

PROVIDING EXPORT CREDIT SUPPORT RIGHT: CONSEQUENCES FOR PUBLIC BUDGETS*

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Abstract

This analysis tries to address the problem of the insufficiency of premium rates used by export credit agencies. This paper aims to answer why and how states should run agencies that may create losses. We see that each supported exporter brings some other benefits to the public budget, and we try to propose how it could be measured. This paper therefore focuses on benefits and costs of the domestic economy. This analysis aims to develop a model that calculates the impacts of each supported export project. The results must be comparable between projects so that projects can be ranked and decisions made on which ones should receive support under current capacity restraints. The current state of knowledge has been analysed, and little attention has been paid to this microeconomic area of export support. The model structure also helps us understand why governments tend to maintain export credit agencies even though they may be temporarily loss-making.

Keywords: State support, export credit, OECD Consensus, export credit agency, public finance

JEL Classification: G22, G29, H81

1. Introduction

Export credit support has gained importance during the last two years, as the SARS-CoV-2 pandemic has hit the world hard. The European Union and the Organization for Economic Co-operation and Development (OECD) have introduced new, less strict rules for provision of export support financing. This was done to relieve economies when pandemic restrictions were imposed worldwide. As described in our previous work (Pýcha, 2021 and 2021), institutions that promote exports act anticyclically. They help more during recessions and less when the economy is growing strongly. One might

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therefore have expected growth in the total volume generated by export credit agencies (ECAs) in 2020; this is, however, not supported by our empirical findings carried out among selected OECD members. As Table 1 shows, most ECAs have lowered the volume of export support issued during the last three years.

Table 1: Export support volumes of selected ECAs (in billion EUR; 2018–2020)

Country	Name of ECA	2018	2019	2020	change (%)
Belgium	CREDENDO	86.7	84.6	83.7	–3.5
Canada	EDC	67.0	70.3	65.4	–2.4
Czech Republic	EGAP, CEB	1.6	1.7	1.4	–15.0
Denmark	EKF	4.5	2.4	3.1	–31.5
France	BPI	19.0	19.1	20.5	7.9
Italy	SACE	28.6	21.2	14.9	–48.0
Japan	NEXI	0.6	0.6	0.5	–15.7
Sweden	EKN	5.5	5.2	6.4	16.4
Switzerland	SERV	3.6	2.0	2.4	–33.2
United Kingdom	UKEF	2.8	4.6	4.9	76.0
United States	US EXIM Bank	5.9	8.1	8.8	48.5
Total		225.9	219.9	212.1	–6.1

Source: Own analysis

This unexpected decrease can be explained by the different nature of the current crisis, which was caused by unprecedented restrictions imposed by governments worldwide. Economic output was restricted immediately. This all led to a situation where ECAs lost part of the export volume that they were meant to support. On the other hand, the easing of the rules of ECA financing probably had the intended positive effect. These two variables went against each other, and, in the end, we see a slight decline in their activity. We can most likely expect these volumes to grow in future years, as the world economy will need some time to recover.

Countries and their ECAs were chosen according to public data availability. For the Czech Republic, we can see two ECAs: one bank (CEB) and one insurance company (EGAP). According to their annual export volumes provided to Czech exporters,

the EGAP provides roughly ten times more support than the CEB, and it therefore plays a crucial role in Czech export support.

As export support is of great importance, and we believe its importance may grow further in future, this paper aims to extend the current state of knowledge in the area of public finance by explaining from a microeconomic point of view why running an ECA makes sense even if it might make a continuous loss. Most of these institutions are owned by national governments, and their economic results influence public budgets either directly or indirectly. To support this statement, we analyse the institutional structure of export support, which may vary from country to country. A detailed analysis dealing with this was presented by Nakládal (2013), who researched it for the OECD countries. This leads us to the question: what is the owner's motivation if not profit? We believe the answer is that every supported case brings other benefits to the economy, which in the end means that public budgets are better off with ECAs than without them.

Most ECAs are directly owned, or at least directly controlled, by the government, so they have a connection to the state budget. Saghir (2020) confirms the great importance of ECAs for international business and analyses their ownership structure. In our previously published papers, we presented the issue of minimum premium rates (MPRs) and their possible insufficiency. This is based on evidence that ECAs apply MPRs to the principal amount only, while the insured value also consists of a significant amount of interest. Our findings supported the view that the current structure of MPRs could easily be in conflict with the long-term sustainability of ECAs required by the OECD Arrangement and may represent a burden on public finance.

It is easy to imagine that credit granted to an exporting factory creates jobs for people in targeted areas. It then generates higher tax revenues and reduces spending on benefits for unemployed workers. Tax revenues are levied on workers' wages and company profits as, we presume, exporting companies are profitable because they would not exist otherwise. A low unemployment rate is usually a goal for a government, as it may bring real economic growth or political credit. According to the OECD Arrangement, ECAs must be sustainable in the long term. However, this may not always be the case, as governments might have other motives. One could argue that not every ECA is owned or controlled by the government. However, when we take a look at Table 2, we can see that it is scarce to see an ECA owned or controlled by any other body than a government.

Almost all of the analysed ECAs are owned or controlled by the government. However, their governance structure differs from state to state, and it is hard to find a unified method for comparing ownership. Sometimes an ECA is directly owned by the state. Sometimes it is owned by ministries or central banks, and the commercial financial sector rarely plays a role in controlling an ECA. The only ECA presented above that is not officially owned

by its government is the OeKB in Austria. This export support institution is governed by eleven Austrian banks, each of which owns a certain share in the OeKB. According to Podvršič *et al.* (2020), the Austrian government and its budget play a role too. This role is not displayed in the official ownership structure of the ECA, but its export support programmes are often financed via the state budget to fulfil state goals.

Table 2: State ownership or control of selected ECAs

Country	Name of ECA/shortcut	Ownership/controlled by
Belgium	Credendo	Fully owned by the government
Canada	EDC	Fully owned by the government
Czech Republic	EGAP, CEB	Fully owned by the government
Denmark	Finnvera	Fully owned by the government
France	BPI	Government agency – controlled by the state
Italy	SACE	The majority is owned by the state, indirectly via a special bank
Japan	NEXI	Fully owned by the government
Sweden	EKN	Government agency – controlled by the state
Switzerland	SERV	Owned by the federal government
United Kingdom	UKEF	Government agency – controlled by the state
United States	US EXIM	Fully owned by the government

Source: Own analysis

It is important to analyse what should be the ultimate goals pursued by governments when establishing the long-term strategy for their ECAs. This paper aims to present a new model to help ECAs or their owners analyse the benefits and costs of individual export projects when resources are limited. This limitation amongst insurance ECAs is most often set by insurance capacity, which means the upper limit of total insurance exposure at any one time. There may, of course, be other financial limitations, such as territorial or counterparty limits. These limitations force ECAs or their owners to have a mechanism that helps them evaluate export projects and decide which of them will be supported. Furthermore, the proposed variables in the presented model show what kind of variables governments may tend to stress as important as they fulfil their goals in domestic economy. Above that, we chose variables, specifically ratings, to demonstrate insufficiency of MPRs

in certain business projects, which shows us that sometimes ECAs use premium rates that cover all expected losses, but sometimes fail to do so.

2. Literature Review

The last two decades have shown us the importance of ECAs worldwide and how they influence international trade, especially in developing countries with weak financial systems. This importance is supported by Auboin and Engemann (2012), who even claim that such a positive effect of export support is very stable over time. As we analysed mainly the macroeconomic aspect of the existence and sustainability of export support, it became clear that this analysis must be accompanied by micro-level research to provide a possible explanation for our findings in a previously published paper (Pýcha, 2020). When we started studying the research into export credit support, we gradually realized that most interest is devoted to macro-level analysis. At the same time, not so many papers deal with microeconomic issues. More papers need to be written and published to fill that gap from this perspective.

By contrast, much attention has been paid to studies analysing the intensity of export support on the macro level. The ultimate goal is to set precise limitations for ECAs' operations to keep the market free and maximally efficient. To fully understand the world of ECAs and their development over time, one must know the history. Therefore, we must mention De Ricolfis (2011), who summarized the development of ECAs within the OECD framework and demonstrated the main objective followed by the OECD. In brief, the rules for export support provided by ECAs must eliminate unfair practices and subsidies used by neighbouring countries as their economic tools, thus helping to build a strong foundation for a sustainable and long-lasting global economy with minimal distortion.

The OECD Arrangement presents the basic rules that should be followed by ECAs, but are not strictly mandatory. Many ECAs do not play by these rules, which seems to be an issue in the current export support system. All ECAs are established with one primary purpose: to operate worldwide to benefit their nation's exporters and workers. This idea is intensely discussed in the Competitiveness Report (2019) published by the US Exim Bank. In the last five years, there has been a marked increase in the number of ECAs worldwide. Currently, the world has at least 115 such institutions. This increase in itself does not seem to be so disturbing. However, there is a connection with the far worse development that we continually witness in the world of export support. The Competitiveness Report (2019) drew our attention to the fact that about two thirds (66%) of total world export and trade-related finance were issued by ECAs that do not abide by the OECD Arrangement.

This is happening because, in recent years, new trade barriers have been announced around the world. Of course, the most discussed trade war is currently being waged between

the USA and China, attracting many authors, including Liu *et al.* (2020) and Lawson *et al.* (2019). However, the return to stronger trade barriers is a very current issue, and our research shows that it lies partly in weaker cooperation among OECD members. Many countries do not want to follow common rules, even if they promise long-term sustainable growth, because some countries would instead grow faster themselves. This ultimately leads to a situation where those countries that currently follow the OECD rules may soon follow the example of those that do not.

The consequences of the weakening position of the OECD worldwide can be seen in the rise in tariffs, direct subsidies and other non-recommended supportive tools for domestic companies, workers and citizens in general in the last few years. In their recently published paper, Lindé *et al.* (2019) confirm this situation, which presents an advanced analysis of how such trade barriers influence international trade volumes. The analysis uses an older macroeconomic model developed by A. P. Lerner and shows that the primary findings about Lerner symmetry still hold. This research conclusion suggests that introducing new trade barriers damages international trade and global output.

Many research projects are available that confirm the inefficiency of trade barriers and evaluate the degree of inefficiency (often called the effect of deadweight loss). Our paper focuses on export support institutions and strongly agrees with Rienstra-Munnicha *et al.* (2013). According to them, the total positive effect of a direct subsidy from an exporting company is much lower than the same volume of support provided by an ECA.

ECAs do not play the same game as other commercial companies, even though they play it on the same field. ECAs' goals are different, which is supported by Liu *et al.* (2021), who stress that ECAs do not maximize their benefits, but usually pursue the government's goals. This research claims that ECAs try to maximize the output of social benefits by optimizing the allocation of credit resources within their limitations. We can partially agree with this because ECAs pursue different goals from those of commercial insurance companies. Yet, they do not always have to pursue social benefits as their only goal. Helping the government's budget may not always go hand in hand with maximizing social benefits. The research is highly theoretical and does not offer any practical use. However, our paper could help expand it with a practical model applicable to any ECA.

Another point of view on the purpose of ECAs is presented by Dawar (2019), who reminds us that these institutions exist to function as a substitute for commercial institutions when the market freezes. They act as a lender of last resort, and according to the study, they have helped the international trading system many times to survive unexpected financial crises. We believe that our model can incorporate this purpose because helping to ease recession will probably ease the government's negative impact and directly influence the public budget.

After rigorously researching the current state of knowledge in the area of interest of this paper, we found that both Cuyvers *et al.* (1995) and, more recently, Urban *et al.* (2014) presented models for the planning and assessment of export promotion activities. The former of the two papers is more of a local study prepared for only one country, while the latter does not focus on the world of ECAs. These earlier studies do not follow the path that we aim to describe, but they certainly help us base our research on stronger foundations, as we are not the first authors to turn our attention to this area. The present paper intends to develop a new model that can be used as a practical tool for any ECA in today's world and simultaneously presents possible MPR insufficiency.

3. Methodology

Every exporter approaches the ECA in their own country to request financing. This model is based on known ECA practice that we could learn after discussing it with chosen ECAs' employees. It has to be able to consider many variables, which are divided into two groups. The first group consists of all the benefits that the realization of any individual export project brings to the domestic economy. The second group consists of all the costs that the ECA covers. In the financial world, and especially in the insurance industry, those costs are a risk. Therefore, instead of costs, we use risk, which is a measurable value represented by the expected loss. Then we can put the two groups into a general equation of the assumed model.

$$ESR = \frac{BfDE}{VR} \quad (1)$$

ESR stands for a value that helps us compare different export projects. All positive effects on the domestic economy must be measured on the export side because only those effects are interesting for the government. The effects that may arise on the import side could influence a foreign country's economy and public budget, which is something we do not want to see in our model. The value of risk then needs standard values such as the probability of default (*PD*), exposure at default (*EAD*) and loss given default (*LGD*). All these values should be obtained from the presented data before export support can be granted. The *PD* is connected to the importer's credit quality, which is expressed by a rating. *EAD* is expressed by the insured value, which we consider to be the net value of self-insured retention reduced by collected premium. *LGD* could be calculated internally using historical data. Based on an OECD assumption, this value should converge to 50%.

The first input is the value of exports and the share of the national content, which shows how much of the exported value is manufactured in domestic economy. The OECD specifies no minimum national content: each country can set its minimum. Logically,

a greater national content is preferable from a government's perspective because no country wants to support its neighbour at its own expense. It should be mentioned that national content is not often discussed, unless its level is lowered. It is a powerful tool to boost the volume of support given by ECAs, as it makes more exporters eligible for export support. This area was partially analysed by Hunke (2014), who described how it can be proved that the required level of national content has been fulfilled. Usually, ECAs accept the so-called Proof of Origin, or Certificate of Origin, which confirms the percentage of national content. The exporter must always present values of export and national content during the process of application for export support.

The second input measures the employment effect related to the realization of export support. The employment effect is a vital part of the assumed model because every country's government follows it closely. The importance of this input lies in the fact that ECAs can target their support at specific exporters and thus help them lower unemployment rates in specific geographical regions or sectors. The support effect will also be higher if the unemployment rate is above its long-term average. This means that less support is provided during economic booms than during recessions.

Another point that must be made here is that ECAs prefer to support higher value-added activities and, therefore, higher salaries are preferred. Higher salaries also bring higher revenues from income tax. To sum up, we present the following equation, which describes the effect of employment.

$$EE = \frac{\frac{ExR}{NuExEm}}{\frac{RDE}{NuEmDE}} \times \frac{U_{Act}}{U_{LT}} \times \frac{AvS_{Exporter}}{AvS_{country}} \quad (2)$$

The employment effect can be divided into three subparts multiplied by each other. The first one recognizes the exporter's productivity in comparison with the average domestic productivity. From the perspective of ECAs, it is preferable to support higher rather than lower productivity. Data on an exporter's revenues or the number of its employees should be included in the application for export support. However, they can also be found in the exporter's annual report. Data for the whole economy are most often available to the public from statistical offices or similar institutions, depending on a country's practices. The symbols U_{Act} and U_{LT} represent the current and long-term unemployment rates. ECAs prefer to support exporters in times of high unemployment, but the definition of high unemployment is undoubtedly subjective. We believe that the definition should always be related to the long-term average unemployment rate and that everything above that rate should be considered high. For our case study, we will use the 10-year average unemployment rate because economic cycles last roughly 10 years.

The last subpart consists of the salary effect, which, as was mentioned above, reflects the motivation of ECAs to support higher value-added activities.

The third part tries to account for the multiplication effect among the sectors of the domestic economy. This input should give preference to exporters who help the economy grow faster by having a greater positive impact on gross domestic product. We use the sector multiplication data to determine how much of the total final output is created when one unit of export support is granted. This effect may be limited if the exporter is partially owned by a foreign entity, leading to a transfer of the positive effects abroad.

$$ME = \frac{SM}{AvSM_{ECA}} \times \left(1 - \frac{SFO}{100}\right) \quad (3)$$

A sector multiplier can be obtained from the statistical office by using the values of intermediate consumption and gross added value for each sector. The average multiplier is then calculated as the average of all the sectors' multipliers weighted by the insured values of the sectors present in the portfolio of a specific ECA. The higher the first part, the better the output for the domestic economy that can be expected when export support is granted. The second part of the equation considers the exporter's foreign ownership, which is very common in today's world.

The fourth part analyses territorial diversification, which does not directly bring higher growth or benefits to the domestic economy. It is, however, something that is very often required by ECAs or by the government itself. The reason for this is to ensure the stability of export over time. ECAs prefer to support export to territories that are not often present in the export mix of the domestic economy, which functions as a form of diversification. This can be added to the model with a chosen granularity by sorting the destination countries according to export volume and then splitting the sorted list in a descending order into a variable number of same-sized groups. Countries in the upper groups, based on export volume, will not receive any additional benefits, unlike the countries in the lower groups. For our model, we chose four groups, as presented in Table 3. This bonus will be added to the total model output, as it follows the preference of ECAs and governments to have a stable, diversified demand for their country's exports.

The fifth part enriches the model with help given by ECAs to exporters entering a new market, which is usually unachievable without the widespread chain of contacts worldwide that ECAs develop over decades. When there is a chance to help an exporter access a foreign market not yet discovered by domestic exporters, it may have a deep impact on all future companies that may start exporting there. Helping one exporter may, in this case, mean showing the way to all other exporters in domestic economy. We shall

differentiate the bonus for the exporter according to the portion of the total volume of export directed to the foreign country. If the destination country is standard, which means that more than 1% of the home country's exports in the previous year went to that country, then it receives no bonus. If the destination country is rare, which means that less than 1% of the total of the home country's exports in the previous year went there, then it receives a 10% bonus. Finally, if the exporter goes to a destination country to which no exports were directed in the previous year, it receives a 20% bonus.

Table 3: Preference for territorial diversification

Export destination in countries belonging to	Preference expressed as a bonus (%)
the first fourth of the most common	–10
the second fourth of the most common	0
the third fourth of the most common	10
the last fourth of the most common	20

Source: Own assumption

The last part reflects the portion of the research and development costs that the exporter bears during the production process. This preference is significant because higher spending on innovation leads to production with significantly higher added value.

$$IE = \frac{\frac{Co_{RD}}{TCoEx}}{\frac{ExSCo_{RD}}{TCoS}} - 1 \quad (4)$$

The innovation effect gives credit to exporters who spend more on research and development than the average in their sector. Information about the structure of an exporter's costs is usually available in annual reports or in the application for export support that an exporter submits. Data on the sectoral structure of costs can be found in most countries in data sets produced by statistical offices.

The denominator in Equation 1 is more limited than the numerator because it must comply with the operation of a specific ECA. Self-retention is always used by ECAs, as it helps reduce moral hazard. However, in our model, we assume that the insured value is already the net of self-retention and, therefore, we do not put it directly into the model.

$$VR = [(IV - WP) \times PD \times LGD \times (1 + OC)] + CC \times (1 + PFC) \quad (5)$$

The first part of the equation above $[(IV - WP) \times PD \times LGD]$ describes all the variables that affect the accepted risk, which consists of maximum possible exposure (the insured value reduced by the collected premium) and, in our model, represents EAD . It is then multiplied by PD and LGD . All the variables are known to ECAs when they are considering an applicant for export support. PD depends on the buyer's (importer's) rating. LGD is selected to be used in compliance with the OECD assumption. OC stands for operating costs, as in the real world, there are always costs arising from the running of an ECA, mainly consisting of employees' wages. Given the fact that MPRs are structured with the assumption that 80% is allocated to cover the risk of default and the remaining 20% is allocated to OC , then we must take this too as fixed.

Cost of capital features in our model denominator because the insurance industry is heavily regulated by Solvency II rules, with relatively high capital requirements, which leads us to account for this. This part can be understood as a risk surcharge only if the fair value of the written premium is higher than the written premium calculated using MPRs. This part is relevant, especially in cases where MPRs are insufficient to cover the expected loss.

$$CC = \max \{ 3\sigma \times [FV_{WP} + (FV_{WP} - WP)]; 0 \} \quad (6)$$

The symbol σ represents the value of 19% as set by the Solvency II regulations for assessing credit and suretyship risk. The fair value of a written premium is calculated as an expected loss, which means the multiplication of the PD , EAD and LGD of a corresponding risk. The difference between a written premium and its fair value can be demonstrated between an unearned premium reserve and a premium reserve.

The last part of the denominator accounts for the fact that the accepted risk increases when the written premium is financed. In ECAs, an export loan may be used not only to export goods and services but also to pay the premium to the ECA that ensures them all. When we imagine such a situation, we see that the moral hazard involved increases, as does the risk. It must be mentioned that this can be added to our model only subjectively because moral hazard can hardly be measured. We choose to have a 10% surcharge on capital costs for our model only.

To summarize all the variables that influence our export support model, we present the following structure expressed in Equation 7.

$$ESR = \frac{VE \times SNC \times EE \times ME \times (1+TD) \times (1+NME) \times (1+IE)}{(IV-WP) \times PD \times LGD \times (1+RC) + CC \times (1+PFC)} \quad (7)$$

To describe the model at the end of the methodological part, we understand that we must multiply all the parts of the numerator by each other. Every part in the numerator presents positive effects that an export project may bring to the domestic economy, and

the denominator presents related costs. The export support ratio (*ESR*) then represents the model's output and can be used to compare export projects when deciding which will receive support.

4. Example Analysis

To illustrate the specific ability of the proposed model, we prepared three examples that differ from each other significantly. Understandably, a brief glance is hardly enough to assess which export project brings the greatest benefits to the economy. As described in the methodological part, some subjective assumptions can be omitted or adjusted according to the character of an individual ECA or the preferences of its country's government. In Table 4, we present all three theoretical examples to be evaluated by the proposed model. These examples are not real projects supported by ECAs, and were made up for this analysis only. However, they were prepared with the knowledge of real projects supported by real ECAs in multiple countries. The real cases cannot be presented due to data security and business secret requirements.

Table 4: Theoretical export examples to be evaluated by proposed model

	Export case 1	Export case 2	Export case 3
Destination country	Turkey	Nicaragua	Morocco
Export description	Supply of an air-conditioning system for a hotel chain in Ankara	Construction of a railway track between the cities of Managua and Leon	Construction of a hospital with equipment in the city of Ben Guerir
Insurance duration (years)	5	8	6
Value of export (mil CZK)	35	490	120
Debtor's/importer rating	B+	B–	BB+
Importer	Hotel Ankaran	Ministry of Transportation	Moroccan Health Association

Source: Own preparation

4.1 Data description

We chose to use data from the Czech Statistical Office using the Czech crown as the currency, although such data can also be gathered in other developed countries. The *PDs* are cumulative figures from the Rating Transition Study (Standard & Poors)

for 1981–2020. The ratings of debtors/importers are assumed to be at the level of a state, which means they are always equal to their country's rating. The ratings for all countries are taken from Trading Economics' public source.

The premium rate used by ECAs is modelled by the calculator available online on the Export Guarantee and Insurance Corporation website. According to the OECD Arrangement, ECAs apply a premium rate on the principal amount of the insured loan only, which is questioned by Pýcha (2021) because insured value consists of contractual interest. This practice is confirmed by some ECAs and raises the question of how contractual interest can be covered. Our previous papers demonstrated the dependency of expected loss on the amount of contractual interest. We now see the difference between the written premium based on MPR and the fair value of such a premium using our previous findings. Fees are not a subject of our interest because they are not discussed in OECD Arrangement, and their use is solely up to each individual ECA. As these institutions promote national exports, significant fees are hardly used among ECAs.

The unemployment data are taken from the Czech Republic and used in the same way for all the projects, as we assume that they were calculated simultaneously. Otherwise, the effect on unemployment would differ over time, as both the rate and its average would differ. The data for all three examples are fictitious. They are used only for this model presentation to show how ECAs could use them and demonstrate MPR insufficiency.

4.2 Results

In this part, we present the evaluation of each example with a brief explanation of what is driving the results. The first one presents a support project in Turkey. The importer is a credible hotel in Ankara with a decent credit history, which allows it to be granted the best possible rating in Turkey of B+. The exporter will modernize the ventilation system and install new air-conditioning units in the hotel. The value of export is 35 million CZK, the loan for the importer has a duration of 5 years, and the total insured value comes to 45 million CZK, which includes the principal and the contractual interest insured. In this case, we also assume that part of the principal is used for premium financing. Table 5 presents the valuation of the model.

This project is not entirely manufactured nationally in this case study, as the national content is 70%. The employment effect is lower than 1 due to a higher 10-year average unemployment rate rather than the current unemployment rate in the Czech Republic. However, this exporter's productivity is about 45% higher than the country's average, and its average salary is also almost 8% higher than the country's average. The multiplication effect is also lower than 1, as the energy and air-conditioning sector has a relatively low

multiplicator. This effect is then lowered because this exporter is owned partially (23%) by a foreign entity. Territorial diversification and new market entry are not beneficial factors in the case of exports from the Czech Republic to Turkey. One positive thing is the higher-than-average spending on R&D, which is accounted for under the “innovative effect” category.

Table 5: Case study 1 results – Air-conditioning system renovation in Turkey

Benefits	Inputs for benefits	Costs	Inputs for costs
Value of export (mil CZK)	35	Insurance value (mil CZK)	45
National share (%)	70	Written premium (mil CZK)	1.5
Employment effect	0.876	Rating of the importer	B+
Multiplication effect	0.707	Corresponding PD (%)	3.8
Territorial diversification (%)	–10	LGD (%)	50
New market entry (%)	0	Operating costs (%)	20
Innovative effect (%)	17	Capital costs (mil CZK)	1.1
		Export support ratio	7.72

Source: Own preparation

On the side of costs, we see the insured value and written premium that compose *EAD*. The fair value of the premium is higher than the written premium, representing the issue of MPRs and the need for its update. For a B+ rating in Turkey, we see the current MPRs do not cover all the expected costs. The overall score for this project is 7.72 and has no units; it serves for comparison purposes only.

The second case study presents a support project in Nicaragua. The buyer in this case is the Ministry of Transportation, which is directly controlled by the government of Nicaragua. The exporter will build a railway to connect two major cities in that country, which will help improve the developing country’s infrastructure.

In this case, the premium is not financed as the exporter can afford to pay the premium from its savings. Unlike the first case study, the export is performed fully within the national economy, and, therefore, the national content reaches 100%. The employment effect is significantly lower and reflects productivity lower than the average for the economy and salaries for the exporter’s employees lower than the country’s average. On the other hand, Nicaragua as a project destination is very uncommon for the Czech Republic. It therefore helps not only diversify territorially but also open up a new market for other exporters.

Table 6: Case study 2 results – Railway track construction in Nicaragua

Benefits	Inputs for benefits	Costs	Inputs for costs
Value of export (mil CZK)	490	Insurance value (mil CZK)	600
National share (%)	100	Written premium (mil CZK)	46,6
Employment effect	0.387	Rating of the importer	B–
Multiplication effect	0.899	Corresponding PD (%)	14.49
Territorial diversification (%)	10	LGD (%)	50
New market entry (%)	10	Operationg costs (%)	20
Innovative effect (%)	–8	Capital costs (mil CZK)	72,6
		Export support ratio	1.58

Source: Own preparation

Looking at the costs, we must admit that this risk is far from the correct pricing by MPRs, as the fair value of the premium is significantly higher than the written premium. The issue of MPR insufficiency has become a real threat for such a country and rating grade. For this reason, we see high capital costs in our model. The overall output is 1.58, representing a value almost five times lower than that in case study 1.

The last case study presents a project to build a hospital in the Moroccan city of Ben Guerir. The buyer is a state-financed association that helps provide affordable and accessible healthcare for the citizens of this North African country.

Table 7: Case study 3 results – Hospital construction in Morocco

Benefits	Inputs for benefits	Costs	Inputs for costs
Value of export (mil CZK)	120	Insurance value (mil CZK)	148
National share (%)	50	Written premium (mil CZK)	2.8
Employment effect	1.521	Rating of the importer	BB+
Multiplication effect	0.446	Corresponding PD (%)	0.89
Territorial diversification (%)	–10	LGD (%)	50
New market entry (%)	10	Operating costs (%)	20
Innovative effect (%)	16	Capital costs (mil CZK)	0
		Export support ratio	59.84

Source: Own preparation

This project has a lower national content with a value of only 50%, which can be explained by the majority share of foreign ownership (70%). The employment effect is above 1, representing very high productivity that is almost twice as high as the country's average. Similar applies to salaries. The multiplication effect is low, which relates to the fact that a foreign body owns the majority of this producer. Even though the model assumes a benefit for the category of new market entry, it does not show the same for territorial diversification. The reason for this is explained by the export structure of the Czech Republic, in which Morocco represents less than 1%. It is, nevertheless, one of the leading destination countries for Czech exports. The innovative effect represents a high investment in the area of R&D in comparison with the average for the sector.

The costs present a very different story from the previous examples. The MPR is relatively high for this rating grade, above 2%. This shows that even ECAs can sometimes price too high compared to a commercial market. The capital costs are zero, as the written premium covers them and, therefore, premium financing does not add up to anything. The overall score is 59.84, which is, without doubt, the best output of all three. As the results differ significantly, we also present a summarizing table to present the overall scores for all three examples.

Table 8: Final results

Example	Model score	Ranking
Air-conditioning system renovation in Turkey	7.72	2 nd
Railway track construction in Nicaragua	1.58	3 rd
Hospital construction in Morocco	59.84	1 st

Source: Own preparation

As our results suggest, the most beneficial for the domestic economy would be Example 3, followed by Example 1, while Example 2 would be the least beneficial. The results show the practical use of such a model, which can help ECAs decide which export projects it is best to support when there are any limitations/capacity restraints.

5. Conclusion

The contribution of this paper is threefold. Firstly, it presents a practical way to model impacts on the national economy and can also be used as a decision-making tool by ECAs, either directly or indirectly by their owners, when limitations do not allow support to every export project. This model presents many perspectives that bring either benefits

or costs when a certain export project is supported. More importantly, it also provides comparable results, allowing ECAs to rank export projects from those with the lowest impact on the domestic economy to those with the highest. Secondly, this paper explains a government's motivation to operate ECAs even if they are loss-making in the long term. The model presents major effects representing either governmental incomes or savings on governmental expenditures. The employment effect, for instance, demonstrates how important it is for a government to control the unemployment trends territorially or by sectors of the economy. Thirdly we demonstrate the problem with OECD pricing on chosen examples (based on real ECA projects), which is sometimes above and sometimes below the correct price according to the expected loss calculation.

As we see this connection between the impact of ECAs on the domestic economy and their results more clearly, we may better understand why there is a strong motivation for countries to have an ECA that operates meaningfully. The micro-economic motivation among ECAs and their owners is clear. Those owners do not measure the effectivity of ECAs by their profits only but much more likely by the effects described by the proposed model.

It is therefore not correct to assume that each government tends to satisfy the OECD requirements regarding the level playing field and the long-term sustainability of ECAs fully. We simply cannot expect there to be motivation for it. It is really necessary to have a much more explicit system of pricing that provides the required granularity. Most importantly, one that considers the contractual interest typically insured by ECAs, even though they only apply MPR to the principal amount. Furthermore, it is recommended that all grey areas of export support be identified by the official requirements of the OECD and easily accessible to all ECAs. The MPRs then could be updated more often and would better keep up with the world's development. Having these would help us clarify to all the participating ECAs how export support should be provided correctly to satisfy the major OECD requirements aimed at guaranteeing no, or very limited, market distortion.

List of Abbreviations

$AvSM_{ECA}$	Average sector multiplier of ECA
$AvS_{country}$	Average salary in domestic economy (country)
$AvS_{Exporter}$	Average salary at exporter
$BfDE$	Benefits for domestic economy
CC	Capital costs
Co_{RD}	Research and development costs at exporter
EAD	Exposure at default

EE	Employment effect
ESR	Export support ratio
ExR	Exporter's revenues
$ExSCo_{RD}$	Exporter's sector costs of research and development
FV_{WP}	Fair value of written premium
IE	Innovation effect
IV	Insured value
LGD	Loss given default
ME	Multiplication effect
$NuEmDE$	Number of employees in domestic economy
$NuExEm$	Number of exporter's employees
OC	Operating costs
PD	Probability of default
PFC	Premium financing costs
RDE	Revenues in domestic economy
SFO	Share of foreign ownership
SM	Sector multiplier
SNC	Share of national content
$TCoEx$	Total costs of exporter
$TCoS$	Total costs in sector
U_{ACT}	Actual (current) unemployment rate
U_{LT}	Long-term unemployment rate
VE	Value of export
VR	Value of risk
WP	Written premium

References

- S&P Global (2021). *2020 Annual Global Corporate Default and Rating Transition Study* [online]. New York: S&P Global. [Accessed 20 November 2021]. Available at: <https://www.maalot.co.il/Publications/TS20210408160139.PDF>
- WTO (2020). *Agreement on Subsidies and Countervailing Measures*. Geneva: WTO. Available at: https://www.wto.org/english/docs_e/legal_e/24-scm_01_e.htm
- Auboin, M., Engemann, M. (2012). Testing the Trade Credit and Trade Link: Evidence from Data on Export Credit Insurance. *SSRN Electronic Journal*, <https://doi.org/10.2139/ssrn.2169862>

- Cuyvers, L., De Pelsmacker, P., Rayp, G., et al. (1995). A decision support model for the planning and assessment of Export Promotion Activities by Government Export Promotion Institutions – the Belgian case. *International Journal of Research in Marketing*, 12(2), 173–186, [https://doi.org/10.1016/0167-8116\(94\)00021-f](https://doi.org/10.1016/0167-8116(94)00021-f)
- Dawar, K. (2019). *EU Export Credit Agencies: Assessing Compliance with EU Objectives and Obligations* [online]. Florence: Respect. [Accessed 27 December 2021]. Available at: <http://respect.eui.eu/wp-content/uploads/sites/6/2019/12/Final-K-Dawar-Horizon-2020-Work-Package-4.2.pdf>
- OECD (2017). *Guidance on Premium Rules for Officially Supported Export Credits in Market Benchmark Countries*. Paris: OECD.
- Hunke, O. (2014). Export Credit Guarantees in a Globalised World. *CESifo Forum*, 15(3), 17–22.
- Nakládal, J., 2013. *Aktuální trendy v systému statní podpory úvěrového pojištění v České republice*. Ph.D. Thesis, Prague University of Economics and Business.
- Lawson, C., Dietrich, C., Murray, T. (2019). *The Effect of Trade Barriers and Governmental Regulation on Overall Economic Well-Being* [online]. Available at: <https://smartech.gatech.edu/bitstream/handle/1853/62052/Lawson%20Dietrich%20Murray%20Final%20Emetrics%20Research%20Paper.pdf?sequence=1>
- Lindé, J., Pescatori, A., (2017). *The macroeconomic effects of trade tariffs: Revisiting the lerner symmetry result*. IMF Working Paper No. 17/151. <https://doi.org/10.2139/ssrn.3014081>
- Liu, L.-J., Creutzig, F., Yao, Y.-F., et al. (2020). Environmental and economic impacts of trade barriers: The example of China-US trade friction. *Resource and Energy Economics*, 59(2), 101144, <https://doi.org/10.1016/j.reseneeco.2019.101144>.
- OECD (2020). *The Red Book. Arrangement on Officially Supported Export Credit*. Paris: OECD. Available at: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg\(2020\)1](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg(2020)1)
- Podvrsic, A., Becker, J., Piroška, D., et al. (2020). *Mitigating the COVID-19 effect: Emergency economic policy-making in Central Europe*. ETUI Research Paper 2020.07. <https://doi.org/10.2139/ssrn.3684990>
- Pýcha, M. (2021a). Problems with long-term financial sustainability of export credit agencies. *Prague Economic Papers*, 30(2), 156–170, <https://doi.org/10.18267/j.pep.762>
- Pýcha, M. (2021b). *Fair insurance cover for export credit under oecd pricing framework*. Prague Economic Papers, 30(5), 509–528, <https://doi.org/10.18267/j.pep.779>
- Saghir, W. (2020). Corporate Structure and Governance of Export Credit Agencies: A UKEF Overview. *Financial Law Review*, 18(2), 1–12, <https://doi.org/10.4467/22996834flr.20.006.12428>
- Urban, M., Mejstřík, M., Gutierrez Chvalkovská, J., (2014). Application of the decision support model to Czech exports. *Acta Oeconomica Pragensia*, 22(2), 33–47. <https://doi.org/10.18267/j.aop.430>