Charles University in Prague

Faculty of Social Sciences
Institute of Economic Studies

MASTER THESIS

The Performance of Export Credit Agencies in European Post-Communist Countries

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, May 16, 2014

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Signature

Acknowledgments

Abstract

This thesis contributes to current literature dealing with the topic of sovereign export promotion in form of government-back export credit agencies by analysing a very homogenous group of Central European countries. Export credit agencies in the Visegrad region indeed foster export. Different institutional forms of export credit agencies are compared and using example of a small open economy, the Czech Republic, it is suggested that the most profitable and effective strategy for governments in comparable countries is to establish an export credit agency offering insurance and export guarantees. The export credit agency with the best performance in the region is Slovak Eximbanka.

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Abstrakt

Táto práca prispieva k súčasnej literatúre, venujúcej sa štátnej podpore exportu vo forme exportných úverových agentúr, analýzou homogénnej skupiny krajín strednej Európy. Exportné úverové agentúry na území krajín Višegrádskej skupiny majú výrazný vplyv na export. Rôzne inštitucionálne formy exportných úverových agentúr sú v predkladanej práci porovnané. S použitím príkladu Českej republiky, ako malej a otvorenej ekonomiky, je navrhnuté, že najvýhodnejšou a najefektívnejšou stratégiou pre vlády v porovnateľných krajinách je založenie exportnej úverovej agentúry ponúkajúcej poistenie a exportné záruky. V súčasnosti je najvýkonnejšou exportnou úverovou agentúrou v danej oblasti slovenská Eximbanka.

Klasifikácia JEL	F14, G28, C23
Kľúčové slová	exportné úverové agentúry, Višegrádska štvorka, medzinárodný obchod
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Master Thesis Proposal

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Topic characteristics Government in each Visegrad Four country developed a strategy to boost its export to help its country to recover from the current financial crisis. In particular, they want to further support their domestic exporters through subsidized credits, loans, insurance schemes or consulting. However, there is no complex, extensive and independent analysis of effectiveness and precise impact of such government policy applied on very specific and homogenous region of post-transitive European economies. The goal of this master thesis is to analyze performance of ECAs in the Visegrad Four region during the last two decades. We will use two different approaches.

The first approach uses gravity equation of international trade; all previously obtained results will be highly improved. The second approach consists of creation of a unique database for each firm in at least one of the countries including firm-level data about each exporting firm. This will be extremely challenging due to the huge amount of detailed data we are going to collect from different sources, such as information about types of products and their quantity for each firm separately, exporting destinations (from customs offices), precise characteristics of a respective firm (from tax department) and information about firm's participation in official export promotion scheme. We have to match data from 3 different datasets for each firm. With this dataset we are going to be able to not only evaluate an impact of such government policy on macroeconomic indicators of export, but we could also characterize a change of company's output (portfolio of products or exporting destinations) and find

a strategy for export agencies when choosing their future, most profitable, investment.

Hypotheses

1. Which form of ECA (e.g. bank, insurance company, or a combination of the two) is the most effective?

2. Does government investment into ECA pay off?

3. Does an access to state export promotion have a large impact on a typical firm in the region?

Methodology   In the first part of the master thesis, we are going to use previously collected data from Eximbanka, KUKE and CEB and include missing data from Hungarian Eximbank and EGAP. Afterwards, we are going to use gravity model approach in order to obtain more precise results and significantly improve empirical models of effectiveness of export promotion for Visegrad Four region.

   Second part of this master thesis is going to be focused on rather microeconomic effect of government export promotion. We have to create a unique dataset containing an amount of government export assistance provided by ECA to a firm, characteristics of a firm (annual earnings, number of employees, etc.) and an amount of export from a firm. One way how to proceed; suggested in Martincus (2008); is to use a so-called matching difference-in-difference model. Matching part consists of pairing each assisted firm with more similar members of the non-assisted group on the basis of their observable characteristics and then estimating the impact of assistance by comparing the exports of matched assisted and nonassisted firms.

Outline   The expected structure of the master thesis is as follows:

1. Introduction

2. Development of ECA in the region

3. Description of data and methodology

4. Results

5. Verification of hyphotesis

6. Conclusion

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        Author   Supervisor

Chapter 1

Introduction

All OECD countries, with an exception of Ireland and Iceland, set up a separate institution to publicly promote exports from their countries - so called export credit agency. Export credit agencies are commonly structured as public or semi-public institutions that draw funds from the treasury or public capital markets and transform these into export finance. Some ECAs are organized as government departments that report to particular ministries (e.g. ECGD in the UK and ERG in Switzerland), some are structured as more autonomous state-owned enterprises (e.g. SACE in Italy and NEXI in Japan), whereas in a few cases, official export credits are channelled through a private company on the basis of an agreement with the host government (e.g. COFACE in France and Hermes in Germany) (Wright, 2011).

This thesis focuses on export credit agencies incorporated on the territory of Visegrad Four (the Czech Republic, Slovakia, Poland and Hungary). Even though all four countries represent relatively homogenous group of small, developed and opened economies that overcame the period of transition, their export promotion schemes differ significantly.

The structure of this thesis is following. The first chapter reviews current trends in literature regarding the analysis of export credit agencies. The second chapter contains theoretical insides and backround preceding empirical analysis of export credit agencies. Reasons for establishment of such institution and conditions to be fullfilled before an establishment of export credit agency are introduced. Development of international trade with regards to expansion of export promotion activites and successful performance of export credit agen-

cies during the recent financial crisis are described. All export credit agencies on the territory of Visegrad Four countries are presented and a comparison of portfolio of products they offer follow. The third chapter uses an example of export credit agencies in the Czech Republic and traditional econometric approach based on gravity equation of international trade to test and compare effectiveness of two institutional forms of such agencies (institution offering insurance product and institution offering bank products). The fourth chapter uses an extensive dataset created for the purposes of this thesis to analyse five export credit agencies on the territory of Visegrad Four throughout almost all years of operation of those agencies. Competitiveness and performance of the five agencies is estimated using multiple econometric techniques until proper specification of the model. A summary of findings and further suggestions for the analysis of export credit agencies (hereinunder: ECAs) in the region are carried in the last chapter.

Chapter 2

Review of Literature

This section shortly presents recent academic literature analysing the impact of export credit agencies, their methodology and results. The topic of government export promotion remains a controversial issue among academic economists, business analysts and policy makers. Active export promotion policy supporters argue that independant official export promotion agency strengthtens the export promotion of domestic companies. Multiple research papers empirically support this position. Abraham and Dewit (2000) showed that export promotion does not necessarilly imply trade distortions and that the most export destination do not benefit from insurance premium subsidies. The article focuses on official export insurance. Other benefit is that their insurance stimulates trade by covering commercial, and more importantly political risks. Export guarantees reduce the profit uncertainity of risk-averse exporters and decrease default risk of importer's. Volume of exports to risky markets therefore increase. Majority of working papers that followed Abrahan and Dewit (2000) conclude positive, although small effect of official export promotion institutions on volume of export.

Anderson and van Wincoop (2001) introduced a new methodological approach that can be widely applied to different aspects of implicit barriers of international trade. Data from the United States were observed and it was concluded that borders reduce bilateral national trade level by plausible though substantial magnitudes. The new methodology is suggested to estimate effects of other variables, such as currency unions, or in our case, an establishment of export credit agency in a country. As a result, two influencial and traditional approaches to estimation of impact of ECAs were introduced by Egger and Url

(2006) and Moser et al. (2008), other relevant literature builds on their work.

Egger and Url (2006) applied gravity model of international trade on data from Austrian export credit agency, Oesterreichische Kontrollbank. They used newly granted guarantees for the period 1996 - 2002 disagregated on two-digit industry level. It was concluded that there is a large difference between short-term and long-term effects of public export guarantees on export flows due to the lag between the day when guarantee is provided and the actual shipment of the good that creates a time shift between ECA book-keeping and official foreign trade statistics. Austrian export credit guarantees push exports mainly into Central, Eastern and Southern European countries, as well as other formet Soviet Union countries. Export credit guarantees change the industry special-isation only to a small extent (around 23%).

Moser et al. (2008) examined positive effect of export guarantees of ECA Euler Hermes on volume of exports from Germany. The gravity model empirical approach was used; a new variable, political risk, was introduced. No signifi-cant effect of export guarantees was observed on the sample of non-industrial countries alone was observed. After the change of legislation, guarantees led to more than proportional increase of exports with multiplier around 1.11 even for the group of non-industrial countries. Political risk was found to have a detrimental effect on exports. It was pointed out that costs of public export intervention and market distortion must be considered when evaluating ECAs (Euler Hermes experienced significant losses in 1980s and beggining of 1990s that had to be covered from the state budget).

Recent influential paper by applies Euler Hermes data for the time period 2000-2009. Unlike previous authors that used aggregate data, the Felbermayr and Yalcin (2013) use two-digit industry level data, hence sector effects were accounted for. They did not estimate dynamic gravity equation, but rather canonical theory-founded model of Anderson and van Wincoop (2001) that estimates impact of export credit guarantees on the intensive margin of bilat-eral trade by using a linear model with a complete set of binary fixed-effect interactions while controlling for multilateral resistance terms. The estimated effect of export guarantees is significantly smaller than in previous literature, especially in richer countries where there is little need for public guarantees. The effect is larger in sectors characterised by high time-to-build lags and ex-

ternal financial dependance, such as aviation, shipbuilding and transportation. Similar approach with firm-level data had been used by Volpe and Carballo (2010). They applied matching difference-in-difference approach on firm-level data from small developing country, Uruguay. They examined the effect of official public policies (e.g. export credit agencies) on decision to enter new export markets. They found out that trade supporting activities have helped firms reach new destination countries and introduce new differentiated products, although trade promotion activities do not effect the volume of exports. Further, Badinger and Url (2013) estimated effect of Austrian export guarantees on firm-level data on sample of 178 firms. Data were obtained by survey as responses to a questionnaire. Determinants of firm's export guarantee usage are assesed. They found a sizeable, economically and statistically significant effect of export credit guarantees on extra-firm exports.

Vast majority of world academic literature focuses only on export guarantees, empirical analysis of ECAs providing credits and other bank products is therefore given by Janda et al. (2013a). They analysed gravity equation for the Czech Republic in 1996 - 2008 period on data from Czech Export Bank. While Czech exports flow mainly to European developed countries, export guarantees push Czech exports to mostly European developing countries. Unlike previous methods of estimation of the gravity equation, Least Trimmed Squared approach is used to find influancial data in the sample; assumption of the equal importance of all observations is relaxed. Two gravity models were proposed and the results were ambiguous. In the static model, guarantees are highly significant factor affecting exports, dynamic model does not provide any explicit evidence whether export promotion in form of guarantees is successful. After the removal of outliers, the hypothesis of successfulnes of export guarantees can not be rejected. Guarantees reduce uncertainty and hence increase exports to (risky) countries. ECAs moreover reduce entry costs and gather information of foreign markets.

Janda et al. (2013b) analysed ECAs in Visegrad Four region that form very homogenous group, nevertheless, their export promotion schemes differ. Different forms of ECAs are described and evaluated. Gravity model is applied on data from the Czech Republic, Slovakia and Poland and it is concluded that ECA operating the most effectively is currently Polish KUKE that operates as an insurance institution for Polish exporters. Gravity equation of interna-

tional trade was estimated by fixed effect method and least squared dummy variable (LSDV) method. This thesis builts on this working paper and extends obtained findings by expanding the dataset and using more appropriate econometric techniques.

Nevertheless, oponents of export credit agencies argue that objectives of export promotions are likely to be captured by powerfull interest groups. Export promotion might distort competition and undermine multilateral free trade system. Public credit insurance can be also used to hide export subsidies in case the insurance premium charged by ECA is below the premium level that exactly covers the sum of expected losses and transaction costs of the insurer. Export subsidy consists of this difference. Higher optimal output of the exporter leads to a market distortion (Egger and Url, 2006). For those reasons, free traders (opponents of official ECAs) support efforts of World Trade Organisation and the European Union to regulate export subsidies (Abraham and Dewit, 2000). OECD Consensus Agreement harmonizes public export insurance in industrial countries and decreases market distortions. Meanwhile Chauffour et al. (2010) discuse conditions to be fullfilled in a country in order to effectively set up an ECA. Emerging markets have been affected by the lack of available trade financing options. Strong government structure must be involved as well as sufficiently large capital stock for the institution to be capable of acting independently and to have strong enough operational footprint to achieve its objectives must be available. Authors conclude that ECAs are more suitable for more matured economies than for low-income countries that are still confronting development challenges.

Chapter 3

Institutional Backround to ECA Analysis

This chapter is divided into six sections. Theoretical aspects preceding empirical analysis of government-backed export credit agencies are discussed. First section summarizes reasons for establishing ECAs and for public support of ECAs. The second section describes international regulation of ECAs. Incentives for such regulation are introduced. The third section describes and compares different institutional forms of ECAs established in Visegrad Four countries and analyses advantages of each form. Development of international trade regarding performance of ECAs in the region is covered in the next section. Section analysing performance of ECAs during the recent financial crisis and emphasising importance of ECAs in times of the crisis follows. The last section contains information about different product portfolios offered by ECAs that exporters, banks or buyers of exports can benefit from.

3.1   Incentives for Public Export Promotion

Export transactions tend to be larger, they consist of capital intensive goods, whose production and delivery might take several months or even years, therefore delivery periods are substiantly longer and transactions become more risky (Herger and Lobsiger, 2010). Longer distance to the export destination causes larger cost of shipment, hence cost of produced yet not delivered products also increases. Various financial instruments have emerged as substitutes for the lack of face-to-face cash transactions between suppliers and customers in inter-

national trade as a result of rare cash payments in international transactions (Badinger and Url, 2013).

It is common that domestic firms within their countries provide cash discounts as an incentive for early payment.[1] Average maturity of the credit on invoice for firms within one country is 60 to 80 days. In international trade, the length of the credit is significantly longer. For a comparison, payment within first three months after the issue of the credit signals a high creditworthiness of the consumer. Payments of exports of equipments or machinery might be often extended to up to five years (Egger and Url, 2006). Delay in transactions exposes firms to a risk of default. Debt instruments, such as trade credit, permit firms to finance such delays in transactions without imposing internal funds (Baltensperger and Herger, 2009). Exporters and their banks, however, generally have less resources to cover credit defaults for international transactions (Felbermayr and Yalcin, 2013).

Catastrophic events, such as political unrest or economic crisis can lead to high losses for exporters. Incomplete information about creditworthiness of foreign buyers, exchange rate fluctuations, or even the hazard involved in international contracts, increase the risk that exporters face in cross-border trade. Monitoring costs for the international trade further increase due to different jurisdictions (Amiti and Weinstein, 2011), especially enforcing repayment of the contract in a foreign jurisdiction is complicated (Badinger and Url, 2013) hence decreased chances of repayment of the credit. Financial frictions have significantly stronger effect on international transactions than domestic ones (Amiti and Weinstein, 2011). International trade increases bank counterparty risk and systematic risk (Chauffour et al., 2010). As a result, insurance of large exports towards politically unstable countries is widely non-marketable (Herger and Lobsiger, 2010). Therefore ECAs, insuring exports on government's behalf, have been established in OECD countries. Credit insurance in advance limits potential losses from export sales on credit to a previously agreed fixed insured amount (Baltensperger and Herger, 2009). This has a particularly important issue after the start of the recent financial crisis when a need for export guarantees increased (Felbermayr and Yalcin, 2013).

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[1]For example, if a costumer pays within first ten days, amount of three percent is deducted from his invoice total, while the payment is due in thirty days.

Demand for export insurance and guarantees is high. The market for short-term insurance is dominated by private agencies (over 80% of overall business) and ECAs underwrite the wider majority of medium and long-term commitments by providing adequate insurance to domestic exporters. The latter are evaluated as more risky and hence not applicable for commercial forms of insurance and exports might not be realized without any form of publicly provided insurance. Medium and long-term insurance is usually used for larger transactions, such as those related to capital goods, large machinery or turn-key plants. Exporters insure themselves directly against the risk of buyer's default and the exporters are reimbursed in case of non-payment. Credit guarantees are widely used; they provide guarantees to banks or other financial institutions willing to lend either to the exporting or the importing firm. If the primary reliable firm fails to repay the credit, the guarantor takes a responsability for the financial obligation (Chauffour et al., 2010).

3.2   International Regulation of ECAs

First attempt to regulate ECAs was a foundation of the Berne Union, established by France, Italy, Spain and the United Kingdom in 1934. Initial goal of the organisation was to facilitate cross-border trade by supporting international acceptance of principles in export credits and foreign investment and to provide a forum for professional exchanges among their members (Psenakova, 2012). Actions to regulate government-backed ECAs intensified in 1950s due to ambiguous effect of their operations on trade competitors (Evans, 2005) and in order to prevent a recurence of the war of export subsidies which had erupted earlier in the 1970s (Wright, 2011) when the four-fold increase in oil prices occured resulting in some countries attracting significant trade deficits and attempting to limit these through the provision of extremely advantageous credit terms (Mulligan, 2007). The signature of OECD Arrangement on Officially Supported Export Credits followed in 1975. According to the OECD Arrangement, ECAs can have forms of either ministerial department, publicly owned or supported insurance companies (Baltensperger and Herger, 2009). Despite the limited membership of OECD Arrangement (only 22 countries) and rather being a self-designed gentlemen's than formal agreement (Wright, 2011), the OECD Arrangement has the most influential role in enforcing rules (Ray, 1998). The OECD Arrangement moreover provides a framework for OECD countries

to negotiate how to stabilize the delicate conflict between the concentrated national benefits of promoting domestic exports and the diffused international costs that they may impose on each other. The overarching aim has not been to eliminate export subsidies altogether, but to establish an international consensus on what constitutes a legitimate export subsidy (Wright, 2011).

The main changes in the OECD Arrangement in 2005 were primarily related to interest rates, mixed/tied credits and local cost support. Changes have also been made to the classification of countries, the inclusion of certain types of ships, nuclear power stations and commercial aircraft. Renewable energy and water projects were fully excluded in 1978 but reviewed in June 2007 (Mulligan, 2007).

Nowadays, the Berne Union (or the International Union of Credit and Investment Insurers) is the leading association for export credit and investment insurance worldwide, and is providing a forum for professional exchange among its members. 70 ECAs from around the world are current members of the Berne Union, including all ECAs on the territory of Visegrad Four region. Berne Union's members represent all aspects (private and public) of the export credit and investment insurance industry worldwide. The organization regularly asks its members to provide information about their provision of short as well as medium and long-term export insurance to trading partners around the globe (Chauffour and Farole, 2009). To help support roles of the Berne Union, the Prague Club was established in 1994. Its primary objectives were to form information exchange networks in Central and Eastern Europe (Asia and Africa later joined) for agencies that did not yet meet the entrance requirements of the Berne Union and to support such agencies in developing their export credit and insurance schemes (Mulligan, 2007). There are 33 current members of the Prague Club. Even though all ECAs in Visegrad Four fullfilled the criteria for the Berne Union membership, they remain members of the Prague Club (Psenakova, 2012).

3.3   Export Credit Agencies in Visegrad Four

States govern their official export promotion schemes through either direct or indirect ownership of respective export credit agencies. Indirect ownership

might be managed via banks of national economy (Poland), state-owned development banks (Hungary, until recent bill passed in 2012) or another type of ECA (Czech EGAP holds a minor percentage of shares of CEB).

First export credit agency on the territory of Visegrad Four was Polish Export Credit Insurance Corporation (hereinunder: KUKE), established in 1991. Shortly after, the Export Guarantee Ltd. in Hungary and the Export Guarantee and Insurance Corporation (hereinunder: EGAP) incorporated in 1992, and Export Credit Insurance Corporation in Slovakia incorporated in 1993. To avoid problems emerged from combining export insurance and financing under one organisation, first Hungarian ECA, the Export Guarantee Ltd., was divided into two separate organisations in 1994 - the Hungarian Export Credit Insurance (hereinunder: MEHIB) and the Hungarian Export-Import Bank (hereinunder: Eximbank). As EGAP provides only insurance coverage, an increased need for state-owned credit agency promoting export was resolved in 1995 when the Czech Export Bank (hereinuder: CEB) was established. Furthermore, Slovak Export Credit Insurance Corporation was substituted by a typical ECA - Eximbanka SR in 1997.

It is typical for European countries to have a separate institution providing credits and guarantees, hence an institution operating in a form of a bank; and an insurance company providing different types of export insurance, usually with state guarantees. Another possibility is to have one institution offering both insurance and bank products. All three models of ECAs have their advantages and disadvantages that we are going to analyse in the following chapter.

Individual Government Bank

It is the most common model in the European Union. According to Janda et al. (2013b), its advantages overcome its disadvantages because since it is incorporated as a joint-stock company, it is usually able to gain its own revenues. This implies significantly lower public expenses for the government. Since the government is usually its only shareholder, government has a big impact on the portfolio of credits that the bank provides, and thus, the government can also choose priority territories to promote. On the other side, it can not operate just by itself and it has to insure a vast majority of its credits in another insurance company. This may be prevented by introducing a special government

legislation for eximbanks.

This institutional form is used in the Czech Republic (Czech Export Bank) and Hungary (Export-Import Bank).

Individual Insurance Company

The second model, usually connected with the model of the individual state export bank, is an *individual insurance company*. According to Janda et al. (2013b), similarly to the individual export bank, there is a possibility of long-term operations on its own budget and revenues when the insurance company is incorporated as a joint-stock company. Then direct risk for the government decreases and so there is no need for accounting of direct government guarantees in a national budget. By analogy, the individual insurance company is necessarily reliable on commercial banks' financing. Its disadvantage is that the government can not influence territorial targets of the insurance company. To do so, the government export bank must be employed.

This type of institution is the most commonly used in Visegrad countries, it was established in Poland (KUKE), in the Czech Republic (EGAP) and in Hungary (MEHIB).

While all other ECAs in the region provide only insurance to otherwise non-insurable exports by commercial insurance companies, MEHIB provides two types of insurance. Typical political risk insurance is protected by the state guarantees (same model applies in EGAP and KUKE), MEHIB is entitled to insure commercial marketable risk for which it is fully responsible.

Target markets differ for the three ECAs. MEHIB is highly oriented towards Russian (65% of its non-marketable insurance activities in 2010) and other post-Soviet markets, KUKE and EGAP orient more towards developed European countries with close geographical and political relations (e.g. Germany and Netherlands).

Institution Offering Both Insurance and Banking Products

The last type of the institutional form of export credit agencies is an *institution offering both insurance and banking products*. According to Janda et al. (2013b), its disadvantages, derived from the previous discussion, are that this institution can not use only its own financing to operate. Furthermore, it is quite difficult to define this institution: Is it a bank or is it an insurance company? This also implies that it is not possible for this type of ECA to obtain its own rating, therefore it has to face an extensive risk. At the same time, a special laws must be adopted for this institution to operate as a separate joint-stock company (such as Act No. 80/1997 Coll. on the Export-Import bank in Slovak Republic). Commercial banks might not be willing to provide financing that is sometimes necessary. On the other side, this type of an institution has a wider range of products offered in one place and its costumers can benefit from its one stop shop approach. This institution can also use its own "know-how" and support.

The only representative of this form is Slovak Eximbanka. It is necessary to mention that this export support scheme has also employed in Hungary until 1994, when the Export Guarantee Ltd. was divided into two separated organizations, above mentioned MEHIB and Export-Import bank.

3.4 International Trade and Export Promotion Development in Visegrad Four

In this section we observe evolution of exports (from the Czech Republic, Slovakia, Poland and Hungary) and export promotion in form of insurance (in the Czech Republic, Slovakia and Poland). Exports to above 180 are traced in 1994 - 2012 period and they are summarized in Table 3.2. The numbers are reported in billions of USD. Countries are grouped according to Human Development Index. The Human Development Index 2012 (HDI) is a composite statistic of life expectancy, education, and income indices used to rank countries into four equal size tiers of human development. For the list of analysed countries, by the category, see Table 3.1. Category 1 includes industrial, highly developed countries, category 4 contains the least developed countries.

For a better comparison, Figure 3.1 provides graphic distribution of share

Table 3.1: Human Development Index 2012 classification

Category 1: highly developed	Andorra, Argentina, Australia, Austria, Barbados, Belgium, Brunei Darussalam, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hongkong, Hungary, Chile, Iceland, Ireland, Israel, Italy, Japan, Korea, Rep., Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Qatar, Seychelles, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States
Category 2: developed	Albania, Algeria, Armenia, Azerbaijan, Bahamas, The, Bahrain, Belarus, Bosnia and Herzegovina, Brazil, Bulgaria, Colombia, Costa Rica, Cuba, Ecuador, Georgia, Grenada, Iran, Jamaica, Kazakhstan, Kuwait, Lebanon, Libya, Macedonia, Malaysia, Mauritius, Mexico, Montenegro, Oman, Panama, Peru, Romania, Saudi Arabia, Serbia, Sri Lanka, St. Lucia, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Uruguay, Venezuela
Category 3: less developed	Belize, Bhutan, Bolivia, Botswana, Cambodia, Dominican Republic, Egypt, El Salvador, Equatorial Guinea, Fiji, Gabon, Ghana, Guatemala, Guyana, Honduras, China, India, Indonesia, Iraq, Jordan, Kyrgyz Republic, Lao PDR, Maldives, Moldova, Mongolia, Morocco, Namibia, Nicaragua, Paraguay, Philippines, Samoa, South Africa, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste, Turkmenistan, Uzbekistan, Vanuatu, Vietnam
Category 4: the least developed	Afghanistan, Angola, Bangladesh, Benin, Burkina Faso, Burundi, Cameroon, Comoros, Congo, Democratic Republic, Cote d'Ivoire, Djibouti, Eritrea, Ethiopia, Gambia, The, Guinea, Guinea-Bissau, Haiti, Chad, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Nigeria, Pakistan, Papua New Guinea, Republic of Congo, Republic of Yemen, Rwanda, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Source: HDI

Table 3.2: Export outflows by country development index (in billions USD)

	1	2	3	4	TOTAL
Czech Republic					
1994	11974	652	538	52	13215
1997	19942	894	405	52	21294
2000	26854	1162	391	53	28459
2003	45277	1750	652	58	47738
2006	84965	4675	1590	226	91456
2009	98937	5748	2647	320	107652
2012	135714	9681	4043	369	149808
Slovakia					
1994	5722	344	225	20	6311
1997	8384	527	119	18	9048
2000	11108	429	158	24	11719
2003	17640	855	238	16	18748
2006	32006	2379	517	83	34985
2009	29948	3754	1207	99	35008
2012	67439	5077	2226	109	74852
Poland					
1994	13638	935	442	102	15116
1997	19720	2291	621	118	22749
2000	27386	1887	461	176	29910
2003	44283	3668	721	172	48843
2006	85946	10052	2099	301	98399
2009	107554	11311	3355	558	122778
2012	66195	18221	4670	686	89773
Hungary					
1994	42168	4167	995	220	47549
1997	15657	1077	202	45	16980
2000	25118	1574	230	27	26949
2003	37078	2746	546	79	40449
2006	55010	8350	1848	449	65657
2009	60003	9861	2260	109	72233
2012	75974	14788	3635	374	94771

Source: Comtrade, HDI, author's calculation

of overall export ouflows in percents into each observed category of countries. Share of exports to highly developed countries highly exceeds exports to other group of countries, its share ranges from 73% (Poland, 2012) to almost 95% (the Czech Republic, 2003), whereas share of exports to the least developed countries does not exceed 0.6% (Poland, 2003). Distribution of exports from all four countries follows similar, stable pattern. Share of exports to countries with middle development index (category 2 and 3) starts to increase after year 2006 and peaks in 2012, when exports from Poland to countries of category 2 and 3 account for up to 25.5%. Overall, exports are significantly more diversified in recent years than in the beginning of the observed period.
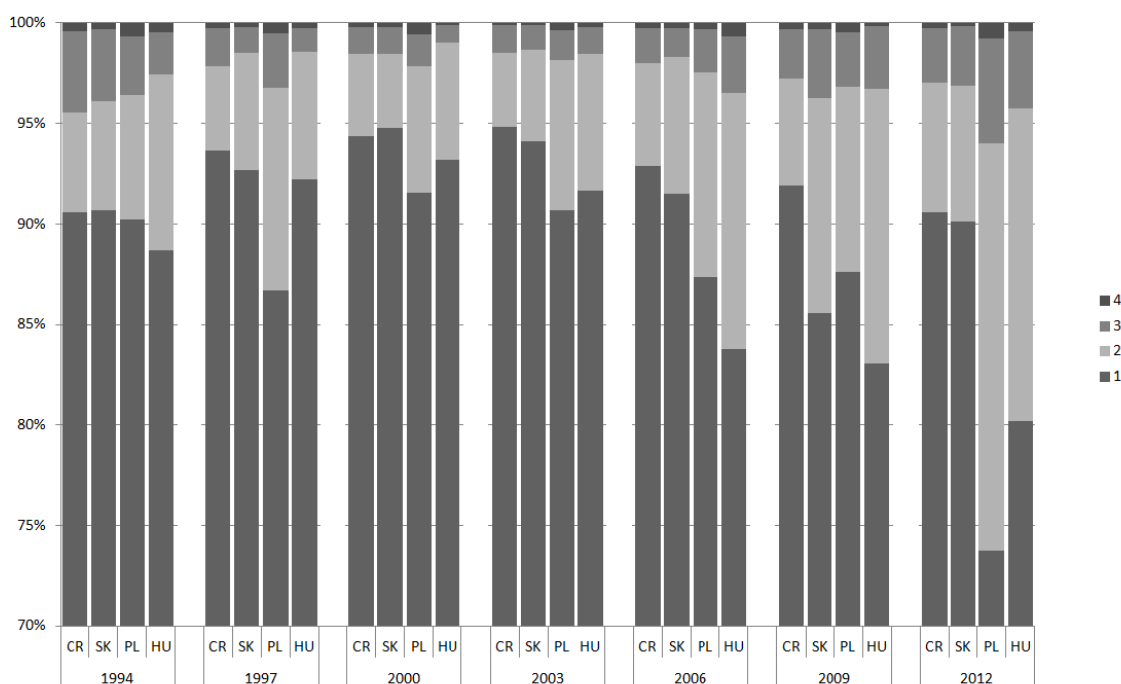
Figure 3.1: Export outflows by country development index in %

Table 3.3 reports distribution of export insurance coverage to the same categories of countries. Data are available for years 1994 - 2012 for Slovakia and for the Czech Republic and for years 2003 - 2009 for Poland.

Analogically, a percentage share of export insurance by Visegrad ECAs into four categories of countries, according to their level of development, is summarized in Figure 3.2. While a similar pattern of the share of exports was observed in all four countries, distribution of insurance coverage of exports is

Table 3.3: Export insurance coverage by country development index (in billion USD)

	1	2	3	4	TOTAL
Czech Republic					
1994	5.3	156.8	38.1	0.0	200.3
1997	128.7	163.7	170.7	2.2	465.3
2000	300.2	433.2	29.9	0.7	763.9
2003	191.4	149.5	69.4	0.0	410.4
2006	193.5	472.0	153.3	68.0	886.9
2009	1222.3	581.2	167.0	5.3	1975.7
2012	405.8	1522.8	599.6	6.5	2534.7
Slovakia					
1994	15.1	0.9	0.0	0.0	16.1
1997	32.3	6.4	8.6	0.0	47.3
2000	121.2	15.1	15.5	0.0	151.9
2003	271.7	84.9	4.3	0.2	361.1
2006	543.7	192.3	0.9	0.0	737.0
2009	512.0	131.2	47.4	0.0	690.7
2012	766.6	119.8	14.4	1.6	902.4
Poland					
2003	1097.5	283.5	27.7	0.1	1408.8
2006	1302.8	429.7	22.1	0.0	1754.5
2009	1244.7	432.5	44.9	0.3	1722.5

Source: Comtrade, HDI, author's calculation

clearly more volatile and differ markedly even among the three countries. Unlike exports, export insurance provided by ECAs is designated, by definition, for more risky countries that often tend to be less developed. Slovak and Polish ECAs, however, insure exports targeting mostly to highly developed countries (around 70%). Czech insurance of exports to highly developed countries ranges from 3% in the initial year to 62% in 2009, meanwhile insurance of exports of category 2 countries dominates. There was a substantial jump in the distribution of the insurance recorded after the offset of the financial crisis in 2009, although with different sign effects in the three countries. Czech export insurance share designated for the developed countries decreased from 42% in 2008 to 16% in 2011, opposite effect occured in Slovakia (from 70% share in 2008 up to 81% in 2011) and Poland (from 68% share in 2008 up to 77% in 2011). Similar categorization of countries into four categories according to their income (published by the World Bank) is used in Felbermayr and Yalcin (2013).
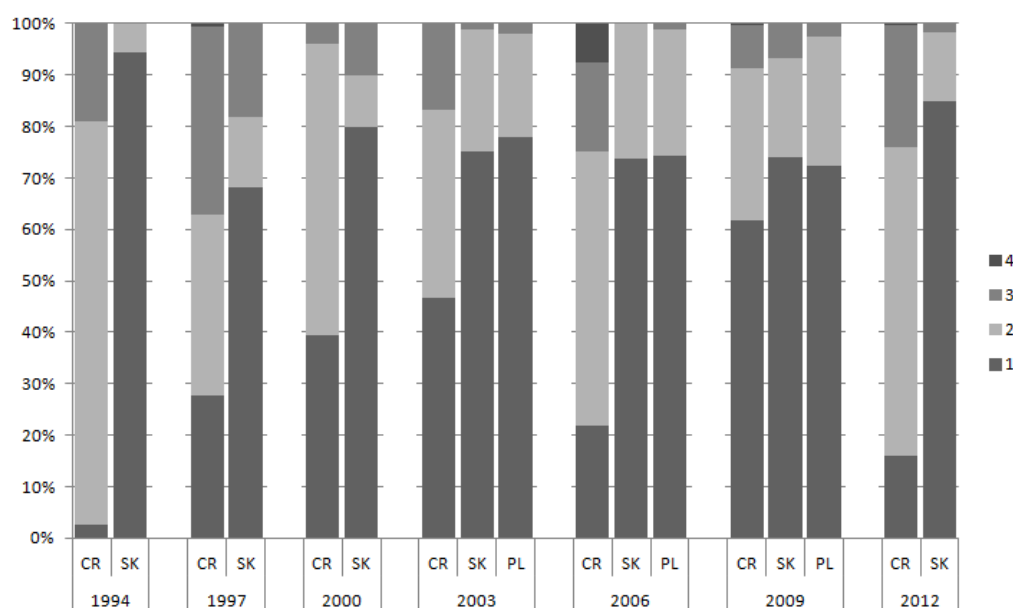
Figure 3.2: Export insurance by country development index in %

Official export insurance promotion provided by ECAs covers volume of export only to a small extent. Slovak insurance coverage is the lowest, starting at 0.3% in 1993 (i.e. Slovak Eximbanka insured 0.3% of all Slovak exports) and it peaks at 2.8% in 2002 and afterwards slightly decreases. Czech insurance coverage ranges from 0.6% in 1993 to 2.8% in 1999. Polish ECA KUKE insures relatively the highest percentage of Polish exports, ranging between 1.4% and

3.3%.

3.5 Importance of ECAs during the Financial Crisis

Publicly supported export credit and insurance schemes are primarily established to correct failures that arise with non-marketable parts of trade finance in the international trade sector. Thus a desire for creating and strenghtening ECAs in the time of crisis increases. Financial crisis has a negative and sizeable impact on export (Monova et al., 2011). Therefore at the G20 summit in London in 2009, governments pledged to support international trade flows by providing their respective ECAs with expanded mandates to issue short-term direct financing to exporters (Wright, 2011), hence their ECAs are bound to provide at least 250 billion USD of additional guarantees to mitigate against the decrease in the international trade due to the current crisis (Herger and Lobsiger, 2010).

Uncertainity, due to higher problems of assymetric information, increases when the financial crisis occurs. Decline of exports is as well caused by financial constraints. International trade frequently relies on financial intermediaries, because sellers do not frequently extend credit to foreign buyers directly, instead, they leave the lending to a domestic bank, who in turn contracts with the buyer's bank. As an implication, imports to countries with less trust in the buyer's bank are hit relatively harder by the financial crisis. Since trade finance has a critical role in supporting international trade (around 80-90% of world international trade relies on trade finance), the shortage of trade finance has important negative consequences on international trade. This is where ECAs step in. Empirical studies showed that public support for trade finance is more effective than other forms of credit support (Ellingson and Vlachos, 2009).
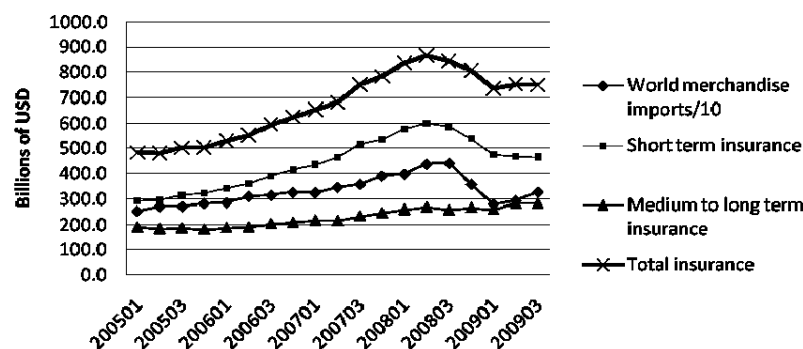
When the crisis occurs, firms have incentives to hoard cash (Ellingson and Vlachos, 2009). For example, US bank reserves massively increased; reserves went up from 2 billion USD in Auguest 2008 to 798 billion USD in January 2009 (Edlin and Jaffe, 2009). As a solution, it was observed that banks often tie the extention of credit to actual transactions, hence firms can not hoard

cash. Moreover, sellers tend to insist on upfront payment from foreigners who do often need credit. The bank in exporter's domestic country is more willing to provide specific loans for input purchases than general cash loans. Therefore, incentives for promoting trade finance are stronger.

Theoretical importance of ECAs in times of the crisis is supported by numerous empirical research studies. The effect of insured trade credit provided by the Berne Union members on trade is very strong and remains stable over the cycle and does not vary between crisis and noncrisis periods (Auboin and Engemann, 2012). Data from private insurers suggest that considering a decline in the supply of private credit insurance during the initial years of the financial crisis, the reduction in private insurance exposure explains about 5 to 9% of the drop in world exports and even 10 to 20% of the drop in European exports (Van der Veer, 2010).

Chauffour et al. (2010) traced the development of world imports and trade insurance volumes from Q1 2005 to Q3 2009. Figure 3.3 summarizes their findings. Trade volumes dropped between Q2 2008 and Q1 2009 and gradually recovered afterwards. Insurance volumes mirror the development of trade volumes but insurance dropped by 15% less than the overall trade. When separating between short-term and long-term insurance, figures suggest that short-term insurance dropped strongly between Q2 2008 and Q1 2009 (22%) unlike long-term commitments that dropped only by 3% and recovered steadily ever since (9% increase was reported already in Q1 2009). Those findings are supported by data from the Berne Union that indicate that in Q4 2008, new insurance commitments of ECAs increased strongly for high-income countries and decreased for developing countries (Chauffour and Farole, 2009).

This fact is explained by the increase of high systematic risk in the observed period that is generally linked to an increase of large scale transactions. This type of transactions tend to be covered by medium and long-term insurance. Short-term commitments are terminated or reduced easily by banks or insurers with needs to recapitalize and their balance sheets from liabilities with higher risk. ECAs (covering mostly medium and long-term commitments) stepped in to ease finance terms and to boost financial programs of governments (Chauffour et al., 2010).

Figure 3.3: World trade and trade insurance volumes

Chauffour et al. (2010) further decomposed changes of commitments in 2008 - 2009 time period into three categories depending on the level of income of importing country. Drop of short-term commitments was evenly distributed across three categories of countries. Recovery was slightly slower in middle-income countries. The change of medium and long-term commitments (the case of ECAs) was less evenly distributed. Between Q2 2008 and Q1 2009, medium and long-term commitments grew by 9% to high-income importing countries but dropped by 7% to middle-income and 4% to low-income countries. This implies that crucial imports of raw materials and intermediate good to developing countries in the peak time of the crisis were not successful. After Q1 2009 (recovery period), medium and long-term commitments have rebounded strongly for low and middle-income countries (by 12%) and remained constant for high-income countries. Therefore ECAs have been more successful in supporting trade flows to developing countries in the recovery period.

Annual data from three Visegrad countries (the Czech Republic, Slovakia, Poland) with exports and insurance volume to observed group of countries[2] provide similar evidence. Figures 3.4, 3.5 and 3.6 indicate graphic development. Export from all three countries was growing steadily in years 2005 - 2008 by 17% to 34% annually. Slovak export in 2008 was an exception, because its growth slowed down markedly (only 2% annual change). Sharp drop of exports occured in 2009. Exports from the Czech Republic dropped by 22%, from Poland and Slovakia by 21% annually, hence similar impact of the begin-

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[2]For detailed description of dataset see Section 4.2.
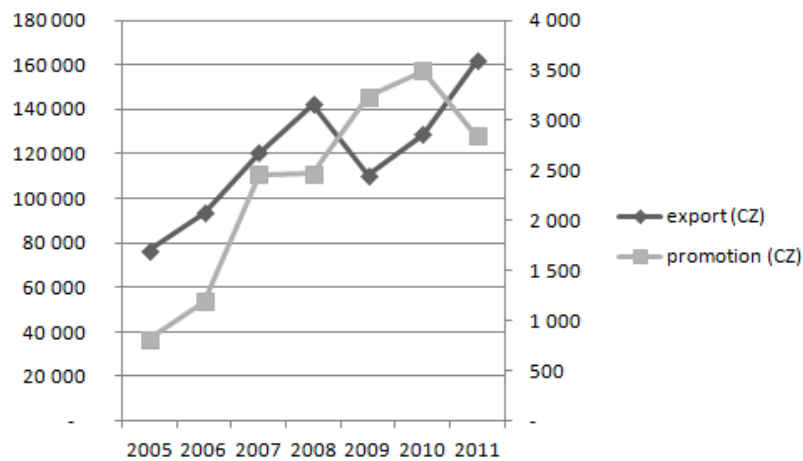
Figure 3.4: Export and promotion from the Czech Republic in 2005 - 2011 (in billions of USD)

ning of the crisis on all three countries is noticed.
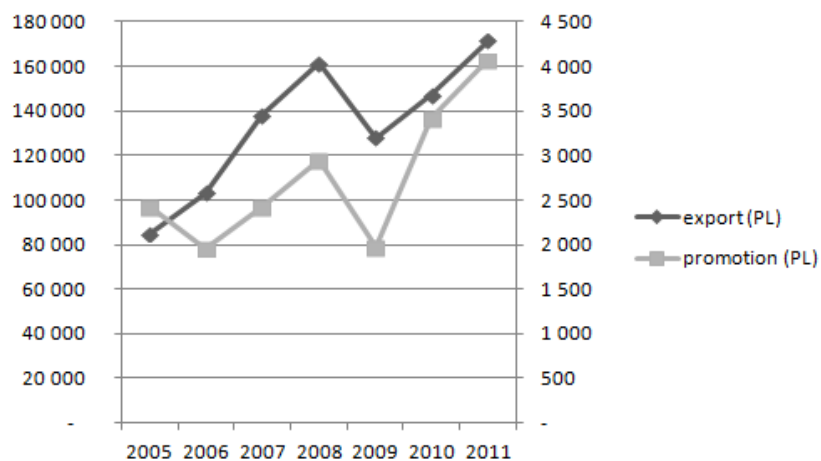
Figure 3.5: Export and promotion from Poland in 2005 - 2011 (in billions of USD)

After year 2009, development of exports differ in the three countries. Exports from the Czech Republic and Poland grew by around 16% in following year, export from Slovakia increased more sharply. Growth continued in the next year. Exports more than doubled in all three countries in the observed period, 112% of additional volume of exports was added to observed volume of initial export in the Czech Republic, by 102% in Poland and 148% in Slovakia. We conclude that the three countries had very similar development of their exports before the crisis, however, their exports were differently impacted by

the financial crisis.
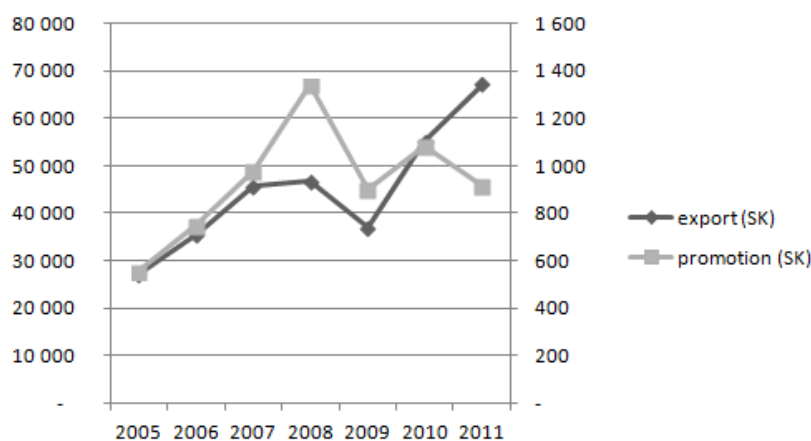
Figure 3.6: Export and promotion from Slovakia in 2005 - 2011 (in billions of USD)

Development of amount of export promotion in the form of insurance in all three countries mirrors the development of exports, with the exception of the Czech Republic. Czech insurance volumes did not experience drop until 2011. Before year 2009, insurance volumes were closely linked to export volumes. Both Slovak and Polish insurance volumes dropped by 33% in 2009 in comparison with insurance volumes recored in the previous year. Polish insurance volumes picked up much faster than in case of Slovakia in the next year, Czech insurance volumes continued to grow only steadily.

We aggregated the data from three countries to obtain one graph in Figure 3.7. Again, data before 2009 for both exports and insurance volumes follow a similar path, afterwards, drop is observed. Nevertheless, drop in overall insurance volumes is much smaller than drop of exports (-10% and -22%). Insurance volumes recovered in the next year and increased by even 31%. Growth of exports was slower (20%). This fact supports evidence that exports and insurance volumes in three of the Visegrad countries follow worldwide trends in international trade, presented by Chauffour et al. (2010). Visegrad ECAs boost the trade after the outbreak of the crisis in 2009 and helped domestic exporters. In order to compare similarities in findings of the analysis to Chauffour et al. (2010), Figure3.8, with identical scale, follows. Lower volume of insurance in Visegrad countries is due to the fact, that only one insurance company in each
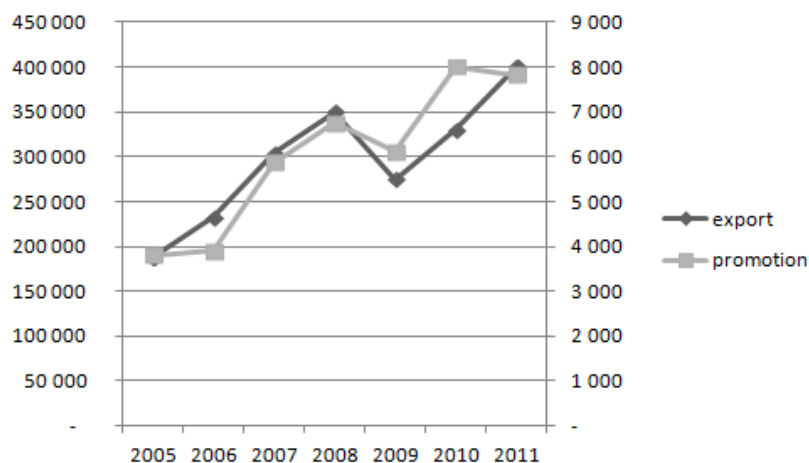
Figure 3.7: Total export and promotion in 2005 - 2011 (in billions of
USD)

country is accounted for, not all medium and long-term commitments are con-
tained in this analysis, as in case of Chauffour et al. (2010). Otherwise, our
findings are clearly similar and support the previous analysis.
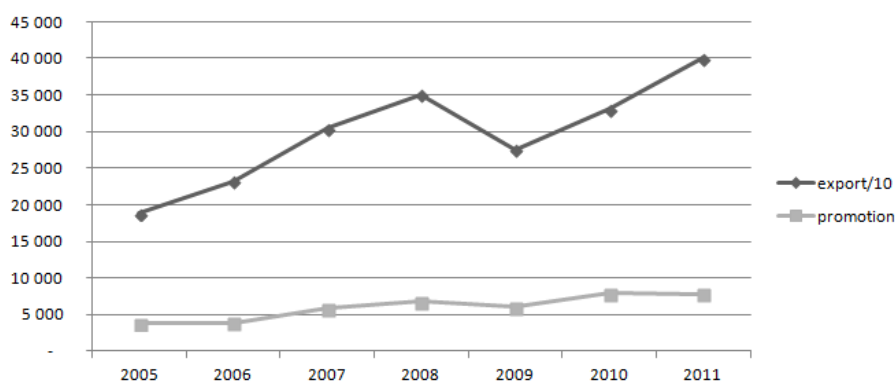
Figure 3.8: Total export and promotion in 2005 - 2011 (in billions of
USD)

We conclude that ECAs intensively expanded their financial operations dur-
ing the recent financial crisis and they significantly helped to prevent financial
markets from drying up.

3.6   Products of ECAs

First we present credit instruments used in Visegrad countries. Credit and banking instruments are arranged according to categories of potential customers that might benefit from products.

Direct export credit is provided to domestic exporters by ECA. Refinancing contract with ECA can be signed after an issuance of credit with commercial financial institution. Afterwards, refinancing enables exporter's bank to obtain funds from ECA to provide credit for the exporter under more favourable conditions. Domestic exporters can benefit from subsitied credits for their investment projects abroad. Among common bank guarantees issued by ECAs are bid, performance, retention and warranty.

Structure of instruments for foreign buyers of exports from Visegrad Four region is more complex, depending on the stage of business with the exporter. Even before signing the contract, pre-export credit financing costs connected to contract is available. Furthermore, direct and indirect export buyer credits are extensively traded. The latter stands for an agreement signed between the buyer's bank and ECA. Refinancing of buyer's export credit is also common.

ECAs' insurance covers losses from defaulted supplier and buyer credits, confiscation of goods abroad, claimed contract bonds and guarantees, or the production costs of incomplete export transactions (pre-shipment insurance). To offset reduction in exports due to the current crisis, some new insurance products have recently been launched. Those include export risk guarantees on working capital, letters of credit, and counter and refinancing guarantees (Herger and Lobsiger, 2010).[3]

The most common trade credit insurance products are following (Herger and Lobsiger, 2010). Letters of credit commits the importer's bank itself to pay the domestic exporter the agreed price once conditions like the punctual and undamaged delivery of the products have been met. With a documentary collection, exporter delegates the settlement of the payment to a bank which handles the collection by sending corresponding instructions to the importer's bank. Those indirect payments have an advantage that they are made more

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[3]In case of Swiss ECA - Swiss Export Risk Insurance.

quickly and with expertise of specialized intermediary for financial transactions, moreover, they rely on the creditworthiness of the foreign bank rather than on unknown foreign buyer (Herger and Lobsiger, 2010).

The majority of insurance products from Visegrad ECAs is designed for exporter's commercial banks. Insurance of credit for pre-export financing covers the bank against a non-repayment of the credit due to inability of exporter to fulfill the contract or to manufacture goods or provide services. Bank moreover choose from insurance of short term or medium and long term supplier credit financed by the bank. They protect against the risk of non-repayment by a foreign importer. Bank possibly applies insurance of confirmed letter of credit. This instrument is defined as a written promise of a seller to a buyer that is guaranteed to clear by seller's bank (in this case, by exporter's bank).

As for the bank of importer of Visegrad goods or services, it might employ insurance of export buyer credit instrument to cover the risk of non-repayment of export buyer credit by a foreign importer. Characteristics of this type of insurance are highly standardized by the OECD Consensus (Janda et al., 2013b).

Future investors (or their banks) benefit from insurance of investments of domestic legal persons abroad when investor is willing to enter target markets of Visegrad governments. Exporter can apply insurance of short term or medium and long term exporter supplier credit, depending on the lenght of the contract.

The widest portfolio of both insurance and financing products is offered by the Czech Republic (22 different types of above mentioned insurance and credit instruments are offered all together), followed by Slovakia (18), Hungary (13) and Poland (10). A proximity of Czech and Slovak export product portfolio could be observed; this might be explained by close historical ties and joint development of banking and insurance sector (Janda et al., 2013b). For a table summarizing the instruments used in Visegrad ECAs, see the Appendix B.

Direct export buyer credit forms the highest share of credit financing used by ECA in the Czech Republic (77%) followed by pre-export financing cost credit (20%). As EGAP's most commnon partner bank is CEB (over 30% of EGAP's insurance covers CEB's credits), the structure of EGAP's insurance is similar, with the highest share of insurance of direct export credit (55%) and

pre-export costs (20%).[4] Slovak Eximbanka's widely used instruments are bank guarantees (52%) and refinancing of export buyer credit (29%), with insurance of export receivables consisting of 72% of all insurance products.[5] Hungarian Eximbank finances mostly export buyers credit and pre-export financing credit.[6]

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[4]Annual Reports of CEB and EGAP, 2012.
[5]Annual Report of Eximbanka SR, 2011.
[6]Annual Report of Eximbank, 2012.

Chapter 4

Analysis of ECAs in the Czech Republic Based on Gravity Equation of International Trade

This chapter analyses an effectiveness of advanced post-Communist European countries using an example of the Czech Republic. Two forms of ECAs were established shortly after a demise of Czechoslovakia. EGAP, state-owned credit insurance institution, was established in June 1992 to cover political and commercial risks uninsurable by commercial insurance. Establishment of the Czech Export Bank followed in March 1995 to further support competitiveness of Czech exports by providing goverment-backed financing for Czech exporters.

This chapter uses a unique dataset including historical data for all complete years of operation of Czech ECAs until year 2012. This thesis is the first to estimate effects of both separate export credit agencies in one country and to compare their impact on exports. Both institutions are at first analysed separately, afterwards datasets were merged into a single dataset. We test whether export promotion in form of both isurance coverage or credit creates additional Czech exports, whether gravity model of international trade is supported by Czech data (we test significance of traditional variables used in gravity models of international trade, e.g. GDP, population, distance) while adding variables political risk and export promotion. First section describes theoretical backround to international trade equation and specifies the methodology, description of data is included in the second section. Results and a short discussion of empirical results follow.

4.1   Theoretical Framework

In the literature, international trade flows have often been studied along the lines of the gravity equation.[1] In fact, the gravity model has become the main working tool for an empirical analysis of international trade (Moser et al., 2008), and it was used to estimate effects of eg. trade agreements or currency unions on international trade flows. Gravity equation model proved to be highly consistened with other macroeconomical models.

The basic idea of the model is related to physics due to the fact that gravitation attraction between two bodies (countries) depends positively on the mass of each body (approximated by the size of economies measured by their respective GDP) and negatively on the distance separating them (distance of countries, approximated by the distance between their capiatal cities). Due to the nature of public export promotion, they tend to alleviate friction of the international trade and thus are expected to have positive impact on the volume of international trade (exports). Despite export promotion being designated mostly for exports to countries with higher political risk, it covers only a small percentage of overall volume of exports. Thus we expect political risk to negatively impact trade volumes, because exports are more likely to flow to safer destinations with lower political risk.

4.2   Econometrical Model and Data Description

We estimate three different specifications of gravity model along the lines with Egger and Url (2006) and Janda et al. (2013b). Our baseline equation has a form:

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

$$
\begin{aligned}
\ln(export_{it}) \quad &= \quad \beta_0 + \beta_1 \ln(promotion_{it}) + \beta_2 \ln(GDP_{it}) + \\
&+ \quad \beta_3 \ln(distance_i) + \beta_4 \ln(population_{it}) + \\
&+ \quad \beta_5 \ln(risk_{it}) + \mu_i + \mu_t + \epsilon_{it}
\end{aligned}
$$

where t stands for a year, i stands for a receiving country destination, μ_i is a country specific error term, μ_t is a time specific error term and ϵ_{it} stands for an error term with zero mean and constant variance. Model describing the CEB covers time period 1996 - 2012,[2] whereas insurance company (EGAP) model covers time period 1993 - 2012.[3]

An endogenous variable in our regression models is a logarithm of export from observed country (the Czech Republic) to country i in year t. It is expressed in current US dollars. Data were collected from the Comtrade database in USD.

A key variable in our model is $\ln(promotion_{it})$. It is a logarithm of overall amount of state promotion sent into a country i in year t that was provided by corresponding export credit agency (EGAP or CEB). It is a sum of different forms of promotion: guarantees, credits, etc. in case of CEB and different types of insurance coverage in case of EGAP. It is a variable of interest in our regression model and we use its coefficient to compare effects of export credit agencies in two different forms on an amount of export. Data were provided by CEB and EGAP. We assume that state export promotion increases export especially to countries with higher political risk. Hence we expect a positive coefficient of the variable.[4] Other exogenous explanatory variables are:

$\ln(GDP_{it})$ is a logarithm of GDP of a receiving country i in year t. This variable is suggested to be used as a proxy for a size of market in gravity

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[2]Data for the year 1995 do not cover the entire year 1995 hence they are excluded from our analysis.

[3]Analogically we excluded year 2012.

[4]Note that a common practice when dealing with transformation of zero values to logarthmical form is to remove those observations. However, in our case, there is a large number of zero values and so we can not remove all of them. Thus when running the regression we subsituted all zero values of promotion by 1 in order to be able to compute logarithmical form. This approach has been suggested by Janda et al. (2013a).

models. Data were obtained from the International Monetary Fund and
they are expressed in current USD. We expect a coefficient of this variable
to be positive because demand for imported products and services should
increase in bigger markets.

$\ln(distance_t)$ is a logarithm of geographical distance of capital cities of ex-
porting and importing country i, expressed in kilometres. It is proposed
as a proxy for transaction costs and hence for resistance in the gravity
model. Transaction costs increase with growing distance of an importer
so we expect this coefficient to be negative.[5]

$\ln(population_{it})$ is a logaritm of population in receiving country i in year t.
With growing population demand for foreign exports increases, therefore
we expect the coefficient to have a positive value. Data were obtained
from the International Monetary Fund official database.

$\ln(risk_{it})$ is a logarithm of a political risk of country i in year t. Already
Tinberg (1962) has pointed political risk to be an important obstacle to
international trade flow because it represents an additional transaction
costs. Governments try to stimulate exports by granting export credit
guarantees against export risks, especially political risks (Moser et al.,
2006). This variable was introduced by Moser et al. (2006) in gravity
model estimation. However, we expect the effect of export promotion
to riskier countries to be offset by the volume of export to less risky
countries that are chosen by the majority of exporters. This implies
a positive expected sign of the $risk$ coefficient. We collected political
risk data from International Country Risk Guide database (PRS risk
rating). Data range from 1 to 100, where 100 stands for no risk, the lower
the number, the higher political risk in the country. Other database of
political risk, which is predominantly used also by Czech ECAs for their
internal rating of country risk, is regularly published by OECD. However,
OECD started to publish the database only after year 1999. OECD data
range from 0 to 7 with 0 standing for no risk. We analysed similarity of
the two risk scales in 1999 - 2011 time period that is available. Analysis,
where we used simple OLS regression and regressed PRS rating on OECD
risk rating, is summarized in Table 4.1.

The two datasets proved to be highly correlated (with R-squared 72.12%)

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[5]Source: timeanddate.com

Table 4.1: Political risk (dependant variable: PRS risk)

OECD risk	-5.517***
	(.081)
constant	83.961***
	(.397)
n	1780
R^2	0.7212

Source: Author's calculation
Note that *, **, *** denote significance
at 10%, 5%, 1% level, respectively.

and p-value 0.000 with t-statistics very low (-67.83). Beta coefficient is
negative since two ratings have an opposite scale (0 stands for no risk in
OECD rating but the highest risk in PRS rating). Therefore both risk
ratings futher proved to be suitable for the international trade analysis.
PRS rating is more appropriate for our research because of longer data
availability and more detailed form of rating scale.

4.3   Results

We are going to present results of our gravity models in this section. Datasets
were arranged into unbalanced panel data and we estimated two different mod-
els (fixed effects and random effects model) for EGAP and CEB. Later we
merged the data into one dataset for the period 1993 - 2012. CEB promotion
is set to 0 for the period 1993 - 1995 because CEB had not been established in
this period. Therefore we are able to precisely estimate the effect of foundation
of an export credit agency in a country.

A common approach with panel data is to estimate both random effect and
fixed effect models by GLS regression and then use Hausman test to decide an
appropriate model. Under the null hypothesis of Hausman test, both random
effect and fixed effect models are effective and consistent; the alternative hy-
pothesis rejects the random effect model. We do expect the fixed effect model
to be more consistent with our data because we used a sample of majority of
countries in the world; data were not chosen randomly. Data for smaller un-
derdeveloped countries, such as their GDP, export or political risk, are usually

not available in international databases and hence they were excluded from our
regression. Fixed effect estimation outweights in working papers dealing with
the gravity equation. Results of our regressions are reported in Table 4.2 that
follows.

Table 4.2: Static GLS regression - the Czech Republic (separate models)

	CEB		EGAP	
	RE	FE	RE	FE
promotion	0.039***	0.037***	0.046***	0.044***
	(0.006)	(0.006)	(0.004)	(0.004)
population	0.944***	2.035***	0.910***	1.878***
	(0.058)	(0.136)	(0.055)	(0.116)
GDP	0.083***	0.058***	0.088***	0.061***
	(0.011)	(0.011)	(0.011)	(0.010)
distance	-1.816***		-1.780***	
	(0.101)		(0.097)	
risk	1.564***	-0.302	1.086***	-0.092
	(0.230)	(0.277)	(0.197)	(0.221)
constant	7.788***	-16.578***	9.653***	-15.214***
	(1.708)	(2.462)	(1.555)	(2.167)
n	2115	2115	2442	2442
R^2	0.673	0.125	0.655	0.158
Hausman p-value	0.00		0.00	

Source: Author's calculation
Note that *, **, *** denote significance at 10%, 5%, 1% level,
respectively.

First, we estimated a static GLS model without lag variables. Random ef-
fect model for CEB and EGAP yeild similar results. All explanatory variables
are significant even on 1% significance level. Positive and significant coefficient
on political risk indicates, that exporters choose "safer" export destinations to
decrease the probability that they will suffer losses on their investment (such as
failure to receive payment for the delivery of products) due to external events
in the export destination such as government or legislative changes. Although
ECAs focus on pushing exports to more risky destinations, the volume of pro-
moted exports is offset by exports without such promotion. Exports are design
for larger and more developed economies with higher purchasing power and
hence more resources. This fact is supported by the positive coefficient of ex-
planatory variables GDP and population. As expected, negative coefficient of
variable distance suggests that exporters choose geographically closer destina-
tions for their exports to offset both information problem and more importantly,
to decrease transportation costs. Geographical proximity often implies overall
closeness of economies due to similar development and historical tights and
similar market structure. All variables naturally have very similar values in

CEB and EGAP model.

Variable of interest, export promotion, is significant in both models even on 1% level of significance. Export promotion has positive effect on exports. 1% increase in credit or bank guarantees from CEB increases exports to respective destination by 4.6%, increase in insurance coverage of exports by EGAP increases exports by 3.9%.

Large test statistics in Hausman test (low p-value) suggests that random effect model is rejected in favour of fixed effect, as we expected.

Political risk variable becomes insignificant in fixed effect model. Effects of variables population and GDP are both postive, nevertheless, coefficient of population is much larger than in random effect model. Export promotion is highly significant with positive effect on export in both models. Its coefficients have similar value than in case of random effect models, 3.7% in CEB credits and 4.4% in EGAP insurance. Export promotion in form of export insurance has a larger effect on the amount of exports than credits and guarantees therefore our analysis suggest that it is more perspective and profitable. It must be also noted that insurance coverage involves fewer financial resources thus it might be less risky for the ECA financed directly linked to the state budget. Export fixed effect model is poorly explained by given variables (R-squared only 15 and 12%) thus we estimate dynamic model (with lag export variable) to improve the credibitily of the model.

Dynamic GLS models with fixed and random effects with lagged explanatory variables report larger R-squared, as Table 4.3 shows. Again, Hausman test strongly rejects random effect model. All variables have similar effects than is static models, alhough size of coefficients on promotion decreased. EGAP insurance again seems more successfull because it increases export by 2.9% which is more than 2.4% given by CEB promotion.

Next, we merged data from EGAP and CEB databases and estimated both static (Table 4.4) and dynamic (Table 4.5) models for random and fixed effects for the period 1996 - 2011. Hausman test rejected random effect model.

The fixed effect specification of the dynamic gravity model prevails in the

Table 4.3: Dynamic GLS regression - the Czech Republic (separate models)

	CEB		EGAP	
	RE	FE	RE	FE
promotion	0.015***	0.024***	0.024***	0.029***
	(0.006)	(0.005)	(0.004)	(0.004)
export_lag	0.645***	0.334***	0.672***	0.372***
	(0.013)	(0.015)	(0.012)	(0.014)
population	0.285***	1.623***	0.220***	1.417***
	(0.019)	(0.122)	(0.018)	(0.103)
GDP	0.082***	0.034***	0.082***	0.038***
	(0.011)	(0.010)	(0.010)	(0.009)
distance	-0.558***		-0.477***	
	(0.032)		(0.029)	
risk	1.330***	-0.221	1.114***	-0.088
	(0.107)	(0.247)	(0.098)	(0.194)
constant	-1.545***	-15.185***	-0.843*	-13.262***
	(0.566)	(2.194)	(0.518)	(1.894)
n	2104	2104	2426	2426
R^2	0.877	0.346	0.882	0.431
Hausman p-value	0.00		0.00	

Source: Author's calculation
Note that *, **, *** denote significance at 10%, 5%, 1% level,
respectively.

literature dealing with Central European countries (Janda et al., 2013a, Janda et al., 2013b). Moser et al. (2008) estimated random effect and Mundlak-type random effect models applied on data from Germany. However, current literature that re-estimates effects of German export guarantees (Felbermayr and Yalcin, 2013) further rejects such specification using Hausman test. Fixed effect dynamic model fits our data relatively well, R-squared is 43.2%. The effect of both insurance coverage and export credits and guarantees on exports is positive and significant and providing support for the hypothesis that export promotion provided by Czech ECAs lead to higher Czech exports. Effect of Czech promotion (here 2.1% for CEB and 2.5% EGAP) is comparable with other relevant literature e.g. by Moser et al. (2008) that concluded that effect of German guarantees is slightly lower than 2% and by Egger and Url (2006) who estimated the effect of Austrian export guarantees to be around 4.5%. The coefficients of other explanatory variables are as expected. Czech companies export more to countries with higher market value, measured by GDP, and to larger markets that causes higher overall demand for products, therefore higher demand for foreign exports. Coefficient for distance is negative in random effect model, distance leads to smaller proximity of two countries, larger transportation and information costs. Past exports have a positive effect on the value of exports nowadays, this can be explained by e.g. a persistance of long-term suppliers contract. Political risk has an ambiguous and no clear

Table 4.4: Static GLS regression - the Czech Republic (single model)

	RE	FE
promotion_CEB	0.035***	0.035***
	(0.006)	(0.006)
promotion_EGAP	0.040***	0.038***
	(0.005)	(0.004)
population	0.904***	1.871***
	(0.055)	(0.115)
GDP	0.086***	0.060***
	(0.011)	(0.010)
distance	-1.755***	
	(0.097)	
risk	1.075***	-0.075
	(0.196)	(0.220)
constant	9.600***	-15.173***
	(1.553)	(2.151)
n	2442	2442
R^2	0.657	0.165
Hausman p-value	0.00	

Source: Author's calculation
Note that *, **, *** denote significance at 10%,
5%, 1% level, respectively.

effect on exports, the variable tends to be nonsignificant in fixed effect model.
An auxiliary random effect GLS regression (Hausman test suggested random
effect to be more efficient) of export promotion on political risk was further
estimated. Coefficient of political risk was significant and negative, suggesting
that Czech export promotion instruments are indeed designated for more risky
export territories. Note that fixed effect estimation yields downward-biased
estimates when a lagged dependent variable is included (Moser et al., 2008).

Table 4.5: Dynamic GLS regression - the Czech Republic (single model)

	RE	FE
promotion_CEB	0.007	0.021***
	(0.006)	(0.005)
promotion_EGAP	0.022***	0.025***
	(0.004)	(0.004)
export_lag	0.670***	0.367***
	(0.012)	(0.014)
population	0.218***	1.420***
	(0.018)	(0.102)
GDP	0.082***	0.037***
	(0.010)	(0.009)
distance	-0.473***	
	(0.030)	
risk	1.115***	-0.078
	(0.098)	(0.193)
constant	-0.844*	-13.266***
	(0.518)	(1.888)
n	2426	2426
R^2	0.882	0.432
Hausman p-value	0.00	

Source: Author's calculation
Note that *, **, *** denote significance at 10%,
5%, 1% level, respectively.

Chapter 5

Analysis of ECAs in the three Visegrad countries

This chapter extends the gravity model introduced in the previous chapter. Data from Slovakia and Poland are included. We collected almost 13000 observations, out of which 8747 include values for complete set of variables. We introduce a new approach that combines databases of three countries into one model based on the gravity equation of international trade. Different techniques are used for the estimation, namely fixed and random effect GLS model, least squares dummy variable (LSDV) approach and Poisson pseudo-maximum likelihood estimator (PPML).

This chapter is divided as follows. First, we describe the new dataset with data from Slovak Eximbanka and Polish KUKE. Empirical methods and results of different analysis follow. We test and evaluate effect of 5 ECAs in Visegrad region and compare their performance.

5.1 Model and Data

Previously introduced equation with additional variables form a baseline equation in this analysis.

$$
\begin{aligned}
\ln(export_{it}) \;=\; & \beta_0 + \beta_1 \ln(promotion_{it}) + \beta_2 \ln(GDP_{it}) + \\
+\; & \beta_3 \ln(distance_i) + \beta_4 \ln(population_{it}) + \\
+\; & \beta_5 \ln(risk_{it}) + \beta_6 (CZ) + \beta_7 (PL) + \\
+\; & \beta_8 (bank) + \beta_9 (insurance) + \beta_{10} (bankproduct) + \mu_i + \mu_t + \epsilon_{it}
\end{aligned}
$$

As in the previous chapter, t stands for a year, i stands for a receiving country destination, μ_i is a country specific error term, μ_t is a time specific error term and ϵ_{it} stands for an error term with zero mean and constant variance.

Data used in the analysis come from different sources. Dependant variable is $\ln(export_{it})$. Data for the variable of interest, $\ln(promotion_{it})$, were kindly provided by EGAP, CEB, KUKE and Eximbanka. The variable stands for logarithm of the sum of various sources of promotion either in form of bank credit and guarantees or insurance coverage. Data for Eximanka are available for the period 1994 - 2012 for insurance coverage and for the period 2009 - 2012 for banking products. The latter have been processed by Eximbanka only in recent years. Data from Polish KUKE are available for the analysis for the period 2002 - 2010. Again, we have observations for period 1993 - 2012 for Czech EGAP and 1996 - 2012 for CEB. For detailed description of variables $\ln(export_{it})$, $\ln(distance_i)$, $\ln(GDP_{it})$, $\ln(promotion_{it})$, $\ln(population_{it})$ and $\ln(risk_{it})$ see Section 4.2.

We added several dummy variables to the model to differentiate effect of the three countries, type of the institution and product.

CZ and PL determinate domestic country of the exporter. For Slovakia, both
variables equal 0.

$bank$ and $insurance$ determinate the type of ECA. For CEB, $bank$ is set to
1 and $insurance$ is 0. In case of EGAP and KUKE, $bank$ equals 0 and
$insurance$ equals 1. Both dummy variables are set to 1 for Eximbanka
since this institution is a mixture of a bank and an insurance company
and provides products of both types.

bankproduct is set to 1 when we deal with bank product, namely credit, guarantee or refinancing, it is 0 otherwise.

Descriptive statistics (mean, standard deviation, minimum, maximum and number of observation) are summarized in Table 5.1. Our dataset contains more panel observations for country-year pairs (e.g. CEB and EGAP data for year 2000 for each exporting destination or Eximbanka's insurance and banking product for year 2011), thus we created a new variable as an interaction term for country, bank and bankproduct variables and used this variable to define our data as panel data in statistical software.

Table 5.1: Descriptive statistics - the Czech Republic, Slovakia, Poland

Variable	Obs	Mean	Std. Dev.	Min	Max
export	11499	$3.93*10^8$	2.161^9	3	$5.22*10^{10}$
promotion	12774	5952647	$4.07*10^7$	0	$1.26*10^9$
population	12199	$3.57*10^7$	$1.32*10^8$	13848	$1.35*10^9$
gdp	11316	$1.50*10^{13}$	$1.43*10^{14}$	$7.20*10^7$	$3.06*10^{15}$
distance	12747	5625.839	3831.317	0	18197
risk	9526	61.608	17.038	11	100

5.2 Results

First, we estimated the model using fixed effects. For comparison, model with random GLS effects is reported, nevertheless, the latter was strongly rejected by Hausman test. The countries for the analysis were not chosen randomly, missing data tend to occur in case of less developed countries and those are excluded from the analysis. Table 5.2 presents the results of the GLS regression analysis.

We estimated the static model using 8474 observations, 8286 observations were used in the dynamic model. All variables in fixed effect static model are significant on 1% significance level with the exception of the political risk. Political risk is significant on 5% significance level, although this variable is no longer significant in dynamic fixed effect model. After including the lag value of the dependant variable, export, R-squared noticeably increased (from 14%

Table 5.2: GLS regression - the Czech Republic, Slovakia, Poland

| | Static | | Dynamic | |
	RE	FE	RE	FE
export_lag			0.802***	0.493***
			(0.006)	(0.009)
promotion	0.066***	0.057***	0.026***	0.037***
	(0.003)	(0.003)	(0.002)	(0.003)
population	0.875***	2.089***	0.104***	1.307***
	(0.031)	(0.076)	(0.009)	(0.069)
GDP	0.086***	0.058***	0.047***	0.032***
	(0.006)	(0.006)	(0.005)	(0.005)
distance	-1.685***		-0.237***	
	(0.053)		(0.015)	
risk	1.393***	-0.288**	0.566***	-0.156
	(0.123)	(0.148)	(0.051)	(0.129)
constant	7.920***	-18.052***	-0.035	-13.197***
	(0.898)	(1.409)	(0.262)	(1.243)
n	8474	8474	8286	8286
R^2	0.639	0.135	0.902	0.526
Hausman p-value	0.00		0.00	

Source: Author's calculation
Note that *, **, *** denote significance at 10%, 5%, 1% level,
respectively.

to 53%), lag value of the dependant variable highly explains variations of the variable export as expected. Variable aggregate export promotion is significant and positive. Its coefficients suggest that an increase of newly covered business by 1% causes additional increase of exports by about 5.7% (static model) and 3.7% (dynamic model). Thus export promotion in three Visegrad countries proved to have an important effect on export from those countries. Our analysis showed that gravity equation of international trade fit data from Visegrad countries. Domestic companies export more to countries with larger markets size (measured by GDP) and to more populous countries (measured by population) because the two factors lead to higher demand for goods and indeed cause more opportunities for an exporter. The volume of export is negatively influenced by the distance of capitals of two countries (in random effect model).[1] Transport and information costs are an important factor for Visegrad exporter when choosing a potential destination for their goods or services. Political risk has a negative effect on the volume of exports. A possible explanation is that our dataset covers a long period including a turbulent period of transition of Visegrad countries and other Eastern European countries. Due to unstable conditions during the transition period, Eastern and Central European countries were evaluated as more risky. At the same time, Central and Eastern European countries were main destination for Visegrad exporters. If

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[1]Data for distance were obtained by taking logarithm of the distance from Prague, Warsaw and Bratislava.

we analysed shorter, more recent period, the coefficient of political risk would be likely to have a positive value.

To overcome the problem of exclusion of time-invariant variables from the fixed effect model, we estimated least squared dummy variables (hereinunder: LSVD) model. LSDV estimator whereby the unobserved individual characteristics are captured by sets of dummy variables for exporter-importer country pair and exporter time, importer-time country-time specific effects (Greene, 2014). The LSVD model is defined by

$$\log(export_{it}) = \beta X_{it} + \sum_{j=1}^{n} \gamma_j C_j + \sum_{s=1}^{t} \delta_s Y_s + \epsilon_{it}$$

where X_{it} denotes a full set of explanatory variables described above, C_j is a set of dummy variables identifying country destinations and Y_s are dummy variables denoting respective year. This model does not omit variables constant over time, therefore the explanatory variable *distance* and previously defined dummy variables are excluded from our analysis. Results of the LSDV analysis are reported in Table 5.3.

Table 5.3: LSDV regression - the Czech Republic, Slovakia, Poland

	LSDV
promotion	0.025***
	(0.002)
population	-0.009
	(0.078)
GDP	0.006
	(0.006)
distance	-0.859***
	(0.083)
risk	0.787***
	(0.006)
CR	1.415***
	(0.029)
PL	1.619***
	(0.038)
bank	-0.004
	(0.067)
bank product	0.081
	(0.059)
constant	16.594***
	(1.437)
n	8474
R^2	0.904

Source: Author's calculation
Note that *, **, *** denote significance at 10%, 5%, 1% level, respectively.

LSDV model reports high R-squared (90.4%). However, a lot of variation is captured by dummy variables, F-test of joint significance of dummy variables yeilds high test statistics hence dummy variables are jointly significant. Effect of export promotion is smaller than in GLS model, 1% increase in export promotion (in form of banking products and insurance coverage) causes volume of exports to increase by 2.5%. Population and GDP do not have significant impact on exports. Moreover, dummy variables describing the type of product and the institution do not have significant coefficients suggesting that exports are influenced similarly by both export promotion in form of insurance coverage and bank product. All types of ECAs institutional type have comparable influence on exports, whereas volume of exports is affected by the exporter's domestic country. Polish economy is the largest from the three observed Visegrad countries thus it is natural that Polish exports form the highest portion of all observed exports.

To overcome the problem of insignificance of key gravity model variables while estimating the LSDV model (due to numerous dummy variables), Baltagi et al. (2014) suggest the Poisson pseudo-maximum-likelihood (PPML) estimator. PPLM estimator for the (two-way) cross-sectional model can also be applied to the two-way (or even three-way) panel models with a large number of country pairs and a small number of time periods (N >> S) (Baltagi et al., 2014), as in our case. To account for possible heteroskedasticity, Santos Silva and Tenreyro (2006) recommend estimating the gravity model in levels rather than in logs. An advantage of this strategy is that information on zero bilateral trade (or in our case - export promotion) (Baltagi et al., 2014) may be used when identifying parameters without loosing some observations or creating inaccuracies by changes 0 value to 1. Results on PPML analysis in logaritmical form are reported in Table 5.4.

We analyse results of logarithmical form of PPML for clearer comparison with previous models and more intuitive interpretation of coefficients. Since PPML model was found to have an appropriate specification for our data, we extended the analysis. Four interaction variables were added to the PPML model to estimate effects of performance of ECA in the three countries, namely $promotion_{it} * cr$, $promotion_{it} * pl$, $promotion_{it} * bank$ and $promotion_{it} * bankingproduct$. The final model fits data well (R-squared=62.5%), all explanatory variables except variable $promotion_{it} * bank$ are significant. Moreover,

Table 5.4: PPML regression - the Czech Republic, Slovakia, Poland

	log	log
promotion	0.005***	0.007***
	(0.001)	(0.001)
population	0.038***	0.038***
	(0.001)	(0.001)
GDP	0.013***	0.013***
	(0.001)	(0.001)
distance	-0.075***	-0.074***
	(0.001)	(0.001)
risk	0.200***	0.197***
	(0.005)	(0.005)
CR	0.085***	0.101***
	(0.003)	(0.004)
PL	0.107***	0.114***
	(0.004)	(0.006)
bank	-0.040***	-0.049***
	(0.006)	(0.009)
bank product	0.062***	0.070***
	(0.005)	(0.008)
promotion*CR		-0.003***
		(0.001)
promotion*PL		-0.002***
		(0.001)
promotion*bank		0.001
		(0.001)
promotion*bank product		-0.002*
	(0.005)	(0.001)
constant	1.561***	1.553
	(0.026)	(0.026)
n	8474	8474
R^2	0.736	0.739

Source: Author's calculation
Note that *, **, *** denote significance at 10%, 5%, 1% level, respectively.

all variables have expected sign of their respective coefficients. PPML model reports lower values of the variable of interest - export promotion. 1% change in export promotion positively influences Slovak exports by 0.7% in case of insurance coverage provided by Eximbanka and by 0.007-0.002=0.005 or 0.5% for Eximbanka banking products. Czech export promotion provided by EGAP (insurance coverage) effects the volume of their exports by 0.007-0.003=0.004 thus 0.4% and by CEB by 0.007-0.003-0.002=0.002 or 0.2%. Analogically, Polish KUKE insurance coverage increases Polish exports by 0.007-0.002=0.005 or 0.5%. Coefficients of other explanatory variables have expected signs and their influance on export was discussed previously.

The magnitude of impact of ECAs in Visegrad countries is comparable with Auboin and Engemann (2012). They estimated that 1% increase in trade credit granted by the Berne Union members to a country leads to a 0.4% increase in real imports of that country.

We conclude that given the form of our dataset, PPLM estimator is appropriate and prefered. Values of coefficients in PPLM model suggest that both coefficients obtained by GLS and LSDV regression models were overestimated. Extended dataset provides evidence in favour of the conclusion derived in the previous chapter - export promotion in form of insurance coverage is more effective than banking instruments promoting exports. The export credit agency performing the most effectively on the territory of Visegrad Four is Slovak Eximbanka, followed by Polish KUKE and the two Czech export credit agencies.

Chapter 6

Conclusion

Empirical literature dealing with role of export credit agencies is very small. This thesis makes a valuable contribution to current literature by analysing a homogenous group of small, open economies with historical proximities but different export promotion schemes. The impact of export promotion on aditional volume of exports is analysed in European post-Communist countries throughout the whole transition period and turmoil period of financial crisis in recent years until year 2012. We focus on Visegrad countries.

The thesis is divided into three sections. First section provides theoretical backround to the analysis of export credit agencies. The second section uses the example of the Czech Republic and investigates the effect of different forms of export credit agencies. The last section merges datasets from three countries - the Czech Republic, Slovakia and Poland and using advanced econometric methods analyses the performance of export credit agencies in the region.

Exporters face multiple obstacles when entering foreign markets, e.g. incomplete information, political unrest or financial frictions. Government support exporting domestic companies to boost exports, hence the economy. Incentives for such public policies have emerged after the outbreak of the recent financial crisis. To prevent undesirable war of export subsidies and extremly advantageous credit terms, there was a need for international consensus. The OECD Arrangement on Officially Supported Export Credits and the Berne Union were established.

We divided countries according to their level of development, measured

by Human Development Index 2012, into four categories: highly developed countries, developed, less developed and the least developed countries. A distribution of exports towards each category of countries is approximately stable with decreasing share of exports to highly developed countries in favour of developed countries (in case of Poland and Hungary), whereas a distribution of export insurance promotion is very volatile. Decreasing share of insurance contracts to the least developed countries suggests that ECAs in the region tend to shift their insurance activities towards more commercial, less risky and marketable activities.

Data from three Visegrad countries provide evidence in favour of the hypothesis proposed by Chauffour et al. (2010) that ECAs worldwide successfully supported trade flows during the financial crisis and prevent financial markets from drying up. Visegrad export promotion in form of insurance and guarantees clearly follows trends in development of export volumes. Drop in both exports and insurance occured in 2009, fall in export was indeed much higher (-22% drop in exports and -10% drop in insurance coverage).

Gravity model of international trade fits data from the Czech Republic. Traditional explanatory variables (GDP, population, distance) are highly significant with expected signs of their coefficients. The effect of financial instruments provided by two forms of ECAs, namely bank and insurance company, on a volume of exports was estimated and compared using multiple specifications of gravity equation in extended time period 1993 - 2012 including almost all complete years of operation of Czech ECAs. Both types of ECAs led to additional exports, hence ECAs are successful in boosting international trade in the region. Insurance coverage and guarantees create slightly more additional exports (2.5%) than credit and financing (2.1%). Along with multiple advantages that ECAs providing insurance products have (such as low riskiness and sustainability), it is concluded that ECA in form of a insurance company is more effective and it creates more benefits for the governements.

An extensive dataset using data provided by five ECAs from the Czech Republic, Slovakia and Poland contains almost 13000 observations. After ommiting missing values, 8474 observations were further analysed. Dataset covers period 1993 - 2012 for Slovakia and the Czech Republic and 2002 - 2011 for Poland. Dynamic fixed effect GLS model was analogically estimated. Since

fixed effect models ommit time invariant variables, in order to improve obtained results, LSDV approach was used. A disadvantage of LSDV approach is that large set of dummy variables has a significant impact on the volatility of the explained variable, moreover, many explanatory gravity model variables did not have significant coefficients with desirable signs. Thus PPML model was estimated resulting in high R-squared and significant variables in lines with traditional gravity equation. PPML confirms results presented in previous chapter - ECA in form of insurance company performs more effectively. The ECA with a currently most successful performance is Slovak Eximbanka. 1% increase in Eximbanka's financial activities creates 0.7% (insurance products) and 0.5% (bank products) of additional volume of exports, followed by Polish KUKE (0.5%), EGAP (0.4%) and CEB (0.2%).

An alternative ad more complex solution to gravity models estimation is non-linear generalized method of moments estimation, proposed by Greene et al. (2014). This approach also avoids well-known problems of the fixed effects approach, such as the huge loss of degrees of freedom, identification of the effects of all covariates, estimation on large data sets etc. Moreover, it provides consistent parameter estimates in the face of potential endogeneity, so long as the moment conditions used are valid.

Alternatively, analysis of export credit guarantees might be extended by using firm-level data. This approach is recommended in current literature in line with working papers published by Badinger and Url (2013), Felbermayr and Yalcin (2013) and Volpe and Carballo (2010). The authors used firm-level data and different matching techniques with treated (firms benefiting from export subsidy) and control groups. Nevertheless, it is extremely complicated to access microeconomic data on firm level because they are classified as sensitive and nonpublic and they are protected by bank secrets in case of Slovak and Czech jurisdictions.

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Appendix A

International Trade in Visegrad Four Countries

Table A.1: Export outflows

	1	2	3	4	TOTAL
Czech Republic					
1994	11974	652	538	52	13215
1995	19060	923	487	60	20530
1996	18944	989	472	68	20473
1997	19942	894	405	52	21294
1998	25179	1074	431	59	26744
1999	24998	841	353	76	26268
2000	26854	1162	391	53	28459
2001	30943	1187	452	61	32643
2002	40892	1599	728	79	43298
2003	45277	1750	652	58	47738
2004	60652	2692	972	127	64443
2005	70013	3485	1271	167	74936
2006	84965	4675	1590	226	91456
2007	108820	6229	2468	248	117766
2008	127098	7966	2663	451	138177
2009	98937	5748	2647	320	107652
2010	114365	6853	3525	380	125123
2011	143404	8740	4181	395	156720
2012	135714	9681	4043	369	149808
Slovakia					
1994	5722	344	225	20	6311
1995	7228	493	191	28	7940
1996	6563	390	114	12	7078
1997	8384	527	119	18	9048
1998	9612	468	91	7	10179
1999	9381	377	101	39	9897
2000	11108	429	158	24	11719
2001	11824	447	132	30	12432
2002	13516	563	136	20	14234
2003	17640	855	238	16	18748
2004	22079	1201	262	33	23576
2005	24490	1671	383	58	26602
2006	32006	2379	517	83	34985
2007	39677	3677	850	104	44308
2008	37858	4945	1166	114	44083
2009	29948	3754	1207	99	35008
2010	46379	4396	1723	88	52586
2011	56690	5024	2530	98	64341
2012	67439	5077	2226	109	74852

Source: Comtrade, HDI, author's calculation

Table A.2: Export outflows, cont.

	1	2	3	4	TOTAL
Poland					
1993	11161	883	522	169	12734
1994	13638	935	442	102	15116
1995	18506	1671	509	115	20802
1996	19203	1909	605	159	21876
1997	19720	2291	621	118	22749
1998	23033	2128	481	93	25735
1999	24103	1710	537	211	26562
2000	27386	1887	461	176	29910
2001	18471	2333	600	265	21670
2002	35289	2625	552	198	38664
2003	44283	3668	721	172	48843
2004	60080	5534	1368	222	67204
2005	71270	7222	1838	281	80611
2006	85946	10052	2099	301	98399
2007	115029	13614	2456	444	131543
2008	131221	17106	3360	364	152051
2009	107554	11311	3355	558	122778
2010	122287	13739	3780	705	140511
2011	140437	17060	4600	523	162620
2012	66195	18221	4670	686	89773
Hungary					
1993	6123	706	206	39	7075
1994	42168	4167	995	220	47549
1995	9605	1138	248	47	11038
1996	9946	953	200	43	11143
1997	15657	1077	202	45	16980
1998	19436	1448	236	30	21150
1999	22883	1288	234	36	24442
2000	25118	1574	230	27	26949
2001	27049	1856	367	30	29303
2002	30508	2193	430	62	33192
2003	37078	2746	546	79	40449
2004	47339	4218	866	80	52502
2005	49150	5779	1204	220	56353
2006	55010	8350	1848	449	65657
2007	70888	10953	2441	506	84788
2008	75436	14217	2640	319	92613
2009	60003	9861	2260	109	72233
2010	68258	12101	3080	135	83574
2011	79704	15113	4007	231	99055
2012	75974	14788	3635	374	94771

Source: Comtrade, HDI, author's calculation

Appendix B

Portfolio of Products

Table B.1: Bank products

	CR	SK	PL	HU
Pre-export credit	Yes	Yes	No	No
Direct export supplier credit	Yes	Yes	No	Yes
Direct export buyer credit	Yes	Yes	Yes	Yes
Indirect export buyer credit	Yes	Yes	Yes	Yes
Credit for investment abroad	Yes	Yes	No	Yes
Refinancing of supplier's export credit	Yes	Yes	No	Yes
Refinancing of buyer's export credit	Yes	No	No	Yes
Forfaiting	Yes	Yes	Yes	Yes
Purchase of export insured receivables	Yes	No	Yes	No
Non-payment bank guarantees	Yes	Yes	Yes	No
Payment bank guarantees	No	Yes	No	No

Source: Janda et al., 2013b

Table B.2: Insurance products

Insurance of	CR	SK	PL	HU
Short Term Export Supplier Credit	Yes	Yes	No	Yes
Short Term Export Supplier Credit Financed by a Bank	Yes	No	No	Yes
Medium and Long Term Export Supplier Credit	Yes	Yes	Yes	No
Medium and Long Term Export Supplier Credit Financed by a Bank	Yes	No	No	No
Export Buyer Credit	Yes	Yes	Yes	Yes
Confirmed Letter of Credit	Yes	Yes	No	No
Credit for Pre Export Financing	Yes	Yes	No	No
Investment of Domestic Legal Persons Abroad	Yes	Yes	Yes	Yes
Credit for the Financing of Investments of Domestic Legal Persons Abroad	Yes	Yes	No	No
Prospection of Foreign Markets	Yes	No	No	No
against the Risk of Inability to Fulfil an Export Contract	Yes	Yes	No	No
Bank Guarantees Issued in Relation to an Export Contract	Yes	Yes	No	Yes
Short Term Export Receivables	No	No	Yes	No
Leasing	No	No	Yes	Yes

Source: Janda et al., 2013b