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**A meta-analysis of economic diplomacy and its effect
on international economic flows**

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Abstract

This meta-analysis deals with 29 empirical studies on the trade and investment impact of economic diplomacy (embassies, consulates and other diplomatic facilities, investment and export promotion offices, trade and state visits). The meta-regression results suggest that the significance of the coefficient of economic diplomacy is more pronounced when studies use embassies as an explanatory variable as compared to studies using consulates, trade missions, state visits and export promotion agencies. If the primary dependant variable under investigation is exports one may also expect to find more significant coefficients than in an otherwise similar regression explaining the relation between economic diplomacy and imports, total trade or foreign direct investment. Furthermore empirical design factors play a role in the reported results of the studies we reviewed. Studies based on a single country will in general show lower significance.

Keywords

Meta-analysis, economic diplomacy, international flows, trade, FDI.

A meta-analysis of economic diplomacy and its effect on international economic flows!¹

1 Economic diplomacy: an introduction

Barriers to international trade and foreign direct investment (FDI) remain large despite the advances made in communication and transportation technology, massively lower transportation cost and reductions in formal trade barriers. Informal trade barriers, cultural and institutional differences and *modus operandus* act as intangible barriers that create frictions similar to the well-known traditional resistance factors (Disdier and Head, 2008, Head and Ries, 2006). Economic diplomacy, the topic of our investigation, is increasingly being recognized as an instrument to deal with these intangible barriers to trade (e.g. Bergeijk, 2009, Yakop and van Bergeijk, 2011). Economic diplomacy typically is an interdisciplinary subject to the fields of international economics, international political economy and the international relations literature and is receiving increasing attention (Bergeijk, Melissen and Okano-Heijmans 2011). Economic diplomacy aims to influence decisions on cross-border economic activities pursued by governments and non-state actors (Bayne and Woolcock, 2007, Okano-Heijmans, 2011) and involves the activities of the government and its international networks. Economic diplomacy can thus be defined as the use of government relations and government influence in order to stimulate international trade and investment and this activity covers a broad range of semi-permanent international representations (embassies, consulates and other public sector business support facilities), domestic institutions (investment and export promotion offices), and diplomatic bilateral activities (trade and state visits).

Mainstream economists traditionally have been sceptical about economic diplomacy and the efficacy of its instruments, especially where it concerns export subsidies and export promotion agencies. Economic diplomacy, a tax-funded activity, in neoclassical thought merely is a disruptive income transfer. Seringhaus and Botschen (1991), for example, showed that the use of export promotion is very limited and export promotion efforts do not address the needs of exporters. Likewise, Gencturk and Kotabe (2001) found that export subsidies make businesses more profitable, but at the same time have no effect on their turn-over. In the same spirit export promotion agencies (EPAs) have received considerable criticism, particularly in the 1990s. Influential World Bank publications by Keesing and Singer (1991) and Hogan (1991), criticized the establishment of EPAs especially in countries with high trade barriers where export promotion would serve as a palliative; the effective first best

¹ Earlier versions of this paper were presented in 2010 at the 4th International Biennale On Commercial Negotiation at Negocia, Paris, the European Trade Study Group's Copenhagen Conference 2011, the IDB workshop "The Effects of Trade and Investment Promotion", October 2012 and the 4th MAER-NET Colloquium, University of Greenwich, September 2013. Comments by participants of the conferences and Henri de Groot are gratefully acknowledged.

solution is to lower trade barriers. As a result of these critical World Bank studies many development institutions withdrew their support to EPA's (Lederman et al. 2006).

Interestingly, despite these criticisms economic diplomacy continued to play an important role in commercial policy. Economic diplomacy has existed for a long time and has always been considered relevant by policy makers basically for four reasons. Firstly, cultural factors may make it necessary for national governments to get involved in international transactions. This is especially the case now that the former centrally planned economies account for an increasing share of world trade. In these countries government is still regarded as a natural partner in the economy. Secondly, state enterprises may be the counterpart of a company operating in the international markets. This creates the necessity for entrepreneurs to seek cooperation with their national government to equalize the power balance and to improve its playing field. Thirdly, (political) uncertainty about international transactions must often be removed or reduced. Government involvement may signal that a transaction will not raise political resistance. Finally, the information needed for international transactions sometimes requires involvement of government officials.

Economic diplomacy may serve as a toolbox to tackle specific manner of market failures that hinder international transactions. Informational and/or transparency problems increase the cost for exporting, importing and investing internationally and hamper (the building of) trust that is necessary for international economic transactions. Economic diplomacy lowers transaction costs by enhancing mutual trust and providing information that private parties have difficulty accessing due to information asymmetries. It is highly likely that knowledge about export markets is under-produced from a societal point of view, because appropriation is difficult if not impossible. Pioneer exporters provide information to their competitors about the existence of a market, distribution channels, etc. and their investments may be harvested by free riding rivals (Hausmann and Rodrik, 2003). Governments may step in by providing "unique, reliable and impartial access to information such as through the global embassy network and other government channels and contact, which become available through the government's very long term and non-commercial attachment to overseas markets" (Harris and Li, 2005, p. 74). In addition to increased academic attention, economic diplomacy is also gaining ground in policy-making. All these developments increase the importance of knowledge about the (size) effects and significance of economic diplomacy.

Economic diplomacy is increasingly being recognized as a relevant topic in empirical research in international economics, international political economy and the international relations literature. Because the empirical work in the field of economic diplomacy is still emerging, research results are not yet conclusive. We take stock of this literature by providing a meta-analysis of 29 empirical studies published in the period 1986-2011. These studies provide us with 1334 point estimates and 643 *t*-values regarding the impact of economic diplomacy on international economic flows. We scrutinize the mixed evidence that is provide by these studies, correcting for differences in research design,

methodology, time frame and manner of data deployed in the 29 studies.² Meta-analysis is a research method that enables researchers to synthesize and summarize previously obtained empirical findings for a single research question in a quantitative and statistically rigorous fashion. Meta-analysis is a statistical approach in which the reported results are adjusted for the characteristics of the identified primary studies. It therefore goes beyond the traditional literature review.

The use of a meta-analysis in addition to a traditional review of the literature has several advantages: a meta-analysis is more objective and transparent than a traditional literature review because it systematically analyses sources of (quantitative) variation from earlier studies. The method offers the opportunity to present the results of several studies in a coherent framework and to estimate an average meta-effect, which often cannot be unambiguously determined on the basis of individual studies (Florax, De Groot, De Mooij, 2002). A meta-analysis especially adds value in emerging fields of research: the primary studies address a similar research question and the meta-analysis allows the researcher to quantify and unfold trends in empirical results that would otherwise be difficult to detect. Meta-analysis also enables us to combine the results from the different fields of research where economic diplomacy is gaining ground like international relations, economics and international political economy. This is particularly relevant only because the topic of economic diplomacy should be studied from a multidisciplinary point of view and because empirical studies so far have by and large been mono-disciplinary in focus.

The remainder of this paper is structured as follows. Section 2 reviews empirical research in the field of international economics and international political economy that addresses the impact of economic diplomacy on trade flows and investment. We discuss the problems encountered in these studies. Section 3 discusses the construction of our sample and provides descriptive statistics. Section 4 sets out the design of the meta-analysis and Section 5 presents and discusses the empirical results. Section 5 concludes and offers suggestions for future research.

2 Review of literature

Most studies in our sample use the gravity model that has a longstanding history in analysing the international pattern of bilateral trade and investment flows (Bergeijk and Brakman, 2010). The majority of studies in our sample use economic diplomacy as one of the determinants of international trade and the parameter estimate can be interpreted as the partial derivative of international trade or investment with respect to the particular diplomatic instrument(s) that is (are) investigated in the paper concerned. Actually this approach is already

² Our sample size is comparable to meta-analyses that deal with other aspects of international economics such as Görg and Strobl (2001) who analysed 21 studies and 23 observations or Diebel and Wooster (2006) who used 32 studies and 141 observations.

present in the first application of the gravity model. Tinbergen (1962) recognized the importance of political factors in international trade and included (former) colonial ties as one of the explanatory variables in his analysis of bilateral trade flows. Since the work of Tinbergen many studies have been published that investigate the influence of diplomacy and international politics on trade and investment flows.

Until the mid-1990s, the methodology used for analysis still was rather crude from today's perspective due to limited computing power and data availability. The studies predominantly pertained to cross section analysis of events data based indicators to explain the development of bilateral trade (Pollins, 1989a, 1989b, Bergeijk, 1992 and 1994, Polachek, 1997) and Foreign Direct Investment (Nigh, 1986). The empirical works uncovered a positive correlation between, on the one hand, trade and investment and, on the other hand, diplomatic cooperation. Differences in the significance, strength and sometimes the sign of the correlation, occurred for single year (Bergeijk, 1992, 1994) *versus* pooled cross sections (Pollins, 1989a, 1989b and Nigh, 1986) and for developing *versus* developed countries (Nigh, 1986). Also the extent to which countries were integrated in the world economy appeared to be relevant (Pollins, 1989a) as well as the socio-political system (centrally planned *versus* market economies; Bergeijk 1992).

Due to the collapse of the Soviet Union and the breakdown of the Iron Curtain for some time apparently reduced research interest in the topic, but in the mid-2000s economic diplomacy returned on the research agenda again. In contrast with the earlier literature, researchers deployed panel data and used more specific tools of economic diplomacy as explanatory variables. The international network of countries (consisting of embassies, consulates, export promotion offices and investment promotion offices) and the trade missions on various levels, organized within this network, are the focal point of these analyses.

The World Bank published studies on the effectiveness of investment promotion (Morriset, 2003) and export promotion agencies (Lederman et al., 2006). According to these studies investment promotion agencies and export promotion agencies have a strong and statistically significant effect. The studies claimed that on average a 10% increase in the budget of investment promotion leads to a 7.5% increase of FDI flows (Morriset, 2003) and that each additional dollar of export promotion, increases exports by 40 dollars for the median agency (Lederman et al., 2006). The World Bank publications were followed by other studies on the topic of export promotion, often also producing positive and significant effects but generally of smaller size. Next to differences in the reported size effects the empirical work that followed the World Bank publications had a somewhat different and wider scope. In addition to the significance and size effect of export promotion, studies dealt with the regional effect of export promotion (Volpe Martincus et al. 2010a, Gil et al., 2008), the effect of the level of development on the impact of export promotion (van Veenstra et al., 2011) and the effect of export promotion on the extensive and

intensive margin of trade³ (Gil et al. 2011, Volpe Martincus et al., 2010a, 2010b, Volpe and Carballo, 2011, Segura-Cayuela et al., 2008).

A second strand in the recent literature deals with the contribution of the diplomatic service on trade and investment flows. Rose (2007) was the first to publish on the macroeconomic level effects of the network of embassies and consulates-general (Rose, 2007). The effect of the changes in the international diplomatic network are studied by Afman and Maurel (2010) and the heterogeneity in effects due to different forms of representation in this network are analysed by van Bergeijk et al. 2011. Furthermore research emerged on the use of the international network via organizing trade missions including state visits (Nitsch, 2007, Head and Ries, 2006, and Creusen and Lejour, 2011, 2012) .

The recent studies report positive and significant coefficients. Rose (2007) finds that the opening of an additional embassy or consulate is associated with 6 to 10 per cent higher exports. Afman and Maurel (2010) calculate that the opening of an embassy has a similar impact as a 2 to 12 percentage points reduction in ad valorem tariff. Van Veenstra et al., (2011), however, find a smaller effect of 0.5 to 0.9 per cent additional exports when increasing the number of embassies and consulates by 10 per cent. The use of the diplomatic network via trade missions also shows mixed results varying from an export stimulating effect of 6 to 10 per cent for the US, France and Germany (Nitsch, 2007) to insignificant econometric outcomes for Canada (Head and Ries, 2006). Exploring micro data for the Netherlands, Creusen and Lejour (2011) find an export promoting effect of trade missions of 5 to 20 per cent where the higher number refers to the effect for low income countries, but their estimates for missions to high income countries are insignificant. Additionally the interaction between measures of economic diplomacy is explored. The type of diplomatic representation seems to matter. Embassies have a larger impact on trade than consulates, while honorary consulates on average do not add value to trade (van Bergeijk, De Groot and Yakop, 2011). Also the effectiveness of both embassies and consulates as well as export promotion agencies depends on the level of development of the trade partners. The impact of economic diplomacy seems to be strongest in North-South, South-South and South-North trade and weak for the flows between rich (OECD) countries (van Veenstra et al., 2011, Creusen and Lejour, 2012).

The role of economic diplomacy and its relation to FDI flows has received less attention also since the mid-2000s. Next to the earlier mentioned publication of Morriset (2003) on the role of investment promotion, work has been done on the impact of the bilateral politic-diplomatic relation on FDI flows. The studies show a positive and significant impact of cooperation between countries, similar to the relation found for trade (Polachek et al., 2007). Policies that increase economic security, such as similarity in foreign policy, enhance U.S. FDI (Biglaiser and DeRouwen, 2007).

³ See Moons 2012 for an extensive review on the effect of economic diplomacy on the margins of trade.

Differences in the reported results may partially be explained by the primary studies characteristics. A general observation is that analyses are often constrained because of limited data availability and that frequently data sets had to be built from scratch by the researchers by collecting primary data through surveys, by inspecting a great many number of national websites and/or coding of qualitative historical information. As a consequence the metrics of economic diplomacy may vary. Also, some studies only relate to the trade and/or investment activities of one source country, thus being country specific and not allowing for generalisation. Clear examples are Head and Ries (2006) on the effectiveness of Canadian trade missions Creusen and Lejour, (2011, 2012) on Dutch foreign network and its activities and of Gil et al., (2008) and Gil et al., (2011) that limit themselves to export of Spanish regions. The samples of these studies are quite specific and general conclusions cannot be drawn on such a narrow basis. The same may hold true for analyses done for only a limited group of source countries. Up till now most data samples relate to the more developed source countries. Since higher cultural and institutional barriers typically exist at lower levels of development the sample should ideally cover source and destination countries at different stages of economic development. A related problem is the use of cross sections leading to year specific outcomes. In order to deal with these issues our meta-analysis combines the information of the individual studies in order to distil the general pattern hidden in the individual studies.

3 The data

We constructed a database with the characteristics of studies that empirically investigate the impact of economic diplomacy on international flows. The starting point is the literature review in Bergeijk (2009). We followed up on the references made in the studies that were surveyed by Bergeijk and also searched the EconLit electronic database and the internet using Google Scholar. This provided us with a list of published articles, books, working papers and conference papers that investigate the effect of economic diplomacy on trade and FDI flows. In our search we used broad keyword listings with the following terminologies: economic diplomacy, diplomacy and (international) trade, diplomacy and FDI, information barriers and diplomacy, embassies, trade missions, consulates, export promotion institutions, export promotion, investment promotion agencies and investment promotion institutions.

Not all uncovered studies could be included in our sample. Qualitative papers, mostly from the field of international relations, were not included since we were searching for empirical research. Our initial search also delivered a number of effectiveness studies published in the 1990s (Seringhaus and Botschen, 1991, Seringhaus and Rosson, 1998), but these studies do not deal with the impact of economic diplomacy on trade and investment flows. Also excluded were studies based on surveys about successful export strategies at the company level (Gençtürk and Kotabe, 2001, Bernard and Jensen, 2004,

Francis and Collins-Dodd, 2004 and Samsudoha and Ynus Ali, 2006). The search, moreover, provided a limited number of micro data studies dealing with the effect of economic diplomacy on the margins of trade (Volpe Martincus et al., 2010a,b, Volpe and Carballo, 2011 and Biesenbroeck et al., 2011). These studies, mostly conducted by Inter-American Development Bank researchers, primarily focus on the effects of trade promotion for Latin American countries (Biesenbroeck et al., 2011 focus on the effect of trade promotion in Canada). The margin of trade papers look into the development of trade patterns of firms that are treated with economic diplomacy but the studies cannot be included in our sample because they provide information on how trade is being promoted by trade promotion and not on the question of its impact on the level of bilateral trade. The studies typically show that trade promotion increases the diversity of traded product, the volume of products traded or a combination of both (Moons, 2012). The studies, moreover, report results which are specific to the groups of assisted companies⁴ and do not answer the question what the overall impact of economic diplomacy is. Our initial search also provided us with a number of studies that used a logit or probit model to estimate the relationship between economic diplomacy and trade/FDI. In these models the dependent variable is usually a binary variable, i.e. the analysis is concerned with estimating the change in the probability to trade or invest abroad (see, for example, Alvarez, 2004). As such the results from these models do not provide information on the size of the change in the level of trade or FDI by the use of economic diplomacy as is the case in the results of the rest of the studies.

Our final meta-analysis database consists of 29 studies investigating the relationship between economic diplomacy and the impact on international flows (see Table 1). All our studies investigate the impact of (some instrument of) economic diplomacy, controlling for a wide range of potentially relevant variables including distance between trading partners, markets size, common borders, common language and preferential trade agreements. In the database 1334 coefficients on the effect of diplomacy and 643 *t*-values are reported. Furthermore we registered the dependant variable of the primary study, *i.e.* export, import, total trade or FDI, and the different instruments of diplomacy taken into account in the literature we reviewed. In order to be able to control for methodological differences we also included other study characteristics such as the number of observations used for the primary studies regressions, the year of publishing, the period under investigation and the econometric method used. The metrics for economic diplomacy differ widely, *i.e.* economic

⁴ To arrive to more general statement the authors do apply statistical corrections to correct for self-selection within the groups of firms supported by export promotion agencies. It is however impossible to correct for the unobserved factors of self-selection.

Table 1
Studies used in the meta-analysis and summary statistics for reported t values

Authors	Instrument of diplomacy in primary study	Period	Sample size	Number of t values	Average t value	Median t value	Minimum t	Maximum t	Standard deviation
Nigh (1986)	Diplomatic Relation	1954-1975	504	4	5.26	4.79	2.61	8.86	2.31
Pollins (1989a)	Diplomatic Relation	1955-75	552	14	2.56	2.45	1.90	4.39	0.65
Pollins (1989b)	Diplomatic Relation	1960-1975	600	32	4.86	4.71	0.59	7.06	1.31
Summary (1989)	Consulates	1978, 1982	66	8	2.22	2.30	0.39	4.03	1.11
Bergeijk (1992)	Diplomatic Relation	1985	1560	4	5.72	6.31	3.08	7.18	1.57
Bergeijk (1994)	Diplomatic Relation	1986	1560	4	6.38	7.25	3.20	7.80	1.89
Polachek (1997)	Diplomatic Relation	1948-1978	n/a	1	0.30	0.30	0.30	0.30	0.00
Morriset (2003)	Investment Promotion Agency	2002	58	7	2.10	2.01	1.14	3.33	0.64
Keshk et al (2004)	Diplomatic Relation	1950-1992	143792	2	1.89	1.89	0.92	2.86	0.97
Simmons (2005)	Diplomatic Relation	1967-2000	1300	8	2.11	2.39	1.05	2.74	0.62
Head and Ries (2006)	State Visits, Trade Missions	1990-2003	216969	32	1.10	0.19	-2.93	6.99	2.51
Lederman et al.(2006)	Export Promotion Agency	2005	78	19	2.62	3.27	-0.27	5.53	1.78
Biglaiser and DeRouen (2007)	Diplomatic Relation	1966-2002	2335	4	1.31	1.07	0.15	2.93	1.05
Gil Pareha et al.(2007)	Embassies, Consulates	2001-2003	912	49	4.78	5.08	-0.11	8.26	1.54
Gil et al. (2008)	Embassies, Consulates	1995-2003	26098	64	3.75	2.71	-5.08	14.20	3.83
Nitsch (2007)	State Visits, Trade Missions	1948-2003	18409	51	1.53	2.04	-1.59	4.20	1.67
Polacheck et al. (2007)	Diplomatic Relation	1990-2000	5449	2	9.15	9.15	8.59	9.70	0.56
Rose (2007)	Embassies, Consulates	2002-2003	4132	105	4.44	3.80	-1.69	16.50	3.42
Long (2008)	Diplomatic Relation	1984-1997	217340	5	5.43	5.16	1.04	10.40	3.29
Segura Cayuela and Vilarrubia (2008)	Embassies, Consulates	1999	2138	2	1.79	1.79	1.70	1.87	0.08
Afman and Maurel (2010)	Embassies, Consulates	2005	4269	46	2.68	1.63	-0.37	8.17	2.47
Hegre et al. (2010)	Diplomatic Relation	1950-1992	279343	9	5.34	1.89	-9.60	15.26	7.25
Volpe Martincus et al. (2010a)	Embassies, Consulates, Export Promotion Agency	1995-2004	n/a	72	5.19	2.79	-1.23	39.33	7.46
Creusen and Lejour (2011)	Embassies, Consulates, Foreign Export Promotion Office, State Visit, Trade Mission	2002-2007	68600	9	3.16	3.63	1.55	4.38	1.11
Ferguson and Forslid (2011)	Embassies, Consulates, Foreign Export Promotion Office, State Visit	1997-2007	1120	4	-1.76	-1.46	-4.19	0.08	1.67
Gil Pareja et al. (2011)	Foreign Export Promotion Office	1993-2008	409684	34	2.43	2.45	-2.57	14.02	2.62
Veenstra et al. (2011)	Embassies, Consulates, Foreign Export Promotion Agency	2006	1242	16	1.38	0.93	-2.00	5.60	2.12
Bergeijk et al. (2011)	Embassies, Consulates	2005	3730	24	1.65	0.93	-2.50	10.22	3.10
Yakop and Bergeijk (2011)	Embassies, Consulates	2006	3906	12	3.77	3.92	1.50	6.00	2.13
Full sample				643	3.21	2.96	-9.60	39.33	2.13

diplomacy has been reported based on diplomatic event data⁵, the geography of the foreign network of countries (embassies, consulates and foreign branches of export and investment promotion offices), the activities deployed by the foreign network of countries (trade missions and state visits) and finally activities undertaken in the home market (export promotion and investment promotion). Also substantial heterogeneity exists with respect to research methods and dependant variables. We therefore created three categories of moderator variables for further analysis: empirical design factors, dependant variable characteristics and instruments of economic diplomacy. Table 2 provides an overview of the various primary study characteristics included in our sample.

While building the database we were confronted with a mix of linear and non-linear coefficients that, for consistent analysis, needed to be transformed into elasticities if we wanted to say something about the size effect of economic diplomacy. For calculating the elasticity from linear models or vice versa we needed to know average values of the dependent and explanatory variables, but a number of studies did not report this basic essential information. Furthermore, a number of semi-elasticities were reported which could not be used for size effect meta-analysing regressions. We therefore decided to work with the reported or calculated *t*-values, because a *t*-statistic (the estimated coefficient divided by its standard deviation) has no dimension and often is reported or can be calculated from the usually reported statistics. By doing so we bypassed the difficulties of differing units of measurement making a size effect meta-analysis in its basic form impossible.

This bypass, however, comes at a clear cost. While 1334 coefficients are reported in 30 studies only 643 *t*-values in 29 studies are reported or could be calculated. We put a lot of effort in contacting the authors of the primary studies in order to get the missing information (such as *t*-values or standard errors). This in most cases, however, proved not to be successful. Because of missing *t*-values, or information that would allow us to calculate *t* values (and also information that would allow us to calculate elasticities) we had to drop the Reuveny and Kang (1998) study all together.

The reported *t*-statistics as shown by Table 1 vary considerably between studies. A number of studies have insignificant mean and/or median *t*-values (Polachek, 1997, Keshk et al., 2004, Head and Ries, 2006, Biglaiser and DeRouen, 2007, Nitsch, 2007, Segura Cayuela and Villarubia, 2008, Fergusson and Forslid, 2011, van Veenstra et al., 2011 and van Bergeijk et al., 2011). Others such as Head and Ries (2006) Gil et al. (2008) and Hegre et al. (2010), however, report very significant *t*-statistics (both positive and negative). These

⁵ Papers investigating the influence of diplomatic relations based on political event data can look into the effect of either more or less interaction between country pairs. These are two sides of the same medal. The results of an analysis on less interaction is of similar size but exactly the opposite of an analysis on more interaction. For sake of comparison we are interested in more political interaction only. We therefor changed the sign of the regressions that investigate less interaction.

differences could be due to country specific factors, data characteristics, differences in time period, differences in the dependant variable, and alternative measures of research design. We will explore these sources of heterogeneity in more detail in the next section by means of our meta-analysis, but before we do so we provide a first picture of the potential impact of some of the study characteristics. Following other meta-analyses (Sinani and Meyer, 2009, Havranek and Irsova, 2010, Mebratie and Bergeijk, 2013) we compute composite t -statistics for a number of variables that we will later use as moderator variables in our meta regression. The advantage of working with larger sub samples of t -statistics compared to looking at individual results is that small t -statistics could be significant in the aggregate even if they are not significant in the primary study. This is intuitively plausible and follows from the fact that for a larger sample, the sample standard deviation is a more precise estimator of the population's standard deviation (Newbold, 1995). The uncertainty caused by the sample estimator as compared to the population's standard deviation is reduced as the sample size increases and the t -distribution more and more fits the Standard Normal Distribution. Tests on the mean of aggregate t -statistics are thus more powerful than looking into individual t -statistics. We therefore computed the combined t -statistics by dividing the sum of t -statistics over the square root of the number of observations in the full sample. Let t_i denote the t -statistic corresponding to the specific characteristic of interest. N denotes the number of observations. Then the combined t -statistic t_c becomes:

$$t_c = \frac{\sum t_i}{\sqrt{N}} \sim N(0,1) \quad (1)$$

This straight forward calculation of the combined t -statistic may, however, be influenced by some studies that contribute particularly large numbers of t -statistics, for example, because a lot of sensitivity analyses are reported. Examples of such studies in our sample are Gil et al. (2007), Rose (2007) and Volpe Martincus (2010a). To deal with the over representation of parameters from such studies we introduce weights per observation. Following Djankov and Murrell (2002) and Diebel and Wooster (2010), normally distributed test statistics are obtained as follows:

$$\frac{\sum_{k=1}^m w_k t_k}{\sqrt{\sum_{k=1}^m w_k^2}} \sim N(0,1) \quad (2)$$

Here w_k represents the weight assigned to the k -th observation. The weight depends on the total number of observations taken from a particular study; smaller weights are assigned to studies that have larger numbers of reported t -values. For example, the study of Keshk et al. (2004) contributes 2 observations. The weight assigned to each t -statistic is in this case 0.5. While if a study contributes only one t -statistic, as in our sample Polachek (1997), the weight employed to this observation is 1.

Table 2
Moderator variables meta-regression analysis

Categories of moderator variables	Moderator var name	Discription
<i>Empirical design factors</i>	FIXED EFFECTS	Dummy, 1 if fixed effects estimate; 0 otherwise
	NOTOLS	Dummy, 1 if other than OLS estimate; 0 if OLS
	COUNTRYSPECIFIC	Dummy, 1 if primary sample is country specific; 0 otherwise
	ENDOGENEITY	Dummy, 1 if primary analysis corrects for endogeneity; 0 otherwise
	GRAVITY	Dummy, 1 if primary regression is gravity model; 0 otherwise
	PANEL	Dummy, 1 if panel data; 0 if cross-section data
	PRE2000	Dummy, 1 if primary study is published before 2000; 0 otherwise
	Observations	Number of observations in the dataset of primary study
<i>Dependant variable</i>	EXPORT	Dummy, 1 if exports is dependant variable primary study; 0 otherwise
	IMPORT	Dummy, 1 if imports is dependant variable primary study; 0 otherwise
	FDI	Dummy, 1 if foreign direct investment is dependant variable primary study; 0 otherwise
	TOTALTRADE	Dummy, 1 if total trade is dependant variable primary study; 0 otherwise
<i>Instrument of diplomacy</i>	EMBASSIES	Dummy, 1 if embassies is included in primary study regressor; 0 otherwise
	CONSULATES	Dummy, 1 if consulates is included in primary study regressor; 0 otherwise
	EMBASSIESANDCONSULATES	Dummy, 1 if embassies and consulates is included as 1 group in primary study regressor; 0 otherwise
	FOREIGN EPA	Dummy, 1 if foreign export promotion office is included in primary study regressor; 0 otherwise
	EIPA	Dummy, 1 if export/investment promotion agency is included in primary study regressor; 0 otherwise
	DIPLOMATIC RELATION	Dummy, 1 if diplomatic relation is included in primary study regressor; 0 otherwise
	STATEVISITS	Dummy, 1 if visits by head of state is included in primary study regressor; 0 otherwise
	TRADEMISSION	Dummy, 1 if visits by minister of other representative is included in primary study regressor; 0 otherwise
TRADE MISSIONS TOTAL	Dummy, 1 if state visits dummy is 1 or trade mission dummy is 1; 0 otherwise	

Table 3
Aggregate t-statistics for the 29 studies

	Using median t stat from each study		All observations		Excluding outliers		Weighted all observations		Weighted excluding outliers	
	t _c	N	t _c	N	t _c	N	t _w	N	t _w	N
Full data set	16.7	29	88.6	643	76.1	580	42.3	643	36.5	580
Empirical design factors										
Fixed effects	10.1	14	60.1	256	49.3	236	21.0	256	15.6	236
Country specific	8.0	12	53.7	306	50.6	277	27.4	306	25.9	277
OLS	13.0	14	57.4	279	51.0	252	39.7	279	38.0	252
Endo	10.3	15	78.3	455	63.5	402	26.9	455	22.8	402
Gravity	14.5	20	86.5	579	73.2	519	45.1	579	39.4	519
Dependant variables	12.5	19	80.2	484	67.3	433	49.6	484	45.1	433
Imports	5.4	7	30.2	115	31.0	112	16.9	115	17.3	112
Exports	12.5	19	80.1	490	67.8	435	34.1	490	31.8	435
Total Trade	6.3	4	20.0	21	9.9	17	11.9	21	7.9	17
FDI	8.5	4	14.4	17	12.4	16	16.7	17	13.5	16
Economic Diplomacy Characteristics	8.5	12	57.3	281	52.6	268	42.5	281	39.4	268
Embassies & consulates	8.4	9	53.8	209	51.3	201	22.0	209	20.6	201
Embassies	15.9	4	44.4	38	27.7	29	43.1	38	23.7	29
Consulates	5.4	5	16.2	72	17.4	68	19.2	72	19.6	68
Foreign EPA	3.8	4	26.5	90	23.8	76	9.6	90	9.5	76
EPA/IPA	4.5	4	38.0	62	19.7	53	23.3	62	15.8	53
Trade Missions	3.1	2	5.3	20	7.0	17	7.3	20	8.0	17
State Visits	-0.7	3	11.7	69	15.1	59	-0.2	69	13.5	59
Diplomatic relation	19.2	9	38.3	60	33.4	56	27.4	60	20.4	56

Results for aggregated and weighted aggregated t statistics are presented in Table 3. We did calculations on the full sample of studies as well as a sub sample excluding outliers to check the robustness of the calculations. For the sample excluding outliers we dropped the 5% smallest and largest observations, leaving a total number of 580 t -statistics included in the analysis without outliers. Table 3 shows that the median t -statistics for all the tested characteristics is always statistically significant except for State Visits. This is basically caused by the median t -value of Ferguson and Forslid (2011), but note that Head and Ries (2006) also have a number of insignificant t -values. The State Visits t -statistic based on the full sample excluding outliers always shows significant aggregate t -values. The weighted t -statistic is however negative. This is caused by the dynamics resulting from the weighing process. Studies that contribute only a limited number of observations have heavy weights to each individual contribution. In this case relative heavy weights are assigned to the negative t -values from the Ferguson and Forslid study because this particular study only has 4 observations in the total database.

Across studies the use of export as a dependant variable is associated with more significant effects of economic diplomacy than studies that use imports, total trade or FDI as dependant variable. The number of observations related to FDI flows is remarkably low.

When it comes down to the economic diplomacy characteristics, *i.e.* the variable used to explain the effect of economic diplomacy, studies that analyse embassies and consulates on average tend to generate more significant outcomes than state visits, trade missions, export promotion offices and the more general diplomatic relation measure. The weighted aggregate t -statistic does also point towards a tendency to find relatively significant results for export and investment promotion agencies.

Table 3 illustrates the extent of heterogeneity in bivariate analyses, both for empirical design, the definition of the dependant variable and the economic diplomacy characteristics. The next step is to investigate this in a multivariate setting. We do so by doing a meta-analysis on our collected sample of t statistics.

4 Design of the meta-analysis

A meta-analysis combines several studies of similar design and investigates consistencies and discrepancies of their results. The essence of meta-analysis is to obtain a single estimate of the effect of interest from some statistic observed in each of several studies (Bradburn et al., 1998). This methodology is well established in several academic fields, among which medicine, psychology and increasingly also economics. The technique provides revised interpretations of earlier research and is often useful to help indicate priorities for future research (Meyer and Sinani, 2009).

We focus on the t -statistic of the coefficient that represents the impact of economic diplomacy on international flows and the influence several study characteristics have on this statistic. Our approach helps to find out the effects of study characteristics on the sign and significance of the estimated effect of

economic diplomacy on international flows. Equation (3) provides a way for estimating how primary study characteristics influence the likelihood of finding significant effects of economic diplomacy on international flows.

$$P(y_{ij}=1)=\alpha_0+\beta_1OBSERVATIONS_{ij}+\beta_2NOTOLS_{ij}+\beta_3COUNTRYSPECIFIC_j+\beta_4GRAVITYEQUATION_j+\beta_5PRE2000_j+\beta_6ENDOGENEITY_j+\beta_{7,\dots,10} [primary\ dependant\ variable_{ij}]+\beta_{11,\dots,17} [instruments\ of\ diplomacy_{ij}]+\varepsilon_{ij} \quad (3)$$

Where y_{ij} is a binary variable that serves as the dependent variable. y_{ij} takes the value of 1, if the coefficient of the i -th regression in article j is significant (we will distinguish between the 5% or 1% level). And, $y_{ij} = 0$ if not. The relation between the dependent and the explanatory variables will be estimated with a logistic regression. Logit-analysis makes it possible to calculate the probability P that a specified use or availability of economic diplomacy yields a significant t stat. If this probability exceeds 0.5, a significantly t value is 'predicted'. We distinguish between 3 sets of explanatory variables: primary dependent variable, and economic diplomacy instrument(s) investigated and correct for various empirical design and quality factors (see the classification and description in Table 2).

4.1 Empirical design and quality factors

The empirical design factors included in equation 3 are *COUNTRYSPECIFIC*, *NOTOLS*, *PRE2000*, *GRAVITYEQUATION*, *ENDOGENEITY* and *OBSERVATIONS*. These variables capture the fact that a study deals with one country only, the effect of the estimation method, the period of publication, whether or not the equation in the primary study was a gravity model and the number of available observations, respectively.

4.2 Primary dependent variable

We classify the explanatory variable in the original studies with dummy variables for *EXPORT*, *IMPORT*, *FDI* and *TOTALTRADE*. They indicate what explanatory variable was used in the primary study regression. Of the literature under review 17 regressions deal with direct investment, 21 with total trade, 115 with imports and 484 with exports.

4.3 Instruments of economic diplomacy

The economic diplomacy characteristics tested for in equation 3 include mutually exclusive and exhaustive dummies for the instrument of economic diplomacy used in the given studies. The economic diplomacy characteristics are *EMBASSIES*, *CONSULATES*, *EMBASSIESANDCONSULATES*, *FOREIGNEPA*, *TRADEMINISTERS*, *PMORROYAL*, *EIPA* and *DIPLOMACY*. These variables respectively capture whether the economic diplomacy coefficient pertains to embassies, consulates, embassies and

consulates as one combined explanatory variable, export promotion offices abroad, trade mission, state visits, export or investment promotion agencies or the diplomatic relation as a proxy for economic diplomacy.

Next to the probability of finding a significant t -statistic we also investigate the influence of study characteristics on the magnitude of the t -statistic. We therefore use a second meta-regression analysis, regressing the reported t -statistics obtained from the literature under review on earlier mentioned empirical design factors, the choice of the explanatory variables and economic diplomacy characteristics. We estimate the following regression model:

$$Y_{ij} = \alpha_0 + \beta_1 \text{OBSERVATIONS}_{ij} + \beta_2 \text{NOTOLS}_{ij} + \beta_3 \text{COUNTRYSPECIFIC}_i + \beta_4 \text{GRAVITYEQUATION}_i + \beta_5 \text{PRE2000}_i + \beta_6 \text{ENDOGENEITY}_i + \beta_{7,\dots,10} [\text{primary dependant variable}_{ij}] + \beta_{11,\dots,17} [\text{instruments of diplomacy}_{ij}] + \varepsilon_{ij} \quad (4)$$

Where Y_{ij} is the value of the t -statistic of the economic diplomacy coefficient derived from the j^{th} regression in the i^{th} article, β_0 represents the random effect that control for the commonality and dependency of estimates within and across studies and ε_{ij} is the error term (Meyer and Sinani, 2009). The explanatory variables in equation (4) are similar to those defined for equation (3)

We present OLS and random effects estimates of equation (4) for the sake of comparison. The random effects model is, however, our preferred estimation. The random effects models use more realistic assumptions about the effect size, as compared to a fixed effects model. Under fixed effects the effect size of a given variable is assumed to be homogenous across studies, i.e. the fixed effect model assumes that there is one true effect for all the studies in our sample (Vevea and Hedges, 1998). All the observed differences are in that case caused by sampling error. Given the diversity in our instruments of economic diplomacy, differences in countries analysed in the primary studies and the substantial variety of time periods investigated, among other reasons, we want to allow the t statistic of economic diplomacy to vary from study to study. Random effects allows for these different t -statistic per study⁶ which we find more realistic given the diversity of the studies under review.

⁶ The assumption of using fixed effects in meta-analysis is more widely discusses in Fields (2003).

5 Empirical results

5.1 Logit estimates of factors explaining economic diplomacy significance

Table 4 presents the logit coefficient estimates of equation (3). In our regression analysis the reference case is a primary study that measures the impact of foreign representation (embassies *and* consulates) on exports. Both these reference variables are the most used in their specific group of factors included in our econometric analysis.

Table 4
Logit estimates on the significance of economic diplomacy

	Logit		Logit		Random Effects Logit	
	5%	5%	1%	1%	1%	1%
Observations (10^{^5})		0.201 (0.83)		0.548** (2.17)		0.548** (2.17)
NOTOLS	0.551** (2.35)	0.157 (0.46)	0.557** (2.52)	0.625* (1.74)	0.678*** (2.60)	0.625* (1.74)
COUNTRYSPECIFIC	-0.223 (-0.84)	-0.432 (-0.95)	-0.644** (-2.54)	-0.621 (-1.39)	-0.832** (-2.53)	-0.621 (-1.39)
EDNOGENEITY	0.432* (1.68)	0.268 (0.72)	0.792*** (2.99)	0.971** (2.40)	0.528 (0.84)	0.971** (2.40)
GRAVITYEQUATION	0.435 (1.03)	0.237 (0.40)	1.083*** (2.72)	1.563*** (2.59)	1.558** (2.00)	1.563*** (2.59)
PRE2000	2.109*** (3.06)	2.381*** (2.94)	1.909*** (2.94)	2.639*** (3.25)	1.668 (1.59)	2.639*** (3.25)
TOTALTRADE	-1.207* (-1.67)	-1.180 (-1.52)	-2.087*** (-2.97)	-2.483*** (-3.13)	-2.736** (-2.32)	-2.483*** (-3.13)
IMPORT	-0.819** (-2.51)	-0.673** (-1.97)	-1.053*** (-3.05)	-1.013*** (-2.77)	-0.938** (-2.50)	-1.013*** (-2.77)
FDI	-0.297 (-0.40)	-0.533 (-0.70)	-0.276 (-0.37)	0.122 (0.16)	0.00565 (0.00)	0.123 (0.16)
EMBASSIES	0.743 (1.31)	-0.364 (-0.50)	1.320** (2.27)	0.197 (0.26)	1.972** (2.45)	0.197 (0.26)
CONSULATES	-1.463*** (-4.10)	-2.844*** (-5.28)	-1.413*** (-4.01)	-2.994*** (-5.57)	-0.891 (-1.50)	-2.994*** (-5.57)
FOREIGN EPA OFFICE	-0.530* (-1.66)	-1.338*** (-2.95)	-0.254 (-0.83)	-1.540*** (-3.48)	-0.933 (-1.55)	-1.540*** (-3.48)
TRADE MISSION	-1.543*** (-2.94)	-2.137*** (-3.11)	-1.387** (-2.42)	-3.254*** (-4.17)	-0.720 (-0.78)	-3.254*** (-4.17)
STATE VISIT	-1.269*** (-3.41)	-1.784*** (-3.36)	-1.424*** (-3.80)	-2.669*** (-4.72)	0.0903 (0.09)	-2.669*** (-4.72)
EPA/IPA	-0.507 (-1.33)	-1.079 (-1.37)	-0.453 (-1.25)	-0.777 (-1.05)	0.0226 (0.05)	-0.777 (-1.05)
DIPLOMACY	0.342 (0.52)	-0.372 (-0.44)	0.867 (1.35)	-0.233 (-0.28)	1.372 (1.38)	-0.233 (-0.28)
Constant	0.344 (0.62)	1.475* (1.66)	-0.928* (-1.72)	-0.741 (-0.83)	-1.371 (-1.48)	-0.741 (-0.83)
N	643	416	643	416	643	416
Speudo r sqr	0.11	0.18	0.15	0.23		
Correct predictions %	72.01%	72.36%	68.85%	73.08%		
Sensitivity	89.73%	85.82%	81.49%	74.55%		
Specificity	34.15%	47.97%	51.96%	71.35%		
False positives	65.85%	52.50%	48.04%	28.65%		
False negatives	10.27%	14.18%	18.51%	25.45%		

t statistics in parentheses * p<0.1, **p<0.05, *** p<0.01

The models show the relation between the empirical design, the dependent variable under investigation and the characteristics of economic diplomacy with the likelihood of finding statistically significant coefficients for economic diplomacy. We investigate two variants: significance at the 5% level and better (model 1 and 2) and at the 1% level and better (model 3, 4, 5 and 6), respectively.

Model 1, 3 and 5 are based on the full sample of studies and observations. Model 2, 4 and 6 are based on a smaller sample of 27 studies and 416 observations. The difference is due to the fact that some of the primary studies do not report the number of observations used for each reported regression. Two studies, Volpe Martincus et al. (2010a) and Polacheck (1997), drop out entirely because the number of observations used for the regressions in their papers is not provided. Likewise, observations of Rose's (2007) extensive sensitivity analyses can no longer be included when accounting for the number of observations.⁷

With respect to the study characteristics of the surveyed literature, country specific studies have a smaller probability of producing significant coefficients for economic diplomacy as compared to studies that investigate the influence of economic diplomacy using a multiple country model. These results are robust both at the 5% and 1% significance levels. However, this effect could be driven by the studies of Rose (2007) and Volpe Martincus et al. (2010a) because when these studies are dropped from our sample the significance of the country specific dummy disappears.

Older studies, that is studies conducted before the 2000s are significantly more likely to have produced positive and significant results at the 1% significance level and better. The same can be said for econometric investigation into the effect of economic diplomacy that use larger datasets and primary studies that use a gravity equation.

Corrected for the empirical design factors the choice of the dependent variable seems to be significantly associated with a greater likelihood of finding significant results for economic diplomacy at the 5% level and better. Primary studies that use exports as dependant variable tend to find more significant results than studies using the total trade flow or imports as dependant variable. Studies investigating the effect of economic diplomacy on foreign direct investment flows do not differentiate significantly from studies using export as dependant variable in their likelihood of producing significant results.

The characteristics of economic diplomacy have a strong and significant impact on the probability that a primary study. Compared to primary studies that use embassies and consulates (the reference group) most studies are less likely to find a positive and significant t -statistic. Exceptions are studies that use only embassies (rather than embassies and consulates) as explanatory variable which are associated with a higher likelihood of producing significant results under some specifications. Furthermore, the results for studies using

⁷ Rose reports numbers of observations for all regressions but not for the sensitivity analyses

diplomacy are not statistically different from those using embassies and consulates.

The results bring to the table an interesting finding. When testing for the influence of economic diplomacy, embassies and consulates are until now most frequently treated as one group. Our results however indicate that there is significant difference in the likelihood of finding significant results for the group as compared to the individual factors. By taking embassies and consulates as one group much relevant insights may be lost and results of one of the two factors may dominate the result for the entire group.

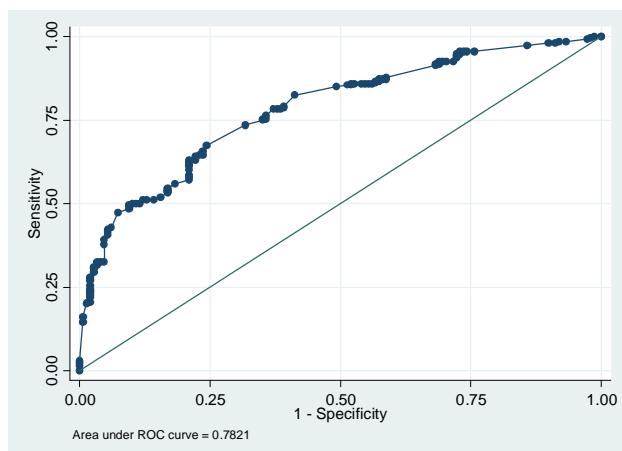
To test the models 1- 4 presented in Table 4 on their discriminatory accuracy we look into the percentage of correct and false predictions of our specified logit models. Adding the observations variable improves the goodness-of-fit. Model 1, predicts significance of economic diplomacy at the 5% level and better correctly in 72% of the cases. Adding the variable *OBSERVATIONS* (model 2) leads to a small increase of correctly classified outcomes. The logit models 3 and 4 predicting significance at the 1% and better level show similar, but more pronounced, dynamics. Adding *OBSERVATIONS* increases the correctly classified outcomes from 69% to 73%.

We investigated the Sensitivity and Specificity of our logit models (see Table 4). Sensitivity, the true positive rate, measures the correctly identified proportion of actual positives. In this case true positives are the predicted significant coefficients for economic diplomacy. Specificity measures the proportion of negatives, i.e. insignificant coefficients of economic diplomacy, which are correctly identified as such. As may be expected the models that include the *OBSERVATIONS* variable perform better on both sensitivity and specificity.⁸

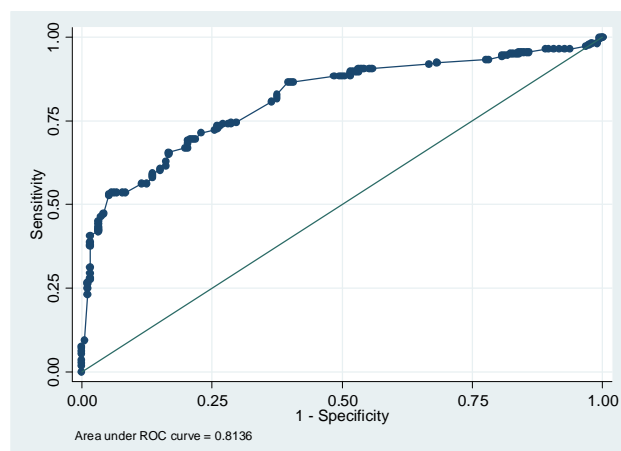
The performance of model (1)-(4) to correctly classify economic diplomacy coefficients as significant or insignificant can also be shown graphically by analysing the ROC curve and the area under the ROC curve. The ROC curve is created by plotting the fraction of true positives out of the positives versus the fraction of false positives out of the negatives. This is depicted in graph 1 and 2. The 45 degree line represents the results of a random draw. The greater the area under the ROC curve, the dotted line in graph 1 and 2, the better the global performance of the diagnostic test. A perfect diagnostic test would yield an area under the ROC curve of 1, representing 100% sensitivity (no false negatives) and 100% specificity (no false positives). Models (2) and (3) perform relatively well with area's under the ROC curve of approximately 80%.

⁸ Results of the different results on sensitivity and specificity are available upon request.

Graph 1
ROC curve logit model 2



Graph 2
ROC curve logit model 4



5.2 Determinants of magnitude of t-statistic economic diplomacy coefficient: A random effects model

To get a more enhanced understanding of the manner in which several study characteristics influence the significance of studies in the field of economic diplomacy we do an additional regression analysis on the magnitude of the t -statistic. Table 5 presents the results for the ordinary least squares and random effects estimation of equation (5). For model 3 and 6 the sample without the 5% most extreme observations is used.

The baseline estimate again uses exports as reference for the dependant variable and embassies and consulates as reference for the instrument of diplomacy under investigation in the primary study. The references for the empirical design factors are based on studies using standard OLS regression models based on multiple country databases published after 2000.

Results are reported for OLS (model 1,2,3) and random effects (model 4, 5, 6). Model (2), and (5) test the robustness of the model by adding the observations variable, which as mentioned earlier restricts our sample of t -statistics. Models (3) and (6) exclude the 5% most extreme observations in order to test for robustness with respect to outliers.

Again we find that empirical design factors play an important role in the reported results of the primary studies. Primary studies conducted on a single country basis will in general show a lower significance of the coefficient. The OLS and Random Effects models provide evidence that studies published before the 2000s produce higher t -values. Studies that use a larger number of observations are *a priori* expected to find higher t -statistics: as the number of observations increases the uncertainty caused by the sample estimator as compared to the population's standard deviation is reduced. This is reflected in the direction and significance of our *OBSERVATIONS* variable. We

furthermore see that more complex regression models produce more significant coefficients than primary studies using OLS. Empirical studies using the gravity equation seem to produce more significant results. Model 5 and 6 however shows that this conclusion is driven by sub samples in our t statistic database. If we allow the *t*-statistic to vary between studies in the random effects model the *GRAVITYEQUATION* and *ENDOGENEITY* variables lose their significance.

Table 5
The effect of economic diplomacy study characteristics on the magnitude the t value

	OLS			Random Effects		
	-1	-2	-3	-4	-5	-6
Observations (10^{^5})		0.994*** (3.75)	0.539** (2.57)		1.73*** (4.10)	1.23*** (3.58)
NOTOLS	1.134*** (3.32)	0.817** (2.32)	0.712** (2.55)	1.040*** (2.77)	0.483 (1.15)	0.696** (2.09)
COUNTRYSPECIFIC	-0.645* (-1.67)	-0.983** (-2.20)	-0.637* (-1.84)	-1.487*** (-3.11)	-1.385* (-1.78)	-1.190** (-2.04)
ENDOGENEITY	1.975*** (4.85)	1.391*** (3.44)	0.672** (2.00)	1.191 (1.16)	0.919 (0.89)	0.533 (0.68)
GRAVITYEQUATION	3.090*** (5.04)	1.418** (2.39)	1.665*** (3.54)	2.899** (2.28)	1.064 (0.80)	1.331 (1.32)
PRE2000	2.120** (2.21)	2.706*** (3.36)	2.575*** (4.10)	1.229 (0.77)	2.857* (1.85)	3.123*** (2.69)
TOTALTRADE	-1.426 (-1.31)	-0.871 (-1.09)	-1.968*** (-3.15)	-2.239 (-1.24)	-1.566 (-0.98)	-2.110* (-1.79)
IMPORT	-0.638 (-1.32)	-0.370 (-1.05)	-0.633** (-2.35)	-0.160 (-0.30)	-0.103 (-0.27)	-0.338 (-1.16)
FDI	1.447 (1.38)	1.631** (2.10)	0.934 (1.57)	1.431 (0.78)	2.252 (1.33)	1.665 (1.33)
EMBASSIES	3.666*** (5.33)	1.212* (1.70)	1.042* (1.92)	4.182*** (5.22)	1.888 (1.22)	1.667 (1.47)
CONSULATES	-1.494*** (-2.69)	-3.116*** (-5.88)	-2.803*** (-6.92)	-0.540 (-0.70)	-2.333 (-1.58)	-2.101* (-1.96)
FOREIGN EPA OFFICE	0.256 (0.51)	-1.037** (-2.18)	-0.739* (-1.94)	-1.520* (-1.72)	-2.484*** (-3.73)	-0.910 (-1.64)
TRADE MISSION	-2.224*** (-2.63)	-4.494*** (-5.94)	-2.760*** (-4.63)	-1.415 (-1.05)	-2.303** (-2.13)	-1.376 (-1.58)
STATE VISIT	-2.905*** (-5.06)	-4.094*** (-7.63)	-2.780*** (-6.45)	-1.316 (-1.01)	-1.968* (-1.81)	-0.748 (-0.80)
EPA/IPA	2.190*** (3.74)	-1.454* (-1.79)	-0.547 (-0.85)	2.937*** (4.27)	-1.195 (-0.93)	0.135 (0.13)
DIPLOMACY	1.786* (1.87)	-0.694 (-0.81)	-0.678 (-1.04)	2.182 (1.47)	-0.271 (-0.18)	-0.440 (-0.39)
Constant	-1.279 (-1.52)	1.809** (1.99)	1.845** (2.58)	-0.542 (-0.35)	1.695 (1.05)	1.379 (1.12)
N	643	416	374	643	416	374
Adj R2	0.20	0.29	0.33			

t statistics in parentheses

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

The choice of the dependent variable is weakly related to the magnitude of the t -statistic. After controlling for various empirical design factors the studies that use import and total trade instead of exports as dependant variable seem to deliver coefficients with lower t -statistics. These findings are however not robust across specifications. Although the direction of the coefficient for the two variables is always negative. Not all coefficients are significant.

The instrument of diplomacy used in the primary study has significant influence on the significance of the coefficient in the primary study. If the primary study uses embassies as a proxy for economic diplomacy, higher t -values will be found. If on the other hand 'lower' forms of foreign representation, i.e. consulates and foreign locations of export promotion offices, are subject of the study, the significance of the coefficient in the primary study will be significantly lower. The results give a further indication that studies taking embassies and consulates as one explanatory variable may lead to a problematic generalisation about the effectiveness of the diplomatic network. Our regression analyses show that regressions using embassies generate more significant coefficients than the embassies and consulates benchmark. Consulates on the other hand are systematically associated with lower levels of significance. Grouping the two (embassies *versus* consulates) into one (embassies *and* consulates) thus leads to an average significance that is too high for consulates and too low for embassies.

Of the other instruments of diplomacy the t -statistic of the diplomatic relation variable does not seem to differ significantly from the t -statistic of embassies and diplomacy. The remaining proxies for economic diplomacy, i.e. trade missions, state visits, export and investment promotion offices, are systematically related to a lower magnitude of the t -statistic in comparison with primary studies that investigate the impact of diplomacy on international trade and investment flows using embassies and consulates.

One contribution of this paper is that this is the first meta-analysis on the effects of instruments of economic diplomacy on international economic flows. Our findings are to some extent comparable to other meta-analyses from the field of economics in the sense that we also find that research design is an important determinant for significance (and magnitude) of the particular subject under econometric investigation (compare, Sinani and Meyer, 2009, Havránek and Iršova, 2010, Mebratie and Bergeijk, 2012 and Lazzaroni and Bergeijk 2013).

We observed several features that deserve attention in future research, specifically considering empirical design. We have seen various authors that use embassies and consulates as one and the same instrument of diplomacy. Our analysis however indicates that the significance of embassies and consulates move in opposite directions. By grouping this two forms of foreign presence into one, the authors may unintentionally lose a lot of the variance that exists between the two. This may lead to false generalisations about the effect of foreign presence on international economic flows. The same could be said about the grouping of trade missions, although here the problem is less wide spread.

6 Concluding remarks

Governments around the world are increasingly involved in economic diplomacy and this article tried to establish if the use of this instrument makes sense empirically. The first questions that need to be answered are whether economic diplomacy has a significant effect on trade and investment flows and what the sign of that relationship is. Unfortunately the emerging literature on the impact of economic diplomacy does not provide an unambiguous answer yet. We have provided further insights into this issue by means of a meta-analysis of the significance of the coefficients of economic diplomacy. We analysed 29 studies on the topic of economic diplomacy and investigated what study characteristics influence the likelihood of finding a positive and significant t -statistic and what characteristics influence the magnitude of the t -statistic.

Our econometric analysis shows that reported effects of economic diplomacy on trade and investment in individual studies are sensitive to model specification. Studies that use embassies as a proxy for economic diplomacy tend to produce higher t -values. The same may be stated for studies conducted before the 2000s, *i.e.* studies that use diplomatic cooperation and for studies that investigate the influence of visits by the heads of state. Higher quality data samples also improve the significance. We find that single country studies and studies that use consulates as an explanatory variable have lower observed t -values.

Our analysis also has valuable lessons for future research. The first thing we note is that the research on the influence of economic diplomacy of FDI is very limited. Of the total of 643 regressions we investigated, only 17 regressions dealt with the effect of economic diplomacy on FDI flows. It would be interesting to see more material on this topic especially given the fact that numerous governments do see a role for economic diplomacy in stimulating FDI.

Furthermore there is a clear cut case for improving the availability for data and increasing the country coverage of economic diplomacy data. Our advice is not only to use bigger datasets but also for authors to report more about the data they have used. This makes comparison between studies a lot more transparent. Also the specification of instruments of diplomacy deserves more rigorous attention. We encountered various studies that, to our opinion, used rather crude grouping of instruments. A number of studies treated embassies and consulates as instrument of diplomacy. We however showed that embassies produce more significant coefficients for their effect on trade and investment flows as compared to consulates and other foreign representations of lower order.

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