Export Credit Guarantees and Export Performance: An Empirical Analysis for Germany

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Abstract

Recent literature finds that exporters are particularly vulnerable to financial market frictions. As a consequence, exports may be lower than their efficient levels. For this reason, many countries support exporters by underwriting export credit guarantees. The empirical evidence on the effects of those policies is, however, very limited. In this paper, we use sectoral data on export credit guarantees issued by the German government. We investigate whether those guarantees indeed do increase exports, and whether they remedy the export-restricting effect of credit market imperfections both on the sectoral and on the export market levels. Exploiting the sectoral structure of a rich three-ways panel data set of German exports, we control for unobserved heterogeneity on the country-year, sector-year, and country-sector dimensions. We document a robust export-increasing effect of guarantees. There is some evidence that the effect is larger for export markets with poor financial institutions and in sectors that rely more on external finance.

JEL Code: F10, F14, F36, G20, G28, G32.
Keywords: Financial development, credit constraints, gravity equation, financial crisis.

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1 Introduction

According to Auboin (2009), some 80-90 percent of all exporters rely on trade finance. Financial frictions can therefore have a potentially disruptive role for international trade flows. A recent surge of theoretical and empirical papers study the role of financial frictions for the export performance of firms. The emerging picture suggests that credit market imperfections do restrain exports, in particular in sectors where firms rely strongly on external finance (Manova et al., 2011). It follows that countries with adequate financial institutions enjoy a comparative advantage in financially vulnerable areas of activity (Beck, 2002). The collapse of credit markets in the crisis of 2008-09 has hit exporters harder than other firms, explaining why international trade fell much more strongly than GDP (Chor and Manova, 2011).[1]

Even in the absence of financial crises, many countries insure their exporters against default risk of their foreign customers. Under current WTO norms, "*the provision by governments (or special institutions controlled by governments) of export credit guarantee or insurance programmes*"[2] qualify as export subsidies and would, in principle, be outlawed. However, the WTO Agreement on Subsidies and Countervailing Measures exempts those schemes if a sufficiently large number of GATT members (12) are members of an "*international undertaking on official export credits*" that regulates the use of those guarantees. The efficiency rationale for this export credit guarantees provided by governments is that private financial markets do not offer adequate instruments to cover export credit risks.

In this paper we use data on the official German export credit guarantee scheme. That scheme is administered on behalf of the German government by Euler Hermes, a private consortium.[3] The case of Germany is interesting because Germany is the world's second largest exporter (and was the first in some years in our sample) and because Euler Hermes is the second largest player in the market for government issued export credit guarantees, after the USA.[4] Euler Hermes has provided us with the universe of all credit guarantee transactions extended to German exporters in the period 2000 to 2009. These data provide details about

[1] Alternative explanations of the strong collapse of trade have been offered by Eaton et al. (2011) and Yi (2009), amongst others. Eaton et al. argue that the drop in trade has been caused by an overproportional fall in demand for traded goods and not so much by increased costs of external finance. Yi stresses the implications of an increasingly vertically integrated global value chain for the elasticity of trade to GDP.

[2] WTO Agreement on Subsidies and Countervailing Measures, Annex I, articles j and k.

[3] The consortium consists of PriceWaterhouseCoopers-AG and the Euler Hermes Kreditversicherungs-AG. In the remainder of this paper we refer to the consortium as to Euler Hermes. For an excellent overview on how Euler Hermes works, see Moser et al. (2008).

[4] See Berne Union (2011), the International Union of Credit and Investment Insurers that includes official export credit agencies and also private insurers.

the quantity of coverage and the insurance type granted to each firm, by export destination and industry. Other firm-level information such as firms' exports or sales volumes is not available. Names and locations of firms are known, but it is impossible to match those firms with firm-level information on exports. In principle, it is possible to match the Euler Hermes data to commercial firm-level data sets such as Amadeus; however, one would lose the export market information.[5] Variation across export markets (destinations $\times$ sectors) is the central source of identification in the present paper, so that we use the Euler Hermes data together with official sectoral export data for Germany.

We report the following main findings. First, public export credit guarantees increase sectoral exports. An increase in the level of guarantees by one percent increases exports by 0.012 to 0.017 percent. This point estimate hides the fact that only about 2-3 percent of German export markets (destination $\times$ industry cells) and approximately the same share of aggregate trade volume are covered by guarantees. Compared to Moser et al.'s (2008) random effects exercise, our estimate is only half as big. It follows that controlling for unobserved heterogeneity, which affects both the incidence of guarantees and export volumes, is crucial. Second, we show that export creation is strongly concentrated in certain sectors and destinations. This is compatible with the view that variation in financial vulnerability across sectors and variation in the quality of financial institutions across destinations matters for the effect. Third, the export enhancing effect of public guarantees was largest in the year 2008, when the international financial crisis reached its peak. Fourth, the quality of financial institutions in destination countries affects exports positively; the interaction with public German guarantees is negative but not statistically significant. Thus, we have only weak evidence that guarantees are more important when destination country frictions are strong. Finally, we report some evidence that guarantees have helped reduce the drop in exports due to the financial crisis in sectors that are particularly dependent on external finance. The effect does, however, not appear to work primarily through trade credit.

Related Literature

Our paper is most intimately related to two studies that test for the effects of public export credit insurance schemes. The only paper on the German export credit guarantees is by Moser et al. (2008). Our approach differs from theirs in several ways. The first difference relates to data: Our analysis covers the period 2000-2009 while theirs covers 1992-2003; we work with data on the 2-digits industry level while they use aggregate data. The second

[5] In related research, we use the merge between the Euler Hermes data and the Amadeus-Hoppenstedt data base for Germany.

difference concerns econometric methodology: We find that the Hausman test forces us to use fixed-effects estimation; Moser et al. (2008) use random effects models. The additional industry dimension allows us to include country × year (sector) effects into the analysis to account for multilateral resistance terms. Moreover, we adopt a more conservative way to compute standard errors (acknowledging serial dependence of errors). The third difference rests on the focus of the analysis: We are not so much interested in estimating a dynamic gravity equation. Rather, we try to analyze whether the public export credit insurance scheme has indeed alleviated financial frictions. Egger and Url (2006) have studied export credit guarantees by the Austrian Kontrollbank. They estimate elasticities of exports with respect to guarantees that are three to five times larger than those found by Moser et al. (2008). Different to Moser et al. (2008), they exploit the sectoral dimension of the data. They do not include controls for time-varying multilateral resistance terms. Finally, they do not study how guarantees interact with sectoral or export market variables related to financial market frictions.

Our paper is also related to an increasing body of literature on the importance of trade finance. Amiti and Weinstein (2011) argue that international transactions are more strongly affected by financial frictions than domestic ones. First, due to the longer shipment, they require a larger amount of working capital by the exporter to cover the cost of goods produced but not yet delivered. Second, exporters (or their banks) have much less recourse in the event of international trade credit defaults. As a consequence, financial crises affect exports more strongly than domestic sales. While Amiti and Weinstein (2011) study how the health of banks affects Japanese firm-level exports, our emphasis is on the role of public guarantee schemes for exports and their interactions with financial market variables. Those guarantees are particularly valuable if the importer can neither pay in advance nor offer a letter of credit. In those cases, exporters engage in an open accounts transaction which leaves them uncovered against default of the importer. With complete financial markets, the exporter could insure against the trade credit default risk through the banking system (e.g., via documentary collection); this amounts to a *de facto* sale of claims on the importer. In practice, the market for such insurance does not appear to function well.[6] This interpretation is consistent with recent findings of Chor and Manova (2011), who provides evidence that credit constraints strongly affect exports. Our paper relates to hers in that we also use sectoral trade data; albeit only for a single country (Germany). Instead of using a sample selection model, we estimate the effect of public guarantees in a linear model with a complete set of binary fixed

[6]In a fascinating single-firm case study, Antras and Foley (2011) show that letters of credit play a more subdued role than usually believed. They also offer a model that sheds light on the firm's choice between different trade finance instruments.

effects interactions.

The paper is organized as follows. Section 2 describes export credit guarantees in Germany and provides some descriptive evidence. Section 3 explains how our empirical strategy deals with unobserved heterogeneity. Section 4 presents results for the average Hermes effects and compares it to earlier results. Section 5 extends the analysis to different income groups and countries, while section 6 considers the effect of Hermes guarantees during the financial crises. The final section provides a summary and policy conclusions.

2 Data: Exports and Credit Guarantees in Germany

The German government guarantees export credit claims of firms located in Germany for certain destination countries and sectors (markets). These guarantees are referred to as "Hermes Guarantees". Budgetary responsibility for this instrument lies with the Federal Government that decides on basic issues of cover policy and the granting of guarantees in an Interministerial Committee (IMC). The conditions of these guarantees with respect to the scope of covered countries, sectors, and costs incurred are defined in the arrangement on officially supported export credits also known as the OECD consensus. A crucial objective of the consensus is the encouragement of *"competition among exporters based on quality and price of goods and services exported rather than on the most favorable officially supported financial terms and conditions"* (OECD, 2011).[7] In Germany the guarantees are issued by a consortium made up by PriceWaterhouseCoopers-AG and the Hermes-Kreditversicherungs-AG on behalf of the Republic of Germany. Insurance is extended against payment of a premium which reflects the riskiness of the underlying market and the financial health of the importer.[8] Profits or losses made by the consortium are directly incorporated into the German federal budget. Table I presents Euler Hermes' aggregate results for the past years. Until the late 70s, there were no noteworthy peaks in overall profits and losses. However, due to the break-up of the Soviet Union and the end of communism in Eastern Europe, as well as due to several debt-crises of emerging economies between 1982 and 1999, Hermes guarantees lead to a cumulated net loss to the government amounting to 13.4 billion Euros. In those years, the German government started to sign debt restructuring agreement with the largest debtors. As a consequence, the cumulated losses could be run down again. In

[7]The Participants to the Arrangement are: Australia, Canada, the European Community, Japan, Korea (Republic of), New Zealand, Norway, Switzerland and the United States.

[8]Euler Hermes employs a risk definition based on OECD country risk measures. For a detailed overview consult http://www.agaportal.de/en/aga/deckungspolitik/laenderklassifizierung.html

Table I: Cumulative profits/losses of Euler Hermes in million Euros, 1954 - 2010

1954	1964	1969	1974	1979	1984	1989	1994	1999	2004	2006	2010
14	-95	-77	-155	548	-338	-3657	-11972	-13407	-11036	181	2081

Notes: Figures represent cumulative Euler Hermes results in million Euros. Yearly profits and losses are cumulated over time. Source: Euler Hermes annual reports.

2006, the cumulated net profit position was close to zero; in the following years it became positive. Besides positive yearly net contributions after 1999, the pay-back of Russian debt in 2006 made a substantial difference.[9]

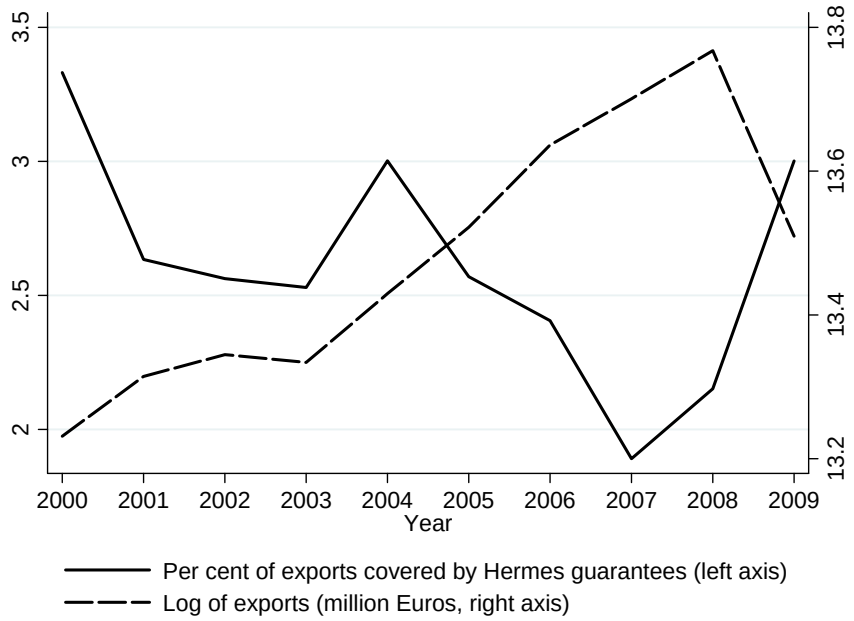
The German guarantee system provides three types of instruments. The most important, both in terms of exporters covered and export volumes guaranteed, are so called 'Einzeldeckungen' (EZDs). Those refer to single, well-defined projects, for specific markets (i.e., destinations and sectors) and importers. The second most relevant instrument is called 'Ausfuhrpauschalgewährleistungen' (APGs). These cover a number of different importers, possibly in different markets. A third instrument, revolving guarantees, is of very minor importance as it makes up less than 2 percent of all guarantees. The specific design of instruments implies that only EZDs can be allocated to destinations and sectors without measurement error. For this reason, in what follows, we concentrate on this instrument. Euler Hermes uses an internal industry classification defining 10 main sectors based on the type of covered products. Each sector can be disaggregated into 4 and 6 digit subheadings (see table A.1 in the appendix).

For all empirical tests we employ bilateral export data using the world trade BACI database provided by CEPII Paris. Our focus is the manufacturing sector. Initially, exports are provided at the HS 6-digit product disaggregation which we transform into NACE 1.1 classification based on correspondence tables from eurostat (RAMON database).[10] Because both the NACE 1.1 and the internal Hermes classifications are product based, it is possible to allocate EZDs to sectoral exports. Appendix A.2 lists those 42 sectors for which a clean match between Hermes data and export data was possible. Export credit guarantees are strongly sector-biased: only 24 sectors record sufficient Hermes activities to conduct an empirical analysis.

[9]In August 2006 Russia payed off its Paris club debts of 25.2 billion Euros, of which Germany received 8 billion Euros (Aga-report, 2006). For a detailed overview of yearly Euler Hermes results see also table A1 in Moser et al., 2008.

[10]Nace 1.1: Statistical Classification of Economic Activities in the European Community, Rev. 1.1. For a detailed overview of correspondence tables consult
http://ec.europa.eu/eurostat/ramon/index.cfmT?argetUrl=DSP_PUB_WELC

Figure 1: German aggregate exports and Hermes coverage ratio



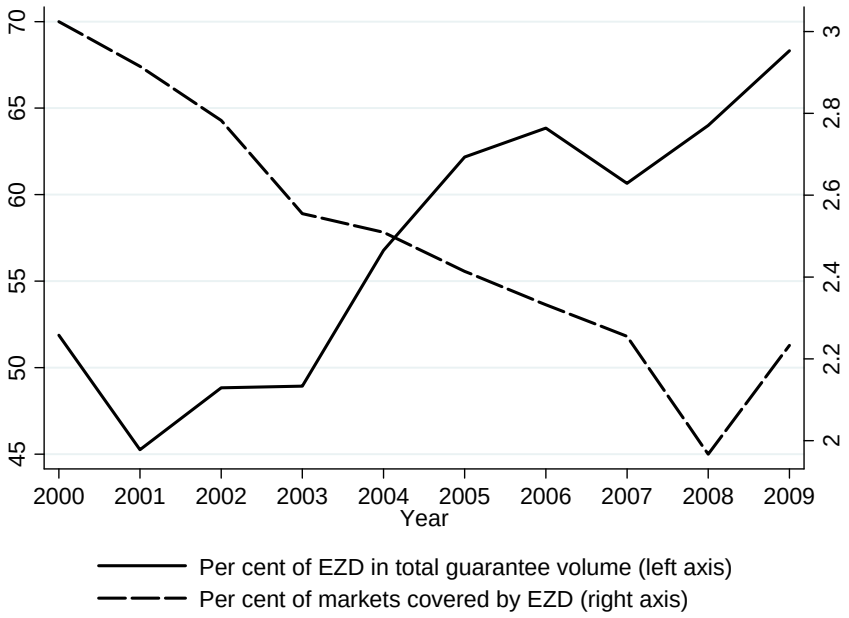
Source: Euler Hermes, BACI data base.

Figure 1 shows the evolution of German exports over time in nominal terms (dashed line, right axis). Exports have increased by about 71 percent from 2000 to 2008, and have plunged by about 22 percent from 2008 to 2009. At the same time, the share of total exports covered by public guarantees has evolved in a counter-cyclical fashion. It has fallen from almost 3.5 percent in 2000 to less than 2 percent in 2007. Interestingly, the use of guarantees has increased even before the Lehman Brother default in September 2008, and has steeply increased further from 2008 in 2009 to reach 3 percent.

Figure 2 plots the share of EZDs in total guarantees issued over time (solid line, right axis). From 2000 to 2009, the relative importance of EZDs has steadily increased. In 2009, almost 70 percent of all guarantees were issued under this form. Hence, it appears sensible to focus on EZDs in our empirical analysis. Despite increased popularity of the instrument, the share of German export markets (sectors $\times$ industries) covered by EZDs has declined from 3 to 2 percent over the period and has only perked up a little after the crisis. The implication of this fact is that export credit guarantees are concentrated on only a few markets. Therefore it is crucial to work with empirical models that can deal with the fact that most markets feature zero coverage by public guarantees.

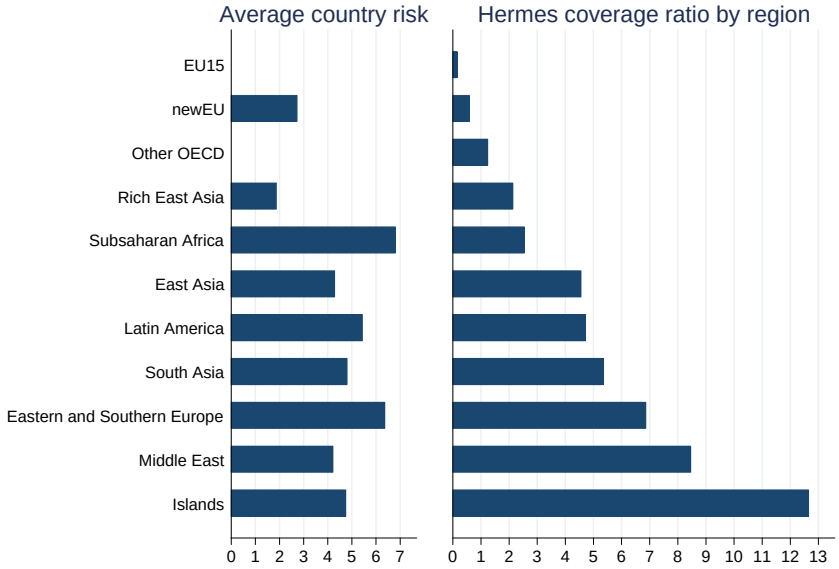
Figure 3 plots average Hermes coverage ratios (guarantees accumulated over 2000-2009 divided by accumulated exports) for 11 regions. Table A.3 provides an overview of all countries in each region. Hermes coverage is smallest in rich industrialized countries (the 'old' EU

Figure 2: Share of EZD guarantees in total guarantee volume



Notes: EZDs are strictly project based export credit guarantees. Source: Euler Hermes.

Figure 3: Hermes coverage ratio and average country risk by region

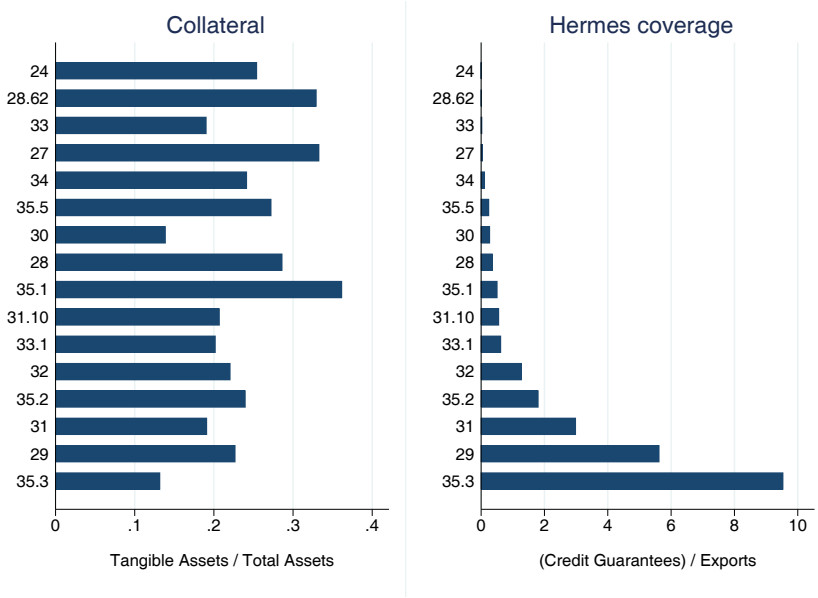


Notes: OECD country risk classification (7 highest, 0 lowest risk). Source: Euler Hermes and BACI data base.

countries alias EU15, new EU countries, and other OECD countries (i.e., US, Canada, New Zealand, Australia). Coverage ratios are slightly higher in rich East Asian countries (Korea,

Singapore, Taiwan, Japan). Coverage in East Asia (which includes China), Latin America (including the Caribbean) and South Asia (most notably India, Indonesia, Bangladesh) lies above the grand mean of 3 percent at 4 to 5 percent. Exports to Eastern and Southern Europe (the former URSS including Russia, Turkey, former Yugoslavia) display coverage ratios of about 7 percent. Coverage ratios are highest in the Middle East (8.5 percent of all exports covered) and for small Pacific Islands. Figure 3 juxtaposes average country risk indicators published by the OECD against the coverage ratios. The picture suggests that the correlation between the two measures is clearly positive across all country groups, but turns negative if one looks at countries in the upper two thirds of the coverage ratio. Hence, it remains unclear whether Hermes guarantees are clearly targeted towards transactions which involve an importer in a particularly risky country.

Figure 4: Hermes coverage and external financial constraints by sector - 2009 -



Notes: Sectoral external finance constraint is measured within each sector as (tangible assets)/(total assets). Relative more collateral decreases financial constraints. Coverage = (accumulated export guarantees) / (accumulated exports). Appendix A.2 provides the sector nomenclatures. Sectors which do not exhibit export guarantees are excluded (which are: 2-16, 23, 23.2, 25.2, 35, 36-93). Source: Euler Hermes and BACI data base.

Figure 4 presents average Hermes coverage rates (accumulated export credit guarantees divided by accumulated exports) for 16 sectors with positive guarantees in 2009. Hermes coverage turns out to be specifically high in sectors with relatively large external finance constraints, a measure which we construct from firm level data (Amadeus-Hoppenstedt) using balance sheet information (tangible assets over total assets). A higher ratio indicates the availability of more collateral which as the literature argues (Feenstra et al., 2011) alleviates

external finance constraints. With a coverage rate of 5 and 9.8 percent the machinery (29) and aircraft (35.3) sectors lie both far above the grand mean coverage rate of 3 percent. Simultaneously, with a tangible assets over total asset ratio of 0.23 and 0.14, respectively, both sectors exhibit collateral significantly below the average share of 0.28. On the other hand, sectors like basic metals (27) and manufactured tools (28.62) display tangible over total assets ratios of 0.33 and 0.32, far above the average ratio indicating low external finance constraints. For these sectors the coverage rate lies below 0.1 percent. These descriptive figures point to a clearly positive correlation between the coverage rate and external finance constraints across sectors. Hence, the incidence of Hermes guarantees is stronger in industries with higher degrees of financial constraints. To account for this, it is necessary to conduct the analysis on industry-level data. An analysis on aggregate data may suffer from aggregation bias. Moreover, the availability of the industry dimension allows us to include interaction terms between year and destination dummies to control for time-varying multilateral resistance terms, avoiding the estimation biases highlighted by Anderson and van Wincoop (2003).

3 Empirical Strategy

Let i denote an export destination (a country), s a sector, and t time. We refer to an export market as to the country-sector combination (i, s). Our preferred estimation equation is given by

$$\ln X_{i,t}^{s} = \beta \times HERMES_{i,s,t} + \boldsymbol{\gamma}' \times HERMES_{i,s,t} \times \mathbf{X}_{i,s,t} + \mathbf{v}_i \times \mathbf{v}_s + \mathbf{v}_i \times \mathbf{v}_t + \mathbf{v}_s \times \mathbf{v}_t + \varepsilon_{i,s,t}, \quad (1)$$

where $HERMES_{i,s,t}$ is either the ln of coverage applied to new business underwritten by Hermes in a specific year for a specific export market and a specific sector ($\ln Guarantees_{i,s,t}$), a dummy that takes value 1 if a specific sector in a specific target market is covered in a specific year ($Dummy_{i,s,t}$), or the share of exports covered by Hermes guarantees ($Coverage_{i,s,t}$):

$$HERMES_{i,s,t} \in \{\ln Guarantees_{i,s,t}, Dummy_{i,s,t}, Coverage_{i,s,t}\}. \quad (2)$$

While the coefficient attached to the binary variable indicates the extent to which the sheer availability of Hermes guarantees for a market (a country-industry pair) affects the volume of exports, the coefficient on $\ln Guarantees$ can be interpreted as the elasticity of exports with respect to the quantity of guarantees. The estimate on $Coverage$ measures the effectiveness of public export credit insurance. If the estimate is equal to unity, the percent increase in exports due to Hermes equals the share of exports covered. To the extent

that the coefficient falls short from unity, the increase in exports is smaller than the share of exports underwritten and some exports would have taken place even in the absence of Hermes coverage.

The model includes an extensive set of dummy variables. $\mathbf{v}_i, \mathbf{v}_s$, and $\mathbf{v}_t$ are complete vectors of country, sector, and time effects. We include all possible binary interactions between these vectors. Of course, this nests the simple terms $\mathbf{v}_i, \mathbf{v}_s, \mathbf{v}_t$. Using this strategy, the interesting coefficient β is identified only by variation within export markets over time. We eliminate $\mathbf{v}_i \times \mathbf{v}_s$ by the appropriate *within* transformation of the model, and apply OLS to the transformed equation. We make the usual assumptions on the error term $\varepsilon_{i,s,t}$. Note that, unlike Moser et al. (2008), we do not run a random effects model since simple Hausman tests reject random effects over our fixed effects specification.

The vector $\mathbf{X}_{i,s,t}$ contains additional covariates that may or may not vary within export markets over time. In our baseline regression, where we constrain $\gamma' = \mathbf{0}$, and when all those fixed effects combinations are used, there are no direct effects of $\mathbf{X}_{i,s,t}$ since we have no time-variant information on German export markets (defined as country-industry pairs) except Hermes provisions. However, in some regressions, we use interactions of $HERMES_{i,s,t}$ with sector-level or export-market variables (such as, for example, foreign interest rates). Also, to see how our more general framework compares with results obtained by Moser et al. (2008), we drop some of the fixed effects and add direct effects of the vector $\mathbf{X}_{i,s,t}$ to the equation.

Note that the empirical model (1) is consistent with a theoretical gravity equation as derived, e.g., by Anderson and van Wincoop (2003). Those authors have shown that it is necessary to control for multilateral resistance to obtain unbiased estimates of bilateral variables that restrict trade. Multilateral resistance terms capture the burden of average trade costs that affect a market, i.e., a weighted measure of all bilateral trade costs. In our context, where there is only one exporter (Germany), multilateral resistance terms for the export markets are absorbed by the $\mathbf{v}_i \times \mathbf{v}_t$ interactions. These dummies also account for all other constant or time-varying influences of German exports into some foreign country, such as that country's geographical position relative to Germany, its GDP, the stance of its trade arrangements with the European Union (and hence with Germany), the exchange rate of that country with respect to the Euro, and so forth. Importantly, it also accounts for unobserved heterogeneity, related to things such as actual transportation costs or historical and cultural ties to export markets.

The $\mathbf{v}_i \times \mathbf{v}_s$ interactions account for all time-invariant features of foreign export markets. For instance, they control for the foreign comparative advantage structure relative to Germany; they also control for sector-specific foreign regulation (for example, hard to observe

non tariff barriers to trade), as long as it does not change over time. The $\mathbf{v}_s \times \mathbf{v}_t$ interactions, in turn, control for all global or Germany-specific sectoral trends. For instance, they capture the evolution of German price competitiveness on the sector level, the German business cycle (and, associated with it, financial factors such as lending rates or the incidence of financial frictions). If a product or process innovation in some sector boosts German exports into all export markets, this will be equally captured by those dummies. The extensive use of dummy variables minimizes the risk that the effect of Hermes on sectoral exports, β, is contaminated by omitted variables bias. We will see that accounting for unobserved heterogeneity in the described way does indeed make a difference in the obtained estimate. Nonetheless we are cautious not to interpret our estimate $\hat{\beta}$ as causal. The problem is reverse causation. It is conceivable that a positive shock $\varepsilon_{i,s,t}$ on exports can cause the German government to grant (or withdraw) export guarantees for a specific export market (i.e., a destination country, sector combination) in a specific year. However, compared to existing studies, such as Moser et al. (2008) or Egger and Url (2006), we believe that our more general framework minimizes those problems.

4 The Export-Enhancing Role of Public Export Credit Guarantees

In this section, we first present evidence on the export-enhancing role of public guarantees. We compare our results with the study that is closest to ours (Moser et al., 2008). Next, we compare the estimated Hermes coefficients across different world regions, sectors, and over time. Finally, we investigate whether country-level financial institutions or sector-level financial vulnerability condition in a systematic way the effect of Hermes guarantees on sectoral exports.

4.1 A Fixed Effects Model for German Exports

Table II shows results for four Hermes variables. To facilitate comparison with the literature, this table does not yet contain country×year effects. Standard errors are corrected for clustering at the panel variable level (country-industry pairs). All regressions contain industry-year effects and are estimated using fixed effects (FE) estimation. Column (1) starts with the binary Hermes variable. The point estimate of 0.173 suggests that a market (country-industry pair), in which public export credit guarantees have been used, had exports 17.3 percent larger than if those guarantees had not been available. This is a substantial effect, estimated

at excellent levels of precision. Note, however, that guarantees were available only to 2 to 3 percent of all markets in the sample period. The trade creation due to Hermes therefore amounts to at most 0.52 percent of total German exports. The estimated effect on GDP is positive, as expected, and significant. The OECD country risk variable shows that risk is a strong deterrent of exports: ceteris paribus, an increase from the lowest (0) to the highest (7) risk category lowers exports by almost 45 percent.[11] The positive coefficients on the ratio of capital formation over GDP and on manufacturing imports in total imports is consistent with findings by Egger and Url (2006) and Moser et al. (2008), signalling that Germany exports more to countries with a similar factor endowment.

Column (2) uses the second Hermes variable, namely the log of guarantees. The point estimate on guarantees turns out to be 0.014; i.e., half as large as the effect estimated by Moser et al. (2008).[12] Coefficients on the other variables in the model are almost totally identical to column (1). The elasticity suggests that a one percent increase in guarantees boosts exports by about 0.014 percent. This seems a minor effect, but one has to bear in mind that only about 3 percent of exports are covered. Taking this fact into account, simple back-on-the-envelope calculations yield an effectiveness ratio (Euros of exports per euros used as guarantees) of 0.47.[13] In column (2), the Hermes variable is defined as $\ln(guarantees+1)$. Admittedly, this transformation is *ad hoc*; however, it serves to account for the vast majority of export relationships in which no public guarantees were used. Column (3) defines the Hermes variable as $\ln(guarantees)$, so that all relationships without guarantees are dropped. The number of observations falls from 42,669 to 1,456, but the estimated elasticity remains broadly comparable to the one estimated before. Statistical significance suffers, though.[14]

Finally, column (4) uses guarantees over exports (coverage) as the Hermes variable. This practice allows to deal with instances of zero guarantees and does not require ad hoc transformation of the interesting independent variable. The point estimate of 0.658 suggests that an increase in the share of exports covered by one point leads to additional exports of 0.66 percent. In other words, for one euro of guarantees, exports increase by 0.66 euros.

Whether these results hold when a more restrictive econometric setup is used (additional country×year effects) remains to be seen. Before addressing this issue, a comparison of the results in Table II to those in the literature is due. Moser et al. (2008) study how political

[11] Calculated as $(\exp\{-0.066\}-1)*7=-0.447$

[12] Table A.5 in the Appendix shows that using aggregate rather than sectoral data leads to the same point estimate of 0.014. Note, however, that the Hermes variable is defined slightly differently in Table A.5.

[13] Let exports be 100 and the level of guarantees 3. A 10 percent increase in guarantees (level change of 0.3) leads to a 0.14 percent increase in exports (level change of 0.14). The effectiveness ratio is 0.14/0.3.

[14] Table A.4 provides the summary statistics.

Table II: Fixed Effects Models for German Exports, 2000-2009

Dep.var. Ln exports, by sector.	(1)	(2)	(3)	(4)
Hermes variable	Binary	ln Guarantees	ln Guarantees, pos. only	Coverage
Hermes	0.173***	0.014***	0.017*	0.658***
	(0.032)	(0.002)	(0.007)	(0.130)
ln GDP	0.357***	0.357***	-0.217	0.360***
	(0.061)	(0.061)	(0.228)	(0.061)
ln Population	-0.138	-0.137	-0.293	-0.149
	(0.201)	(0.201)	(0.686)	(0.201)
Customs Union (0,1)	0.083*	0.084*	-0.035	0.079
	(0.042)	(0.042)	(0.083)	(0.042)
Integration Agreement (0,1)	-0.011	-0.010	0.019	-0.012
	(0.042)	(0.042)	(0.108)	(0.042)
ln exchange rate	0.003	0.003	0.047	0.004
	(0.029)	(0.029)	(0.096)	(0.029)
OECD Country risk	-0.066***	-0.066***	-0.003	-0.066***
	(0.014)	(0.014)	(0.037)	(0.014)
Capital formation	0.202***	0.202***	0.787***	0.203***
	(0.042)	(0.042)	(0.152)	(0.042)
Manufacturing imports	0.130*	0.130*	0.156	0.132*
	(0.058)	(0.058)	(0.167)	(0.058)
Within R-squared	0.110	0.110	0.563	0.110
No. of observations	42669	42669	1456	42669
No. of markets	5434	5434	517	5434
Chi2 Hausman	747.25***	719.44***	135.91***	475.81***

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

risk conditions the effect of export credit guarantees and consider the dynamics of the gravity relationship. Our focus is different; nonetheless it is encouraging to see that we can reproduce the results of that earlier study in spite of the fact that our data differ from Moser et al.'s in several ways. First, we cover a different decade (2000-2009 instead of 1992-2003), second, we

disaggregate over two-digit industries, and third, we include only those guarantees for which a sectoral allocation is possible (EZDs).

The difference of our results with respect to those shown by Moser et al. (2008) mostly result from our use of a fixed effects (FE) model and not so much from the fact that we use sectoral data. Table A.5 in the Appendix reproduces the model employed by Moser et al. (2008) on our more recent aggregate data.[15] Column (1) reports a fixed effects model, column (2) additionally corrects the variance-covariance matrix for serial correlation of error terms over time. Column (3) is the random effects (RE) model used in Moser et al.'s Table 1. A Hausman test very clearly rejects the Null that estimated parameter differences are non-systematic. The more efficient RE model is therefore rejected in favor of the less efficient but consistent FE model. The point estimate on the ln of guarantees is 0.014 (only modestly significant statistically when correcting the error structure) in the FE specification while it is 0.02 in the RE model. Moser et al. use the same RE model and find an effect of 0.028. Column (4) replicates Moser et al.'s RE-Mundlak model, confirming on our data that the long-run effect (0.100) is much larger than the short-run one (0.015). Columns (5) to (8) add political risk to the model. As before, the RE-model is rejected very clearly, and statistical significance is modest in the FE model. Interestingly, the inclusion of political risk into the model barely affects point effects of guarantees in our 2000-2009 panel, while it had a strong reducing effect in the Moser et al. exercise.

Table III reports results from our most general fixed effects design based on equation (1). The model differs from that used in Table II in so far that it includes a comprehensive set of additional country-year effects. The theoretical foundation of the gravity model by Anderson and van Wincoop (2003) requires that the econometric specification accounts for the average (multilateral) price faced by foreign consumers. Typically, this multilateral resistance index differs from price indices as computed by statistical offices and is, therefore, essentially unobservable. It captures the degree of competition faced by German firms in foreign markets and can be controlled for by using fixed effects (Feenstra, 2004). Moreover, the use of country-year effects accounts for any unobserved heterogeneity that positively affects both the probability of Hermes coverage and exports. If a positive shock hits an export destination, political pressure to grant export credit guarantees might go up as opportunities for firms are bigger. For these reasons, one can conjecture that the omission of country-year effects leads to an overestimation of the Hermes effect.

Comparing the upper half of Table III to the results in Table II shows that there is

[15]The model by Moser et al. (2008) contains regional dummies, year dummies, and uses random effects estimation.

Table III: Three-Way Fixed Effects Models for German Exports, 2000-2009

Dep.var. Ln exports, by sector.

Hermes variable:	**Binary**	**ln Guarantees**	**ln Guarantees, pos.**	**Coverage**
		Sample as in Table I, (N=42,669)		
	(1A)	(2A)	(3A)	(4A)
Hermes	0.162***	0.013***	0.019	0.667***
	(0.032)	(0.002)	(0.017)	(0.131)
R-squared	0.141	0.142	0.765	0.142
		Full Sample, (N=64,957)		
	(1B)	(2B)	(3B)	(4b)
Hermes	0.158***	0.012***	0.018	0.633***
	(0.029)	(0.002)	(0.016)	(0.119)
R-squared	0.150	0.150	0.749	0.150

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

indeed some overestimation in columns (1) to (3), but the bias appears very minor. Using the binary measure, Table II overestimates by about 6.7 percent; using ln guarantees as the Hermes variable, Table II overestimates by about 7.8 percent. The effect on the coverage ratio is essentially unchanged by adding country-year effects. Excluding all markets (country-industry pairs) for which no Hermes activity is recorded, the general model of Table III finds no effect of Hermes on exports anymore (column (3A). Here, the number of observations is not sufficient to compensate the loss in degrees of freedom entailed by the inclusion of a large number of additional dummies. The conclusion is that working with the models used in Table II does not lead to a strong bias in results.

The OECD country risk measure is not available for all countries to which Germany exports. Hence, when the use of country-year effects makes the inclusion of country-level variables redundant, the number of observations goes up by nearly 50 percent from 42,669 to 64,957 country-industry-year combinations. The lower half of Table III makes use of this larger sample. It appears that point estimates fall relative to the smaller sample, but they

remain qualitatively and quantitatively comparable to those obtained earlier.

4.2 Testing for Dynamic Effects

It is often thought that public export guarantees help exporters to gain a first access to a hitherto unserved market in that they facilitate up front financing of entry costs. Then, even when the guarantees expire, exports into that market remain higher than in the counterfactual case where no guarantee has ever been granted. To test this hypothesis, we introduce lagged Hermes variables into the regression (1). The estimation results are displayed in Table IV. It becomes apparent that the instantaneous effect of the guarantees dominates. Lags, in particular those beyond first order, do not matter. However, it is also clear, that the estimated instantaneous effects are considerably smaller than those obtained in a model without lags (e.g., Table III). This is particularly true for the binary Hermes indicator, which is probably best suited to test for the market access facilitation hypothesis. The difference between point estimate on the instantaneous effect and the long run effect suggests that past Hermes coverage of a market causes additional exports to increase by about 2 percent.

Table IV: Delayed Hermes Effects, 2000-2009

	(1) Dummy	(2) Guarantees	(3) Coverage
Hermes_t	0.139***	0.011***	0.624**
	(0.037)	(0.003)	(0.229)
Hermes_{t-1}	0.029	0.002	0.159
	(0.027)	(0.002)	(0.132)
Hermes_{t-2}	0.004	0.000	0.085
	(0.029)	(0.002)	(0.211)
Hermes_{t-3}	-0.010	-0.001	-0.110
	(0.027)	(0.002)	(0.151)
Within R-squared	0.156	0.157	0.157
No. of observations	40,032	40,032	40,032
No. of markets	6,443	6,443	6,443

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

5 Hermes effects across income groups, regions, and time

In the next step, we show that the effect of public guarantees is heterogeneous with respect to country income groups, world regions, and time. Pooling across those subsamples results in an unbiased *average* effect but hides potentially interesting differences across groups.

5.1 The Hermes effect across income groups

First, we study the effect of Hermes guarantees in country samples differentiated with respect to income per capita levels. Following the World Bank classification, we work with four income groups. We do not run independent regressions, but simply include the full set of interactions between country group indicators and the respective Hermes variable into the model. Table V presents estimated Hermes coefficients. The key insight is that guarantees have no measurable export-boosting effect for exports into countries belonging to the lowest income per capita class. Column (1) looks at the binary Hermes indicator. There, the effect is strongest for countries belonging to the lower middle income class: German exports into a market covered by Hermes increase by about 17.4 percent. That effect falls to 16.8 and to 15.7 percent once one looks at higher middle income or highest income countries. A similar pattern is visible for the ln guarantees in column (2). Focussing on strictly positive guarantees leads to problems of statistical inference. Finally, column (4) looks at the share of exports covered. Again, there is no measurable effect for the lowest income countries. Interestingly, the clear ordering of effect sizes across income groups obtained in columns (1) and (2) is no longer visible.

Summarizing, Table V shows that public export credit guarantees boost exports more in medium income countries than in the poorest or the richest segment. This is nicely consistent with the hypothesis that per capita income correlates strongly and inversely with credit market constraints: If constraints are weak, there is little need for public guarantees, and so they make little difference. If per capita income is very low, market potential for goods typically covered by Hermes (machinery, transport equipment) is low, too. Interestingly, the parameter on the coverage ratio is highest for the richest countries, indicating maximum effectiveness of the instruments for this income group.

5.2 The Hermes Effect over World Regions

Descriptive statistics show that Hermes guarantees are also heterogeneous with respect to different world regions (see e.g. Figure 3). For a systematic analysis of credit guarantees'

Table V: The Hermes Effect Across Income Groups, 2000-2009

Dep.var. Ln exports, by sector.	(1)	(2)	(3)	(4)
		Hermes variable		
Per capita income group	Dummy	ln Guarantees	ln Guarantees pos.	Coverage
Lowest	-0.066	-0.004	0.023	-0.124
	(0.079)	(0.006)	(0.062)	(0.327)
Lower Middle	0.174**	0.014**	0.003	0.623*
	(0.067)	(0.005)	(0.031)	(0.244)
Higher Middle	0.168***	0.013***	0.027	0.585***
	(0.046)	(0.003)	(0.021)	(0.167)
Highest	0.157***	0.012***	-0.004	0.838**
	(0.044)	(0.003)	(0.028)	(0.259)
Within R-squared	0.150	0.150	0.750	0.150
No. of observations	64,957	64,957	1,618	64,957
No. of markets	7,787	7,787	5,71	7,787

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

export effects across regions, we allocate all Hermes relevant countries to 11 geographical regions. Similar to the previous income group estimations, we extend our empirical specification (1) by including the set of interaction terms between defined world regions and the respective Hermes variable. Table VI presents the results for the three different Hermes measures (Dummy, ln-Guarantees and Coverage). Column (1) lists estimates for the binary Hermes indicator. Accordingly, the strongest export enhancing effect of Hermes guarantees is observed in South Asia. The provision of export credit guaranties for this region, which include emerging economies like India and Indonesia, increases exports on average by 29 percent. The second largest effect is observed in EU 15 countries, with additional 23 percent more exports. Compared to the average export enhancing effect of Hermes in a pooled estimation across countries (15.8 percent) these two regions obtain additionally 13 and 7 percent more exports.

The above average effects in South Asia are expected and can be explained by destination frictions and riskier business conditions. However, this argument does not hold generally for

Table VI: The Hermes effect across world regions, 2000-2009

Dep.var. Ln exports, by sector.	(1)	(2)	(3)
		Hermes variable	
Region	Dummy	ln Guarantees	Coverage
Subsaharan Africa	-0.022	0.001	-0.019
	(0.088)	(0.007)	(0.304)
New EU	0.192**	0.015**	1.031**
	(0.072)	(0.005)	(0.321)
Eastern and Southern Europe	0.177*	0.013*	0.598*
	(0.077)	(0.006)	(0.269)
Latin America	0.184**	0.015**	0.433
	(0.067)	(0.006)	(0.266)
Middle East	0.046	0.005	0.524*
	(0.058)	(0.004)	(0.260)
EU15	0.230*	0.015*	1.375
	(0.096)	(0.006)	(0.707)
East Asia	0.255	0.017	0.438
	(0.171)	(0.012)	(0.563)
Rich East Asia	0.106	0.008	0.456
	(0.097)	(0.007)	(0.566)
Other OECD	0.152	0.010	1.202
	(0.152)	(0.011)	(0.752)
South Asia	0.279*	0.020*	0.730
	(0.122)	(0.008)	(0.410)
Islands	0.072	0.006	0.553
	(0.128)	(0.008)	(0.427)
Within R-squared	0.15	0.15	0.15
No. of observations	64,957	64,957	64,957
No. of markets	7,787	7,787	7,787

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * $p<0.1$,** $p<0.05$, *** $p<0.01$. Chi^2 Hausman test rejects random effects specification in each model.

the EU 15. One reason for the high Hermes effect in Europe lies in sectoral characteristics, in particular the aircraft industry, which accounts for a major share of guarantees. Export

credit guarantees in the aircraft industry appear in irregular intervals, but when they appear they tend to be huge. Within the EU 15, Hermes activity is practically confined to the aviation industry. This policy was only relaxed during and after the recent financial crises; we return to this below. In countries of the New EU group, Latin America and Eastern and Southern Europe, the provision of Hermes guarantees leads to additional exports between 19 and 17.7 percent. These regions show a slightly above average Hermes effect, if compared with a pooled regression across countries.

In column (2) the Hermes variable is defined as ln(guarantees) and its strong effect in South Asian countries is maintained. The point estimate in this region results as 0.02 exceeding the pooled regression estimate by 0.008 percentage points. Interestingly, for EU 15 countries the point estimate turns out to be 0.015 equalling those of Latin America and the New EU countries. Furthermore, for the remaining regions, results turn out to be close to the estimated average effect across all countries, which is an elasticity of 0.012. Hence, controlling for the Hermes impact on exports based on a volume measure changes the ordering of results, in such a way that the over average export credit guarantee impact in EU 15 countries is less pronounced. Furthermore, variation in the significant estimates across regions turns out to be small, except for Asia. Column (3) uses again guarantees over exports as the Hermes variable, measuring the effectiveness of the public instrument.

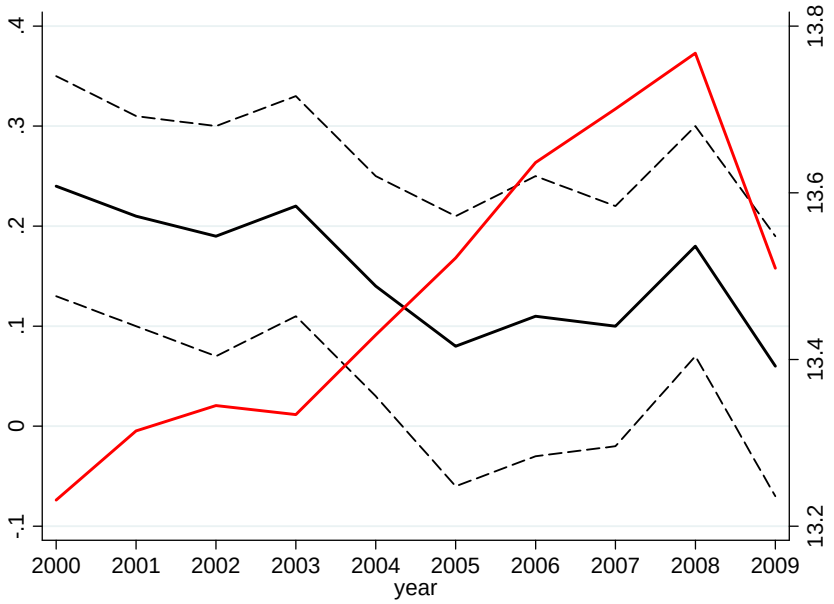
One important observation from these results is that estimates for regions dominated by advanced economies (EU 15, other OECD, and New EU) exceed unity. An increase in export shares to these regions is larger than the covered share of exports. A possible interpretation is that Hermes driven exports serve as source of information for other companies triggering further market entries. For the remaining regions the extent of the coefficient is below unity, pointing on the fact that some exports into these region would have taken place even without Hermes. Interestingly, for East Asia, which includes China and Viet Nam, we do not observe a significant Hermes effect.

5.3 The Hermes Effect over Time

Next, we interact the respective Hermes variable with year dummies. The estimated coefficients are statistically significant (with the exception of 2009) in the case of the Hermes dummy. One could conjecture that the export-enhancing effect of public export credit insurance is highest in periods of slow export growth. Figure 5 plots the coefficients on the Hermes dummy over time and contrast them with the evolution of the growth rate of nominal exports. However, the evidence that the strength of the effect on Hermes is countercyclical

is rather weak.[16]

Figure 5: Smoothed Year-Specific Hermes Effects and the Evolution of Exports



Notes: Black solid line: Estimated Hermes dummy (dashed lines denote 90% confidence interval). For the detailed year-specific Hermes effects see the Appendix, Table A.6. Red solid line (right axis): ln of exports.

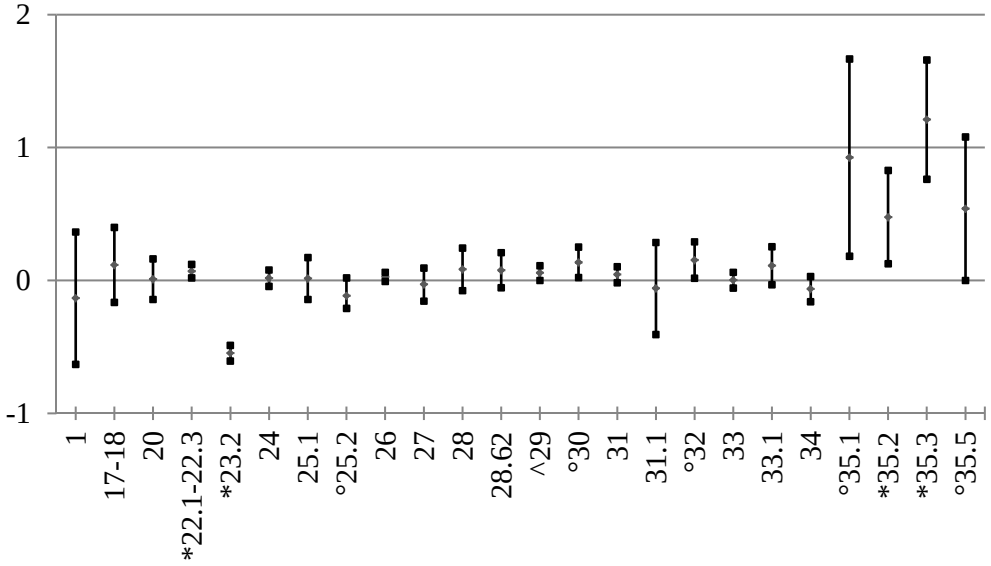
5.4 Sectoral Effects

There is substantial heterogeneity with respect to the industry-level impact of Hermes guarantees. Figure 6 plots the coefficients obtained for the Hermes dummy in 24 sectors for which positive Hermes guarantees have been recorded at least in one year. It also plots the 95% confidence intervals. Out of 24 sectors, in 8 we have significant evidence for positive effects. They are concentrated in the following sectors: publishing and printing (22), machinery and equipment (29), office machinery and computer (30), radio, television and communication equipment (32), ships and boats (35.1), rail- and tramway (35.2), air- and spacecraft (35.3) and transport equipment (35.5). The largest effects with point estimates of 1.2, 0.9 and 0.5 are obtained in the aviation, shipbuilding and transportation sectors, respectively. Symptomatic for these sectors are large export values and high time-to-build schedules coupled with high external finance dependence (see Figure 4). These results suggest that Hermes guarantees may play a role in alleviating industry-level financial vulnerability to capital mar-

[16]See Table A.6 in the Appendix for detailed results.

ket frictions. Furthermore, excluding the four sectors with the largest Hermes effects from the regression does not change the results in the remaining industries.

Figure 6: Sectoral Hermes Effects



Notes: Sectoral effects computed within a single equation fixed effects model for 24 sectors. Hermes is modeled as dummy. Point estimates plus/minus 1.96 standard errors (upper and lower margin of the 95% confidence interval). Appendix A.2 lists the sector names. Robust standard errors corrected for clustering along the destination country × sector dimension. Significance levels are tagged as: * p<0.01, ° p<0.05, ^ <0.1.

The observed sector distribution of Hermes effects partly reflects the importance of EZDs relative to other insurance instruments. For example, the chemical or automotive industries do not make much use of EZDs. The distribution also reflects the fact that industries differ with respect to their financial vulnerability. Hence, public export guarantees have heterogeneous effects on their performance.

6 Hermes and capital market imperfections

This section asks two question. First, do public guarantees remedy destination country capital market imperfections, i.e., frictions faced by the importer? And second, do they alleviate industry level vulnerabilities to capital market frictions?

6.1 Hermes and Import Country Financial Market Maturity

We now interact variables describing the financial market maturity (FMM) of import countries with Hermes variables. If public export credit guarantees are granted because importers find it difficult to obtain credit in order to engage in a cash-in-advance transaction or use documents-based payment procedures, then Hermes can be considered as an instrument mitigating credit market frictions in destination markets.

The hypothesis is that the export-enhancing power of Hermes is larger for import markets which suffer from weak capital market institutions. Beck et al. (2008), and Beck and Demirguc-Kunt (2009) propose a number of indicators to measure the condition of countries' financial market maturity. We use the most recent release of the data which is provided by The World Bank.[17] These FMM measures correlate strongly with the country risk measure provided by the OECD. While they are available for a slightly smaller country sample, they are more relevant in the context of Hermes coverage which aims at providing insurance to exporters.

Table VII presents results based on five different financial market measures for destination countries (liquid liabilities, private credit, stock market capitalization, stock market total value traded, value traded over capitalization). For each FMM measure we consider the effect of the sheer presence of Hermes (Dummy) and also the elasticity of exports with respect to the quantity of guarantees (ln guarantees). To make the direct effect of FMM visible, we are no longer able to control for year×country effects by dummies. So, we account for further relevant covariates which reduces our number of observations. In line with results in related research the quality of financial markets in destination countries has a strong and positive direct effect on exports. For example, column (1) in Table VII shows that German exports are on average about 1.7 percent higher when the ratio of liquid liabilities over GDP increases by 10 percent in the destination country. Depending on the chosen FMM measure this positive trade effect varies between 0.25 and 1.7 percent. Furthermore, it is statistically robust and independent of whether the Hermes effect is measured by a dummy or guarantee volumes.

The interesting question is whether Hermes reduces financial frictions in import countries. We test for this by interacting Hermes with the different FMM measures. The direct effect of the binary Hermes measure across all five specifications is persistently positive and varies between 19.5 and 21.9 percent. The direct effect of Hermes on exports has to be understood as the effect that results when financial market conditions in destination countries are worst

[17] http://econ.worldbank.org

(FMM= 0). The point estimate lies somewhat above the values found in previous tables; suggesting that the export-enhancing effect of Hermes is stronger when FMM is low. However, while the interaction term turns out to be negative across all chosen measures, it is never statistically significant.[18] Summarizing, financial market maturity of the destination countries matters for German exports. However, official export credit guarantees do not play a very strong role in lowering the relevance of this variable for German exports.[19]

[18]In all our tables, standard errors are adjusted for clustering at the country×industry level. Given the structure of our data, this is clearly a preferred approach. Note, however, that statistical significance is sometimes dramatically reduced by clustering.

[19]Using the OECD country risk measure leads to very similar results (of course with opposite signs) than the measures of Beck et al. (2008): the direct effect is strongly negative and the interaction with Hermes is positive, albeit without statistical significance. Also note that estimated interaction terms look very similar when using country×year effects in the regressions.

Table VII: Hermes and Import Country Financial Market Maturity (FMM); Interactions

Dep.var. Ln exports by country										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FMM Variable	Liquid liabilities$^{(a)}$		Private credit$^{(a)}$		Stock market capitalization$^{(a)}$		Stock market total value traded$^{(a)}$		Value traded over capitalization	
Hermes variable	Dummy	Guarantees	Dummy	Guarantees	Dummy	Guarantees	Dummy	Guarantees	Dummy	Guarantees
Hermes	0.195**	0.016***	0.219***	0.018***	0.217***	0.017***	0.207***	0.016***	0.202***	0.016***
	(0.064)	(0.004)	(0.052)	(0.003)	(0.042)	(0.003)	(0.037)	(0.002)	(0.035)	(0.002)
FMM	0.173***	0.174***	0.173***	0.174***	0.094***	0.095***	0.076***	0.077***	0.025***	0.025***
	(0.044)	(0.044)	(0.029)	(0.029)	(0.016)	(0.016)	(0.011)	(0.010)	(0.006)	(0.006)
Hermes × FMM	-0.020	-0.002	-0.069	-0.006	-0.047	-0.004	-0.061	-0.004	-0.037	-0.003
	(0.100)	(0.006)	(0.077)	(0.005)	(0.054)	(0.003)	(0.046)	(0.002)	(0.024)	(0.002)
ln GDP	1.028***	1.027***	1.000***	1.000***	0.906***	0.906***	0.906***	0.906***	0.904***	0.904***
	(0.035)	(0.035)	(0.034)	(0.034)	(0.042)	(0.042)	(0.043)	(0.043)	(0.044)	(0.044)
ln Population	-0.151***	-0.151***	-0.165***	-0.165***	-0.290***	-0.290***	-0.284***	-0.284***	-0.283***	-0.283***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
ln Capital formation	0.121***	0.121***	0.140***	0.139***	0.244***	0.244***	0.247***	0.246***	0.255***	0.254***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.037)	(0.037)	(0.039)	(0.039)	(0.039)	(0.039)
ln Manuf. imports	0.128**	0.128**	0.135**	0.136**	0.175***	0.175***	0.183***	0.183***	0.127**	0.127**
	(0.042)	(0.042)	(0.042)	(0.042)	(0.047)	(0.047)	(0.053)	(0.053)	(0.048)	(0.048)
Within R-squared										
No. of observations	38450	38450	39880	39880	31421	31421	30224	30224	31083	31083
No. of markets	4976	4976	5093	5093	3956	3956	3978	3978	3986	3986

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model. $^{(a)}$ Variable is expressed as share of GDP.

6.2 Hermes and Sector Level Financial Vulnerability

Our final empirical exercise analyzes whether public credit guarantees alleviate industry-specific financial frictions. As financial vulnerability presumably matters most during times of financial distress, we add a triple interaction between a crisis dummy, sectoral vulnerability and the availability of export credit guarantees. We construct sectoral financial vulnerability measures following Chor and Manova (2011), Feenstra et al. (2011) and Askenazy et al. (2011) who successfully demonstrate that credit constraints have strongly negative effects on exports. We account for the financial crisis by a dummy variable which is positive in the years 2008/09. We use the Amadeus database for Germany to construct three sectoral vulnerability measures based on German firms' balance sheets. Our first measure is *Trade Credit* (trade credit accounts payable/turnover) which measures how much credit firms receive from suppliers. Hence, a higher ratio should indicate less financial vulnerability. Following Feenstra et al. (2011) we use *Tangible Assets* relative to total asset as a measure for collateral. A higher share should mitigate credit constraints, thereby increasing exports. Finally, *Liquidity Ratio* measures current liabilities over current assets. A higher ratio indicates a sector's lower ability to meet its obligations, leading to lower exports.

Table VIII reports fixed effects estimates for the chosen credit constraint measures. As above we use two different Hermes definitions (dummy and ln of guarantees). While the direct effect of public export guarantees remains positive and statistically significant across all available measures, the effect of financial vulnerability turns out to be less clear. A larger tangible asset share points on higher exports, but it is statistically insignificant. The remaining two measures have no measurable direct effect on exports. More interestingly, interacting Hermes with each vulnerability measure provides the expected results: Sectors with a higher share of tangible assets or trade credits experience a less stronger export enhancing Hermes effect as indicated by the negative interaction term (Hermes×Vulnerability). Equally, sectors with higher liquidity ratios (less liquid) show on average larger exports if Hermes guarantees are drawn. The extent of these effects and their significance differ depending on the chosen balance sheet measure, but the overall insight is that Hermes coverage lowers the export-inhibiting effects of industry-level financial vulnerability.

Table VIII also reports the additional effect of Hermes in the years of financial crises (Hermes×Crisis). Accordingly, credit guarantees appear to have a positive effect on exports in times of financial distress, but the evidence is mixed as statistical significance is not robust across all specification. Similarly, macroeconomic financial distress seem to amplify the export reducing effect of sectoral credit constraints. Less liquid firms experienced on average an additional export collapse during the financial crisis (columns 5 and 6). Finally, in order

Table VIII: Hermes and Sector Level Financial Vulnerability; Interactions

	(1)	(2)	(3)	(4)	(5)	(6)
	Trade Credit$^{(a)}$		Tangible Assets$^{(b)}$		Liquidity Ratio$^{(c)}$	
	Dummy	Guarantee	Dummy	Guarantee	Dummy	Guarantee
Hermes	0.503***	0.035***	0.817***	0.054***	0.447***	0.032***
	(0.056)	(0.004)	(0.113)	(0.008)	(0.046)	(0.003)
Vulnerability	-0.000	0.000	0.061	0.059	-0.000	-0.000
	(0.020)	(0.020)	(0.101)	(0.101)	(0.001)	(0.001)
Hermes×Vulnerability	-0.163*	-0.011*	-1.410***	-0.085**	0.005*	0.000
	(0.077)	(0.005)	(0.391)	(0.027)	(0.002)	(0.000)
Hermes × Crisis	0.210**	0.010*	0.406	0.023	0.076	0.001
	(0.079)	(0.005)	(0.334)	(0.022)	(0.062)	(0.004)
Vulnerability × Crisis	-0.071	-0.070	0.133	0.128	-0.011***	-0.011***
	(0.037)	(0.037)	(0.179)	(0.179)	(0.003)	(0.003)
Hermes×Vulernability×Crisis	0.156	0.011	-1.058	-0.070	0.028***	0.002***
	(0.100)	(0.006)	(1.539)	(0.103)	(0.008)	(0.000)
Within R-squared	0.869	0.869	0.868	0.868	0.869	0.869
No of observations	41572	41572	42182	42182	41678	41678

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model. $^{(a)}$ trade credit accounts payable/turnover (see e.g. Askenazy et al., 2011); $^{(b)}$ tangible assets/total assets (see e.g. Feenstra, 2011); $^{(c)}$ liquidity ratio current liabilities/current assets (see e.g. Askenazy et al. 2011). Estimates for GDP, Population, Capital Formation and Man. Imports are included but not listed.

to control for whether public credit guarantees mitigated sector specific credit constraints in particular during the financial crisis, we interact Hermes with vulnerability and the crisis dummy. The results are mixed. While sectors with low liquidity and a low share of tangible assets experienced an additional export enhancing Hermes effect, there is no statistical effect if we consider trade credits.

Summarizing, Table VIII shows that export credit guarantees on average lead to a stronger increase in exports when industries are characterized by higher degrees of financial vulnerability. In this context, Hermes appears to be an instrument which partly mitigates credit constraints. Additionally, one can conclude that public credit guarantees have helped contain the export collapse during the recent financial crisis. Hermes helped to reduce the drop during the crisis in particular in sectors with relative higher credit constraints.

7 Conclusions

Most governments engage in underwriting export credit risk of domestic producers. They do so, because it is widely believed that certain transactions cannot be privately insured. In particular, when projects are large and lumpy, or when the deal is exposed to large political and economic risk in the destination country, international agreements allow the use of public guarantees. An increasing body of theoretical and empirical research supports this belief: as shown, amongst others, by Manova et al. (2011), credit constraints do have a trade-inhibiting effect. A related strand of literature argues that the financial crisis of 2008/09 has led to a sharp decline in international trade precisely because it exacerbated credit constraints for exporters or importers.

So far, the empirical literature on the role of export credit guarantees and on their interaction with credit constraints is very small. Building on an earlier contribution by Egger and Url (2006) for Austria, Moser et al. (2008) use data for Germany to analyze the impact of official export credit guarantees on exports in the presence of political risk. In both papers, it is shown that this instrument has a significant positive effect on exports. These studies do not, however, address the effect that public export credit guarantees could have on mitigating the trade-inhibiting forces of credit market frictions.

In this paper we contribute to the literature by focusing on German export credit guarantees, the so-called Hermes guarantees. Unlike previous studies, we have sectoral data. This feature allows us to run regressions that include destination-specific dummies for each year. Amongst other things, this strategy allows to control for multilateral resistance terms, which would, if omitted, bias the estimates. Controlling for other sources of unobserved heterogeneity, we document the export-enhancing effect of Hermes guarantees between the years 2000 and 2009. A one percent increase in public guarantees boosts exports on average by about 0.012 percent. Compared to Moser et al. (2008), this estimate is substantially lower. Besides the difference in the considered period, we deal with unobserved heterogeneity in a fairly general way. Furthermore, unlike earlier studies, the data rejects the use of a random effects methodology, so that we rely on the within-transformation to eliminate country×sector heterogeneity.

We test for differential effects of Hermes guarantees across countries with different income groups. According to our results, guarantees have a smaller effect in richer countries. A one percent increase in Hermes boosts exports in the richest countries by 1.2 percent, in higher middle income countries by 1.3 percent and in lower income countries by 1.4 percent. Hence, Hermes' export enhancing effect increases with decreasing average income. This decreasing correlation supports the hypothesis that there is little need for public guarantees if financial

constraints are weak, which is the case in richer countries. Our exceptional data allows us furthermore, to control for sector specific effects. We find that Hermes effects are particularly large in a small number of sectors, which are the aviation, shipbuilding and transportation sectors. These sectors are characterized by high time-to-build lags and large external financial dependence, suggesting that Hermes guarantees alleviate sectoral financial frictions. Our estimations also show clearly, that Hermes is differently effective in increasing exports across sectors, regions and income groups.

A final set of results relates to the interplay between credit constraints and Hermes coverage. We show that financial market maturity in destination countries is positively correlated with exports. Depending on the financial market measure a 10 percent increase in destination market maturity boosts exports on average by up to 1.7 percent. Across all chosen measures Hermes turns out to mitigate destination market financial frictions. However, in our preferred fixed effect specification estimates turn out to be statistically insignificant. We also exploit variation across sectors in indicators of financial vulnerability. We find that the less vulnerable sectors are with respect to credit constraints, the smaller the positive Hermes effect becomes. We also find some evidence for Hermes guarantees' export enhancing effect during the financial crisis. This mitigating Hermes effect during the crisis turns out be strongest in more vulnerable sectors.

Our results suggest a number of policy implications. Public export credit guarantees can indeed mitigate financial market frictions. But their efficiency significantly differs across sectors and countries. In order to minimize export distortions across industries, the instrument should be provided primarily to sectors characterized by high credit constraints, which appears to be the case e.g. for aviation, shipbuilding and transportation. Importantly, in countries with the lowest income Hermes does not show a positive export enhancing effect. Hence, the provision of public guarantees only based on the capital market imperfection argument is insufficient. In order to prevent large defaults, which Germany experienced in the late 80s and early 90s, it is crucial to account for further country specific characteristic like average income. Otherwise, Hermes default payments are at risk to be misused as windfall gains.

An important question which we were not able to tackle in this work are third country effects and competition among countries with respect to the provision of export credit guarantees. While our results point on windfall gains in some countries and sectors, we can not control for whether external effects are the primal source for these observations. The observed increase of Hermes guarantees during the last decade is most likely to be also driven by other countries' provision activities in new markets. Further research into this direction is therefore necessary.

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A Appendix

Table A.1: Internal Industry Classification - Euler Hermes -

Product Group	Text Product Group
0101	Belowground Mining
0102	Open Cast Mining
0103	Mineral Processing Industry
0104	Coal Processing
0105	Machine Construction Mining
0201	Offshore Extraction
0202	Offshore Extraction
0203	Natural Gas Processing
0204	Crude Oil Processing
0205	Machine Construction Oil- and Natrual Gas Extraction
0301	Pharmaceutical Industry, Bioengineering
0302	Fertilizer
0303	Other Chemical Industry
0304	Machine Construction Chemistry
0401	Renewable Engergy
0402	Power Plant, fossil powered
0403	Nuclear Power
0501	Disposal - Garbage and Sewage
0502	Energy Distribution
0503	Hospital
0504	Tourismus
0505	Facility for Construction of Hauling Means
0506	Haul Means
0507	Traffic Infrastructure and Facilities
0508	Water Management
0509	Telecommunication
0510	Computer and Software
0511	Machine Construction and Infrastructure
0601	Forest Facilities
0602	Pulp Production
0603	Wood Processing
0604	Textile and Leather Goods Industry
0605	Machine Construction Pulp, Wood, Leather and Textile
0701	Farming Facility
0702	Facility for Food Processing
0703	Products based on plant and animals
0704	Machine Construction in agricultural and food product sector
0801	Metal Industry
0802	Primary Products
0803	Synthetic Materials Industry
0804	Medical Technology - Research
0805	Electrical Engineering, Computing, Fine Mechanics, Optics
0806	Machine Construction for Manufacturing
0901	Environment Engineering Facilities
1001	Services
1002	Delivery Services

Notes: Euler Hermes defines sectors/industries according to an internal classification which is based on covered products. Besides this 4 digit classification there exists a 6 digit nomenclature which we use for the underlying dataset. Source: Euler Herms.

Table A.2: Observed Sectors - NACE 1.1 Classification -

NACE 1.1 sector classification	Text	Freq.	Percent
1	Agriculture, hunting and related service activities	1,672	2.57
2	Forestry, logging and related service activities	1,167	1.8
5	Fishing, fish farming and related service activities	740	1.14
10	Manufacture of food products	1,004	1.55
11	Mining of coal and lignite; extraction of peat	260	0.4
12	Mining of uranium and thorium ores	19	0.03
13	Mining of metal ores	746	1.15
14	Other mining and quarrying	1,625	2.5
15	Manufacture of food products and beverages	1,985	3.06
16	Manufacture of tobacco products	1,300	2
17-18	Manufacture of textiles Manufacture of wearing apparel; dressing and dyeing of fur	2,062	3.17
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1,899	2.92
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1,763	2.71
21	Manufacture of pulp, paper and paper products	1,952	3.01
22.1,22.2-22.3	Publishing, printing and reproduction of recorded media	1,941	2.99
23	Manufacture of other non-metallic mineral products	984	1.51
23.2	Manufacture of coke, refined petroleum products and nuclear fuel	1,717	2.64
24	Manufacture of chemicals and chemical products	2,102	3.24
25.1	Manufacture of rubber products	1,971	3.03
25.2	Manufacture of plastic products	2,044	3.15
26	Manufacture of other non-metallic mineral products	2,003	3.08
27	Manufacture of basic metals	1,960	3.02
28	Manufacture of fabricated metal products, except machinery and equipment	2,054	3.16
28.62	Manufacture of tools	1,993	3.07
29	Manufacture of machinery and equipment n.e.c.	2,111	3.25
30	Manufacture of office machinery and computers	1,971	3.03
31	Manufacture of electrical machinery and apparatus n.e.c.	2,080	3.2
31.1	Manufacture of electric motors, generators and transformers	1,955	3.01
32	Manufacture of radio, television and communication equipment and apparatus	2,005	3.09
33	Manufacture of medical, precision and optical instruments, watches and clocks	2,104	3.24
33.1	Manufacture of medical and surgical equipment and orthopaedic appliances	2,006	3.09
34	Manufacture of motor vehicles, trailers and semi-trailers	2,120	3.26
35	Manufacture of other transport equipment	1,553	2.39
35.1	Building and repairing of ships and boats	1,153	1.78
35.2	Manufacture of railway and tramway locomotives and rolling stock	1,246	1.92
35.3	Manufacture of aircraft and spacecraft	1,496	2.3
35.5	Manufacture of other transport equipment n.e.c.	1,267	1.95
36	Manufacture of furniture; manufacturing n.e.c.	2,071	3.19
40	Electricity, gas, steam and hot water supply	234	0.36
74	Other business activities	1,115	1.72
92	Recreational, cultural and sporting activities	1,413	2.18
93	Other service activities	94	0.14
Total		64,957	100

Notes: Based on correspondence tables from eurostat (RAMON-Database) it is possible to transform export data from HS-6 into a NACE 1.1 sectoral classification. Euler Hermes' internal classification of EZDs permits the allocation of export guarantees to the listed 42 sectors. Although our data is restricted to manufacturing the transformation of our data based on official correspondence tables leads to some observations in the service sector (e.g. 74, 92, 93).

Table A.3: Countries of Specific World Regions

Sub-Saharan Africa	Angola, Benin, Burkina faso, Burundi, Cameroon, Cape verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Djibouti, Equatorial guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda,Senegal, Sierra leone, Somalia, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe
New EU	Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia
Eastern and Southern Europe	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegowina, Georgia, Kazakhstan, Kyrgyzstan, Macedonia, Moldova, Montenegro, Russian federation, Serbia, Serbia and Montenegro, Tajikistan, Turkey, Turkmenistan, Ukraine, Usbekistan
Latin America	Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican republic, Ecuador, El Salvador, Falkland islands, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, Venezuela
Middle East	Algeria, Bahrain, Egypt, Iran (islamic republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libyan, Morocco, Occupied Palestinian Territory, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen
EU 15	Andorra, Austria, Belgium-Luxembourg, Denmark, Finland, France, Gibraltar, Greece, Greenland, Iceland, Ireland, Italy, Netherlands, Norway, Portugal, San marino, Spain, Sweden, Switzerland
East Asia	Cambodia, China, Hong kong, Lao People's Democratic Republic, Macau, Mongolia, Viet Nam
Rich East Asia	Japan, Korea, Singapore
Other OECD	Australia, Canada, New Zealand, USA
South Asia	Afghanistan, Bangladesh, Bhutan, Brunei Darussalam, East Timor, India, Indonesia, Malaysia, Maldives, Mauritius, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Seychelles, Sri lanka, Thailand
Islands	American Samoa, Anguilla, Antarctica Antigua and Barbuda, Aruba, Bahamas, Barbados, Bermuda, Bouvet Island, British Indian Ocean Territory, Cayman Islands, Christmas Island, Cocos Islands, Comoros, Cook Islands, Fiji, French Polynesia, French Southern Territories, Grenada, Guam, Heard and Mc Donald Islands, Kiribati, Marshall Islands, Micronesia, Montserrat, Nauru, Netherlands Antilles, New Caledonia, Niue, Norfolk Island Northern Mariana Islands, Palau, Pitcairn, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Solomon Islands, South Georgia and the South Sandwich, St. Helena, St. Pierre and Miquelon, Tokelau, Tonga, Trinidad and Tobago, Turks and Caicos Islands, Tuvalu, United States Minor Outlying Islands, Vanuatu, Virgin Islands, Wallis and Futuna Islands

Notes: The region EU 15 includes Andorra, Gibraltar, Norway, Switzerland

Table A.4: Summary Statistics

	Mean	Std. Dev.	Min	Max	Source
Large sample I (N=42,669), e.g. Table II					
ln Exports	7.970	3.43	-0.34	16.94	BACI
Hermes (0,1)	0.034	0.18	0.00	1.00	Euler Hermes
ln Guarantees	0.520	2.81	0.00	21.46	Euler Hermes
Coverage ratio	0.004	0.04	0.00	0.96	Euler Hermes
ln GDP	24.363	2.09	19.59	30.07	WDI
ln Population	9.273	1.74	3.66	14.10	WDI
Custums Union (0,1)	0.179	0.38	0.00	1.00	WTO
Economic Integration Agreement (0,1)	0.262	0.44	0.00	1.00	WTO
ln nominal exchange rate	2.835	2.70	-3.01	10.08	WDI
OECD country risk	3.949	2.60	0.00	7.00	OECD
ln capital formation	22.824	2.10	17.68	28.43	WDI
ln manufacturing imports	4.191	0.20	2.58	4.53	WDI
Large sample II (N=64957), e.g. Table III					
ln Exports	6.967	3.57	-0.34	16.945	BACI
Hermes (0,1)	0.025	0.16	0.00	1.000	Euler Hermes
ln Guarantees	0.379	2.40	0.00	21.459	Euler Hermes
Coverage ratio	0.003	0.04	0.00	0.962	Euler Hermes
Small sample (N=1,456), e.g. Table II					
ln Exports	12.0	2.0	4.3	16.37	BACI
ln Guarantees	15.3	2.5	7.0	21.46	Euler Hermes
ln GDP	25.6	1.6	21.3	30.07	WDI
ln Population	10.4	1.5	6.0	14.10	WDI
Custums Union (0,1)	0.1	0.4	0.0	1.00	WTO
Economic Integration Agreement (0,1)	0.2	0.4	0.0	1.00	WTO
ln nominal exchange rate	2.7	2.7	-1.3	10.08	WDI
OECD country risk	3.8	2.1	0.0	7.00	OECD
ln capital formation	24.1	1.6	19.4	28.43	WDI
ln manufacturing imports	4.2	0.2	2.8	4.53	WDI

Notes: Panel dimension is country × sector ("export market"). WDI denotes World Development Indicator Data Base 2010, BACI is sectoral trade data base from CEPII (Paris) based on COMTRADE.

Table A.5: The Moser et al. (2008) Specification on Aggregate Data: RE versus FE models

Dependent variable: ln of Exports	(1) FE	(2) FE	(3) RE	(4) Re-Mundlak	(5) FE	(6) FE	(7) RE	(8) Re-Mundlak
ln Guarantees	0.014**	0.014*	0.020***	0.015**	0.015**	0.015*	0.021***	0.015**
	(0.006)	(0.008)	(0.006)	(0.006)	(0.006)	(0.008)	(0.006)	(0.006)
ln GDP	0.422***	0.422***	0.609***	0.431***	0.402***	0.402***	0.587***	0.416***
	(0.080)	(0.137)	(0.068)	(0.080)	(0.082)	(0.133)	(0.070)	(0.082)
ln Population	-0.527**	-0.527	0.078*	-0.565**	-0.383	-0.383	0.113***	-0.420*
	(0.246)	(0.344)	(0.041)	(0.246)	(0.249)	(0.337)	(0.044)	(0.250)
ln Distance			-0.011	-0.007			-0.008	-0.011
			(0.054)	(0.051)			(0.054)	(0.051)
Capital Formation	0.199***	0.199*	0.195***	0.198***	0.171***	0.171	0.172***	0.171***
	(0.055)	(0.112)	(0.054)	(0.055)	(0.056)	(0.111)	(0.054)	(0.056)
Manufacturing Imports	0.203***	0.203*	0.154**	0.213***	0.192**	0.192*	0.142*	0.203***
	(0.076)	(0.108)	(0.075)	(0.076)	(0.076)	(0.105)	(0.075)	(0.076)
ln Avg. Guarantees				0.100***				0.099***
				(0.036)				(0.036)
ln Avg. GDP				-0.010				-0.008
				(0.215)				(0.218)
ln Avg. Population				0.522**				0.358
				(0.255)				(0.259)
Avg. Capital Formation				-0.715**				-0.796**
				(0.312)				(0.317)
Avg. Manufacturing Imports				0.239				0.309
				(0.192)				(0.200)
Political Risk					-0.051***	-0.051*	-0.047***	-0.047**
					(0.019)	(0.030)	(0.018)	(0.019)
Avg. Political Risk				-0.055				-0.004
				(0.047)				(0.050)
No. of observations	1076	1076	1076	1076	1067	1067	1067	1067
No. of countries	143	143	143	143	141	141	141	141
R-squared	0.567	0.567	0.948	0.954	0.718	0.718	0.948	0.953

Notes: Panel dimension is country. Robust standard errors corrected for clustering along the destination country dimension only for columns (2) and (6). All regressions contain year and region effects as well as a constant (not shown). Hausman test rejects RE specification (3) against FE model (1) with a p-value of 0.000, and RE specification (7) against model (5) with a p-value of 0.000. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

Table A.6: The Hermes effect across years, 2000-2009

Dep.var. Ln exports, by sector.	(1)	(2)	(3)
		Hermes variable	
Year	Dummy	ln Guarantees	Coverage
2000	0.239***	0.020***	1.126***
	(0.058)	(0.004)	(0.267)
2001	0.207***	0.016***	0.415
	(0.055)	(0.004)	(0.301)
2002	0.187**	0.015***	0.725***
	(0.058)	(0.004)	(0.210)
2003	0.218***	0.016***	0.830**
	(0.057)	(0.004)	(0.253)
2004	0.136*	0.011**	0.393
	(0.056)	(0.004)	(0.237)
2005	0.076	0.007	0.344
	(0.067)	(0.005)	(0.365)
2006	0.110	0.009*	0.886
	(0.069)	(0.005)	(0.464)
2007	0.100	0.008	0.421
	(0.059)	(0.004)	(0.416)
2008	0.184**	0.013***	0.939**
	(0.057)	(0.004)	(0.300)
2009	0.062	0.006	0.175
	(0.067)	(0.004)	(0.249)
Within R-squared	0.150	0.150	0.150
No. of observations	64,957	64,957	64,957
No. of markets	7,787	7,787	7,787

Notes: Panel dimension is country × sector ("export market"). Robust standard errors corrected for clustering along the destination country × sector dimension displayed in brackets. All regressions contain year × industry effects and year × country effects (not shown). Country × sector effects are eliminated by within transformation. * p<0.1,** p<0.05, *** p<0.01. Chi^2 Hausman test rejects random effects specification in each model.

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