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Political risk and export promotion: Evidence from Germany

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Research Notes 23

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Political risk and export promotion

Evidence from Germany

December 20, 2006

Beginning with Jan Tinbergen in 1962, the academic literature early on pointed to political risk as an important impediment to international trade. This form of risk represents an additional transaction cost which has to be taken into account by firms in their export decisions since political events may lead to payment arrears or even default. While this notion became widely accepted, empirical evidence on the role of political risk is relatively scant.

Specifically, our data set comprises German exports and guarantees to 130 countries over the period 1991 to 2003. Our contribution to the discussion is threefold. First, we incorporate political risk into our empirical model of exports. Second, we provide evidence on the effectiveness of export credit guarantees in fostering exports using a novel data set on export credit guarantees from the German Export Credit Agency (ECA) Euler Hermes. Third, we apply a dynamic panel estimator which allows us to capture export dynamics, i.e. to take into account the effect of past exports on current exports.

The main findings are as follows. Our results underline political risk as an important impediment to exports. Political risk in an importing country has a significant and negative impact on German exports. Furthermore we find that export credit guarantees have a positive and significant influence on exports. Note that the inclusion of political risk only leads to a small reduction in the effect of guarantees on exports.

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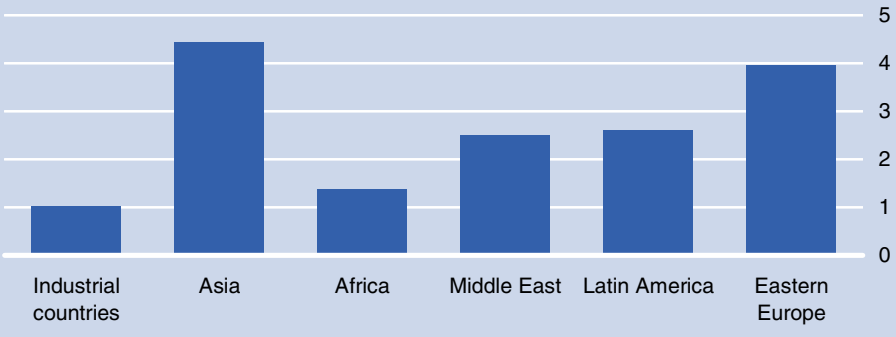
Euler Hermes newly granted average export guarantees per year from 1991 to 2003
EUR bn



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Political Risk and Export Promotion: Evidence from Germany*

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Abstract

Political risk represents an important hidden transaction cost that reduces international trade. This paper investigates the claim that German public export credit guarantees (Hermes guarantees) mitigate this friction to trade flows and hence promote exports. We employ an empirical trade gravity model, where we explicitly control for political risk in the importing country in order to evaluate the effect of export guarantees. The idea behind export promotion through public export credit agencies (ECAs) is that the private market is unable to provide adequate insurance for all risks associated with exports. As a consequence, firms' export activities are limited in the absence of insurance provision. Using a novel data set on guarantees we estimate the effect of guarantees in a static and dynamic panel model. We find a statistically and economically significant positive effect of public export guarantees on exports which indicates that export promotion is indeed effective. Furthermore, political risk turns out to be a robust determinant of exports and hence should be taken into account in any empirical model of trade.

Keywords: public export credit guarantees, political risk, panel regression.

JEL classification: F13, H81, C23.

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1 Introduction

Exports safeguard economic growth, jobs and a good standard of living in Germany. A country which is a successful exporter needs a strong and reliable state export credit insurance scheme. This is particularly important for opening up the difficult markets in the threshold and developing countries.[1]

Apart from purely economic variables it is likely that political or semi-political factors play a part in determining the volume of trade between countries.[2]

Political risk matters to international trade activity, because it represents an important hidden transaction cost. Meon and Sekkat (2004) find that participation of Middle East and North African countries in the world economy is severely strained due to political risk and low quality of institutions. Anderson and Marcouiller (2002) provide evidence for the importance of insecurity and corruption on international trade patterns within a gravity framework.

The basic idea behind trade gravity models is related to Newtonian physics stating that trade volumes between two countries depend positively on economic mass and negatively on resistance. While the trade constraining effect of distance and asymmetric information is well documented, political risk as another crucial friction to trade has been largely neglected in the academic literature so far.

Export promotion aims at mitigating frictions in international trade. Governments seek to stimulate exports by granting export credit guarantees against export risks, especially political risks. While this public sector intervention was hotly debated in the past due to potential subsidy rates in the risk premia charged from exporters, several international agreements and regulations largely repelled these concerns.[3] Notably, the empirical literature has very little to say about the trade promoting effect of *export credit agencies (ECAs)*. Since all industrial and an increasing number of emerging countries have installed ECAs, this comes as a surprise.[4] Beyond that it is remarkable that ECAs receive relatively little public attention even though their total new financing commitments averaged about USD 85 billion each year over the

[1] Wolfgang Clement, Former German Economy Minister (AGA, 2003).

[2] Tinbergen (1962, p.265).

[3] This claim is supported by the data exemplified in Table 3 in the appendix. Official export credit agencies started to break-even in the mid 1990s. More details on this table and the mentioned agreements will be given below. Important contributions in this strand of literature include Melitz and Messerlin (1987), Abraham and Dewit (2000) and Dewit (2001).

[4] Many official export credit agencies (ECAs) in industrial countries were founded after World War II. Major ECAs include Export Credits Guarantee Department (ECGD) of the United Kingdom, Export-Import Bank of the United States, Euler Hermes of Germany, Compagnie Française d'Assurance pour le Commerce Extérieur (COFACE) of France, Sezione Speciale per l'Assicurazione del Credito all'Esportazione (SACE) of Italy and International Trade Policy Bureau, Nippon Export and Investment Insurance (NEXI) of Japan, just to name a few of them. Most official export credit agencies of OECD-countries and some private insurers are part of the Berne Union, the International Union of Credit and Investment Insurers.

period 1998 to 2002, outnumbering gross official development assistance and gross international financial institution lending (Wang et al., 2005).[5]

While the scope and exact objective of an ECA may vary from country to country, most of them were founded on grounds of market imperfections in the export insurance sector, namely inadequate provision of risk insurance by the private sector. The argument goes that a lack of export insurance places high risks on exporting firms and thus limits their exporting activities. The primary function of export credit agencies can thus be seen in removing or reducing uncertainties and risks inherent to international trade, or at least to shift them away from exporters and their banks and thus to promote trade (Stephens, 1999). The German government seeks export promotion primarily through *Euler Hermes*, the German export credit agency.[6]

The empirical and theoretical literature on export promotion is rather scant.[7] An important recent empirical contribution is Egger and Url (2006) who on the one hand test for the trade promoting effect of public export credit guarantees provided by the Oesterreichische Kontrollbank (OeKB) and on the other hand investigate if these state guarantees influence the export structure with regard to industries and countries. Using newly granted guarantees disaggregated on a 2-digit industry level for the period 1996-2002 the authors find that Austria's ECA indeed fosters export activity. Interestingly, they find that a small positive short-term effect is outreached by a much more pronounced long-term effect. The overall multiplier amounts to 2.8. The export structure does not seem to be altered by the provision of public export insurance.

While our empirical approach is related to Egger and Url (2006), we make three important contributions. First, we extent their empirical model by the friction that gives rise to export guarantees, namely political risk. Secondly, we evaluate the claim that German export credit guarantees indeed foster the export activities of German companies in a dynamic framework. And third, while the international comparison with the Austrian case is interesting in itself, we analyze in the case of Euler Hermes a dominant player in the world export credit insurance market. In the year 2004, Euler Hermes granted about 21 billion Euro of new export guarantees (AGA, 2004), i.e. exports worth 21 billion Euro (about 2.9 percent of total exports) were guaranteed on behalf of the German government.[8] The total exposure of the Federal Government stood on average at roughly 115 billion Euro over the last seven years. Over the period 1990 to 2002 Euler Hermes accounted on average for

[5]The figure refers to the amount of exports guaranteed by the Berne Union, whose members are largely but not exclusively from the public sector. The figures for gross official development assistance and gross international financial institution lending amount to about USD 67 billion and USD 60 billion per year over the same period (Wang et al., 2005).

[6]Note that Euler Hermes is able not only to underwrite export credit insurance on behalf of the German government (as a public export credit agency) but also to take export insurance on their own account (as a member of the Allianz Group - private sector insurance). This paper only refers to the public dimension of the insurance activities of Euler Hermes.

[7]Recent empirical studies dealing with alternative means to promote exports are provided by Rose (2005), Nitsch (2005) and Gil-Pareja et al. (2005), who focus on the impact of embassies, state visits and regional trade agencies on foreign trade. The theoretical literature on (official) export credit insurance includes Funatsu (1986), Dewit (2001) and Rienstra-Munnicha and Turvey (2002).

[8]Note that about 8 percent of all exports to non-industrial countries are guaranteed, while only about 0.25 percent of exports to industrial countries are guaranteed.

nearly one fifth of all new commitments underwritten by members of the Berne Union, the International Union of Credit and Investment Insurers, encompassing many important official ECAs and a number of private (re)insurers.[9]

Our main findings are the following: First, we find strong evidence that political risk has a detrimental effect on exports. This finding confirms the opening quote by Jan Tinbergen that political factors do matter for international trade. We find a statistically and economically significant impact of political risk in empirical trade models, which has been largely neglected in the empirical trade literature so far. Secondly, we can confirm the effectiveness of guarantees for export promotion. Our results suggest a multiplier in the range of 1.7 to around 6, i.e. for every additional unit of granted export guarantee exports increase by up to six units. Hence, these results indicate that Euler Hermes seems to live up to one of its basic rationales for existence: German export promotion. However, we also find that the effect differs for the sub-sample of non-industrial countries as well as for the time period considered. While we cannot confirm this effect for non-industrial countries prior to 1999, we find an export promoting effect of guarantees for the period since then. Third, our dynamic panel approach allows us to provide evidence that a dynamic specification is warranted to model international trade in a gravity framework.

This paper is organized as follows. In the second section, we discuss why public sector intervention in the market for export insurance may be warranted. We further provide a description of the functioning of the German ECA and the relevant international agreements in place. The third section takes a closer look at the data, explains the estimation strategy and formulates the testing hypothesis. The following section contains the results and discusses the various robustness checks undertaken. The final section summarizes the results and provides an outlook for future research.

2 The institutional setting

In the following section, we provide the theoretical motivation for public export guarantees. Furthermore, we describe how Euler Hermes works in practise.

2.1 Motivation for public export guarantees

The *theoretical starting point* for the discussion is the *Arrow-Debreu model* which assumes that an insurance market for any type of risk exists.[10] In an economy with complete markets and full information available to all agents, markets for all future states of the world exist and risk can be priced on forward markets. If desired, agents can thus hedge against certain risks according to their risk attitude by buying and selling forward contracts. If markets are incomplete and/or asymmetric information exists, government intervention might be useful in order to improve efficiency.

[9] Authors' calculations based on figures provided by Wang et al. (2005) and AGA (2004). Note that the Japan Bank for International Cooperation (JBIC) is not a member of the Berne Union.

[10] The following paragraph mainly relies on Alsem et al. (2003) and Obstfeld and Rogoff (1999, p.269f).

International trade is commonly conducted on the basis either of payment on receipt of goods or of payment within 180 days of receipt (Stephens, 1999). This introduces some degree of uncertainty for the exporter with respect to the shipment and timely payment of the importer. On the one hand, the importer may become insolvent and hence defaults on the export contract *(commercial risk)* and on the other hand actions by an importer's host government may cause nonpayment on an export contract *(political risk)*.[11] Such action may include foreign exchange restrictions, debt moratoria or acts of war. Assuming risk averse exporters, we expect them to seek protection against such risks. That said, exporters are willing to pay a risk insurance premium in order to hedge against some or all of the risks inherent to their international trade activities. The crucial question is whether well-functioning (private) markets exist for all export risks. In what follows, we will describe the reasoning behind market imperfection for the political risk insurance.

Three main arguments can be brought forward in support of a *market imperfection*, namely i) high correlations of risks in an export credit portfolio ii) strong time-varying risk exposures and iii) potentially higher recovery rates of claims stemming from political risk arrears by export credit agencies. While the first two arguments constitute characteristics of export credit risks that make them different from other (industrial) risks and challenge the insurability of export credit risk[12] , the last argument is linked to sovereign risk issues.

With regard to the first argument, export credit risks by their very nature tend to be highly correlated. Given that credits at risk are concentrated within a given country all credits are exposed to the same (political) risk which thus cannot be easily diversified away.[13] Hence, the assumption of independence among exposure units and the randomness of losses does not hold in this context. On top of that, potential contagion from one country to another may even question the independence of political risks across countries. Hence, risks tend to deteriorate in tandem and losses are concentrated. The unbalancedness of a portfolio of export credit risks can become high.[14] This in turn may negatively affect the economic feasibility, because a relatively unbalanced risk portfolio requires the (re)insurer to hold relatively more capital reserves and/or drives risk premiums up. This may prevent a liquid private market from unfolding.

Secondly, the local political conditions may change quickly and surprisingly due to external events such as war, acts of terrorism or internal events such as elections

[11] It is nowadays commonly accepted that political risk constitutes an important subgroup of country risk. For further details see for instance Bouchet et al. (2003).

[12] We only focus on those risks and specifics of export credit risk that warrant a closer look for our research question. More generally, Schmit (1986) lists the following requisites of an ideally insurable risk: large number of homogeneous exposure units; independence among exposure units; calculable expected loss in monetary values; definite loss as to time, place, amount, and cause; fortuitous loss; economic feasibility; avoidance of catastrophe potential.

[13] The arguments with respect to the specifics of export credit risk are mainly based on Alsem et al. (2003, ch. 3). Consider for instance the imposition of capital controls - or even worse the declaration of a debt moratorium - that prevent private domestic companies in an emerging market from buying foreign exchange. If twenty enterprises bought export insurance against this risk type in a single country from the same insurer, it would be highly likely that the insurer has to pay out all twenty companies as a consequence of this event.

[14] Alsem et al. (2003) measure unbalancedness of risks in a given portfolio through the correlation between risks.

or political turbulence. Recent developments in Latin America, where international investors are currently facing a high expropriation risk, underline that political conditions not only may change quickly but are also interlinked.[15] In such situations, it becomes very hard for the insurer to gauge the actual risk of an export credit cover beyond a few months in the future, resulting in higher risk aversion on the insurers side. Alsem et al. (2003, p.45) underline that one cannot necessarily infer from past political risk experience to future developments affecting the risk portfolio. These characteristics imply that export credit insurance require a high profit margin and high capital requirements.

Finally, a further argument in favor of a public sector intervention through credit export agencies is based on the specifics of sovereign debt. It is argued that the government has an advantage over the private sector in recovering claims in the absence of an international or supranational bankruptcy court. The government can bundle all its claims and put various diplomatic means to use in order to recover due obligations. This may result in bilateral negotiations and/or multilateral debt rescheduling under the aegis of the Paris Club. Public officials acknowledge that "high expectations of recoveries from political claims under rescheduling agreements are justified " (AGA, 2003, p.71). Figure 1 in the appendix shows claims paid out by Euler Hermes due to and recoveries from political risk. It is noteworthy that debt restructuring agreements make up for the largest share of recoveries.[16]

In sum, market imperfection relevant to our research question may be threefold. First of all, if the price of a risk transfer, namely the insurance premium, is getting too high for exporters exposed to political risk, no transfer takes place and no market for this particular risk transfer will develop. Against the background of elevated political risk in developing countries, there is still a considerable amount of potential trade and/or investment that does not take place due to the absence of political risk insurance. Secondly, and linked to the first argument, private insurance companies are not willing or able to bolster such risks with sufficient capital. The complex nature of political risk and the large scale of potential losses in typical medium-term projects would require very high capital reserves. Finally, recovery rates from defaults and arrears stemming from political risk may be higher, when the government manages the claims.

2.2 How does Euler Hermes work?

Commercial risk and political risk are the *two main categories of risk* which are typically insured by export credit agencies.[17] The German government provides export

[15] After Bolivia's president Morales declared a re-nationalization of the country's oil and gas industry at the beginning of May 2006, Ecuador's president Palacio mimicked his counterparts' decision two weeks later.

[16] Still, the data has to be interpreted with some caution since there are usually considerable lags between the moment a claim is paid out and it can be (partly) recovered through a debt restructuring agreement.

[17] Euler Hermes defines *commercial risk* as the risk that the importer (private buyers only) becomes insolvent or fails to pay within six months after due date. Euler Hermes covers the following types of *political risks*: (i) general political risk such as legislative or administrative measures, wars, riots or revolution, which prevent payment of the covered debt, (ii) conversion and transfer risk such as non-conversion and non-transfer of local currency deposits made by the buyer as a consequence

and investment credit guarantees to companies and banks via a consortium consisting of Euler Hermes Kreditversicherungs-AG and PricewaterhouseCoopers AG.[18] The aim of these guarantees is to provide an insurance against risks not adequately covered by the market and thus to promote trade with developing countries (Euler Hermes, 2003). These guarantees are commonly referred to *Hermes guarantees* or *Hermes Buergschaften* and encompass general political risk, conversion and transfer risk as well as other commercial risks.[19] There are essentially two ways a guarantee can be granted by Euler Hermes. Either, the export credit agency grants a supplier credit which essentially implies selling insurance directly to the exporter. Alternatively, if a bank finances the export activity, the insurance can be given to the bank to cover default risk. In this case, the insurance coverage of the ECA is re-directed from the exporter to his house bank. Other simple scenarios include that the exporter's bank directly applies for the insurance in country A or that a bank grants the importer a credit in country B, implying a bank relationship between a German bank and a bank abroad.

Another aspect of export guarantees is the *nexus between Euler Hermes and the Federal state.* The German government is involved in three decisive ways in the provision of credit guarantees. First, public export credit guarantees are fully integrated into the accounts of the government. Income such as premiums, fees and monies recovered are transferred to the federal budget accounts. All disbursements and costs incurred such as indemnification of claims and administrative expenses are also paid out of federal funds. Euler Hermes is paid a fee for handling the export credit scheme (Euler Hermes, 2003). Secondly, the statutory maximum exposure limit represents the maximum amount up to which liability in form of granted export guarantees may be accepted by the Federal Government under the Federal Budget Law. Euler Hermes can underwrite export risks on behalf of the German state up to this ceiling, whereby it is noteworthy that the Interministerial Committee (IMC) examines all major applications and decides whether to grant cover. However, the statutory maximum exposure limit has traditionally not been fully exhausted. Table 6 gives an overview over the guarantee business of Euler Hermes.[20] A comparison of column (6) and (7) reveals that granted guarantees have not exceeded once the total ceiling in the period from 1991 to 2003. This provides evidence that demand for export guarantees is not restricted in practice by this upper ceiling(AGA, 2004). Secondly, Table 6 shows that applications for cover are substantially higher than newly granted guarantees. This suggests prima facie that demand for export guarantees is considerably restrained, but the existing gap can be partly explained by the fact that not all applications finally result in an export business. In addition, for some countries a specific ceiling is fixed which consequently may restrain the demand for export coverage in the respective countries. Finally, the risk premia charged by Euler Hermes

of restrictions placed on international money transfer, namely capital controls or an outright debt moratorium, (iii) loss of goods due to political events and (iv) loss of entitlement to payment due to impossibility of contract fulfilment. See http://www.exportkreditgarantien.de/eng/index.html (6.1.2005).

[18]Euler Hermes is mainly responsible for credit export guarantees and PwC is largely in charge of investment guarantees and untied loan guarantees. For simplicity, we will use henceforth Hermes for Euler Hermes Kreditversicherungs-AG and PricewaterhouseCoopers AG synonymously.

[19]From here onwards, we use the term political risk interchangeably for political, conversion and transfer risks.

[20]Figures in columns (2) to (4) are based on the data set in use and may diverge from official figures in the annual reports due to rounding errors and exchange rate conversion.

are based on country ratings. Hence provided that ratings used by Euler Hermes adequately reflects risk insurance should be priced appropriately.[21]

There are several international agreements in place that regulate the activities of public export credit agencies' (ECAs). First, the *World Trade Organization's* Agreement on Subsidies and Countervailing Measures (SCM) disciplines the use of export subsidies. This agreement demands premia to cover long-term operating costs and losses and was strengthened in 1995. Table 3 in the appendix shows premia received, recoveries from defaulted payments and claims that were paid out by Berne Union members and Euler Hermes, respectively. Following Dewit (2001) the sum of premia and recoveries is divided by total claims. The last two columns show this ratio for the Berne Union and Euler Hermes. A ratio below 1 means that income from risk insurance is insufficient to cover reimbursements claimed, indicating a subsidy component in the risk premia charged to exporters. The Berne Union started to break-even in the mid 1990s and Euler Hermes in 1998 as exemplified by a ratio larger than 1. Secondly, the so-called *Knaepen-Package* ensures (as part of a more general OECD Consensus Arrangement) an international level playing-field by establishing guiding principles for minimum risk-based premium fees for country and sovereign risks. The Knaepen-Package has become effective in 1999. The *European Union*[22] has taken a third regulatory action by restricting ECAs' activities to non-marketable risks (in contrast to marketable risks). The rationale behind this decision is to eliminate distortions of competition in the export risk insurance market, where private provision is expected to cover the demand at reasonable risk premia. According to the EU short-term business to OECD core members represents such a case. Hence, ECAs are restricted from short-term public export guarantees that aim at covering export risks to OECD core members with a maturity of less than two years since 1998. Export business with a duration of over two years can still be insured by ECAs.

3 Empirical strategy

In this section we conduct an empirical analysis focusing on the impact of guarantees and political risk on exports. Hence, we test whether Euler Hermes guarantees actually promote German exports and whether political risk hampers German exports. Before presenting the empirical strategy employed, we briefly describe the data in use. Finally, we present the results as well as robustness checks.

3.1 The data

Our analysis relies on data from various sources. To begin with, we use data on German exports provided by the Federal Statistical Office Germany, which is displayed in Table 4 in the appendix. As can be seen, most exports are directed to industrial countries, which amounted to 483 billion Euro or 73 percent of total exports in the year 2003. This fact can be rationalized by the "new trade theory" emphasizing

[21]Support for the adequacy of ECA ratings is provided by the proposals under Basel II. The use of ratings provided by ECAs is explicitly permitted to calculate capital requirements for banks.

[22]For further details see http://ec.europa.eu/trade (22.9.2006).

the importance of intra-industry trade among countries with similar factor endowments.[23] The second most important destination of German exports is Emerging Europe where exports accounted for 13 percent of total exports in 2003, followed by Asia with around 6 percent.

Especially noteworthy is that the export growth dynamics largely stem from non-industrial countries. While exports to industrial countries grew by about 6 percent per annum over the period 1991 to 2003, export growth to non-industrial countries was nearly twice as high (around 12 percent per annum). Eastern Europe experienced the strongest growth of German exports, with exports growing on average at 20 percent per annum from 11 billion Euro shortly after the fall of the iron curtain to 90 billion Euro in 2003. The dynamic development in this region, the scrapping of trade barriers as well as the region's geographic proximity to Germany have certainly underpinned this trend. Exports to Asia developed dynamically as well with around 11 percent per annum growth. Note that the export figures for Asia reflect the Asian crisis in 1997, with exports plunging in the following two years and the pre-crisis level only to be reached again in 2000. While export growth to the Western Hemisphere[24] is slightly higher than to industrial countries, Africa and the Middle East registered lower growth rates per annum (both around 4.5 percent).[25] To sum up, industrial countries are by far the largest export destination for Germany, but the export growth dynamics are considerably higher in non-industrial countries.

Next, we take a closer look at the data on all newly granted guarantees for the period 1991 to 2003, which were kindly provided by Euler Hermes.[26] Table 5 displays the development of Euler Hermes guarantees over time and by region. Clearly, Asia and Emerging Europe, i.e. Eastern Europe, CIS countries, Malta, Cyprus and Turkey, receive most export guarantees over the sample period amounting to an average of 4.4 and 4.0 billion Euros per year, respectively. Note that as for exports, the Asian crisis took its toll on the total amount of guarantees.[27] Countries in the Middle East as well as in the Western Hemisphere receive on average around 2.5 billion per year. In contrast, Africa received least of all non-industrial regions. It should be noted that the short-term guarantees granted for exports to industrial countries have faded away since 1998 in response to a new EU Commission Directive that limits export credit insurers' activity to so-called "non-marketable risks".[28] From then on ECAs had to abstain from short-term business in the EU and the OECD core countries.[29]

[23] See for instance Helpman (1998).

[24] The United States and Canada are part of the subgroup industrial countries.

[25] Note the strong growth of exports to the oil exporting countries in the Middle East since 2000, implying that Germany benefitted to some extent from their increasing oil revenues.

[26] Coverage of risks by guarantees typically distinguishes between before and after the shipment. The data used in the analysis represents cover after shipment.

[27] Note that the strong decline in Euler Hermes guarantees in the aftermath of the Asian crisis supposedly was driven by supply as well as demand side factors.

[28] The annual reports on export credit guarantees of the Federal Republic of Germany provide a constant update on such issues (AGA, 2001), (AGA, 2002) and (AGA, 2003). For more details on the jurisdiction see the European Union website http://europa.eu.int.

[29] Exceptions to this rule are Cyprus, Czech Republic, Estonia, Hungary, Republic of Korea, Latvia, Lithuania, Malta, Mexico, Poland, Slovak Republic, Slovenia and Turkey, whereby the new EU accession countries are viewed as marketable risk starting from 2005. Note that these countries do not show up as industrial countries anyway in the above classification of regions.

Note, however, that an interesting picture emerges by looking at the percentage of total exports covered by Euler Hermes guarantees. Even though the share of total exports covered has been declining over time with an all time high of 12.3 percent in the late 1970s (AGA, 2004) to around 3.5 percent in the last decade (see also Table 6), public export credit guarantees still play a vital role in higher risk regions. Roughly speaking, every fourth unit of exports was publicly insured over the sample period to Western Hemisphere (23 percent), the Middle East (20 percent) and Africa (18 percent), followed by Asia with 16 percent and Eastern Europe with 8 percent. The relative export coverage to industrial countries is negligible.

A second source of data in the empirical analysis is the International Country Risk Guide (ICRG) indicator on political risk provided by the Political Risk Services Group (PRS). This quantitative indicator is a blend of political factors that potentially influence the risk of investing in a country. The analysts' subjective opinions on the following components (with weights in brackets) constitute the political risk indicator: Government stability (12), socioeconomic conditions (12), investment profile (12), internal conflict (12), external conflict (12), corruption (6), military in politics (6), religion in politics (6), law and order (6), ethnic tensions (6), democratic accountability (6), bureaucratic quality (4).[30] The original indicator runs from zero (very high risk) to one hundred (very low risk). For better intuition, we inverted the index. Hence, a higher political risk indicator implies higher risk in the importing country. As a robustness check, we also employ the ICRG's composite risk index that consists of the political, financial and economic risk indicator.

The World Development Indicators constitute a third data source for instance for data on consumer price indices, gross domestic product, gross fixed capital formation as well as population size. Individual variables and their sources are described in detail in the appendix. The appendix also contains summary statistics as well as correlation matrices for the variables used in the regression analysis.

3.2 Empirical model

In the literature, international trade flows have often been studied along the lines of the gravity equation.[31] The basic idea behind a gravity equation is related to physics and the fact that "gravitational attraction between two bodies depends upon the mass of each body and the distance separating them" (Baldwin, 1994, p.119). In other words and in the context of this paper: Trade flows between Germany and other countries depend on countries' economic size and all kinds of transaction costs, ranging from pure transportation costs and information costs to hidden transaction costs like political risk.[32]

As attrition in physics, certain frictions will impede the exchange in goods or capital. As a consequence, the gravity model has been augmented by various factors

[30]Since this political risk indicator also incorporates issues like corruption and law and order it is sometimes interpreted as an indicator of institutional quality.

[31]This methodology dates back to Tinbergen (1962) and Pöyhönen (1963), who first estimated a gravity equation for trade flows.

[32]Note that Tinbergen (1962, p.263) also pointed out that distance would not only proxy for transportation but also for information costs. An influential paper in this context is Portes and Rey (2005) who conclude that information asymmetries significantly contribute to the explanation of cross-border equity as well as trade flows.

thereby controlling for different frictions in international trade and capital flows. The introductory quote by Tinbergen represents such a case in point. Consequently, we include an indicator for political risk as an important friction in our analysis of German exports. Note that public export guarantees aim at alleviating this friction. By combining these two variables in our empirical gravity model, we reconcile recent work on export behavior from Egger and Url (2006) and Meon and Sekkat (2004). While the former takes account of public export guarantees, the latter incorporate an indicator of political risk.

The gravity model, albeit initially an empirical approach, has been deduced from a variety of economic theories on goods and asset trade, respectively. The first paper in this regard is Anderson (1979) who derives the gravity model from an expenditure point of view, i.e. he assumes that national expenditure on tradeable commodities is a function of income and population. Bergstrand (1985) provides a microeconomic foundation of the gravity model using a general equilibrium framework. Concerning the volume of trade, for instance Helpman (1998) derives an equation in which the volume of trade depends positively on the trading partners' GDP levels. Empirical studies on trade flows using the gravity equation are numerous. Among recent studies is Rose (2004) who uses the gravity model to estimate the impact of the World Trade Organization on the volume of trade between a large number of countries.

3.3 The gravity equation

We estimate a specification of the gravity model along the lines of Egger and Url (2006). It is important to note, however, that we have added a crucial variable when determining the effect of guarantees on exports, namely political risk.[33] Our baseline equation is as follows:

$$\begin{aligned} \ln(Exports_{c,t}) &= \mathrm{c} + \alpha \ln(gdp_{c,t}) + \beta \ln(dist_c) + \gamma \ln(pop_{c,t}) + \delta \ln(guarantees_{c,t}) + \\ &+ \theta \ln(risk_{c,t}) + \eta \ln(other_{c,t}) + \mu_c + \mu_t + \varepsilon_{c,t}. \end{aligned}$$

where subscript c for the receiving country and t for time (year). The *dependent* variable is:

- $ln(exports_{c,t})$: Log of real exports from Germany to country c in year t

The set of *regressors* include[34]:

- $ln(gdp_{c,t})$: Log of real GDP of country c in year t
- $ln(dist_c)$: Log of distance between Germany and country c
- $ln(pop_{c,t})$: Log of population for country c in year t
- $ln(guarantees_{c,t})$: Log of real newly granted guarantees for country c in year t

[33] All variables are converted in real terms by using the appropriate consumer price indices and are in denominated in Euro or have been converted to Euro as described in the appendix.

[34] See Appendix to this chapter for sources and exact definition of variables.

- $ln(risk_{c,t})$: Log of political risk index in country c in year t
- $ln(other_{c,t})$: Other control variables for country c in year t

Note that the data-set exhibits two dimensions and thus two unobserved effects may exist: country μ_c and time μ_t specific effects. The error term $\varepsilon_{c,t}$ is assumed to have a mean of zero as well as a constant variance.

We use several estimation techniques to check the robustness of our results. First, we use a standard random effects model as a benchmark. In line with Egger and Url (2006) we also estimate a Mundlak (1978) type random effects model. They argue that the Mundlak specification has the advantage to capture short- as well as long-run effects of the various variables. This is done by including the averages over time for each time-variant variable (see Mundlak (1978), Egger and Pfaffermayr (2004) and Egger and Url (2006)). The coefficient on each variable approximates the short-run impact and the coefficient on the averages over time of each variable accounts for the additional long-run impact.[35]

Finally, we estimate the above equation using a dynamic estimator which we expect to reflect the long run impact more appropriately. There are several reasons to assume that past exports exert a significant effect on current exports. With regard to the latter, Bun and Klaassen (2002) have argued that repeated interactions between business partners as well as sunk costs related to distribution and service networks warrant a dynamic specification of the model. Omitting past exports from the regression equation would hence lead to inconsistent results.

Choice of variables

The determinants of German exports in this paper include the "usual" gravity factors such as GDP and distance as proxies for market size and information costs. As additional controls, guarantees, an index covering political risk in the importing country as well as other control variables proxying for the importer country's relative factor endowments, namely the gross fixed capital formation in percent of GDP as well as the share of manufacturing imports of total merchandize imports in debtor countries, are included in the baseline specification. We expect the following effects of the explanatory variables:

GDP: GDP is commonly used in gravity models as a proxy for market size. Given that we analyze exports from Germany to other countries, we only include the recipient country's GDP. The rationale behind this variable is that international demand for German exports is ceteris paribus higher in larger economies. In addition, German exporters have more opportunities to sell their products in larger markets and the gain experience the more customers they trade with in a country, i.e there are economies of scale when dealing with larger countries.

Distance: We expect a negative coefficient for distance, which we consider to be a proxy for transportation as well as information costs. Note that a positive effect could also be rationalized should the correlation of a country's business cycle with Germany's business cycle decrease with distance.

[35]Note, originally the averages of the variables "between effects" were included to control for correlations between random effects and explanatory variables.

Guarantees: At the heart of this study lies the question whether official export credit guarantees indeed foster exports. For several reasons a positive coefficient for guarantees is expected: First, Abraham and Dewit (2000) show in a theoretical model of official export insurance that export guarantees can reduce the profit uncertainty of risk averse exporters, which stems from default risk on the importer's side. This risk reduction increases exports to (risky) markets where exporting companies would not sell otherwise.[36] As shown in the opening remark, assistance in *opening up difficult markets* is indeed one of Euler Hermes' goals. Second, it is a well-established fact in the literature that the decision to enter foreign markets entails substantial sunk costs. In the presence of such entry costs, Dixit (1989) shows theoretically that current market participation is affected by prior experience. This insight was empirically confirmed among others by Roberts and Tybout (1997), who find that prior export experience increases the probability of exporting by as much as 60 percentage points. Bernard and Wagner (2001) find a largely comparable effect for German data. Furthermore, in an uncertain environment exporters may be reluctant to reverse their decision to export later, even when the initial stimulus in form of a favorable exchange rate or export promotion is removed. Hence, a transitory shock can lead to a permanent change in the export structure. This phenomenon is called "hysteresis". Bernard and Jensen (2004) argue that public export agencies may have a positive effect on export participation by gathering information on foreign markets and thereby reducing entry costs.[37] In a similar vein, if public guarantees initiate an export relationship, learning effects on the side of the exporter as well as the export credit agency are expected, which make future exports to this country more likely.[38] Finally, maintaining export relations/trade credits during times of financial distress allows exporters to profit from the strong export growth during the recovery phase as for instance in the aftermath of the Asian Crisis in 1997/98.

Political risk: As we have mentioned above, one contribution of this paper is to estimate the impact of political risk on exports. We expect political risk to exert a negative impact on trade flows given the fact that higher political risk poses an important friction for exporters. Hence, we anticipate a negative coefficient on political risk: Countries with higher political risk receive ceteris paribus less exports, i.e political risk impedes trade flows. Furthermore, controlling for political risk is desirable when measuring the export promotion effect of guarantees on exports, as the omitted variable bias is reduced.

Other: As in Egger and Url (2006), we include a country's gross fixed capital formation to GDP ratio as well as a country's share of manufacturing imports in overall imports to proxy for a country's relative factor endowment. We expect positive coefficients as German trade is dominated by "intra-industry trade", i.e. exports are ceteris paribus directed to countries with a similar factor endowment. Furthermore, we include time dummies for each year to control for time specific events.

[36] Abraham and Dewit (2000) demonstrate that this policy objective can be achieved without subsidization by charging a fair premium.

[37] In fact, contemporaneous export promotion does not turn out to be significant in their estimations, but "the selection of large plants may be exactly the wrong sample to observe the effects of state export promotion, as most agencies explicitly target small and medium firms (Bernard and Jensen, 2004).

[38] On the exporters' side an importer-exporter business relation is established and a better understanding of the business climate unfolds. On the export insurance side the country risk expertise is enhanced and credit risk tools are further improved.

4 Empirical Results

This section presents the results from our regression analysis. We first present the specification based on the random effects model as well as the Mundlak (1978) type random effects regressions as a benchmark for our results against Egger and Url (2006). Furthermore, we estimate a dynamic version of the gravity model, i.e we explicitly allow past exports to have an impact on current exports, by using a system GMM estimator introduced by Blundell and Bond (1998). Secondly, we check for the robustness of the results with regard to adding additional variables as well as splitting the sample across time and country groups.

4.1 Baseline specification

The starting point of our empirical analysis is given by the equation in the last section without controlling for risk. Table 1 shows the results without (columns 1 and 2) as well as with political risk (columns 3 and 4).

Columns (1) and (2) contain the results for the random effects GLS and a Mundlak-type random effects model. The model fits the data well. We obtain a high R-squared which is typical for gravity models. The effect of guarantees on exports is positive and significant providing support for the hypothesis that guarantees indeed lead to higher exports. The average overall effect of guarantees on exports is comparable to the one found in the literature by Egger and Url (2006).[39] The coefficients of the other explanatory are as expected: German companies export more to countries with larger market size, measured by GDP, while more populous countries receive ceteris paribus less exports, i.e. countries with lower per capita income obtain fewer exports. Note that a higher market size reflects a combination of demand and supply factors as larger countries demand more goods and at the same time offer more opportunities for exporters such as economies of scale with regard to market entry costs. The positive coefficient on the ratio of capital formation to GDP as well as a larger share of manufacturing imports in total imports is associated with more imports supporting the hypothesis that countries with a similar factor endowment receive more exports. Finally, the coefficient on the distance variable is negative and significant, which is rationalized by the fact that transportation as well as information costs are likely to rise for countries situated further away from Germany.

In columns (3) and (4) we proceed to include our proxy for political risk in the regression. Again we use a random effects GLS and a Mundlak-type random effects model. The results clearly confirm that political risk represents an important friction in international trade. Countries with less stable governments, a higher probability of internal or external conflict and a higher level of corruption deter German exporters. In fact, a one percent rise in the political risk index leads to a reduction of about 0.1 percent in the short run and 0.65 percent in the long run. With regard to guarantees we continue to find a positive and significant albeit smaller effect on exports. By controlling for political risk, we reduce the omitted variable bias, i.e. the problem that guarantees themselves are associated with political risk. After controlling for

[39] This will be discussed at length below.

Table 1: Static Specification for Various Estimators

	RE-Standard	RE-Mundlak	RE-Standard	RE-Mundlak
Guarantees	0.028***	0.023***	0.021***	0.019***
	(3.9)	(3.15)	(3.18)	(2.83)
GDP	1.032***	1.115***	0.965***	0.981***
	(20.99)	(9.56)	(20.48)	(9.39)
Population	-0.158***	-0.914***	-0.080*	-1.208***
	(3.31)	(4.43)	(1.69)	(6.15)
Distance	-0.794***	-0.743***	-0.780***	-0.716***
	(10.44)	(10.22)	(11.6)	(11.51)
Capital Formation	0.391***	0.364***	0.348***	0.344***
	(8.62)	(7.65)	(8.17)	(7.86)
Manufacturing Imports	0.810***	0.728***	1.058***	0.952***
	(8.49)	(7.1)	(11.75)	(10.02)
avg. Guarantees		0.202***		0.183***
		(5.12)		(5.35)
avg. GDP		-0.352**		-0.329**
		(2.51)		(2.53)
avg. Population		0.842***		1.313***
		(3.94)		(6.32)
avg. Capital Formation		0.105		0.017
		(0.49)		(0.09)
avg. Manufact. Imports		-0.229		-0.534
		(0.63)		(1.6)
Political Risk			-0.146***	-0.100**
			(3.61)	(2.46)
avg. Political Risk				-0.650***
				(2.75)
No. of Obs.	1193	1193	1057	1057
No. of Countries	130	130	112	112
R^2	0.95	0.96	0.95	0.96

Absolute value of t-statistics in parentheses. All variables are in logarithms. Constant, region and time specific effects included.* significant at 10; ** 5 and *** 1 percent

political risk, we still observe in columns (3) and (4) that more guarantees lead ceteris paribus to larger export volumes.

The regression analysis presented so far can be challenged in two different aspects. First, the underlying data generating process is potentially dynamic (see Bun and Klaassen (2002)) and thus the estimates for both short- and the long-run effects will be biased (Egger and Pfaffermayr, 2004). Secondly, the empirical specification may suffer from an endogeneity problem which would lead to biased and inconsistent coefficients. The argument is that the causality may also run the other away around with exporters demanding more guarantees for countries where they export more.

In order to deal with both issues we estimate a dynamic specification of the gravity model. However, given that the "within estimator" (fixed effects regression) yields biased estimates when a lagged dependent variable is included (Nickell, 1981) we use an instrumental variable approach. Following Blundell and Bond (1998) we use the so-called system generalized method of moments estimator which uses lagged

levels as instruments in the difference equation and additionally first differences for the level equation. Our use of the system-GMM estimator is also partly driven by the high persistence in the export series. Blundell and Bond (1998) show that a high persistence in the series leads to weak instruments in the difference GMM estimator and can thus be subject to bias. The use of additional instruments under the system GMM estimator results in much smaller biases and greater precision in the estimates.

Table 2: Dynamic Specifications

	All Countries	Non-Industrial Countries	Non-Industrial Countries before 1999	Non-Industrial Countries after 1998
$Exports_{i,t-1}$	0.500***	0.461***	0.582***	0.432***
	(4.83)	(4.63)	(5.03)	(2.63)
Guarantees	0.030**	0.047***	0.047***	0.063**
	(2.44)	(2.88)	(2.63)	(2.13)
GDP	0.457***	0.497***	0.319***	0.480***
	(4.23)	(4.71)	(2.6)	(3.82)
Population	0.024	0.017	0.029	0.009
	(0.66)	(0.5)	(0.97)	(0.14)
Distance	0.357***	0.232**	0.112*	0.289
	(3.86)	(2.29)	(1.81)	(1.45)
Capital Formation	0.270***	0.271***	0.282***	0.241***
	(2.81)	(4.23)	(3.71)	(3.06)
Manufacturing Imports	0.393*	0.299*	0.282	0.244
	(1.83)	(1.75)	(1.57)	(1.22)
Political Risk	0.198**	0.316***	0.309***	0.330*
	(2.46)	(3.65)	(2.73)	(1.82)
No. of Obs.	985	791	423	368
No. of Countries	112	91	84	84
Hansen p-value	0.09	0.32	0.15	0.38
Hansen df	48	48	20	26
AR(1) p-value	0.00	0.00	0.02	0.05
AR(2) p-value	0.06	0.07	0.18	0.59

Windmeijer corrected t-statistics in parentheses. All variables are in logarithms. Constant, region and time specific effects included.* significant at 10; ** 5 and *** at 1 percent.

Table 2 presents the results of the dynamic specification of equation 1. There are two important take-aways from column (1). First, the results confirm that the data generating process is dynamic. The coefficient of the lagged dependent variable (exports in the previous period) is positive and significant. Secondly, the validity of the instruments chosen has to be examined. This is done by the Hansen test which explicitly tests the validity of the instruments. The test statistics do not suggest that there is an endogeneity problem present in our empirical model. The Hansen test is insignificant at the 5 percent level implying that the instruments are valid. The dynamic specification shows that the long run effect of guarantees on exports is given by an elasticity of around 0.06 and thus much smaller than based on the Mundlak specification.

The *crucial question* is whether this statistical effect is *economically large*. Our coefficient of interest, δ, is positive and significant in all specifications but exhibits quite some variation over the different specifications, ranging from 0.021 (random effects specification with political risk) to 0.20 (short-term plus long-term effect (0.019+0.183) in the Mundlak specification). As a consequence, the implied multiplier effect of public export guarantees varies as well. In order to get an idea of the magnitude, we use the estimated coefficient of the specification in Table 2 column (1) (δ=0.03/(1-0.5)=0.06). Since the dependent as well as the independent variable of interest is denoted in logarithms, the result can be interpreted as an elasticity. A 1 percent increase in guarantees leads to an 0.06 percent increase in exports. To better grasp the magnitude, we can compute an *average elasticity*. Export credit guarantees granted per year and country average 172 million Euro and the average amount of German exports is about 4.8 billion Euro. A 1 percent increase of guarantees (1.7 million Euro on average) leads consequently to an increase of exports amounting to nearly 2.9 million Euro. We therefore find an economically relevant multiplier in height of 1.7.[40]

This result is noteworthy for three reasons. Provided that the long-term effect are correctly captured by the dynamic specification, this result indicates that export promotion is indeed successful. Secondly, while the empirical results are pretty much in line with (Egger and Url, 2006), whose preferred specification yields a multiplier in height of 2.8, it is noteworthy that the specification closest to them[41] yields a much higher multiplier (Table 1, column (2)) of around 6. This specification clearly represents our upper bound for the multiplier effect. The magnitude of the multiplier compared with the multiplier of the dynamic specification gives some indication that the former multiplier is potentially biased upwards.

Next, we present the results for non-industrial countries only - first for the whole time period and second for two sub-periods. There are two arguments for this approach. First, guarantees are provided as an insurance against political risk which is potentially more important in non-industrial countries, i.e. it is especially interesting to confirm the impact of guarantees and political risk for this sub-group of countries. Secondly, the *Knaepen-Package* which came into effect in 1999 (see section 2.2) set new standards for the calculation of risk premia. The latter could have induced a structural break in 1999. Based on a (rather crude) calculation in line with Dewit (2001), which is shown in Table 3 in the appendix, we find for instance that Hermes claims appear to contain a subsidy component until 1998/1999. We therefore run the regression for the period before and after the new regulation came into effect.

The overall results for non-industrial countries (column 2) are very much in line with the dynamic baseline specification comprising the full sample as guarantees and political risk turn out with the same sign and significant. Yet there is an important caveat. The multiplier of guarantees (0.047/(1-0.461)*1498/200) is now equal to 0.65 which implies that guarantees induce a less than proportionate increase in

[40] The short run effects are typically substantially smaller than one given that most guarantees are granted for a period of more than one year. Hence, while newly granted guarantees in a given year show up in the respective year exports occur only after considerable delay.

[41] The specification only differs in the explanatory variable on manufacturing imports. While Egger and Url express this variable in percent of total imports our variable is expressed in percent of merchandise imports. We would suspect that this difference is negligible.

exports in the long run.[42] Hence, the country sample matters for an evaluation of the effectiveness of export guarantees.

In addition, we run the dynamic regression for two sub-periods, before and after 1999, i.e. before and after the *Knaepen-Package* came into effect. The results in columns (2) and (3) of Table 2 in fact suggest that the change in regulation led to a significant change of the impact of guarantees on exports: While guarantees have a significant effect in both periods, the multiplier differs substantially.[43] During the first period, the multiplier is given by (0.047/(1-0.58)*1258/216)=0.65, while the respective multiplier in the period is given by (0.064/(1-0.43)*1774/181)=1.09. Consequently, the new regulation appears to have had a positive effect by reducing the subsidy component (see Table 3) as well as to increase the export generating effect of guarantees. For the period from 1999 onwards, we find that guarantees have led to a more than proportionate effect on exports, i.e. one unit of guarantees ceteris paribus led to 1.09 units of exports on average.

4.2 Robustness of the results

In this section, we check the robustness of our results in a number of ways as shown in Table 11. First, we introduce the real exchange rate as a further control variable.[44] As expected the real exchange rate turns out to have a positive and significant impact on exports. A depreciation of the German real exchange rate results results in higher German exports to the respective country. This result holds for the random effect, the Mundlak type as well as the dynamic specification. With regard to guarantees and political risk our results remain largely unchanged. In fact, the long run multiplier of guarantees is equal to 2 for the overall sample and 1.08 for non-industrial countries after 1998.[45]

Secondly, we run a regression including an interaction term for guarantees and political risk. The idea behind this is that the effect of guarantees on exports is determined by the respective political risk. We first included both variables and the interaction term in the regression. However, given the large correlation between guarantees and the interaction term, both variables turned out to be insignificant. Hence, we decided to show only the results for the interaction term when guarantees are excluded. The result confirms that the interaction term is significantly positive. However, given that we cannot test directly against guarantees we refrain from further interpretation.

Finally, we use the composite risk indicator provided by PRS Group. This indicator comprises political, financial and economic risk with the weights given by 50, 25 and 25 percent, respectively. The coefficient for the composite risk indicator has the expected negative sign (higher risk leads to less exports) and is significant. All other coefficients remain largely unchanged.

[42] Note that the average amount of guarantees and exports on which this calculation is based varies with the sample, i.e. guarantees/exports are on average higher/lower for non-industrial countries than for the full sample.

[43] One may also hypothesize that export guarantees for capital goods lead to a higher multiplier than consumption goods. Future research may deal with this issue.

[44] In a related research question Dell'Ariccia (1999) investigates in a gravity framework the impact of exchange rate volatility on international trade.

[45] Results for non-industrial countries are not shown but can be obtained upon request.

5 Conclusion

In this paper, we present empirical evidence for the effect of official export credit guarantees on the volume of exports. Our results are threefold: First, Euler Hermes is indeed able to foster exports. Specifically, we find an economically significant multiplier of about 1.7 in the dynamic specification of the gravity model, which is considerably smaller than the multiplier based on static panel estimators. In addition, our results confirm that the estimates with regard to the effectiveness of export credit agencies crucially hinge on the sample of countries and the time period considered. In fact, based on a sample of non-industrial countries alone, we cannot confirm that export guarantees have been effective over the entire period under consideration. However, after a change in regulation introduced by the *Knaepen-Package*, we find that guarantees led to a more than proportionate increase in exports of a magnitude of around 1.09 even for the sub-group of non-industrial countries.

Second, we find strong evidence that political risk has a detrimental effect on exports. In the wording of the gravity literature, political risk constitutes an important friction to international trade activity. This finding confirms an impression voiced already by Jan Tinbergen, which has been largely neglected in the empirical trade literature so far.

Third, we show that a dynamic panel approach is warranted to model international trade in a gravity framework as past exports exert a significant impact on current exports, supporting the hypothesis that repeated interactions between business partners as well as sunk costs related to distribution and service networks should be considered when thinking about the determinants of international trade flows.

Even though we are able to find evidence for a trade promoting effect of Euler Hermes on German exports, still, a note of caution is warranted. It is important to bear in mind that we only tackled one of the issues central to an overall assessment, encompassing benefits and costs of an export credit agency. With respect to the latter, questions about the costs of public export intervention (e.g. the considerable losses accumulated by Hermes in the 1980s and early 1990s, which consequently had to be covered by the state budget) and possible market distortion stemming from the state interference are beyond the scope of this paper. Even though the potential hidden subsidy component of risk premia has been definitely reduced to a substantial extent, one has still to bear in mind that the business models of public export credit agencies and private sector insurers differ. Official ECAs are usually covered or re-insured by the government and consequently do not have to hold capital provision for contingent loan losses. Furthermore, their financial goal is often simply to break-even. Mandating ECAs to break-even hence carries economic costs. Instead of investing in an ECA, the government could alternatively invest in financial assets with a comparable risk of loss but higher yield returns. Hence, with regard to the benefits and costs of an export credit agency, one should take the *opportunity costs* of maintaining such an institution into account as well. This idea has been recently voiced by UK's Department of Trade and Industry (DTI, 2005). There are also a number of effects which need to be considered in an evaluation of ECAs. Among these are the possible impact on output, employment and the public budget due to increased export activity. Further research on public export credit agencies is clearly desirable.

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6 Appendix

Countries in the sample

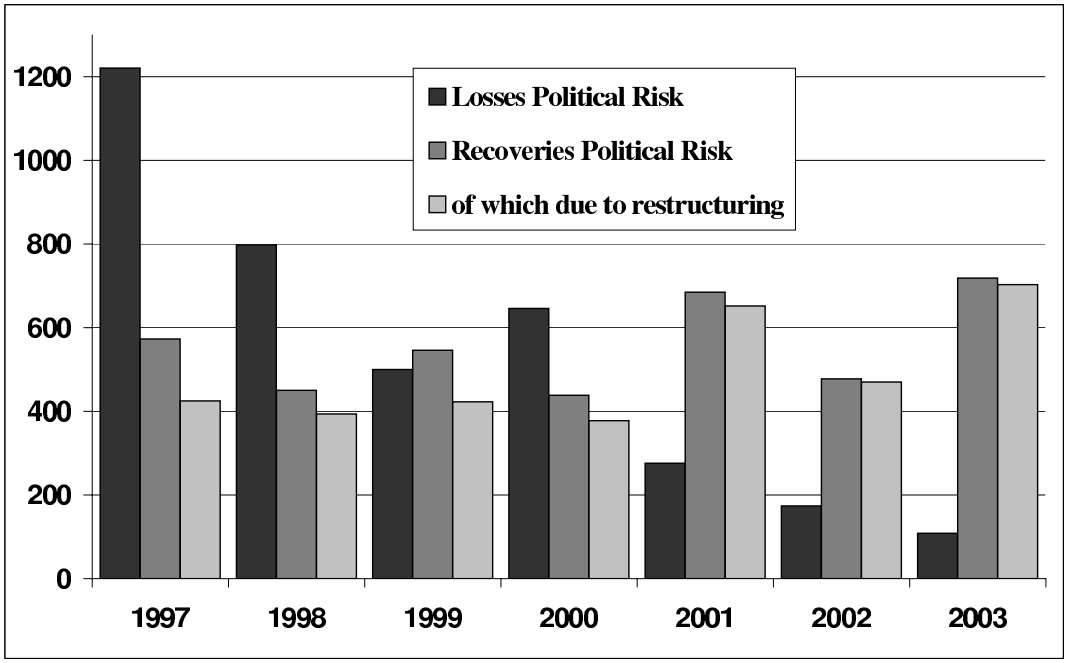
Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Greece, Ireland, Island, Italy, Japan, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Albania, Algeria, Argentina, Armenia, Azerbaijan, Bangladesh, Bahrain, Belarus, Bolivia, Botswana, Brazil, Bulgaria, Cameroon, Chile, China, Columbia, Costa Rica, Congo Republic,Cote d'Ivoire, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea-Bissau, Honduras, Hungary, India, Indonesia, Iran, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Lithuania, Madagascar, Malaysia, Mali, Mexico, Moldova, Mongolia, Morocco, Namibia, Nicaragua, Nigeria, Oman, Pakistan, Panama, Papa-New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russia, Saudi-Arabia, Senegal, Singapore, Slovak Republic, Slovenia, Sri-Lanka, South Africa, Syria, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, South Korea, Uganda, Ukraine, United Arab Emirates Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe.

Definitions and Sources of variables

- **Log Exports$_{c,t}$:** Logarithm of real exports from Germany to country c in year t (in Euro). As deflator, the CPI (base year 2000) for Germany from the World Bank is used.
  Source: Federal Statistical Office Germany and World Development Indicators 2005.
- **Log Guarantees$_{c,t}$:** Logarithm of real newly granted guarantees by Euler Hermes Kreditversicherung AG for country c in year t (in Euro). As deflator, the CPI (base year 2000) for Germany from the World Bank is used.
  Source: Euler Hermes Kreditversicherung AG and World Development Indicators 2005.
- **Log GDP$_{c,t}$:** Logarithm of annual GDP of country c in year t (in constant 2000 USD). The figures are converted to Euro at the current average annual exchange rate (line rf), taken from the IFS.
  Source: World Development Indicators 2005 and IMF's International Financial Statistics.
- **Log Distance$_c$:** Logarithm of greater circle distance between Germany and country C. The exact definition is: $d(\delta_G, \phi_G, \delta_C, \phi_C) = r * cos^{-1}(sin\delta_G * sin\delta_C + cos\delta_G * cos\delta_C * cos(\phi_G - \phi_C))$ where δ_G, δ_C are latitude and ϕ_G, ϕ_C longitude of Germany and country c, respectively. r is the radius of the earth (6317 kilometer).
  See http://www.mathworld.wolfram.com/GreatCircle.html.
  Source: Rose (2004).
- **Log Population$_{c,t}$:** Logarithm of population size of country c in year t.
  Source: World Development Indicators 2005.
- **Log Political risk$_{c,t}$:** Logarithm of political indicator for country c in year t. The index runs from 0 (very high risk) to 100 (very low risk).
  Source: Political Risk Services.
- **Log Capital Formation$_{c,t}$:** Logarithm of gross fixed capital formation in percent of GDP for country c in year t.
  Source: World Development Indicators 2005.
- **Log Manufacturing Imports$_{c,t}$:** Logarithm of manufacturing imports in percent of total merchandise imports for country c in year t.
  Source: World Development Indicators 2005.
- **Log Real Exchange Rate$_{c,t}$:** Logarithm of foreign consumer price index multiplied by nominal exchange rate divided through German consumer price index. The real exchange rate is indexed to the base year 2000.
  Source: IMF's International Financial Statistics.

Figure 1: Claims due to and Recoveries from Political Risk (in million Euro)



Source: AGA (2004)

Table 3: Premia, recoveries and claims on official export credit insurance for Berne Union members and Euler Hermes (in billion USD)

	Premia (1)	Recoveries (2)	Claims (3)	Berne Union* [(1)+(2)]/(3)	Hermes**
1985-1989	9.26	17.97	47.13	0.58	0.43
1990-1994	15.38	23.61	65.71	0.59	0.33
1995	3.73	8.31	11.81	1.02	0.62
1996	3.66	9.11	10.56	1.21	0.72
1997	3.71	8.3	5.25	2.29	0.83
1998	3.65	7.35	4.77	2.31	1.02
1999	3.68	6.14	6.14	1.60	1.23
2000	3.98	6.11	5.33	1.89	1.10
2001	3.83	7.77	4.44	2.61	1.51
2002	4.11	7.02	5.25	2.12	1.67
2003	4.58	8.68	4.04	3.28	2.43

Source: Dewit (2001) update by Berne Union (2005) for Berne Union members and AGA (2004) for Euler Hermes, authors' calculation.
* Premia plus recoveries as a fraction of claims.
** Premia, recoveries and claims for Euler Hermes are not displayed, but both ratios are computed equally in accordance to Dewit (2001).

Table 4: Exports by region (in billion Euro)

Year	IC	Asia	Africa	ME	WH	EE
1991	235.5	14.1	6.2	10.3	6.2	11.1
1992	239.5	15.6	6.1	11.5	6.8	16.9
1993	224.8	20.1	5.5	10.3	7.6	29.4
1994	249.8	24.0	5.9	10.5	8.5	32.0
1995	276.8	27.9	6.7	9.8	9.5	38.0
1996	282.8	29.0	6.2	10.0	9.7	43.6
1997	306.3	29.6	6.7	11.5	12.1	54.0
1998	334.6	23.5	7.3	11.6	14.0	59.5
1999	389.2	24.4	7.5	12.4	14.0	55.9
2000	450.7	31.7	8.4	13.9	15.0	69.4
2001	474.7	36.4	10.0	15.9	16.1	77.1
2002	477.4	39.9	9.8	16.7	15.0	84.0
2003	483.8	43.2	10.2	17.0	13.0	90.1
Average	340.5	27.6	7.4	12.4	11.3	50.9

Source: Federal Statistical Office Germany, authors.
Note: IC-Industrial Countries, ME-Middle East, WH-Western Hemisphere and EE-Eastern Europe.

Table 5: Euler Hermes newly granted guarantees by region (in billion Euro)

Year	IC	Asia	Africa	ME	WH	EE
1991	1.3	2.9	1.8	3.7	2.0	1.3
1992	1.0	2.9	1.7	4.7	1.8	3.4
1993	1.3	4.1	1.2	2.6	2.1	5.5
1994	1.1	5.1	1.7	2.7	2.5	3.8
1995	1.3	6.4	1.3	2.3	2.4	2.6
1996	2.6	6.2	1.5	1.6	2.3	3.5
1997	1.0	6.2	1.2	1.8	2.9	5.1
1998	0.5	3.9	1.0	1.8	3.2	4.7
1999	0.3	4.1	1.0	1.3	2.5	3.8
2000	0.6	4.1	2.6	2.1	3.4	4.8
2001	0.4	5.0	0.9	2.5	3.1	3.8
2002	1.0	3.5	0.9	3.0	2.9	4.7
2003	1.2	3.4	1.0	2.6	2.9	4.6
Average	1.0	4.4	1.4	2.5	2.6	4.0

Source: Euler-Hermes, authors.
Note: IC-Industrial Countries, ME-Middle East, WH-Western Hemisphere and EE-Eastern Europe.

Table 6: Overview of Guarantee Business

Year	Exports*	Newly Granted Guarantees*	Guarantees as % of Exports*	Cover Applications	Total Ceiling	Granted Guarantees
1991	283.6	13.2	4.7	-	-	-
1992	296.4	16.0	5.4	50.4	92	82.3
1993	297.8	17.3	5.8	43.2	92	85.2
1994	331.0	17.4	5.3	31.6	97.1	92.1
1995	368.9	17.0	4.6	29.8	99.7	91.9
1996	381.5	18.0	4.7	26.7	99.7	97.1
1997	420.5	18.8	4.5	30.2	102.3	99.1
1998	450.5	15.4	3.4	23	109.9	100.9
1999	503.5	13.4	2.7	22.5	112.5	101.1
2000	589.3	19.5	3.3	21	112.5	106.1
2001	630.3	16.5	2.6	21.4	117.6	102.7
2002	642.9	16.4	2.6	22.8	117.6	103
2003	657.4	16.0	2.4	22.7	117	102.9
Average	450.3	16.5	4.0	28.8	105.8	97.0

Source: Euler Hermes, Federal Statistical Office Germany
* Authors' calculations based on the data set
Note: All variables in billions of Euro

Table 7: Summary Statistics

Non-Industrial Countries		Mean	Std.	Min	Max	Obs.
Exp.	Euro (bill.)	0.75	1.88	0.00	18.26	1892
Guaran.	Euro (bill.)	0.11	0.27	0.00	2.95	1749
GDP	Euro (bill.)	41.04	111.64	0.03	1333.72	1756
Pop.	million	34.62	133.52	0.04	1288.40	1806
Pol. Risk	Indicator (0-100)	38.21	12.44	11.00	89.75	1305
Dist.	Distance between capital cities	3705.19	1834.64	298.64	8495.06	1881
Cap. Form.	% of GDP	22.87	9.38	-0.69	113.58	1698
Man. Imp.	% of total merchandise imports	67.85	10.88	24.40	88.84	1209
Real Ex. Rate	Index 2000=100	0.91	0.32	0.03	5.16	1567
Comp. Risk	Indicator (0-100)	36.29	11.66	8.75	85.50	1158

Industrial Countries		Mean	Std.	Min	Max	Obs.
Exp.	Euro (bill.)	16.39	17.14	0.12	69.60	270
Guaran.	Euro (bill.)	0.05	0.12	0.00	1.83	268
GDP	Euro (bill.)	867.88	1790.90	4.84	10993.14	299
Pop.	million	36.35	59.20	0.26	290.81	299
Pol. Risk	Indicator (0-100)	16.13	6.04	3.88	35.75	299
Dist.	Distance between capital cities	2075.27	2996.92	151.59	11427.05	286
Cap. Form.	% of GDP	21.23	3.08	15.11	32.52	290
Man. Imp.	% of total merchandise imports	76.00	6.91	44.95	87.38	291
Real Ex. Rate	Index 2000=100	0.97	0.09	0.64	1.33	299
Comp. Risk	Indicator (0-100)	16.88	4.59	6.50	37.50	276

All Countries		Mean	Std.	Min	Max	Obs.
Exp.	Euro (bill.)	2.71	8.15	0.00	69.60	2162
Guaran.	Euro (bill.)	0.10	0.26	0.00	2.95	2017
GDP	Euro (bill.)	161.35	749.01	0.03	10993.14	2055
Pop.	million	34.86	125.66	0.04	1288.40	2105
Pol. Risk	Indicator (0-100)	34.10	14.38	3.88	89.75	1604
Dist.	Distance between capital cities	3490.08	2099.46	151.59	11427.05	2167
Cap. Form.	% of GDP	22.63	8.77	-0.69	113.58	1988
Man. Imp.	% of total merchandise imports	69.43	10.72	24.40	88.84	1500
Real Ex. Rate	Index 2000=100	0.92	0.30	0.03	5.16	1866
Comp. Risk	Indicator (0-100)	32.56	13.13	6.50	85.50	1434

Table 8: Correlation: All Countries

All Countries	Exp.	Guaran.	GDP	Dist	Pop.	Pol. Risk	Cap. Form.	Man. Imp.	Real. Ex. Rate	Comp. Risk	Inter
Exp.	1.00										
Guaran.	0.49	1.00									
GDP	0.87	0.50	1.00								
Dist	-0.55	-0.01	-0.17	1.00							
Pop.	0.42	0.41	0.64	0.16	1.00						
Pol. Risk	-0.59	0.01	-0.43	0.49	0.20	1.00					
Cap. Form.	0.19	0.18	0.08	-0.08	-0.04	-0.16	1.00				
Man. Imp.	0.31	0.10	0.27	-0.08	-0.09	-0.40	0.15	1.00			
Real. Ex. Rate	0.09	-0.09	0.00	-0.09	0.03	-0.09	0.02	0.06	1.00		
Comp. Risk	-0.61	-0.07	-0.48	0.42	0.19	0.90	-0.22	-0.39	-0.11	1.00	
Inter	0.13	0.86	0.22	0.23	0.46	0.51	0.07	-0.12	-0.13	0.40	1.00

All Variables in Logarithms

Table 9: Correlation: Non-Industrial Countries

Non-Industrial Countries	Exp.	Guaran.	GDP	Dist	Pop.	Pol. Risk	Cap. Form.	Man. Imp.	Real. Ex. Rate	Comp. Risk	Inter
Exp.	1.00										
Guaran.	0.80	1.00									
GDP	0.83	0.79	1.00								
Dist	-0.37	-0.11	0.08	1.00							
Pop.	0.46	0.44	0.68	0.19	1.00						
Pol. Risk	-0.34	-0.20	-0.12	0.25	0.34	1.00					
Cap. Form.	0.30	0.20	0.13	-0.16	-0.04	-0.28	1.00				
Man. Imp.	0.26	0.18	0.26	0.09	-0.07	-0.34	0.21	1.00			
Real. Ex. Rate	0.01	-0.07	-0.06	-0.01	0.06	0.03	0.02	0.02	1.00		
Comp. Risk	-0.38	-0.27	-0.21	0.14	0.33	0.84	-0.36	-0.34	-0.04	1.00	
Inter	0.65	0.91	0.73	0.00	0.58	0.20	0.07	0.03	-0.07	0.09	1.00

All Variables in Logarithms

Table 10: Correlation: Industrial Countries

Industrial Countries	Exp.	Guaran.	GDP	Dist	Pop.	Pol. Risk	Cap. Form.	Man. Imp.	Real. Ex. Rate	Comp. Risk	Inter
Exp.	1.00										
Guaran.	0.15	1.00									
GDP	0.73	0.19	1.00								
Dist	-0.43	0.07	0.25	1.00							
Pop.	0.72	0.31	0.97	0.27	1.00						
Pol. Risk	-0.06	0.36	0.04	0.16	0.20	1.00					
Cap. Form.	0.04	-0.02	0.04	0.08	0.04	-0.11	1.00				
Man. Imp.	-0.12	-0.21	-0.29	-0.11	-0.32	-0.30	-0.29	1.00			
Real. Ex. Rate	0.00	-0.14	-0.33	-0.30	-0.32	-0.17	0.16	0.15	1.00		
Comp. Risk	-0.07	0.22	0.01	0.20	0.17	0.73	-0.22	-0.12	0.00	1.00	
Inter	0.06	0.84	0.15	0.15	0.32	0.79	-0.08	-0.30	-0.20	0.54	1.00

All Variables in Logarithms

Table 11: Robustness Check I

	RE Standard	RE Mundlak	S-GMM RER	S-GMM Interaction	S-GMM Composite Risk
$Exports_{i,t-1}$			0.444***	0.489***	0.524***
			(4.7)	(4.69)	(4.89)
Real Exchange Rate	0.209***	0.189***	0.263***		
	(5.7)	(5.24)	(3.97)		
Guarantees	0.021***	0.018***	0.036***		0.030*
	(3.06)	(2.67)	(2.97)		(1.94)
GDP	0.953***	0.951***	0.519***	0.462***	0.449***
	(20.16)	(8.1)	(4.91)	(4.2)	(3.74)
Population	-0.061	-1.149***	-0.032	-0.02	-0.032
	(1.26)	(5.69)	(0.76)	(0.54)	(0.88)
Distance	-0.769***	-0.689***	-0.384***	-0.369***	-0.322***
	(11.95)	(11.23)	(4.46)	(4.02)	(3.52)
Capital Formation	0.335***	0.336***	0.294***	0.273***	0.269***
	(7.76)	(7.6)	(3.16)	(2.88)	(2.81)
Manufacturing Imports	0.927***	0.814***	0.492**	0.410*	0.377*
	(9.91)	(8.32)	(2.18)	(1.92)	(1.89)
Political Risk	-0.174***	-0.124***	-0.247***	-0.301***	
	(4.26)	(2.99)	(2.94)	(2.69)	
avg. Real Exchange Rate		0.801**			
		(2.38)			
avg. Guarantees		0.171***			
		(4.94)			
avg. GDP		-0.298**			
		(2.12)			
avg. Population		1.284***			
		(6.03)			
avg. Capital Formation		-0.021			
		(0.1)			
avg. Manufacturing Imports		-0.472			
		(1.34)			
avg. Political Risk		-0.733***			
		(3.07)			
Inter				0.010***	
				(3.14)	
Composite Risk					-0.215**
					-2.1
No. of Obs.	1009	1009	940	985	917
No. of countries	105	105	105	112	112
R^2	0.95	0.96			
Hansen p-value			0.32	0.12	0.049
Hansen df			48	48	43
AR(1) p-value			0.001	0.002	0.002
AR(2) p-value			0.055	0.06	0.062

Absolute value of t-statistics in parentheses. Robust t-statistic for random effects and Windmeyer corrected for System GMM. *,**, *** significant at 10, 5 and 1 percent. Constant as well as region and time dummies included but not reported.

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