Export Credit Agencies and Export Performance: Evidence from Sweden

By

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Abstract

This research explores the empirical relationship between export insurance provided by Swedish ECA "EKN" and total exports of goods and services from Sweden for the period of 2008-2014 by using Ordinary Least Squares (OLS) method based on the gravity equation of international trade. The results provide evidence of positive and statistically significant effect of export guarantees on the level of Swedish exports, when additionally controlling for importer's GDP, population and distance. The positive impact of EKN's export guarantees more than doubles after adding a proxy for importer's risk category to the regression, while the risk coefficient is negative, which means that political risk represents a significant constraint for the development of exports from Sweden to more risky countries. The impact of short-term export guarantees on Swedish exports is much stronger in comparison to long-term guarantees. As for the length of export insurance, it appears that small-sized guarantees are the most efficient in fostering exports. Moreover, the findings show that the effectiveness of EKN's export guarantees is heterogeneous with respect to geographical position of importing country, as well as to its GNI per capita level.

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1. Introduction

Export Credit Agencies are considered to play a crucial role in supporting international trade via such instrument as export credit guarantees. The main goal of such guarantees is to provide insurance to national exporters against political risks that could not be covered by private insurance companies due to various market imperfections. This was the case during recent financial crisis when governments were expanding the issuance of new export insurance by its ECA's (by more than 50% in 2009) in order to mitigate the negative impact of international trade contraction and decline in exports. Such a rapid expansion in the volumes of ECA's guarantees raises an obvious question about their effectiveness as a mechanism for export promotion (Badinger and Url, 2012).

Surprisingly, there is very limited empirical evidence on the effects of ECA's export guarantees on export promotion in a given country. Moreover, the existing research works mostly cover the pre-crisis period and are concentrated around several European countries, such as Germany (Moser, Nestmann and Wedow, 2006; Felbermayr and Yalcin, 2011), Austria (Egger and Url, 2006) and the Visegrad group of countries (Janda, Michalíková and Psenakova, 2013). Yet little is known about the influence of export credit guarantees on exports in Sweden and more generally in northern Europe, where the structure of export industries and key trading partners may significantly differ from other regions. Thus, the results of this thesis contribute to the existing literature on the relationship between ECA's export guarantees and the level of export growth.

This research examines how insurance guarantees issued by the Swedish export credit agency EKN for the benefit of country's national companies affect the overall volume of exports from Sweden to other countries. The main purpose of this thesis is to find out whether EKN's export guarantees have a statistically significant positive effect on Swedish exports for the period of 2008-2014 and to measure the strength of such effect for different types of insurance

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guarantees. In order to determine this I will run an OLS regression based on gravity equation of international trade that was initially developed by Tinbergen (1962) and Poyhonen (1963) and will also use its later specification made by Janda, Michalíková and Skuhrovec (2012). Such a model makes it possible to measure how exports from Sweden to its trade partners depend on such factors as economic size of its trade partner, its partner's risk category and what is especially important for my research - the level of guarantees issued by Swedish ECA to support exports to a given trade partner.

However, the main goal of the econometric model presented in this thesis is not simply to determine the positive influence of EKN's guarantees on Swedish exports, but to investigate whether such effect may vary according to size and length of a guarantee. In the other words it means that export guarantees of a particular length and volume will be more efficient in terms of fostering Swedish exports than others. Such a hypothesis could be drawn based on the information from several articles in popular economics journals (Reuters, 2015; ECNS, 2015) and ECA's annual reports (US, UK and EKN), where it is mentioned that short-term small-scale projects are expected to be the most promising in terms of promoting national exports.[1] Yet, in the existing economics literature there is no research addressing this particular topic. In order to answer this question, the present study will focus on examining the relationship between Swedish exports and particular types of guarantees by length (short-term and long-term) and by average size (small, medium, large). The same principle will also be applied to define regions where EKN's guarantees are expected to be the most beneficial for promoting exports from Sweden.

I examine the abovementioned questions using a sample of export guarantees issued from Swedish ECA «EKN» to 141 trade partners (countries) for the period 2008-2014 (not all countries have observations for all seven years), which means 773 country-year observations.

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[1] More specifically, the following annual reports were used: 1) US Exim annual report for 2013; 2) UK Export Finance annual report for 2013-2014; 3) Swedish ECA EKN annual report for 2013; 4) Chinese ECA Sinosure annual report for 2013

The data on both short-term and long-term export guarantees (as well as the number of contracts per country in each year) was provided by Swedish EKN and International Union of Credit & Investment Insurers (Berne Union).

This thesis is organized as follows: Chapter 2 starts with a theoretical analysis of the motivations behind the necessity to establish such institution as export credit agency, followed by the analysis of the key principles and structure of Swedish export credit agency EKN and an analysis of existing literature on the role of ECA's guarantees in fostering exports. Chapter 3 describes the extensive information on the developments of Swedish exports and most important trends in the provision of export guarantees. Chapter 4 provides an explanation of data that was used in the empirical research and methodology applied throughout the work. Chapter 5 presents key empirical results and delivers explanation of the main findings, followed by the conclusion.

2. Theoretical framework

The chapter analyzes the theoretical background of export credit agencies and explains the motivation for the establishment and functioning of such agencies, followed by an overview of the main working principles and products of Swedish export credit agency EKN. The last section provides a brief survey of the existing literature about ECA's role in fostering exports.

2.1 Motivation for the work of Export Credit Agencies

This section reviews the most important motives behind the functioning of Export Credit Agencies (ECA). It also provides an analysis of the evolution of such agencies during the 20-th century and explanation how additional international regulations changed ECA's main working principles.

Nowadays private insurance companies and commercial banks offer a broad variety of insurance products for the participants of trade finance and project finance deals that are used to minimize the potential risks associated with such transactions. Nevertheless, in-parallel with private insurance market there also functions a public or "state-supported" insurance market in the form of export insurance provided by Export Credit Agencies. The reason for the simultaneous existence of two insurance markets is explained by the incompleteness of private insurance markets. Put it differently, according to Janda, Michalíková and Skuhrovec (2012): "private insurance companies are arguably reluctant to expose themselves to certain types of political risks, especially in relation to large and long-term segments of export business".

The main problem for private insurance companies and commercial banks is that due to highly uncertain information on the potential exposure of its client (exporter) to political risks in the country of its trading partner (importer), it becomes extremely risky to provide insurance to such client. Moreover, besides a general political risk (such as war, revolution or economic sanctions imposed against a country of a trading partner), various problems may arise when it

comes to assessing and checking the information about the creditworthiness of a foreign trading partner. Such market failures as a recent financial crisis could also be added to the list of factors which increase the uncertainty of cash-flows between international trading partners. As a result, for private insurance companies it becomes extremely costly, or even impossible, to provide protection against the abovementioned uncertainties and charge adequate premium for such insurance coverage (Janda, Michalíková and Skuhrovec, 2012).

In order to overcome the inefficiencies of private insurance markets, many countries have established such state-supported institutions as Export Credit Agencies (ECA). Due to the possibility to rely on budget money of its country, these agencies have less financial constrains than private insurers and are able to take much higher risks. Thus ECA help to mitigate market failures associated with asymmetric information by issuing export guarantees to its national exporters that could not be covered by private insurers. As a result, such guarantees promote international trade between countries that might otherwise not occur due to excessive political risks of such export transactions.

Probably the most explicit explanation of justification of ECA's activity was provided by Fitzerald (1989) who presented the following list of problems solved by these agencies: "capital market failure and imperfect information on export credit, incomplete insurance markets and resulting unreasonable premium to cover the risk, moral hazard and adverse selection and hence risk premium unsustainable for majority of exporters, imperfectly competitive foreign markets, export externalities linked to production for the export market, and finally, matching other programs such as development aid".

Yet, it is important to mention that such a broad number of functions have not always been relevant for ECA's activity and prior to the end of 1990-s these agencies were quite often very inefficient. Originally most ECA's were created with a much narrower function – to be a lender of last resort for key national producers, insuring their exports to third-world countries against political and commercial risks. Basically in line with such working principles ECA's

were carrying significant risks, which eventually transformed into extremely high losses during the period of 1980-90's.

The most obvious reason for such inefficiency is that quite often export guarantees were viewed as a form of governmental subsidy which presumes that insurance premiums were kept at inadequately low levels and were not taking into account the actual riskiness of a deal. Moreover in many cases ECA's funds were used not in accordance with commercial profitability of a deal, but on political grounds. Such political influence was possible because usually these agencies used to have a lot of governmental officials in its board of directors and supervisory board.

Eventually after a period of high losses, it became obvious that some changes and reforms should be made in order to improve ECA's efficiency. As a result, three important sets of regulations were implemented by OECD that eventually created a level-playing field for all ECA's around the world:

- OECD Arrangement on officially supported export credits. It creates a level-playing field for all ECA's around the world by specifying exact requirements for calculation of minimum risk premium on export guarantees (based on importing country's risk category).

- OECD principles to promote sustainable lending practices in the provision of export credits to low-income countries. Its main function is to limit such countries' exposure to excessive borrowing from lenders supported by ECA.

- OECD Common Approaches. These are guidelines on ECA's activity in projects that may have a significant environmental and social impact in importing country.

It is possible to conclude that due to the implementation of these regulations there was a significant transformation in the key functions and working principles of these agencies. According to research made by Askari (2007): "ECAs nowadays have shifted from their role as lenders of last resort, carrying high risk that can be eventually unloaded on the state budget towards market players that try to operate as a private company, support national companies

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without using public resources on loose economic goals and obtain self-sustainable positive financial results" (Ascari, 2007).

2.2 Principles and structure of Swedish Export Credit Agency EKN

The Export Credit Agency EKN was founded in 1933 and currently provides insurance against political and commercial risks for Swedish exporters in more than 115 countries. The maximum amount of insurance guarantees which EKN can issue is decided by the Swedish parliament and currently amounts to 60.1 billion dollars. Yet, this so called "guarantees ceiling" has never actually been reached and for the last 5 years it was loaded by around 50-65% (EKN Report, 2013). Basically it means that such a guarantees ceiling does not constrain the demand for export insurance in Sweden.

EKN groups the risks that it insures into two main categories: commercial risks and political risks. Commercial risks are associated with the possibility of importer's inappropriate behavior that may affect the stability of the repayments of export loan. This group of risks also includes the potential delays in the repayment of export loan due to insolvency or bankruptcy of a debtor (trading partner). Among the group of political risks EKN identifies such cases as war, labor strikes, change of political regime, military revolts, expropriation of debtor's assets, constraints in debtor's banking system which complicates the transfer of cash-flows from that country, financial sanctions towards debtor's country, natural disasters, etc. In its work principles EKN measures the level of political risk in accordance with the OECD Consensus where all countries are classified into 8 risk categories (where "0" stands for countries with lowest political risk, such as US or Singapore and "7" for the most risky countries, such as Chad or Ukraine). Furthermore EKN calculates a risk premium for export insurance based on country's political risk category.

In order to provide effective protection against these risks for its national exporters, EKN has a wide range of insurance products for both short-term and long-term export credits:

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Loss on claim guarantees – provides insurance of exporters' trade receivables which means that exporter will be protected from the risk that its foreign trading partner (importer) will refuse to pay;

Loss on production guarantee – provides insurance against the risk that exporters' foreign trading partner will breach the contract during the production period;

Letter of credit guarantee – provides a possibility for the bank (creditor) to split potential risks with EKN when the bank confirms letters of credit. Such guarantee will automatically expand exporters' credit line at the bank.

Guarantee for unfair calling – provides additional insurance for the exporter against the risk that its foreign trading partner will be using an already existing export guarantee in an unfair or completely illegal manner.

Investment guarantee – protects foreign assets of long-term investors (exporters) explicitly against political risks. In this case if investing company will receive a compensation from EKN if it will not be able to use its foreign assets or if it will not be able to get a repayment on the investment loan.

2.3 Existing literature on the role of export credit guarantees in promoting exports

This section focuses on the analysis of the existing theoretical and empirical research works on the relationship between ECA's guarantees and export growth. A thorough literature review is important to identify which problems were already addressed by other researches. Consequently, in my research it will help me to concentrate on questions that were not yet properly researched and thus I will manage to contribute to the existing literature on this topic.

In spite of the fact that many ECA's were created in 1930-s, until recently there weren't any attempts from economists to measure the effectiveness of these agencies in terms of their export enhancement function. Theoretical framework that was necessary to answer that question

was introduced in the form of gravity model of international trade by Tinbergen (1962) and Poyhonen (1963). According to the gravity equation, trade flows between two countries depend positively on the economic size (GDP) of these countries and negatively on distance between them. Moreover, this model allows to include additional variables into the equation in order to check how they affect trade between countries. For example, it may be such variables as population, country's risk category and what is especially important in our case − the volume of export guarantees. Almost all of the existing research works on the relationship between ECA's export guarantees and export growth use such modified gravity equation.

The research done by Moser, Nestmann and Wedow (2006) provides empirical evidence of statistically significant impact of export guarantees issued by German ECA Euler Hermes on the level of exports from Germany to other countries. The analysis was based on gravity model where both dynamic and static panel estimations appeared to be statistically significant (a multiplier was between the level of 1.7 and 6 which means that for each additional unit of issued insurance guarantee German exports will rise by around 6 units). Almost the same research principle was applied in the work of Herger and Lobsiger (2010) that is focused on measuring the relationship between ECA's insurance and export promotion in Switzerland (the estimation shows that guarantees improve exports in the manufacturing area by approximately 1%).

There are also two papers related to estimation of the role of ECA's guarantees on exports from Eastern European countries where both exports and export guarantees have a strong orientation on markets of post-soviet countries. The first by Janda, Michalíková and Skuhrovec (2012) investigates the role of export guarantees in Czech Republic by applying econometric analysis based on static gravity model (LSDV estimator) and the dynamic model (GMM estimator) for the period of 1996-2008. It proves that there exists a positive effect of ECA's guarantees on exports. The second by Janda, Michalíková and Psenakova (2013) analyzes which form of export credit agency is more efficient in fostering exports: insurance company (which concentrates mostly on the provision of guarantees), eximbank (focused more on export credits)

or their combination. After comparing the results for each of Visegrad countries it appears that Polish ECA «KUKE» which operates in the form of insurance company has the strongest positive effect on exports (in comparison with other forms of ECA in other Visegrad countries).

A more deep and broad analysis is presented by Felbermayr and Yalcin (2011) where instead of simply checking for the positive effect of guarantees on exports, they investigate which sectors of German exports are expected to have stronger reaction on ECA's guarantees. This research also shows that ECA's insurance in Germany has a stronger effect for those export markets where financial institutions are less developed and thus such countries are more dependent on external finance. This conclusion was further confirmed in works of Chor and Manova (2011) who proves that credit constraints have a significant effect on exports. Further such statement was analyzed by Baltensperger and Herger (2009) who uses data on the provision of export guarantees in OECD countries and makes a conclusion that such support enhances exports only to high-income countries with highly developed financial institutions.

In contrast to Felbermayr and Yalcin, Egger and Url (2006) find that even though export guarantees from Austrian ECA OeKB have in general a positive effect on exports, such guarantees have no influence on export structure with regard to industries and countries. OeKB's role was also analyzed from a different perspective in the work of Badinger and Url (2012) who managed to find a positive effect of export guarantees on exports by assessing firm-specific export performance of 178 Austrian exporting companies. It appears that companies that were using OeKB export guarantees were exporting approximately 80-100% more than companies that were not relying on ECA's help.

This literature review contributes to the present research by presenting empirical evidence to refer to when explaining the regression results of the effect of EKN guarantees on Swedish exports obtained in this work. Considering that the abovementioned research works were conducted in a very limited number of countries and were not covering the after-crisis period, it is safe to assume that there are still a lot of possibilities for the research in this area.

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3. Structure of Swedish exports and developments in the provision of export guarantees
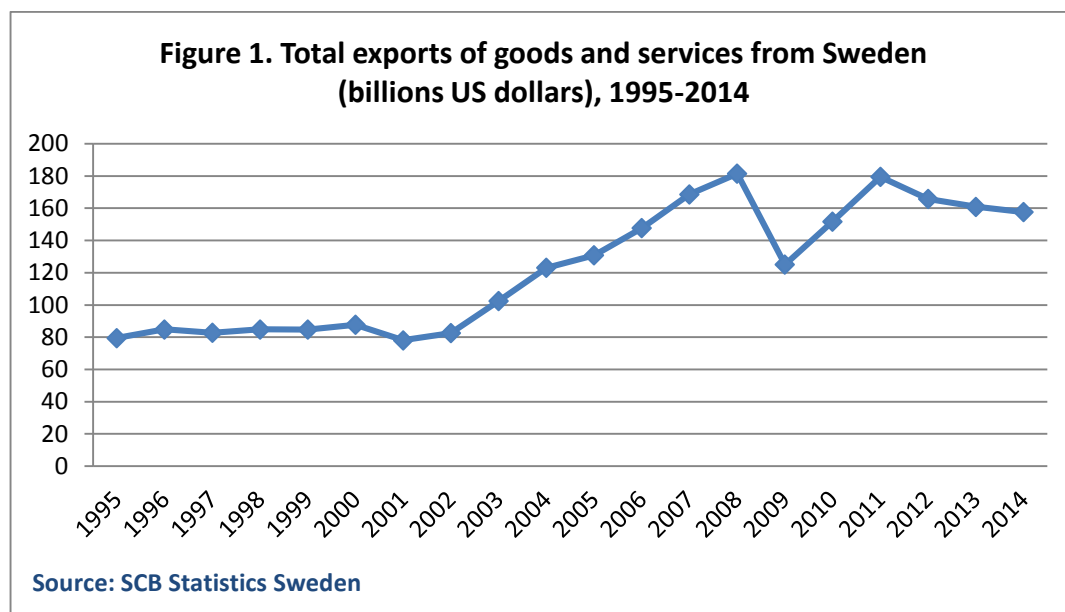
In this chapter I will first of all provide an extensive analysis of the recent developments in Swedish exports of goods and services for the period of 1995-2014 and assess the current structure of such exports by country of destination, as well as by Sweden's key exporting products. Secondly, I will examine the trends in the provision of export guarantees from Swedish ECA EKN to its national exporters. Thirdly, I will explore the dynamics and recent changes of EKN's structure of export guarantees by length of insurance and by size of average guarantees. Finally, in order to present a more detailed picture on the geographical distribution of EKN's guarantees, the relevant data on Swedish exports and export insurance will be analyzed for seven different regions, as well as for seven groups of countries by their political risk category. By doing this analysis I want to get a sight of the trends which can explain my hypothesis about the positive role of EKN's export insurance in fostering Swedish exports (what I want to prove with econometric model in chapter 5).

3.1 Developments of exports from Sweden

The data used in this section was acquired from SCB Statistics and Observatory (Atlas Media) databases in order to investigate the changes in dynamics of exports from Sweden throughout the period from 1995 to 2014. Analyzing the developments in Swedish exports and changes in its structure is crucially important for this research, because these are the key variables used in my econometric analysis in chapter 5 for establishing evidence in favor of EKN's positive influence on Swedish exports and finding the particular types of export guarantees that are the most efficient in fostering such exports.

Figure 1 shows the development of total exports from Sweden during the period of 1995-2014. It can be seen that the level of Swedish exports started to grow rapidly only after 2002 and

prior to that date there was almost no growth in exports. A period of rapid growth when the level of exports more than doubled starts after 2002 and continues until the beginning of the financial crisis in 2008. Yet even during the period of economic contraction Swedish exports decreased only by around 35% and equaled to 120 US billions at its lowest point in 2009 (which is approximately on the level of 2004). After such a dramatic drop Swedish exports returned to its pre-crisis level of approximately 180 US billions in 2011.

Figure 1. Total exports of goods and services from Sweden (billions US dollars), 1995-2014

Source: SCB Statistics Sweden

Probably the most interesting part in Figure 1 is characterized by a period of 2011-2014 when there was a gradual decline in exports. Even though the decline was not significant (around 12%), still it has the possibility to transform into another period of stagnation as it was during 1995-2002. For the present research that recent period of decline is especially important, because obviously Swedish government have been trying to implement various stimulating measures to mitigate such negative scenario and export guarantees is one of the key instruments that could be applied to solve that problem.

Figure 2 shows the sector distribution of Swedish exports (1995-2012) where it becomes clear which industries have the strongest impact on the overall level of export growth. The highest share belongs to exports of telecommunication products and machines, refined petroleum, automobiles, iron products, chemical products and paper goods. As it was already

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shown in Figure 1, the period of export expansion starts only in 2002. Yet the structure of Swedish exports in terms of its key exporting industries has remained almost unchanged neither during the period of rapid growth (2002-2009), not during the crisis and after-crisis period. Such stability of exports structure could lead to conclusion that in general export growth in Sweden was driven not by some rapid advances in some new industry (for example as it was in Norway where the recent discovery and exploration of offshore oil fields significantly affected its export growth), but by a combination of other factors.

Figure 2. Sector distribution of Swedish exports (billions US dollars), 1995-2014
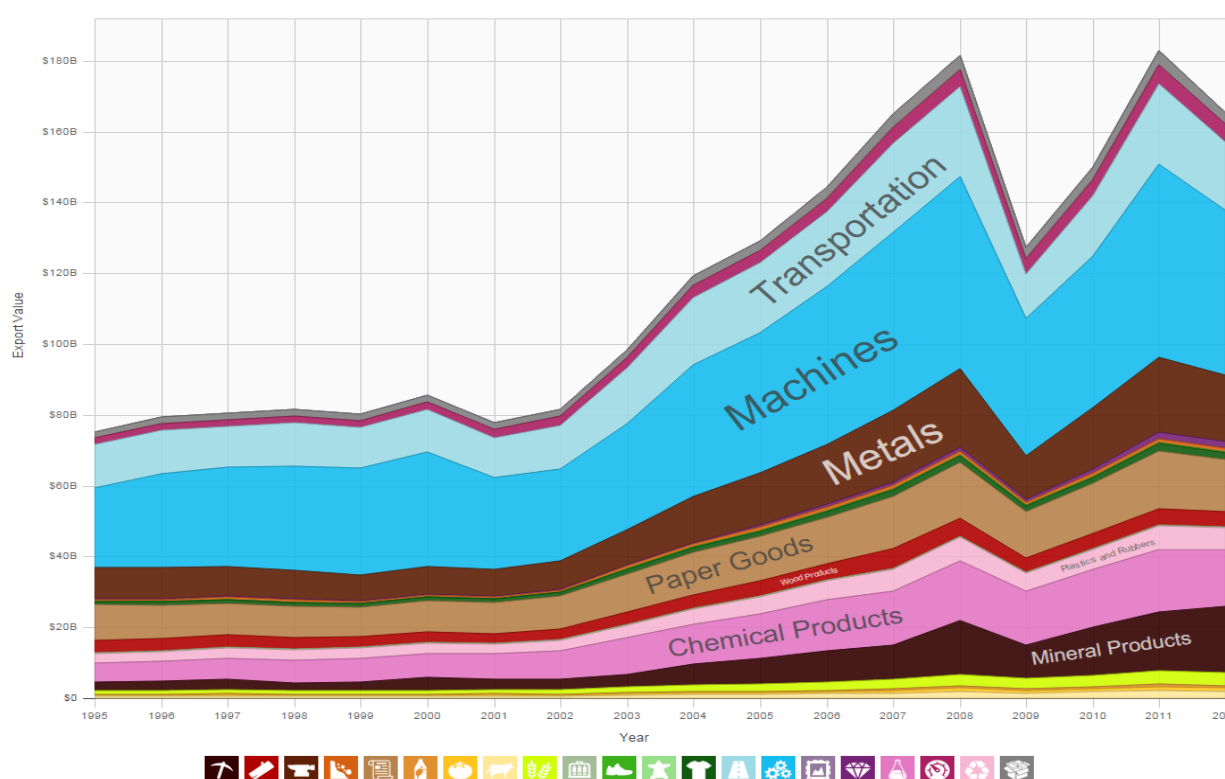
Source: Atlas Media database

Figure 3 shows the dynamics of the total Swedish exports in relation to the main trading partners (for the period 1995-2013). It can mostly explain why a rapid expansion of exports started only after 2002. It can be seen that a rapid export growth from Sweden was accompanied by a strong expansion of exports to EU countries and to China. Growth of EU countries' share in Swedish exports could be explained by further integration of such countries due to creation of

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euro area and elimination of trade barriers, while growth of exports to China can be generally explained by a spectacular rate of growth of Chinese economy.

Figure 3. Regional distribution of Swedish exports (billions US dollars), 1995-2013
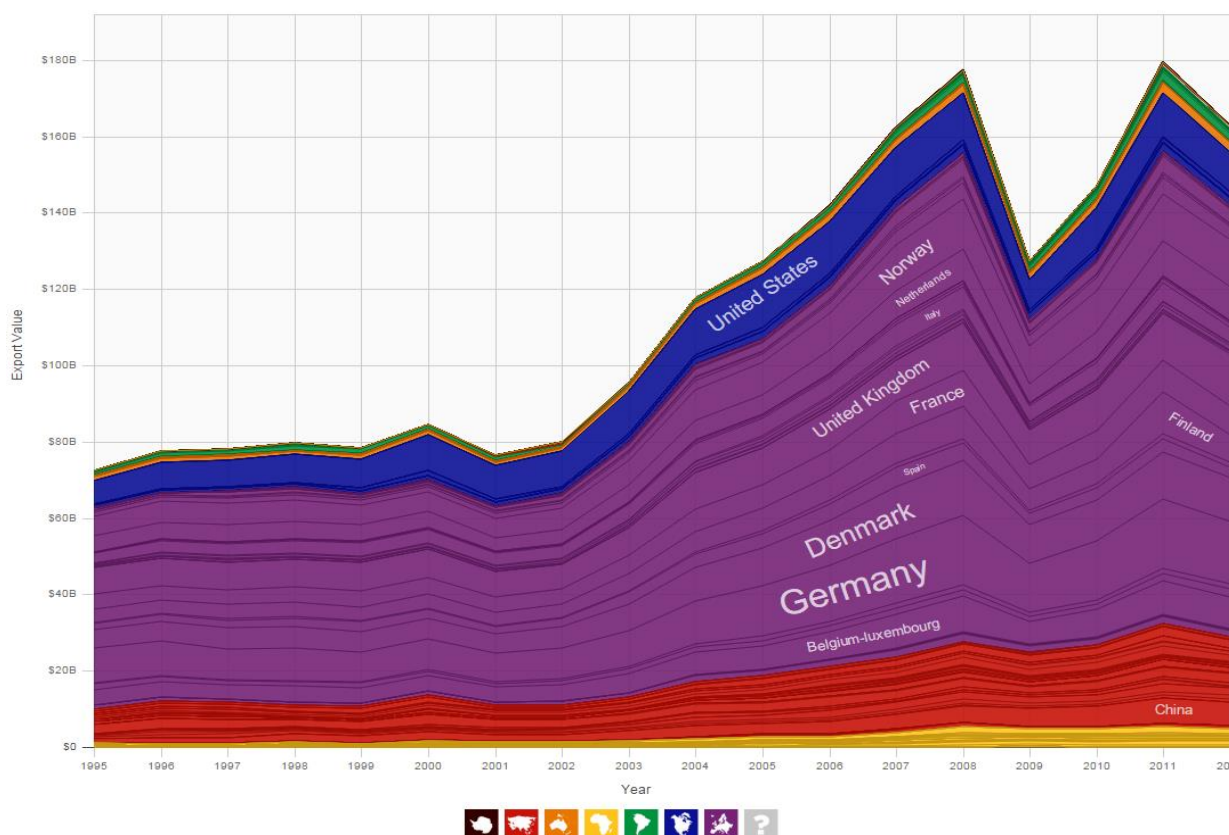
Source: Atlas Media database

According to the information presented in Figures 2 and 3 it is possible to make an important conclusion about the recent developments in Swedish exports: the rapid expansion of Swedish exports is more dependent on the external factors (such as elimination of trade barriers between countries or rise of demand from a country with rapidly-growing economy such as China) and less on internal factors (such as the structural composition of Swedish exports).

3.2 Trends in the provision of export guarantees from Swedish ECA EKN

It is important to understand that the Swedish ECA EKN does not provide export insurance to every single exporting company and there are certain principles (explained in Chapter 2) according to which each year EKN can support only a limited number of transactions.

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Consequently, Swedish exports covered by EKN's insurance represent only a fraction of total exports for a given year. Yet, according to Figure 2 it appears that such fraction can change substantially from the level of around 2% in 2004 and up to its peak of 5% in 2009. Nevertheless, right after the expansionary growth of the share of exports covered by export guarantees, there goes an even more rapid decline to a 2% level in 2014. Moreover, it needs to be taken into account that when total Swedish exports were rapidly growing in 2004-2008 (Figure 1), the share of EKN's guarantees was quite volatile and did not have any particular trend (Figure 4), but as soon as the crisis started in 2008 exports were sharply decreasing, while EKN's guarantees were expanding. Basically this means that Swedish government was viewing export credit guarantees as a mechanism to fight the contraction in international trade. What is even more interesting, when the financial crisis was mostly finished in 2011 there was a gradual decline both in the level of exports (Figure 1) and in the level of guarantees (Figure 4 and 5).

Figure 4. Share of EKN export guarantees in total exports from Sweden(%), 2004-2014

Source: Swedish ECA "EKN"

Figure 5. New export guarantees issued by EKN (billions US dollars), 2004-2014
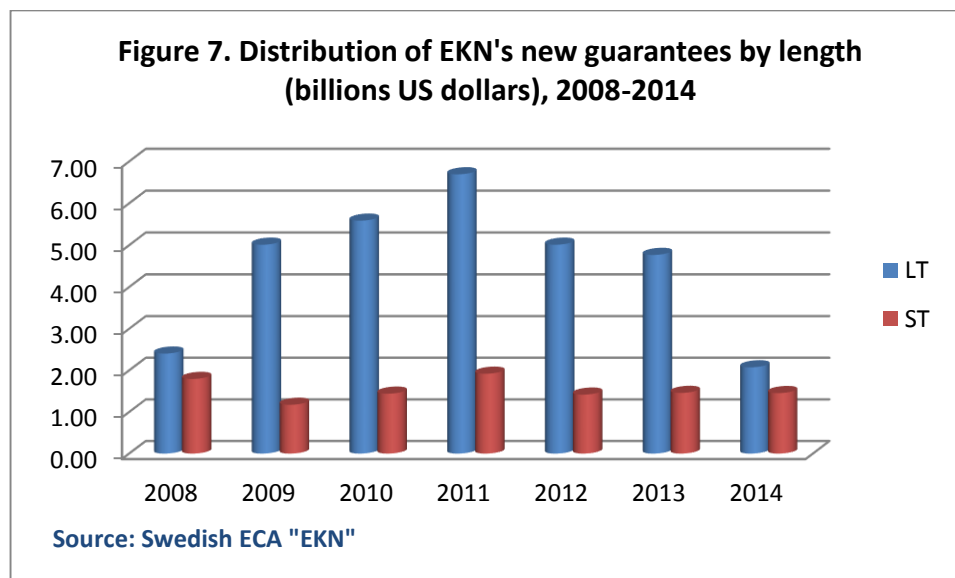
Source: Swedish ECA "EKN"
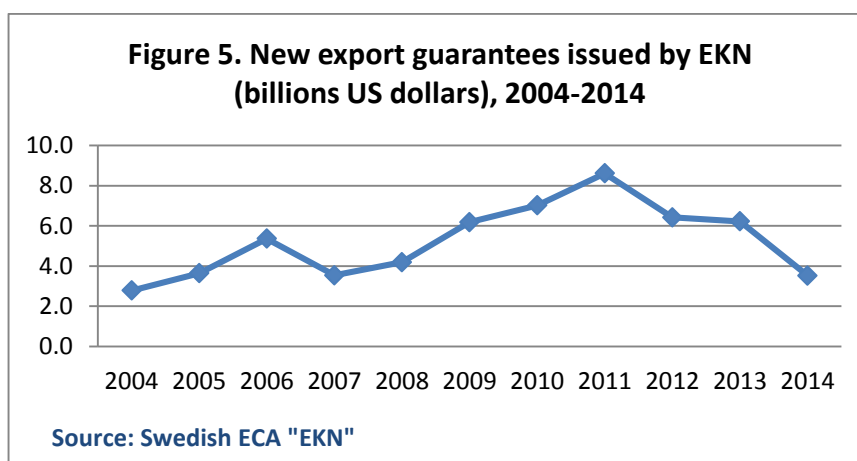
In contrast to the previous two graphs, which were showing the number of new issued export guarantees per year, Figure 6 shows total outstanding amount of export guarantees for a given year in Sweden. In this case the pattern of EKN's insurance is quite different, because for almost the whole observation period the level of outstanding guarantees was constantly growing from $10 billion in 2004 to more than 30 billion in 2011. This is partly explained by the fact that at least some part of the export guarantees are issued for period longer than 1 year, and that the proportion of long-term and short-term insurance also changes from year to year. One further important remark should be made: the amount of outstanding guarantees has remained almost unchanged from 2011 to 2013 (Figure 6), while the level of newly issued guarantees diminished by more than twofold (Figure 5). It means that even though currently there is no such strong expansion of new export insurance as it was in the peak of the crisis, yet total exposure of EKN is still as high as it was in 2011. Thus, there is still a high chance that Swedish government will decide to further preserve that level of EKN's exposure in order to support its exporting producers (when the existing guarantees will expire it will simply issue new ones). Whether Swedish government will stick to that strategy or not will obviously depend on its belief in the export-enhancing effect of these EKN's guarantees.

Figure 6. Outstanding export guarantees issued by EKN (billions US dollars), 2004-2013

Source: Swedish ECA "EKN"

EKN's structure of export guarantees by length and by average size

Focusing on the structure of EKN's insurance by length of newly issued export guarantees, Figure 7 shows that for the whole period there was a significant volatility only in the level of long-term guarantees, while the level of short-term guarantees has remained almost unchanged. This means that during 2009-2011 Swedish government was trying to mitigate negative effects of financial crisis mainly by expanding the provision of long-term guarantees to its national exporters. Moreover, prior to the beginning of EKN's insurance expansion in 2008 and after the end of expansion in 2014 the share of both short-term and long-term guarantees was almost the same; while in 2011 the total amount of long-term guarantees was more than three times higher than the level of short-term guarantees.

Figure 7. Distribution of EKN's new guarantees by length (billions US dollars), 2008-2014

Source: Swedish ECA "EKN"

As for the size structure of EKN's export guarantees, shown in Figure 8, it can be seen that starting from 2008 there was a significant expansion in the amount of large-scale (over 5 million) export guarantees. Basically in comparison with the other two groups (*small* – below 1 million; *medium* – between 1 million and 5 million), the group of large-scale export guarantees was the only one that contributed to the overall volatility of EKN's total level of export insurance. This means that Swedish government was considering that expanding large-scale export guarantees will have the strongest positive effect on Swedish exports during the period of financial crisis. This conclusion is also be supported the fact that particularly in 2011 Swedish

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EKN even decreased the amount of new issued medium-sized guarantees by around 50% in order to further increase the share of large-scale guarantees.

**Figure 8. Distribution of EKN's new export guarantees by average size (billions US dollars), 2008-2014**
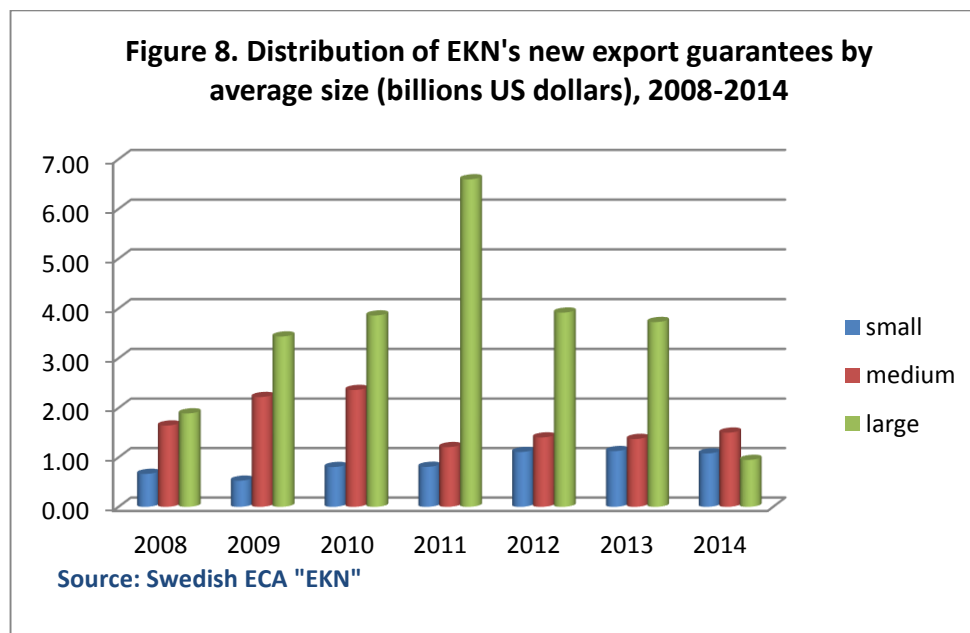
It is also important to mention that for the last several years EKN was constantly trying to implement new products orientated on supporting exports of small and middle-sized Swedish companies with small-scale export guarantees (EKN Report, 2013). During the period of 2008-2014 the amount of small-scale guarantees increased by almost twofold from $0.67 billion (15% of total guarantees in 2008) to $1.08 billion (30% of total guarantees in 2014). Such trend was barely noticeable during the period of economic disturbance when Swedish government was mostly relying on large-scale export guarantees, yet it became important when the negative effects of financial crisis have almost disappeared by 2014. Consequently, it is possible to conclude that Swedish government applies large-scale export guarantees to mitigate trade contraction during economic crisis, but relies more on small-scale guarantees to support its exporting industries during the period of economic stability.

Geographical distribution of EKN's export guarantees

Looking at EKN's export guarantees distribution among the different regions, Figure 9 shows that there was a significant variation in the geographical structure during the period of financial crisis. Yet if we compare the distribution prior to the beginning of the economic

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contraction (in 2008) and the distribution after the financial crisis was mostly over (in 2014), it appears that it will be almost the same. Its means that such change in the geographical distribution was temporary and thus was considered by Swedish government as the effective instrument to fight the contraction of international trade during financial crisis.

Figure 9. Regional distribution of EKN's new export guarantees (billions US dollars), 2008-2014

Source: Swedish ECA "EKN"
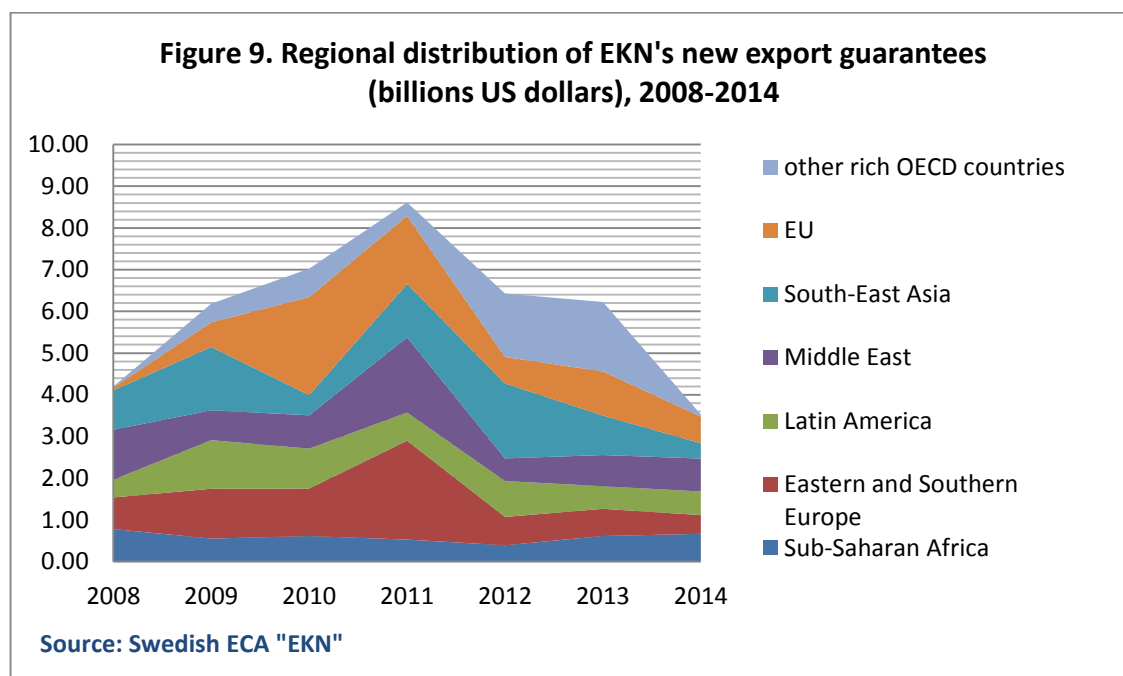
By taking a closer look at the structure of changes in the geographical destination of EKN's guarantees, it is possible to observe an important tendency: the Swedish government was more reluctant to expand the EKN's insurance to more stable and rich regions such as countries of Eastern and Southern Europe, Middle East, EU and other OECD countries. On the contrary, the level of EKN's insurance in more risky and unstable regions such as Sub-Sahara Africa, Latin America and South-East Asia has remained almost the same during the observation period.

In order to have a broader understanding of the geographical distribution of EKN's export guarantees it is also important to analyze the developments of EKN's share of exports guarantees in total exports from Sweden to each region.

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Table 1. Share of EKN's guarantees in total exports from Sweden per region, 2008-2013

Year	2008	2009	2010	2011	2012	2013	2014
Sub-Sahara Africa	24,9%	26,1%	22,7%	12,4%	13,5%	28,1%	30,7%
Eastern and Southern Europe	9,8%	28,4%	21,1%	29,7%	11,0%	10,4%	8,1%
Latin America	10,3%	44,3%	26,1%	14,1%	20,3%	14,7%	17,0%
Middle East	18,5%	14,8%	13,7%	25,9%	8,9%	12,1%	12,5%
South-East Asia	10,3%	19,0%	5,1%	10,7%	17,4%	9,1%	3,6%
EU	0,1%	0,7%	2,4%	1,4%	0,6%	1,3%	0,9%
other rich OECD countries	0,1%	3,1%	3,6%	1,6%	8,0%	9,7%	0,3%

Source: Author's calculations

According to the information in Table 1 it appears that even though the level of EKN's exposure has increased significantly in Eastern and Southern Europe, Middle East, EU and other OECD countries (as it was shown in Figure 9), such increase was still very modest in comparison to total Swedish exports to these regions. However, there was a significant movement in the level of EKN's share of insured exports in total Swedish exports to Latin America. As for the countries of Sub-Sahara Africa, Middle East and South-East Asia, it appears that there was not much deviation in the share of exports insured by EKN in the total level of Swedish exports to these regions.

Distribution of EKN's export guarantees by risk category of importing country

Analysis of the changes in the structure of EKN's export guarantees according to the political risk category of importing country is presented in Figure 10. It can be seen that there's no direct relationship between the level of country risk and the issuance of new export insurance from Swedish EKN. Moreover, provision of export guarantees to 8-th, 6-th and 3-rd categories remains on the very low level during throughout the observation period of 2008-2014. Also it is important to mention that in times of the most severe economic contraction of 2008-2011 Swedish government preferred to expand the level of EKN's guarantees mostly to countries that belong to 5-th, 4-th, 2-rd and 1-st risk category and as soon as the peak of financial crisis was over by 2011 EKN's insurance provision to countries of these groups started to diminish.

Figure 10. EKN's export guarantees by risk category of importer

Source: Swedish ECA "EKN"
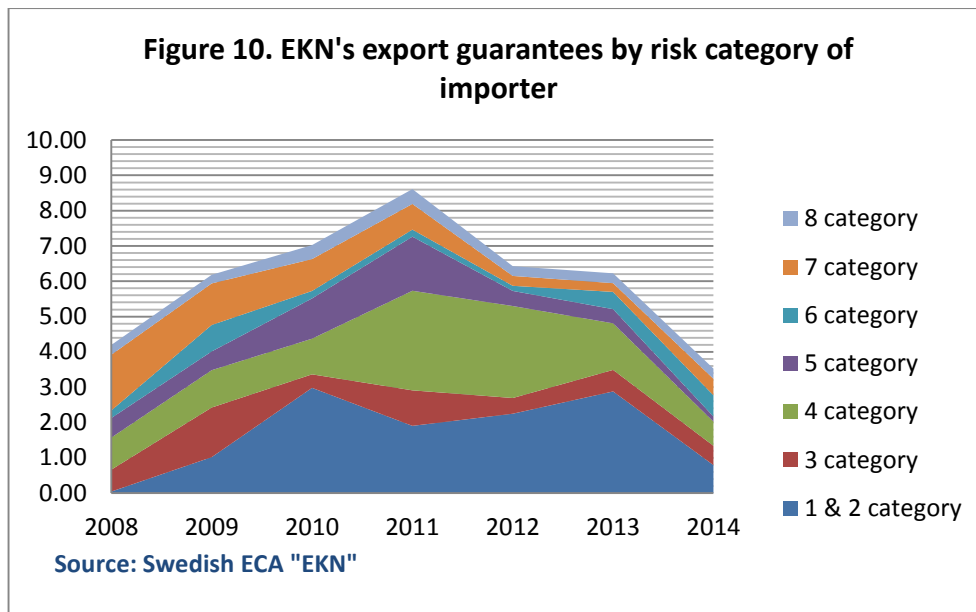
Nevertheless, in comparison to 2008, the distribution of EKN's guarantees among country risk categories was substantially different in 2014. Generally speaking in 2014 EKN's insurance exposure became less orientated to countries which belong to more risky categories, than it used to be in 2008 (for example EKN's exposure to countries of 7-th category have decreased significantly). Thus it is possible to conclude that EKN's strategy of export support has become more risk-averse, because currently it prefers to support less risky export transactions than it used to support before the beginning of financial crisis.

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4. Data description

Before turning to the econometric analysis of the influence of EKN's guarantees on Swedish exports, it is necessary to provide a brief description of the data that will be used in the econometrics model. The present chapter also provides the explanation of each depended and independent variable of the gravity-based model.

Gravity model of international trade implies that trade flows between two countries depend positively on the economic size (GDP) of these countries and negatively on the level of resistance between them. In this context the "level of resistance" can be expressed by such factors as distance between countries, political risk of each country (hidden information costs), population of these countries, etc. As for the level of export guarantees issued from ECA of one country to another, they are assumed to be used as a tool to at least partly alleviate such resistance. Consequently, in order to conduct a thorough econometric analysis of the influence of export guarantees issued by Swedish ECA "EKN" on the level of Swedish exports, I collected data on all of the abovementioned variables for a sample of 141 countries where Swedish exports were supported by EKN's export guarantees issued. The choice of the time period (from 2008 to 2014) has been determined by the availability of data as well as by the existence of a similar research on other countries' ECA's for the earlier periods.

The information about export guarantees issued to support national Swedish exporters was initially received from Export Credit Agency of Sweden "EKN" in a single dataset. The original dataset contained statistics on total amount of new export guarantees issued from Sweden to each country in a given year (in Swedish Kronas). For each country where EKN was providing insurance, there is a separate statistics for the amount of short-term guarantees (less than 1 year) and long-term guarantees (more than 1 year). Moreover for both short-term and long-term guarantees EKN also provides total number of new guarantees per country.

In order to make the dataset more suitable for the econometric analysis I assigned each country (where EKN's guarantees were provided) a unique identification number. Furthermore

several other adjustments were made: 1) data on the amount of new export guarantees was converted from Swedish Kronas into US dollars using the current average annual exchange rate taken from U.S. Internal Revenue Service (IRS); 2) The amount of export guarantees provided from EKN to producers that sell its products in Sweden (i.e. guarantees from Sweden that were provided to Sweden) was excluded from the datasheet, because it makes no sense to use it in a gravity equation; 3) Several small island countries were excluded from the datasheet, because it was impossible to acquire relevant data for other regression variables for such countries.

After making all of the abovementioned adjustments, the final dataset contained information about EKN's guarantees provided to 141 countries for the period 2008-2014 (not all countries have observations for all seven years), which means 773 country-year observations). For the econometric analysis, the following export guarantees variables are considered:

- *ln(STguarantees)* is the amount of short-term guarantees issued by EKN for a specific country in a specific year;

- *ln(LTguarantees)* is the amount of long-term guarantees issued by EKN for a specific country in a specific year;

- *ln(guarantees)* is the total amount of guarantees (short-term plus long-term) issued by EKN for a specific country in a specific year;

These three variables are crucial for our analysis, because the main aim of this thesis is to investigate whether EKN's guarantees enhance Swedish exports. In this thesis I will run three separate regressions to answer that question. This variable is expected to be significant and have a positive coefficient in all three cases.

In order to analyze the relationship between EKN's export guarantees and Swedish exports, I used the measure of total exports of goods and services from Sweden to each country where EKN provided export guarantees as a dependent variable. Such data was acquired from Swedish Statistics Agency (SCB) and was further adjusted to current prices via CPI deflator from World Bank.

In addition, I include other control variables that are likely to have a direct impact on export performance:

ln(gdp) is a logarithm of real GDP of an importing country in a given year. In gravity equation this variable is used as a proxy for market size in importing country. Data were obtained from IMF World Economic Outlook Database and are expressed in current US dollars. It is expected that the larger the importing country, the higher is its export demand (Janda, Michalíková and Skuhrovec, 2012). Thus, we expect that a coefficient of this variable will be positive.

ln(dist) is a logarithm of distance between Sweden and importing country, expressed in kilometers. In gravity model this variable is used as a proxy for transportation costs that is expected to increase with growing distance between exporter and importer (Moser, Nestmann and Wedow, 2008). Thus, we expect this variable to be significant and with negative coefficient.

ln(pop) is a logarithm of population in importing country in a given year. Data were obtained from World Bank official database. It is generally assumed that if population is increasing in a given country, then the demand for export products will also increase there. Thus, we expect the coefficient for this variable to be positive.

ln(risk) is a logarithm of OECD political risk category of importing country. OECD classifies countries by the level of risk into 8 categories (0 category for countries with lowest risk and 8-th category for countries with highest risk). Yet, because there are only 3 countries which belong to 2-d category, in this research work countries of both 1-st and 2-d categories were combined into one group that is named "1&2 category". According to Tinbergen (1962), political risk creates a strong obstacle to international trade between countries, because it represents an additional (hidden) transaction cost. Thus, we anticipate this variable to be significant and with a negative coefficient. Furthermore, when measuring the effect of export guarantees on export promotion, it is important to control for political risk in order to omit variable bias of the regression based on gravity equation (Moser, Nestmann and Wedow, 2008).

Finally, dummy variables are added into the econometrics model. In order to check which types EKN's export guarantees are the most effective in terms of export promotion (small-scale, medium and large-scale), size dummies are introduced. Year dummies are used in order to take into account year-specific characteristics of EKN's effect on Swedish exports. Risk dummies (for 7 categories) are used to check if there exists a relationship between riskiness of a country and the effectiveness of export credits and whether such relationship is linear. Regional dummies (for 7 regions) and country income group dummy (for 4 groups) are used to define in which countries EKN's guarantees will be the most beneficial for promoting exports from Sweden.

5. Empirical evidence

This chapter provides the description of estimated equations, explanation of applied methods and the main regression results. To investigate the effect of EKN's guarantees on Swedish exports, I run a regression with linear specification of the total guarantees using OLS model. Furthermore, to define which type of export guarantees will be more efficient in fostering Swedish exports, I run several regressions with dummy specification of particular types of export guarantees. The same principle of using dummy variables is also used to find out regions and countries where EKN's export insurance is the most efficient in terms of fostering exports from Sweden.

5.1 Effect of export guarantees on exports: linear specification of export guarantees

According to the explanation of the responding variable and explanatory variables in previous chapter, the following equations were used:

$$\ln(Exports) = \beta_0 + \beta_1 * ln(guarantees) + \beta_2 * \ln(gdp) + \beta_3 * \ln(dist) +$$

$$+\beta_4 * \ln(pop) + \sum \delta_i * Year\ dummies + e \qquad (1)$$

$$\ln(Exports) = \beta_0 + \beta_1 * ln(guarantees) + \beta_2 * \ln(gdp) + \beta_3 * \ln(dist) +$$

$$+\beta_4 * \ln(pop) + \beta_5 * \ln(risk) + \sum \delta_i * Year\ dummies + e \qquad (2)$$

The first regression equation will help to estimate the effect of EKN's export guarantees on Swedish exports when controlling for importer's GDP, population and distance between Sweden and importer. The second regression equation will help to estimate the same effect, but also controls for importer's country risk category in order to reduce the omitted variable bias (the problem that the level of export insurance itself is associated with country risk).

Like Janda, Michalíková and Skuhrovec (2012), I use ordinary least squares (OLS) method for estimation. The OLS method is relatively easy to use, but, the estimates may be

biased and inconsistent due to an endogeneity problem. The concern is that the causality may also run the other way around with exporters demanding more guarantees for countries where they export more (Moser, Nestmann and Wedow, 2006). Nevertheless, according to Figure 3 and Figure 9 (from Chapter 3), it appears that in the case of Sweden there's no observable relationship between the size of Swedish exports to a given country and the amount of EKN's export guarantees issued to that country. For example, a significant share of Swedish exports goes to EU countries, yet the amount of EKN's guarantees to EU countries was very limited. Thus, even if such problem of reverse causality exists in my econometrics model, it should not result in extremely biased estimations. As mentioned above, there also exists another type of endogeneity problem which is related to the possibility that if Swedish products are exported to a country with higher risk category, then exporters will have a higher demand for EKN's export guarantees to such country.

The results of OLS regressions of equations (1) and (2) with year dummies are presented in Table 2.

Table 2. OLS regression results: total amount of guarantees and total exports

Dependent variable: *Exports*		
Variable	**OLS without risk**	**OLS with risk**
Log of Guarantees	0.028** (0.026)	0.056* (0.000)
Log of GDP	0.998* (0.000)	0.737* (0.000)
Log of Distance	-0.726* (0.000)	-0.702* (0.000)
Log of Population	0.086* (0.001)	0.088* (0.004)
Log of Risk category		-0.571* (0.000)
Year dummies	Yes	Yes
Sample size	773	773
R-squared	0.879	0.891

Note: * statistically significant at 1% level; ** statistically significant at 5% level

In both columns of Table 2, R-squared is at a high level of 87% (without controlling for risk) and 89% (when controlling for risk) which means that in terms of data variability the

overall quality of the econometrics model is quite good. According to the results of OLS regressions (in both columns), there exists a positive and statistically significant effect of EKN's exports guarantees on total exports from Sweden. Considering that all variables in the equations (1) and (2) are in logarithms, the strength of each variable can be expressed in terms of ordinary elasticities: 1% increase in the total amount of export guarantees increases total exports by 0,028% (for column 1) and by 0,056% (for column 2) ceteris paribus. These effects may look minor, but it is important to take into account that on average only 3% of total Swedish exports were covered by EKN's guarantees (see Figure 4). In line with Felbermayr and Yalcin (2011) the real effect of these guarantees can be expressed with an «effectiveness ratio» which equals 0.93 for OLS without risk control and 1.83 for OLS with risk control.[2] Thus, it is possible to conclude that the estimates in Table 2 support the hypothesis that a higher level of EKN's export guarantees results, ceteris paribus in a higher level of Swedish exports.

The coefficient results for other controlled variables are also significant and have an expected effect on exports. According to Table 2, the higher is the importer's GDP, the higher will be the amount of export from Sweden to that country. Saying it differently, Swedish companies prefer to trade with bigger market economies, where the demand for Swedish products is higher, while the potential market entry costs are usually lower. The distance coefficient is statistically significant and negative, which means that a higher distance between Sweden and an importing country creates additional transportation and information costs. Finally, the level of total Swedish exports is positively affected by the population variable, which can be explained by the fact that usually more populated countries have higher demand for export products.

In the second column of Table 2 a proxy for country risk category is added to the regression. The estimated coefficient for that risk variable is significant and negative, which

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[2] According to the work of Felbermayr and Yalcin (2011), effectiveness ratio is calculated the following way: Let total Swedish exports be equal 100 and the amount of EKN's guarantees be equal 3. In this case a 10% growth in EKN's guarantees (from 0,03 to 0,3) will result in 0,28 growth in total exports (from 0,028). In this case the effectiveness ratio will be 0,28/0,3 = 0,93.

implies that Swedish companies are less reluctant to export their products to countries with higher political risk (because the possibility of importer's default due to political instability is significantly higher in such countries). According to the regression results, a 1% increase in the level of political risk will result in the decrease of exports by 0.57% ceteris paribus. It is also important to mention that after adding the country risk variable to the OLS regression, the positive effect of EKN's export guarantees became twice as strong (0.056) as before that variable was included (0.028). Moreover, even the level of R-squared improved slightly when the risk variable was added. Thus, the inclusion of risk variable helps to decrease the omitted variable bias.

5.2 Effect of export guarantees on exports: linear and dummy specification by type of export guarantee

This section focuses on the analysis of different types of EKN's export guarantees: by length (short-term and long-term) and by size (small, medium and large). Such analysis will make it possible to define which type of EKN's export insurance is the most effective in supporting Swedish exports. Furthermore, the results of this analysis will help to understand whether the Swedish government was actually pursuing an effective policy by expanding particular types of EKN guarantees (explained in Chapter 3) to fight the negative effects of financial crisis during the period of 2008-2014.

In order to investigate whether the issuance of short-term (less than 1 year) or long-term (more than 1 year) guarantees have a stronger effect on the level of Swedish exports, I run two separate OLS regressions based on the following equations:

$$\ln(Exports) = \beta_0 + \beta_1 * ln(LTguarantees) + \beta_2 * \ln(gdp) + \beta_3 * \ln(dist) +$$

$$+\beta_4 * \ln(pop) + \beta_5 * \ln(risk) + \sum \delta_i * Year\ dummies + e \qquad (3)$$

$$\ln(Exports) = \beta_0 + \beta_1 * ln(STguarantees) + \beta_2 * \ln(gdp) + \beta_3 * \ln(dist) +$$

$$+\beta_4 * \ln(pop) + \beta_5 * \ln(risk) + \sum \delta_i * Year\ dummies + e \qquad (4)$$

The results of OLS regression of equations (3) and (4) with year dummies are presented in Table 3.

Table 3. OLS regression results: guarantees (short-term and long-term) and total exports

Dependent variable: *Exports*		
Variable	**OLS (long term)**	**OLS (short-term)**
Log of Guarantees	0.019** (0.102)	0.088* (0.000)
Log of GDP	0.772* (0.000)	0.687* (0.000)
Log of Distance	-0.694* (0.000)	-0.613* (0.000)
Log of Population	0.063** (0.096)	0.124* (0.000)
Log of Risk category	-0.490* (0.000)	-0.707* (0.000)
Year dummies	Yes	Yes
Sample size	530	619
R-squared	0.894	0.87

Note: * statistically significant at 1% level; ** statistically significant at 10% level

According to the results of OLS regression in the first column of Table 3, there exists a positive effect of long-term EKN export guarantees on Swedish exports. Yet, it appears that this effect (0,019) is much lower than in the case of the effect from total guarantees (Table 2) which equals to 0,056. It means that if long-term guarantees will increase by 1%, total exports of goods and services from Sweden will rise only by 0,019%, ceteris paribus. Moreover, the estimated coefficient of long-term export guarantees is statistically significant only at 10% level. The results for other controlled variables have not changed substantially and have almost the same expected effect on Swedish exports as it was shown in Table 2.

As for the regression results in the second column of Table 3, it could be seen that the impact of short-term export guarantees on Swedish exports is significantly stronger than the impact of long-term guarantees or total guarantees. The point estimate of 0.088 means that if short-term export guarantees issued by EKN will be expand by 1%, then total Swedish exports will increase by 0.088%, ceteris paribus. Furthermore, unlike the estimated coefficient of long-term guarantees, the effect of short-term guarantees is statistically significant even at 1% level.

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Thus, it is possible to conclude that in terms of the length of export insurance provided by EKN, short-term guarantees are much more efficient in fostering Swedish exports than long-term guarantees, ceteris paribus.

The effectiveness of short-term ECA guarantees on Swedish exports could be explained by several recent developments in the world economy. First of all, the implementation of Basel III regulations created additional constraints for commercial banks and decreased their willingness to provide long-term export loans. As a result, even though Swedish ECA EKN was expanding the amount of long-term export guarantees during the period of financial crisis, a lot of potential export transactions that could have been insured simply were not conducted due to bank's unwillingness to finance them. Secondly, the development of European sovereign debt crisis made commercial banks even more reluctant in terms of providing long-term export loans. At the same time these restrictions were nonexistent or had less acute impact on the market of short-term export financing.

For further analysis of the relationship between particular types of EKN's export guarantees and Swedish exports, I created dummy variables for the average size of export guarantees in a given year.[3] In other words, I divided all observations into three groups according to the size of average guarantee in each observation: small (less than 1 million US dollars), medium (more than 1 million, but less than 5 million US dollars), large (more than 5 million US dollars). I use the same dependent and independent variables as in equation (2), but substitute the variable *ln(guarantees)* by dummy variables (*small, middle, large*). Dummy variable «*large*» was chosen to be a regression benchmark, which means that it is not presented in Table 4.

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[3] Average size was calculated for each observation in the following way: (total export guarantees issued for a given country in a given year) / (total number of export insurance contracts for a given country in a given year)

Table 4. OLS regression results: total exports and dummies of guarantees average size

Dependent variable: Exports	
Variable	OLS (with risk)
small	0.315 (0.002)
middle	0.289 (0.003)
Log of GDP	0.695 (0.000)
Log of Distance	-0.712 (0.000)
Log of Population	0.109 (0.001)
Log of Risk category	-0.643 (0.000)
Year dummies	Yes
Sample size	773
R-squared	0.886

Note: All coefficients are statistically significant at 1% level;

Table 4 illustrates the relative influence of the size of the average EKN's export guarantee on Swedish exports, compared to the influence of average export guarantees that are bigger than 5 million US dollars. According to the results of the OLS regression, the positive impact of EKN's guarantees on exports increases in line with the average size of export guarantees. The point estimate of 0.289 means that if middle-sized guarantees are used to insure Swedish producers against political risks, then Swedish exports will be 28.9% higher than if large-sized guarantees are used, ceteris paribus. The same logic goes for the small-sized guarantees which are even more efficient in fostering Swedish exports (exports will be 31.5% higher than if large-sized guarantees are used, ceteris paribus). Put differently, the smaller the average size of the guarantee, the more effective that guarantee will be in terms of fostering Swedish exports.

This relation between size of export guarantee and exports could be explained by several factors. First, it is important to remember that the segment of small-scale export guarantees is the least developed among different Export Credit Agencies around the world. This means that currently there is less competition among ECA's for the support of its national exporters on

international markets via this type of guarantees. Consequently, if EKN is supporting its Swedish exporters with such type of guarantees, then there are more chances that buyers from other countries will choose to purchase Swedish products, because thanks to EKN's insurance coverage the price for Swedish products will be lower in comparison to products from other countries (that were not supported by export insurance). Secondly, for EKN the process of providing small-scale exports insurance may be significantly easier in terms of following various requirements and regulations, which means that probably it takes less time and effort for Swedish exporters to obtain such type of insurance coverage.

The abovementioned regression results may appear quite surprising, if compared with Figure 8 in Chapter 3 (distribution of EKN's guarantees by average size). Basically during the period of trade contraction caused by financial crisis (2008-2011) the Swedish government was trying to support its national exporters by expanding EKN's provision of large-sized guarantees, which according to my analysis are the least effective in terms of fostering Swedish exports. Yet, as can be also seen from Figure 8 once the financial crisis had mostly finished in 2014, the share of new small-sized export guarantees actually became higher than the share of large-sized guarantees. Thus, it is possible to conclude that during the observation period of 2008-2014 EKN's policy of export support changed significantly, gradually shifting from using the least effective large-scale guarantees to the usage of the most effective small-scale type of export insurance.

5.3 Effect of export guarantees on exports: dummy specification by geographical distribution of export guarantees

In order to check in which regions export guarantees issued by EKN will be the most efficient in terms of promoting exports of Swedish products, I add regional dummy variables to the regression equation (2). Thus, I separated the existing 773 country observations into seven regions: EU countries, Sub-Sahara Africa, Eastern and Southern Europe, Latin America, Middle

East, Southeast Asia, other rich OECD countries (see Appendix A). Dummy variable «*EU countries*» was chosen to be a reference group.

Table 5. OLS regression results: total exports and dummies of guarantees by region

Dependent variable: Exports	
Variable	**OLS (with risk)**
Other OECD	0.379** (0.046)
Southeast Asia	0.529* (0.006)
Middle East	0.378** (0.011)
Latin America	0.652* (0.002)
Eastern & Southern Europe	-0.263*** (0.063)
Sub-Sahara Africa	0.722* (0.000)
Log of GDP	0.790* (0.000)
Log of Distance	-0.999* (0.000)
Log of Population	0.037 (0.302)
Log of Risk category	-0.536* (0.000)
Year dummies	Yes
Sample size	773
R-squared	0.892

Note: * statistically significant at 1% level; ** at 5% level; *** at 10% level

The regression results in Table 5 shows that EKN's export guarantees had different influence on Swedish exports in different regions. Specifically, in comparison with the EU region (which was chosen as a benchmark) EKN's guarantees to other regions (except for Eastern and Southern Europe) will result in higher exports. For example, if EKN issues insurance guarantees to support its exports to Sub-Sahara Africa countries, then exports will be 72.2% higher than if such guarantees had been issued to support exports to EU countries, ceteris paribus. This low efficiency of export insurance for EU countries is quite predictable and can be explained by the fact that EU countries have the smallest (1-st) country risk category, which means that there is basically no need to protect exports to these countries against political risks.

Another reason for such low effectiveness of EKN's insurance in EU countries, is that only very modest trade barriers exist between Sweden and other EU countries which implies that the demand for export insurance is not so high there, in comparison to other regions.

After comparing the results of OLS regression presented in Tables 5 with the statistical data on the geographical distribution of EKN's guarantees presented in Figure 9 (see Chapter 3), one important pattern can be identified. It appears that during the period of the most severe trade contraction (2008-2011) EKN was mostly expanding the issuance of new export guarantees to support its exports to such regions as EU, other OECD countries, Middle East, Eastern and Southern Europe. According to Table 5 these are the countries where EKN's export guarantees were the least efficient in fostering Swedish exports. Such a controversial policy by EKN can be at least partially explained by the fact that during the financial crisis the level of political risks in less developed regions of Africa, Latin America and Southeast Asia has risen significantly. Thus it became too risky for EKN to provide insurance to cover exports to countries with such a high level of risk. As a result, in order not to overload its insurance portfolio with potentially very risky guarantees, EKN was providing export insurance to more stable countries where the effect of such insurance was the least effective.

When analyzing the geographical distribution of export guarantees, it is important to remember that the effect of these guarantees may be heterogeneous not only with respect to particular world regions, but also with respect to country income groups (Felbermayr and Yalcin, 2011). Thus, analogously to the previous regression, I use dummy variables to analyze in which countries (with respect to their income level) EKN's export guarantees will have the strongest effect on Swedish exports. In line with World Bank classification I divided all 773 country observations into 4 groups by country income level: low income (GNI per capita is less than $1,045); lower-middle income (GNI per capita is between $1,045 and $4,125); upper-middle income (GNI per capita is between $4,125 and $12,745); high income (GNI per capita is more than $12,745). Dummy variable «*low income*» was used as a benchmark in the regression.

Table 6. OLS regression results: total exports and dummies of export guarantees by importer's country income group

Dependent variable: Exports	
Variable	**OLS (with risk)**
lower-middle	0.259** (0.020)
upper-middle	0.093 (0.548)
high	0.308*** (0.069)
Log of GDP	0.700* (0.000)
Log of Distance	-0.698* (0.000)
Log of Population	0.120** (0.042)
Log of Risk category	-0.536* (0.000)
Year dummies	Yes
Sample size	773
R-squared	0.886

Note: * statistically significant at 1% level; ** at 5% level; *** at 10% level

Table 6 illustrates how the export-enhancing effect of EKN's export guarantees differs among countries belonging to different income groups. According to the regression results the effect of EKN's export guarantees on exports to high-income, upper-middle income and lower-middle income countries is stronger than EKN's guarantees that cover exports to low-income countries. For example, the point estimate of 0,308 means that in EKN's guarantees are provided to high-income countries, then Swedish exports will be 30,8% higher than in these guarantees would have been provided to low-income countries. The same logic goes for estimates of upper-middle and lower-middle dummies. Except for the upper-middle dummy, all estimates are statistically significant at 10% level.

Summarizing, Table 6 shows that EKN's export insurance which protects Swedish exports to countries with lowest per capita income are the least effective. This pattern is quite expectable, because if country's per capita income is too low, the demand for Swedish products that are covered by EKN's export guarantees will also be low.

6. Conclusions

This thesis has investigated the relationship between export guarantees issued by Swedish Export Credit Agency «EKN» and Swedish exports for the period of 2008-2014, so as to assess the extent to which EKN helps to eliminate frictions in international trade by providing insurance against political risks to Swedish exporters. The main research question was whether EKN's provision of insurance against political risk has a positive and statistically significant effect on the total level of Swedish exports of goods and services.

Using model based on the gravity equation of international trade, I analyzed the role of export guarantees on exports. Running an OLS regression with data for 773 country-year observations revealed a positive relationship between the amount of export guarantees issued by EKN and the level of total Swedish exports. For example, according to the regression results, if the provision of EKN's export guarantees increases by 1%, total exports from Sweden are expected to increase by 0,026%, ceteris paribus. After adding a proxy for importer's risk category to the regression, the positive effect of EKN's export guarantees almost doubles (to 0,056%), while the risk coefficient is significant and negative. This means that political risk indeed represents an important constraint for the trade between Sweden and other countries and that such constraint is at least partially mitigated with the help of EKN's export insurance.

The empirical findings also show that export-enhancing effect of export guarantees is different for various types of EKN export guarantees in relation to their length and size. According to the results of OLS regressions with dummy variables, short-term guarantees are more effective in promoting Swedish exports than long-term guarantees. As for the length of export insurance, it appears that small-sized guarantees are the most efficient in fostering exports: in this case Swedish exports are expected to be 31,5% higher than if large-sized guarantees are used, ceteris paribus.

The same principle of using dummy variables was applied to define regions where EKN's guarantees are the most beneficial in terms of supporting Swedish exports. I found that these

guarantees are the most effective in fostering Swedish exports to countries of Sub-Sahara Africa, Latin America and Southeast Asia. Furthermore, I provide additional evidence that the effect of EKN's guarantees significantly differs not only among world regions, but also with respect to countries with different per capita income. In this case according to the regression results, exports guarantees which cover political risks of Swedish companies that sell their products to countries with lowest per capita GNI, are the least effective in supporting Swedish exports.

The analysis of the positive effect of export guarantees on total exports has several important implications for the Swedish government. Based on the empirical results presented in this work, the government should modify the existing policy of its Export Credit Agency EKN to make it more efficient in its main function – enhancing exports of goods and services from Sweden. First of all, Swedish ECA EKN should pursue a policy of gradual shift from providing long-term export insurance to the provision of short-term export insurance, because as shown in this work short-term insurance coverage is more efficient in term of supporting Swedish exports. Secondly, in the event of the development of a severe economic crisis in the future, EKN should refrain from expanding the issuance of large-scale export guarantees to fight trade contraction and support Swedish exporters. Instead EKN should rely more on the expansion of the number of small-scale guarantees, because as shown here, this type of export insurance is actually the most effective in terms of supporting Swedish exports during the period of economic disturbance (2008-2014). Finally, EKN should further decrease the share of guarantees that are issued to support exports into the most developed and rich world regions, because the positive effect of these guarantees on Swedish exports is minimal in these regions.

Appendix A

Table 7. Countries of different world regions

Sub-Sahara Africa	Angola, Benin, Botswana, Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Djibouti, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Malawi, Mali, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, The Democratic Republic of Congo, Togo, Uganda, Zambia, Zimbabwe
Eastern and Southern Europe	Armenia, Azerbaijan, Belarus, Bosnia Herzegovina, Georgia, Kazakhstan, Macedonia, Moldova, Montenegro, Russia, Serbia, Turkey, Ukraine, Uzbekistan
Latin America	Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay, Venezuela
Middle East	Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen
Southeast Asia	Afghanistan, Bangladesh, Bhutan, Cambodia, China, Guinea, Hong Kong, India, Indonesia, Laos, Malaysia, Maldives, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Timor-Leste, Vietnam,
Other OECD countries	Australia, Canada, Japan, New Zealand, Singapore, South Korea, Taiwan, USA
EU	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Switzerland, United Kingdom

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