



Do transactions to tax havens and corruption attract officially supported export credit? Evidence from three European export credit agencies

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Abstract

OECD governments provide billions in export credit annually in support of national exporters to developing countries. Linked to the OECD-recommendation on anti-bribery and export credits, the research focuses on whether support of the export credit agencies is dependent on the corruption levels and so called ‘tax haven’ status of the countries to which the exports are destined. We compose a unique panel data set based on data on the export credit agencies of the United Kingdom, the Netherlands and Sweden. We find that corruption levels in the countries to which the exports are destined do not have an influence on the presence and level of export credits. Conversely, whether the destination country of the export is a ‘tax haven’ is important: British and Dutch agencies are significantly more likely to provide export credit for export transactions to tax havens than for non-tax-havens, all else being equal. This declines for the Netherlands over time. The results indicate that the chances that the United Kingdom Export Finance supports transactions with EC to a tax haven are 12 times more likely than for a non-tax haven countries, all else being equal. In the Netherlands, this is 3 times more likely. Based on the findings, we recommend that export credit agencies and their financial backers be extra vigilant in their due diligence policies, especially with respect to ‘tax havens’ and make these policies publicly available.

Keywords Export credit · Corruption · Tax havens · Export credit agencies · Due diligence · Bribery

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Introduction

Annually, officially supported export credit agencies (henceforth ECAs) extend between 42 and 83 billion USD (OECD n.d. A). These ECAs aim to promote national exports by issuing insurance to companies operating or trading abroad against commercial and political risk. While websites of these export credit agencies provide examples of the positive developmental impact of their export credits in the Global South, investigative journalists and civil society actors have linked these credits to forced evictions (Financieel Dagblad 2020; Trouw 2020), environmental pollution (Both Ends 2015), increased debts (Eurodad 2011) and corruption (Beizsley and Hawley 2020). Yet, academic articles in the field of economics and business virtually only consider the effects of export credit agencies on exports, and not on links with other potential consequences. This article contributes to the academic international economic literature by focusing on potential unintended effects of export credits and export credit agencies.

Recent reports by watchdogs and journalists have highlighted in particular the links between export credit (henceforth EC) and corruption. In 2020, an in-depth report was released that analyzed 11 transactions of UK Export Finance (2020), the ECA of the United Kingdom (henceforth UK). It was found that 3 transactions posed exceptionally high risks with respect to corruption (Beizsley and Hawley 2020). In the Netherlands, the link between ECAs and corruption hit the front pages as a result of the Luanda leaks (2020). These examples are part of the long history of concerns about the link between EC and corruption. ECAs can be involved in corrupt practices when the commissions involved in these transactions hide bribes. Tax havens can play a crucial role in facilitating bribe payments in these export-credit-backed deals (Both Ends 2015; Vrij Nederland 2016). In 2003, the first civil society report regarding these concerns about EC and corruption was published (2003). The first cross-country analysis of anti-bribery policies by ECAs followed in 2010, when Transparency International highlighted the differential implementation of the OECD Council Recommendation on Bribery and Officially Supported ECs (2010). The concerns regarding the link between EC and corruption have stimulated public backers to adopt and strengthen the OECD Council Recommendations, which require ECAs to perform due diligence on their clients.

Despite the internationally supported push for ECAs to be vigilant about corruption (2003), hardly any empirical literature has examined the geographic patterns of publicly backed export credits. Although a body of literature on the geographic patterns has emerged for the NGO sector (Koch et al. 2009) and the corporate aid sector (Metzger et al. 2010), it has not for ECAs. Currently, the space is mostly occupied by activist research (e.g. Transparency International 2010; Eurodad 2011; Both Ends 2013a, b; Both Ends 2015). Activist research has suggested a link between corruption and the level of export credits—at least for United Kingdom Export Finance: “[w]e find that UKEF’s support for UK exporters is targeted at sectors prone to corruption such as infrastructure and defense in countries at high risk of corruption. We find that 11 out of 20 of UKEF’s priority

markets rank in the bottom half of corruption indices” (Beizsley and Hawley 2020, p. 3). However, these activist assertions have not been rigorously tested: it remains unproven that ECAs actually back more transactions in corruption-prone countries. This paper fills this gap.

This issue has become even more topical as the proportion of low-income countries experiencing debt distress, or facing a high risk of it, has doubled since 2013, according to data from the joint World Bank–IMF Debt Sustainability Framework (Pazarbasioglu 2019). While the link between the EC of OECD countries and the indebtedness of developing countries is often hard to discern when looking at aggregates of developing countries’ public debts (2011), it becomes all the more apparent when analyzing the origins of those debts in detail (Blackmon 2014). According to Eurodad, the civil society organization that produced a detailed estimate, on average 80 per cent of the debt that developing countries owe to northern governments is the result of EC (Eurodad 2011, p. 10).

By creating a panel data set comprising three European ECAs, with data for 183 countries over the 2008–2019 period, we aim to contribute to the literature on ECAs and their link to corruption. Accordingly, we investigate empirically whether (the perceptions of) corruption in export destination countries have an influence on the likelihood that officially supported ECs back transactions to them. We estimate the effect of corruption on the value of transactions backed by EC for three ECAs from countries in North-Western Europe, one of which is a member of the G7. Whereas the three ECAs under study are not representative of all public-backed ECAs around the world (as these three countries all fall under the OECD regulations), the current research provides the first empirical in-depth understanding of the EC geographic patterns of a North-Western European subset.

This article does not only aim to contribute to the academic debate, but also to the policy debate with respect to ECAs. This article can provide an impetus to the policy debate with respect to unintended effects of ECAs, which is often overlooked (Koch 2017). By getting more insight into unintended effects of international cooperation efforts, they could be mitigated to a certain degree, as examples from international migration policy (Boersma et al. 2022), international trade policy (Koch and Burlyuk 2020) and international climate change mitigation policy suggest (Koch and Verholt 2020).

The remainder of the paper is structured as follows. The first section provides the analytical background of the paper and defines some key terms. It also introduces our main hypothesis, that is, our expectation that officially supported EC will be allocated more when export destination countries are characterized by higher levels of corruption. Thereafter, the second section discusses the data selection and preparation as well as the set-up of the regression statistics. The first set of regressions analyses the determinants of the binary variable transactions insured by ECAs. The second set analyses the level of those transactions as a continuous variable. The results follow, including a discussion of the robustness of our findings. The discussion highlights some additional methods and data that could be used to research this issue in greater depth in the future. The conclusion presents the main findings of this research as well as their implications.

Analytical starting points

This section comprises an overview, albeit short, of the existing literature on export credit and corruption, followed by the definition of the key terms of this research. We conclude this section with a theoretical substantiation of our hypothesis.

Analytical starting points

Generally, two types of literature have evolved around ECAs. On the one hand is the activist literature (Transparency International 2010; Eurodad 2011; Both Ends 2013a, b; Both Ends 2015). This literature has argued that corruption risks attracting EC and lambasts its negative effects:

When ECAs give backing to a company or bank, they almost always require the importing country to offer a counter-guarantee. This means that in the event of a default ... the importing government must compensate the ECA concerned. If it does not do so, the amount is added to the importing country's official debt as a bilateral (government to government) debt. (...) The people of Southern countries are paying debts incurred for some projects that have been of little or no value to either the country or its people. Furthermore, if ECA backing for contracts includes the cost of bribes hidden in commission payments, when ECAs recover compensation from importing governments for amounts they have paid out or add this amount to official debt, ECAs are in effect requiring taxpayers of the importing country to pay for the bribes made by the exporting company. (The Corner House 2003, p. 18)

In addition, according to a recent report on the transparency and sustainability of seven export credit agencies in Central and Eastern Europe (2017), ECAs have fallen into a grey zone regarding the European development policy. A report by the Dutch NGO Both Ends showed that a great number of companies that receive EC channel their transactions through countries that are indicated to be tax havens (2013). Finance & Trade Watch (2017) stated that this is detrimental to sustainable development. Additionally, it noticed that, despite the due diligence requirements of the ECAs, the subject of taxation had not been addressed until recently. This raises concerns as such types of transactions allow international firms to engage in aggressive tax avoidance practices, especially when there is a lack of effective measures that can prevent parties involved in corruption, tax evasion and money laundering from obtaining support from ECAs (2013).

On the other hand there is the academic literature on ECs, which has been growing over the last couple of years. Their findings are in general more positive than the activist literature. A majority of the research on export credit focuses on whether it succeeds in achieving its intended targets, namely increasing export. This has been assessed for amongst others Spain (Cea et al. 2021), Korea (Choi and Kim 2021), Germany (Felbermayr and Yalcin (2011) and Turkey (Polat and Yeşilyaprak 2017). These studies point in the direction that ECs indeed, to varying degrees and

in varying ways, stimulate export. However, the aim of this article is not to measure if ECs achieve the stated objectives, but if they can be associated to unintended objectives, as unintended effects of international cooperation are often overlooked (Koch and Schulpen 2018). By getting more insight into unintended effects of international cooperation efforts, they could be mitigated to a certain degree, as examples from international migration policy (Boersma et al. 2022), international trade policy (Koch and Burlyuk 2020) and international climate change mitigation policy show (Koch and Verholt 2020).

In the recent literature on export credits there has been some attention to their potential link to unintended effects, especially in the environmental realm (Hopewell 2019). However most academic studies that focus on other issues than the effects on export themselves refrain from statistical analysis and focus more on impact of the rise of non-OECD countries on the export credit regime (Bunte et al. 2021, Hopewell 2021). These studies focus more on how ECAs increasingly risk becoming some kind of state-aid than on how ECAs might unintentionally be linked to corruption, which is the focus of this paper. The only academic study that was found on the relationship between ECAs and corruption was a non-quantitative working paper by Franklin (2016). He stipulates, contrary to the activist literature, that ECAs might actually reduce corruption because of the due diligence requirements that they impose on international business transactions (Franklin 2016, p. 12).

We examine the determinants, particularly the corruption levels, of EC issued by three different ECAs from Western European countries. ECAs are public or private institutions that provide exporting companies operating or trading abroad, as well as financial institutions, with credit, insurance and/or guarantees. Their aim is to support the home country's export industries, against country risks within the country in which the importer resides. Such an EC insures exporting companies against these country risks. This is necessary because the country risks may result in an importer defaulting on payment for the goods and services that a company has exported. If this occurs, the ECA makes sure that the insured exporting firm receives payment. EC comes in various forms. The three main types of trade-based financing are export guarantees, insurances and direct transaction-based lending. Export guarantees are assurances made by an ECA that it will pay the exporter if the importers default on their payment obligations. Direct transaction-based lending implies that a loan is conditional on the purchase of goods or services from businesses in the ECA country.

Two types of ECAs exist, namely officially supported ECAs and private ECAs. On the one hand, private ECAs use market-based rates for their insurance and generally operate with repayment terms of shorter than 24 months. Officially supported ECAs, on the other hand, often focus more on the medium term, that is, 2 to 5 years, or the longer term, that is, 5 years or longer. Officially supported ECAs have more means of collecting payments from importing, non-paying entities than private ECAs and thus operate in more risky markets. This is because, contrary to officially supported ECAs, private ECAs cannot make use of their direct connection to the Ministry of Finance and/or Trade (Eurodad 2011, p. 8). A characteristic of officially supported ECAs is that they are in direct connection with and/or under the supervision of the Ministry of Finance or the Ministry of Trade of their country (Eurodad

2011, p. 8). The Ministry can push for payments in bilateral negotiations or make the governments of the importing, non-paying entities liable. In this study, we focus on the export guarantees provided by the ECAs that the British, Dutch and Swedish governments publicly support. Some OECD countries have two official ECAs, such as Sweden, with one focusing on guarantees (EKN—Swedish Export Credit Agency). This research makes use of the data of EKN. Sometimes these ECAs are standalone agencies, such as the American Ex-Im bank, but regularly they are public entities that are part of a commercial bank while maintaining independence. Publicly supported ECAs insure against risks that commercial insurers will not insure against, typically with lower premiums (2006).

The hypothesis

To examine the geographic patterns of ECAs in more detail, we held ten (video) interviews with relevant staff members of four different ECAs (from Norway, Sweden, Germany and the Netherlands) as well as with staff members of the OECD. These interviews provided relevant information that complemented the few academic texts on ECAs and the determinants of export insurance. Annex 1 provides an overview of the function titles of the staff members. During the interviews, we focused primarily on the geographic patterns of the ECAs as well as their anti-corruption practices. Interestingly, the majority of the respondents stated that, since ECAs are demand-driven organizations, they do not make any deliberate geographic choices as such. The interviewees also stated that they did not focus on particular sets of countries, such as poorer countries. Rather, ECAs process requests from exporting companies and provide guarantees or loans as long as they meet the requirements. Only when exports cannot be destined for countries that the UN has placed under a regime of sanctions, such as North Korea, is the actual destination of the supported exports directly affected (interviews #8 and #9). Relevant to the current research, the interviewees provided information on why enterprises may request officially backed EC for certain countries. The official ECAs, with their public backing, specialize in those risks that cannot be insured in the regular market. These are mainly transactions in the higher commercial and country risk categories. As one interviewee explained, “Official ECAs should not compete with market EC providers, but complement them” (interview #10).

According to the OECD, country risks generally encompass two types. First, transfer and convertibility risks occur when a government imposes capital or exchange controls that prevent an entity from converting local currency into foreign currency and/or transferring funds to creditors located outside the country. Second, there is a risk to cases of force majeure that relates to war, expropriation, revolution, civil disturbance, floods or earthquakes (OECD, n.d. B). We hypothesize that, in addition to the examples provided by the OECD, corruption increases country risks. Corruption may increase country risks as it is likely to increase the chance that importers will not pay in full for their imports. This increased likelihood of non-payment can be due to a variety of factors. For instance, importers may consider that non-payment would not lead to measures being taken against them as they can

bribe themselves out of financial claims. Another link between corruption and non-payment could be that the imports were not particularly useful in the first place but were acquired mainly for the embezzlement opportunities that they provided, leaving little incentive for the importers to pay once they have received the kickbacks. When exporters are indeed looking for additional ways to insure themselves against these higher corruption-related risks, we expect that higher levels of corruption in export destination countries lead to more demand for support for transactions, hence for more officially supported EC. Thus, while ECAs do not officially have a policy to target more corrupt countries, it might be the result of their ‘demand-driven approach’.

Conversely, there are some practices that might reduce EC to corrupt countries. To reduce their own risk exposure, some ECAs have capped their maximum exposure per country, especially for high-risk countries. Since there is a clear positive link between risk categories and corruption levels, these ceilings might actually reduce the allocations to countries with more corruption. In addition, some ECAs have subscribed to the ‘sustainable lending principles’, which stipulate that the IMF/World Bank principles concerning debt sustainability in developing countries must be followed. These principles mean that public entity buyers in particular countries may borrow funds only if they (the buyers) meet the good governance requirements. Hence, this control mechanism might also suppress allocations to corrupt countries.

This research aims to discover which mechanisms are stronger: the mechanisms that amplify EC in support of transactions towards corrupt export destination countries or those that suppress these types of export credits? Our hypothesis is that higher levels of corruption in export destination countries lead to more officially supported EC as exporters are looking for additional ways to insure themselves against these higher corruption-related risks. Our hypothesis focuses neither on thematic choices nor on duration choices (longer term vs. shorter term) but on geographic patterns.

Methods and data

To test our hypothesis that corruption determines the geographic allocation of officially supported EC, we analyze the transactions (aggregated at the export destination country level) of officially supported ECAs during the 2008–2019 period (Atradius Dutch State Bank n.d.; EKN 2020b; UK Export Finance 2020). The data set includes data on 183 countries. When a company exports to one of these countries in our data set, it wants to ensure that it will be paid. Therefore, the exporting company may take out an EC guarantee with an ECA. We are interested in determining which factors play a role in the geographic allocation of these EC guarantees. In particular, we are interested in the role that corruption may play.

To examine this expected relationship empirically, we employ first a logit estimation and second a Tobit estimation. This approach is necessary for two reasons. First, we need to account for the selection bias problem in our data set, which arises because information on the dependent variable is missing for some of the observations. This may bias the estimates of the effects of the explanatory

variables as we can only estimate them for those observations for which EC is greater than zero. For instance, the sample of observations for which EC is greater than zero may differ in important unmeasured ways from observations for which EC is equal to zero. The second issue is that EC by definition cannot be below zero, so the data on EC are censored at the value of zero. To address both issues, we analyze the relationship between corruption and EC both at the selection and at the allocation level, in line with earlier studies on the determinants of the cross-country geographic choices of international actors (Neumayer 2002; Koch et al. 2009). We address the selection problem of destination countries by means of a logit model. We deal with the issue that our data on EC are censored at zero with the Tobit model, which is also called the censored regression model. We present the results of these two models in the next section. Since our analysis is based on a panel regression framework, we use the logit and Tobit models as they fit random-effect models for panel data.

One issue that we had to deal with was the issue of endogeneity resulting from an expected reverse causality between EC and corruption. We first sought to deal with this issue by making use of instrumental variables by means of the Heckman two-step method. To use the Heckman procedure, one needs to find at least one variable that accounts for the allocation of EC over different countries, but is unrelated to the actual amount of EC allocated. If such a variable is found, corruption can be used as variable to explain the amount of EC allocation to those countries that are selected (EC is greater than zero). We tried to perform such a Heckman procedure with trade sanction as instrument, as trade sanctions prohibit trade to certain countries. If trade is prohibited so that there is no export, there would be no need for insurance. However, we did not succeed in finding a variable for trade sanctions with sufficient data availability that significantly accounts for the allocation of EC over the various countries. In an attempt to account for reverse causality, we included lags of one year in the robustness checks. This means that we have to interpret a variable lagged once, $t-1$, as having an effect on the dependent variable in year t . The results are shown in the Annex and will be discussed in the section on robustness checks.

Table 1 shows the summary statistics for the indicators that we include in the regression estimation as well as the summary statistics for the most relevant factors broken down by tax haven status (Table S1 in Annex 2 provides more detailed summary statistics). While the summary statistics might suggest that tax havens receive fewer export support than non-tax havens, the regression results show a different story (“Results” section). We will now present a brief discussion of these indicators.

With the aim of having a large data set, we consulted the officially supported ECAs from seven countries: the United States, France, Germany, the Netherlands, Sweden, Norway and the UK. We held interviews with four of these ECAs. We were able to retrieve longitudinal country-wise breakdown data on their ECs from three countries’ ECA, namely those of the UK, named UK Export Finance (henceforth UKEF), the Netherlands, named Atradius Dutch State Business (henceforth ADSB and EC NL), and Sweden, named Exportkreditnämnden (henceforth EKN). The data on EC contain both the main categories of credit, namely guarantees, also referred to as credit insurance, and transaction-based loans, also referred to as liquidity products. We retrieved the data of UKEF from its yearly Annual Report and Accounts

Table 1 Summary statistics

Variable	Obs	Mean	Std Dev	Min	Max
All countries					
EC UK (log)	1647	4.61	7.01	0.0	21.99
EC Netherlands (log)	1464	2.98	6.32	0.0	21.31
EC Sweden (log)	2196	10.48	8.89	0.0	25
Corruption	2194	0.03	0.98	-2.4	2
Tax haven dummy	2196	0.11	0.31	0.0	1
Openness (log)	2126	4.37	0.55	-1.8	7
GDP per capita (log)	2167	8.62	1.45	5.3	11
Population (log)	2188	15.67	2.08	9.78	21.06
Coup dummy	2196	0.02	0.12	0.0	1
Sanction dummy	2196	0.02	0.12	0.0	1
FDI ratio UK	1631	0.10	3.51	-47.9	90
FDI ratio NL	1455	0.10	2.95	-52.5	33
FDI ratio SW	1972	0.03	0.34	-4.2	7
Non-tax haven countries (tax haven dummy = 0)					
EC UK (log)	1467	4.85	7.12	0.0	22
EC Netherlands (log)	1304	3.19	6.48	0.0	21
EC Sweden (log)	1956	11.32	8.72	0.0	25
Corruption	1954	0.09	1.00	-2.4	2
Tax haven countries (tax haven dummy = 1)					
EC UK (log)	180	2.68	5.79	0.0	18
EC Netherlands (log)	160	1.27	4.50	0.0	20
EC Sweden (log)	240	3.64	7.06	0.0	21
Corruption	240	-0.49	0.57	-1.4	1

The summary statistics describe the data after filling in missing observations. Note that EC Sweden is higher than EC UK and EC Netherlands because EC Sweden is expressed in Swedish krona and then log transformed, whereas EC UK and EC Netherlands are expressed in Great British pounds and euros, respectively, and then both are log transformed. EC selected from the three ECAs means that the EC for an observation is greater than zero. The logistic regression is run for these selected countries. In addition, note that the number of observations for EC and FDI from the UK, the Netherlands and Sweden differ because of the three different estimation periods. To be precise, the regression period for the UK is 2010–2018 (9 years' times 183 countries is 1647 observations), that for the Netherlands is 2012–2019 (8 years times 183 countries is 1,464 observations) and that for Sweden is 2008–2019 (12 years times 183 countries is 2196 observations)

(2020). We obtained the data for ADSB (EC NL) from its yearly reports on policy (2020). EKN (EC SW) shared the data with us.

The EC data required substantial treatment as the data sources were reported in different currencies and formats. In addition, the fiscal year of UKEC did not run parallel to the others. Likewise, since an EC guarantee is always issued for one particular transaction, the data were reported at the transaction level. We hence added up the

guarantees from UKEF, ADSB (EC NL) and EKN (EC SW) by destination country and by year (by ECA). We logged the EC variable to improve the distribution. Because we intended to run a Tobit model with selection at zero, we replaced EC logged with zero when EC was zero. In the end, we were able to retrieve data for 10 years (2010–2019) for UKEF, 8 years (2012–2019) for ADSB (EC NL) and 12 years (2008–2019) for EKN (EC SW). We test our hypothesis for these three ECAs separately; hence, we run three separate regression estimations, as the next section will show.

Our key explanatory variable is corruption. Since corruption generally leaves no paper trail, individuals' perceptions and experiences of corruption are often the only information available and thus the best to use if one wants to capture corruption (Kaufmann et al. 2007). To test for the effect of corruption on EC, we use the control of corruption indicator from the World Bank (Kaufmann et al. 2007) because of its global coverage, precision and careful construction by the World Bank institutions (Thomas 2009). The control of corruption indicator is constructed based on the perceptions of governance of firms, NGOs, experts working in the private sector, public sector agencies and households. It captures the perceived extent to which public power is exercised for private gain. This includes petty and grand forms of corruption coupled with extraction from the state by elites and private actors. We inverse the sign of the indicator to match our hypothesis better. Hence, the corruption variable in our data set is an index ranging from -2.5 to 2.5 , a higher number indicating more corruption.

While treating the data, we found that, in some instances, EC for a great amount was extended to entities in relatively small countries, such as the Bahamas, Bermuda and Panama, which were also indicated to be so-called tax havens (2000). This captured our attention. We expect that the large transactions credited to entities in these countries do not completely reflect real export guarantees to these countries but were used as administrative stopovers instead. Investigative journalism (e.g. the Panama papers) has made the pivotal role of these financial secrecy jurisdictions in large-scale corruption apparent. This is not to say that we should always consider transactions to these tax havens to be corrupt. Rather, based on the literature ("[Analytical starting points](#)" section), we hypothesize that there is a higher risk of corruption in these transactions, which may be linked to the EC issued. To account for our expectation, we include a dummy that indicates whether the OECD (2000, p. 17) has indicated a country to be a tax haven (yes = 1, no = 0). The OECD identifies a country as a tax haven when its jurisdiction has no or nominal taxation on financial or other service income and offers or is perceived to offer itself as a place where non-residents can escape tax in their country of residence. There have been some marginal changes in this list over time but no major ones (OECD 2004).

In addition, the regression estimation includes six control variables that account for the range of factors that we expect to determine the extent of EC insurance that ECAs provide. The aim of this paper is not to identify all of the potential factors that drive the geographic patterns of EC. Rather, the hypothesis of this research focuses on the potential role of corruption therein. Hence, we only include control variables when they have a potential relationship with corruption to ensure that the effects of corruption are not inflated. We do not include variables that are unrelated to corruption, such as liquidity in export destination countries, even though they might

determine EC (Auboin and Engemann 2014). We have considered including variables that are known to be related to corruption, such as culture (Jha and Panda 2017). However, because of a theoretical and empirical reason we have opted not to do so. Theoretically, the level of individualism can indeed be linked to the level of corruption (ibid), and corruption can be linked to trade levels (Cooray et al. 2020) which can be linked to export credits. This mechanism from ‘culture’ to ‘export credit’ is theoretically indirect, and none of the interviews and literature mentioned this potential relationship. Empirically, while there are datasets with respect to the level of individualism in a country such as the Hofstede cultural indicator (Hofstede et al. 1990), these indicators exclude most often the lower and middle-income countries, which are the countries of particular interest for this study. Trial regression indicated that our N would be reduced by about two-thirds, hence the ‘cultural’ control was not included because of theoretical and empirical arguments.

We briefly discuss the control variables in the following section.

First, we control for the trade openness of destination countries, which we capture using the sum of exports and imports of goods and services measured as a share of the GDP. This indicator is frequently used to indicate the importance of international transactions relative to domestic transactions (OECD 2011). We expect that the indicator for international trade matters for EC as there would be no need for export insurance without trade in the first place. We obtained the data from the World Bank (2020) and then log transformed them.

Second, we expect that ECAs are more likely to provide EC to companies that export to poorer destination countries because the risk that companies in poorer countries will default on their payments is higher and hence exporters increasingly seek insurance. We measured economic development as the GDP per capita in current 2010 US dollars (2020) and then log transformed it.

Third, we expect population to play a role because it indicates the future potential of destination countries. When a destination country is characterized by a large population, export products have stronger future potential, so more companies are interested in exporting in the future, leading to more EC now. This may make ECAs more likely to issue EC to destination countries with relatively large populations. We obtained the data from the World Bank (2020) and then log transformed them.

Fourth, to control for political instability, which we expect to lead to a greater need for insurance, we include a dummy that indicates whether a successful or failed coup occurred (yes = 1, no = 0) in a country during a certain year. We constructed this dummy based on the Bjørnskov–Rode regime data (Bjørnskov and Rode 2020).

Fifth, we control for the effect of trade sanctions that restrict or prohibit trade. Of course, when an entity cannot export to a certain country, there is no need for export insurance. This also surfaced in multiple interviews as an important, and in some cases the only, factor influencing the geography of EC. We therefore include a dummy that indicates whether the UN had imposed a sanction on a country that had a direct economic impact (yes = 1, no = 0), that is, it diminished trade and/or access to financing, for instance because assets were frozen. We obtained the data from the Targeted Sanctions Consortium database (Global Governance Centre 2014).

Finally, we control for the foreign direct investment (FDI) flow because we expect importing companies of destination countries with a high FDI inflow to be

characterized by lower default risk. Additionally, FDI shows the economic interest of the home in the host country. We include the FDI outflow from the UK (2020), the Netherlands (2020) and Sweden (2020) separately in the relevant regression estimation. We set the regression estimation period for EC from the UK up to 2018 because data on the FDI outflow from the UK are available until this year. We express the FDI outflow as a measure of the host country's GDP in current 2010 US dollars. As such, FDI is an FDI-to-GDP ratio, or FDI ratio for short, expressed in percentages. This allows a proper comparison of FDI values across countries over time.

Several countries showed missing values for multiple variables and for the majority or even the full extent of the time period. We deleted these countries from our data set. When a country lacked one observation for the relevant time period, we filled in the missing value. When an observation was missing for the first year of the period, we copied the observation from the subsequent year. When an observation was missing for the last year of the period, we filled in the observation from the previous year. When an observation was missing in the middle of the period, we used the average value of the observation of the year before and the year after the missing observation. The next section presents our results.

Results

We start with the logistic regression model. For this model, the dependent variable takes the value of one if EC is greater than zero for a certain destination country in a certain year and zero otherwise. Accordingly, we analyze the variables that influence the issuance of EC by the three ECAs in our data set. Second, we employ a Tobit model for the relationship between corruption in export destination countries and EC for transactions to destination (provided that transactions to that destination country are supported in a certain year). This is necessary because there is left-censoring in the dependent variable, also known as censoring from below. This occurs at the value of zero because EC by definition cannot be below zero. As such, the Tobit model allows us to examine, for those observations for which EC is greater than zero, the indicators that may influence EC as a continuous dependent variable. Note that we cannot derive a causal relationship from the Tobit model, only a descriptive one, because the linear effects of the Tobit regression coefficients are on the uncensored latent variable and not on the observed outcome. The results may nevertheless be insightful. We now turn to the discussion of the regression results.

The selection step: the logistic model

We start with a random-effect logistic regression to examine the factors that determine the selection of EC. Table 2 presents the results. The coefficients in the output of the logistic regression are given in units of log odds. The logistic regression coefficients thus indicate the expected change in the log odds for a one-unit increase in the predictor variable with all of the other variables in the model held constant.

Table 2 Export credit from the three ECAs: logistic regression for panel data

	(1) EC UK (dummy)	(2) EC NL (dummy)	(3) EC SW (dummy)
Corruption	-0.0572 (-0.25)	0.0985 (0.48)	0.0454 (0.16)
Tax haven dummy	2.471*** (3.88)	1.116* (1.77)	0.0224 (0.03)
Openness (log)	0.874*** (2.62)	0.149 (0.52)	0.734** (2.00)
GDP per capita (log)	0.967*** (5.67)	0.604*** (4.13)	0.464** (2.32)
Coup dummy	0.243 (0.31)	-1.375 (-1.16)	-0.856 (-1.47)
Sanction dummy	0.736 (0.70)	-0.0379 (-0.04)	-1.577 (-1.35)
Population (log)	1.206*** (9.75)	0.898*** (8.47)	1.406*** (9.12)
FDI ratio UK/NL/SW	-0.0146 (-0.66)	0.0108 (0.33)	-0.0801 (-0.37)
Constant	-32.99*** (-9.96)	-22.53*** (-7.92)	-28.57*** (-7.93)
Observations	1579	1390	1913
Log likelihood	-618.99	-497.52	-722.42
Wald chi ² (8)	133.78	110.37	111.23
Wald chi ² (11)			
Prob. > chi ²	0.0000	0.0000	0.0000

(1) EC UK is the ECA from the UK, 2010–2018 period. (2) EC NL is the ECA from the Netherlands, 2012–2019 period. (3) EC SW is the ECA from Sweden, 2008–2019 period. By dummy we mean that we transformed the EC variable into a dummy that indicates whether EC was zero (EC dummy=0) or more than zero (EC dummy=1) for a certain country in a certain year. Standard errors are clustered at the country level. *T* statistics are in parentheses

* Significant at 10%

** Significant at 5%

*** Significant at 1%

According to the Wald chi-squared test, the models are all statistically significant (prob. > chi²=0.0000). This tells us that our model as a whole fits significantly better than a model with no predictors.

Corruption has no significant effect on the selection of EC, so we cannot confirm our expectation. The tax haven dummy, on the other hand, shows significant coefficients for EC from the UK and the Netherlands. We interpret the coefficient as follows. For EC from UKEF, when a country is a tax haven, it increases the log odds of being a destination country by 2.471 versus when a country is not a tax haven. The estimated coefficients are in log-odds units. These can also be interpreted as odds

ratios when exponentiated. Then, the tax haven exponentiated coefficient is 11.83, which means that the odds of UKEF issuing EC are 11.83 times those of a non-tax haven country with the same observed and unobserved characteristics, including all the other variables in the models. For EC from EC NL, being a tax haven increases the log odds of being a destination country by 1.116. The tax haven exponentiated coefficient is 3.05, which means that the odds of EC being issued from EC NL are 3.05 times those of a non-tax haven country with the same observed and unobserved characteristics, including all the other variables in the models.

We also use the margins command to calculate the predicted probability of EC when an export destination country is a tax haven and when it is not. The margins command reports our model results for an average country, when this country is a tax haven or is not a tax haven. We hold all the other explanatory variables at their mean value. We find that the predicted probability of EC UK is 0.21 when a country is not a tax haven (tax haven dummy=0) and 0.61 when a country is a tax haven (tax haven dummy=1), holding all the other variables in the model at their means. This finding is significant at the 1% level. For EC NL, the predicted probability is 0.11 when a country is not a tax haven and 0.25 when a country is a tax haven, holding all the other variables in the model at their means (significant at the 10% level). The tax haven dummy shows no significant effect in the EC SW regression.

The following picture emerges with respect to the control variables: the GDP per capita and population show a significance influence on the issuance of EC. The higher a country's income and the larger a country's population, the more likely it is that EC will be issued to a certain country in a certain year. While the latter was predicted, the former (that transactions to richer countries had a higher chance of being supported by publicly backed EC) runs counter to our hypothesized causal relationship. We assumed in "[Methods and data](#)" section that poorer countries—keeping in mind the alleged complementary division of labour between those ECs that are publicly backed and those that are not—had a higher chance of receiving publicly backed EC. However, this did not materialize as a transaction towards poor country actually reduced the chance of receiving publicly backed EC.

The allocation step: the Tobit model

We examine the relationship between EC, corruption and tax havens on the condition that EC was issued by means of the estimation of a Tobit model for panel data. Table 3 shows the results. According to the Wald chi-squared test, the models are all statistically significant (prob.>chi²=0.0000). This tells us that our model as a whole fits significantly better than a model with no predictors. The results from a Tobit regression can be interpreted in a similar way to those from a linear regression. Since the dependent variable EC is log transformed, the coefficients can be interpreted in terms of a percentage change.

Corruption does not have significant estimated coefficients. The tax haven dummy shows significant effects for estimations (1) and (2). Here, the regression indicates that on average, 1395% more EC of UKEF (significant at the 1% level)

Table 3 Export credit from the three ECAs: Tobit regression for panel data

	(1) EC UK (log)	(2) EC NL (log)	(3) EC SW (log)
Corruption	-0.493 (-0.40)	0.424 (0.24)	-0.0634 (-0.07)
Tax haven dummy	13.95*** (3.34)	10.03* (1.95)	-2.014 (-0.69)
Openness (log)	4.921*** (1.71)	0.392 (0.16)	2.274** (2.32)
GDP per capita (log)	5.108*** (5.85)	5.113*** (4.07)	1.881*** (2.89)
Coup dummy	0.241 (0.06)	-9.046 (-1.08)	-2.753 (-1.55)
Sanction dummy	5.093 (0.89)	-0.0725 (-0.01)	-5.428 (-1.40)
Population (log)	6.455*** (10.65)	7.418*** (8.37)	5.225*** (11.72)
FDI ratio UK/NL/SW	-0.099 (-0.89)	0.0993 (0.35)	-0.306 (-0.42)
Constant	-175.9*** (-10.72)	-184.1*** (-7.68)	-101.8*** (-9.66)
Observations	1579	1390	1913
Uncensored obs	500	265	1,123
Left-censored obs	1079	1125	790
Log likelihood	-2310.87	-1454.15	-4455.24
Wald chi ² (8)	170.61	109.30	195.86
Prob > chi ²	0.000	0.000	0.000

EC UK is the ECA from the UK, 2010–2018 period. EC NL is the ECA from the Netherlands, 2012–2019 period. EC SW is the ECA from Sweden, 2008–2019 period. Standard errors are clustered at the country level. *T* statistics are in parentheses

* Significant at 10%

** Significant at 5%

*** Significant at 1%

and 1003% (significant at the 10%) more EC of EC NL is issued to countries that are indicated as being a tax haven. However, the tax haven dummy shows no significant effect for the EC SW estimation. Again, income per capita and population have clear significant coefficients. With respect to the control variables, we can see a similar pattern emerging for the ‘level’ regression as for the ‘selection’ regression. Again, population size and GDP influence EC positively, this time the size of EC. For two out of the three countries, the UK and Sweden, the level of trade openness of a country also influences the amount of EC positively, as predicted.

Robustness checks

We perform four types of robustness checks: one related to the time lags between the dependent and the independent variables, one with a different measure of the dependent corruption variable, one dividing the sample based on the income levels of the export destination countries and the last one dividing the sample into different time periods. We find that the results are largely stable with respect to corruption and tax havens, with the exception of the Netherlands. For the Netherlands, we can see that, over time, tax haven loses its significance as a predictor of export credit (for both the selection and the allocation level), and we here provide an explanation for why this might be the case.

First, we perform a robustness check considering the likely problem of reverse causality in our estimation that originates from an effect of EC on corruption. We control for this with two regressions in which we lag all the independent variables for one year and for two years. Annex 3 (Table S2) contains the results. We find that the results of the logistic regression are similar except for the effect of the tax haven dummy on Dutch EC when lagged by two years because the significance level increases to 5%.

Second, we replace the control of corruption variable with the Corruption Perception Index composed by Transparency International (2020) and estimate the same regressions. The CPI scores and ranks countries based on how corrupt experts and business executives perceive their public sector to be. It is a composite index, which means that the indicator is a combination of 13 surveys and assessments of corruption, collected by a variety of reputable institutions. We inverse the sign of the indicator as that matches our hypothesis better. Therefore, the CPI variable in our data set is an index ranging from 0 to 100, a higher number indicating more corruption in the export destination country. We repeat the logistic and Tobit regressions for the panel data. Table S3 (Annex 4) presents the results. According to the Wald chi-squared test, the models are all statistically significant ($\text{prob.} > \chi^2 = 0.0000$). This tells us that our model as a whole fits significantly better than a model with no predictors. The CPI is not available for all the countries in our data set, so the number of observations is smaller than in the previous regression estimations. The CPI shows a significant effect in the British EC regressions but not in the regressions for EC from the Netherlands and Sweden. The tax haven dummy remains significant for UKEF but loses (by a small margin) significance with respect to the Netherlands.

Third, we divide the sample into three groups of countries according to whether they are defined by the World Bank as a high-, middle- or low-income country (2020). Annex 5 (Tables S4 and S5) contains the results. Interestingly, for the logistic regression, we find that corruption significantly influences the selection of British and Dutch EC for high-income countries, but this does not hold for Swedish EC. The signs of the estimated coefficient are positive, which means that the higher the corruption levels in export destination countries, the higher the chance of a transaction being supported from the UK and the Netherlands in a certain year. By contrast, corruption significantly influences the selection of Swedish EC for low-income countries but not that of British and Dutch EC. In the Swedish case, the sign is negative, which means that the higher the level of corruption, the lower the chance of a transaction being supported by the Swedish EC in a particular year. For middle-income countries, corruption significantly affects the selection of British and Swedish EC in a negative way. For the

tax haven dummy, we note that it positively and significantly influences British EC selection in high- and middle-income countries. The same holds for its effect on Dutch EC but only in middle-income countries. It does not significantly influence the selection of Swedish EC. The Tobit regression indicates that, for high-income countries, corruption significantly and positively affects British and Dutch EC but not Swedish EC. The tax haven dummy shows a significant effect only for British EC. For selected middle-income countries, corruption has a negative and significant effect on British and Swedish EC but not on Dutch EC. The tax haven dummy is significant for the British and Dutch EC but not for the Swedish EC. For selected low-income countries, only corruption exerts a significant and negative effect. Hence, even though there are some changes in the results, the main conclusion, that the tax haven status matters for the UK and the Netherlands but not for Sweden, holds.

Fourth, we break up the sample into two time periods. We are curious to determine whether, for instance, the various critical reports in 2013 and 2015 with respect to the usage of tax havens by clients of EC NL might have had an effect on this in the Netherlands. We divide the sample into two broadly equal time periods, the first from 2008 to 2014 and the second from 2015 to 2019. The results for these regressions are shown in Annex 6—Table S6 for the logit regression and Table S7 for the Tobit regression. Here, a very stark difference is apparent for the Netherlands between the time periods: whereas, in the earlier period, the tax haven status was positively driving export credit (both at the selection and at the allocation level), this was no longer the case in the later period. This does not mean that there was no export credit issued for transactions to tax havens in this later period, however. For instance, in 2017, there were transactions above 10 million euros involving ‘towing boats’ to Liechtenstein, a tiny country with fewer than 50, 000 inhabitants tucked into the Alps between Austria and Switzerland. There was no significant difference between the time periods for Sweden and the United Kingdom.

Discussion

In this discussion, we will first discuss some of the statistical challenges that this research faced as well as some considerations with respect to the internal and external validity of the research.

In terms of the estimation model, the Heckman two-step procedure may control better for the selection bias than the Tobit regression estimation. This could account for the selection problem arising from dividing the countries into two groups, namely those important countries for which EC is issued and those for which it is not. There is no randomness in this sample, which disturbs the estimation of the effect of corruption on EC. The Heckman procedure could have accounted for the reverse causality issue between corruption and EC, but couldn’t be performed. Therefore the findings need to be interpreted cautiously. We aimed to reduce the reverse causality by also including time lags. However, we advise future researchers to continue to examine the possibility of constructing a valid Heckman procedure.

Having a high explanatory power (R-square) was not a goal in itself for this research, as the aim was to get a comprehensive insight as to whether corruption

and tax haven status could explain whether more export credit went to a country. The pseudo-R squared ranged between 0.33 and 0.44 for the selection-level step and between 0.05 and 0.22 for the allocation level. This could be increased moving forward by also including the cultural dimension for instance (Jha and Panda 2017).

To enhance the external validity, it would be wise to expand the group of ECAs that is analyzed. It would be most interesting to determine whether other OECD member states outside North-Western Europe display a similar level of interest in tax havens. It would also be interesting to ascertain whether this idea holds for non-OECD countries with strong ECAs, such as China.

To increase the internal validity, it might be interesting to expand the scope of the interviewees. Whereas all the current interviewees were working for ECAs, it might also be relevant to talk to companies that are actually requesting EC support. These companies could be asked questions regarding their procedures with respect to corruption and tax havens with the aim of triangulating the findings and gaining a better understanding of the drivers of their geographic patterns. To further increase internal validity, it might also be important to get a better insight where the exports are ultimately destined to. In quite some of the instances it is likely that, even though the tax-haven is listed as the export destination country, the exports are actually going or ending up elsewhere. In that case the tax-haven is just used as a conduit, and it might be that deals to corrupt countries are disproportionately routed through these tax havens: the results might in that case erroneously indicate an insignificant sign for corruption (as these countries are not listed as ‘destination’ countries). To deal with this anomaly the research should be replicated with the ‘real’ destination countries.

Conclusion

We investigated whether corruption levels in export destination countries influenced whether transactions were supported with export credits from the ECAs of the UK, the Netherlands and Sweden. We studied this hypothesis empirically for 183 export destination countries in the 2008–2019 period. We employed a logistic model to examine the selection of export credit and a Tobit regression for the levels of EC. The corruption levels displayed an ambiguous relationship, which was neither robust nor significant. The statement that ‘the support to UK exporters is targeted at ...countries at high risk of corruption’ (Beizsley and Hawley 2020) could hence not be confirmed in this research.

Conversely, it did matter whether an export destination country was a tax haven: UK and Dutch ECAs backed transactions to these countries significantly more than if those countries wouldn’t have been ‘tax havens’. This wasn’t the case for the Sweden ECA, and this might be related to their 2017 policy of to require an extra due diligence assessment for large transactions when a buyer or an exporter is based in a ‘so-called ‘tax haven’ (EKN 2020). Neither the UK nor the Dutch ECA have such a policy.

One might wonder: ‘so what?’ Why is it relevant to know that transactions to tax havens are disproportionately backed by EC? It is relevant because these tax havens have been shown to play a pivotal role in the facilitation of corruption over the last couple of decades. Routing EC through these jurisdictions hence poses significant

additional due diligence risks with respect to corruption. In addition, in the end, the costs related to corruption might fall on the shoulders of those who are already suffering the consequences of corruption: the citizens of countries with high levels of corruption. After all, the people from importing, often developing, countries may end up paying for corrupt projects when ECAs pay compensation to the insured exporting companies and subsequently recover the amount from the developing government involved or add the amount to a country's official debt (Eurodad 2011).

Our research highlights the important role that tax havens play in the EC universe. However, there are some signs that times might be changing. For instance, the Finnish ECA, Finnvera (2019), has now, like the Swedish ECA, strengthened its tax haven policy. While it is not scrapping all EC to tax havens, it is significantly and publicly increasing its due diligence towards these jurisdictions. This research suggests that other ECAs might also need to consider this type of policy change, especially since aggressive tax planning works against the spirit of the OECD guidelines for multinational enterprises.

As explained in the introduction, this article has aimed to contribute to the analysis of unintended effects of international action. Whereas often, also in the case of export credit, the academic community focuses on the intended objectives (e.g. 'increases in exports'), this article highlights that a broader lens can be useful. This article is one of the first that is focusing on the relationship between export credit agencies and unintended effects, such as corruption. However, export credits impact a host of developmental issues, ranging from land rights to debt and environmental pollution, and many issues in between. Whilst researching export credit agencies isn't easy because of data constraints, this article shows that is both feasible and relevant to take up this challenge.

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Data availability The dataset is available through the website of the Radboud University <https://www.ru.nl/anthropology/vm/unintendedeffects/> or directly via the following link: https://drive.google.com/file/d/17nG18MNYVT_IRkjmM0cF5ZVZYoiOd8xU/view?usp=sharing

Declarations

Conflicts of interest The author declares no conflict of interest. The organization for which the author works, the Netherlands Ministry of Foreign Affairs, has neither interfered with the design of the research nor with the outcomes.

Informed consent Informed consent was obtained from all individual participants included in the study.

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