicate that diplomatic representation does not play a role. This is potentially due to the nature of personal and business services in particular, where private businesses may be in a better position to cater to requests for specific services such as management consulting, accounting and legal services – all of which are part of the business services subgroup.

Table II: Estimation results by service export subgroups.

	(a) Transport, travel and communication services IV-PPML	(b) Government services, personal, cultural and recreational services and other business services IV-PPML
$embcon_{ij}$	0.022***	0.027
	(0.009)	(0.019)
$ldist_{ij}$	-0.410***	-0.547***
	(0.033)	(0.071)
$lgdppc_{ij}$	0.720***	1.214***
	(0.031)	(0.047)
$lpop_{ij}$	0.647***	0.709***
	(0.022)	(0.044)
rta	0.627***	0.382***
	(0.102)	(0.147)
comlang	0.777***	0.544***
	(0.069)	(0.159)
border	0.183*	-0.274**
	(0.105)	(0.136)
y2002	-0.148**	-0.330***
	(0.066)	(0.097)
Hansen *J*-test	0.115	0.013**
Observations	2,100	2,041
R-squared	0.782	0.503

*** p<0.01, ** p<0.05. Robust standard errors in parentheses. Intercepts included but not recorded.

4. Conclusion

While service exports are susceptible to barriers to trade at least as much as goods exports, no study has yet examined whether diplomatic representation affects service exports. This short research note uses a PPML and instrumental variables based cross-sectional gravity model of goods and services exports to identify for the first time whether diplomatic representation significantly and positively affect service exports, whether this effect is larger for service exports than for goods exports, and which service types are especially affected by diplomatic representation.

Results indicate that diplomatic representation positively and significantly affect service exports and goods exports. There is weak evidence that the effect is larger for service exports when looking at the average point estimates, but not when applying a Chow test of the difference between coefficients. In an exploratory next step that looks into subgroups of service exports the results indicate that there is a positive and significant correlation, which also passes a Hansen *J*-test, between diplomatic representation and exports in travel, transport and communication services.

The differences between the effects of diplomatic representation on goods and services exports are small and warrant subsequent studies that look into the types of service export flows, using a panel data approach, and a more recent timeframe. Additionally, studies that look into the effect of diplomatic representation on exports from developing countries could identify whether this policy instrument is worthwhile for developing countries to utilise in

order to enhance their service exports capabilities.

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