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Topic:

Political risk, export credit insurance and trade: A gravity model analysis of South Africa

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I, Thabiso Luyolo Poswa, declare that:

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Abstract

This study adds to the literature on political risk, export credit insurance, and trade. Specifically, the study aims to consider the effect political risk and export credit insurance may have on South African exports using an extended gravity model framework and regression analysis from 1996 - 2018. Gravity models and estimation techniques differ in the literature. Methods include the Fixed Effects (FE), Random Effects (RE), and more recently, using the Poisson-Pseudo Maximum Likelihood (PPML). The PPML is the preferred estimation technique of this study as it reduces the bias problems resulting from zero trade flows and potential heteroscedasticity (Santos Silva and Tenreyro, 2006). In addition, this is further justified as Santos Silva and Tenreyro (2011) and Martin and Pham (2020) argue that the PPML estimation technique is also more appropriate than the traditional FE and RE estimation techniques. Thus, considering these limitations, using the preferred PPML estimation technique, this study finds that political risk significantly undermines trade. However, the export credit insurance variable is insignificant and does not play an influential role in South Africa's bilateral trade. Additionally, other attributes, including the role of market power as measured by Gross Domestic Product (GDP), distance, and the regional groupings of African states through SADC, have important bearings. An important implication is that African countries' inability to harness the gains from trade might be rooted in factors beyond trade finance constraints and more related to political risks and geographical constraints.

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Chapter 1 Introduction

1.1 Introduction

There are several political and socio-economic conditions prevalent in political regimes which may affect foreign investment, and these include, amongst others, political risk, tax policy, and state policies impacting macroeconomic performance (Jensen, 2008). Political risk encompasses three main elements, namely (i) expropriation, (ii) political violence, and (iii) currency inconvertibility. Political risk assesses the profitability of an investment in a foreign country through a critical analysis of the country's political stability, business environment, and legal institutions (Hill, 1998).

Political risk stemming from expropriation is less prevalent today, as there are few cases cited. Compared to expropriation risk, political risk arising from political violence is more prevalent today and adversely affects market conditions, as civil unrest may deter Foreign Direct Investment (FDI) (Kesternich and Schniter, 2010). On the other hand, currency inconvertibility arises when the host country imposes discriminatory taxation or blocks the host country's flow to the home country (Khattab, Anchor and Davies, 2007).

Export promotion can be conducted through governments providing subsidies to export industries' inputs, production, or sales. On the other hand, export credit agencies and schemes are also essential to trade (Moravcsik, 2006). Moravcsik further argues that the formation, maintenance, and success of export credit schemes to enhance export incentives and trade depends on the structure of domestic financial institutions, and the functional value of reliable information exchanged within a regime can prevent financial crises.

A consequence of much financial crisis is the collapse of exports (Amiti and Weinstein, 2011). According to Amiti and Weinstein (2011), exports are more

sensitive to economic shocks due to higher default risk and the higher working capital requirements associated with bilateral trade.

Political instability and corruption can also hamper international trade patterns (Anderson and Mercouiller, 2002). Anderson and Mercouiller note that contracts may not be enforceable across borders or regions. Customs officials may extort bribes, and shipment may be ceased or hijacked, which altogether adversely affects trade (Anderson and Mercouiller, 2002). Concerning South African exporters, Sequeira (2016) argued that bribery in Mozambique for tariff evasion is a form of corruption that can increase trade costs for South African exporters. According to Fitch Solutions (2021), in 2019, 27,9% of Mozambique's imports were from South Africa. It is also good to highlight that Mozambique and South Africa share a common border, and both countries are members of the Southern African Development Community (SADC). Corruption is not only limited to Mozambique. Lodge (1998) noted that bribery scandals occurred throughout Southern Africa at several ports. And Callebert (2012) stresses that custom officials in Southern Africa often use bribes and social connections, increasing trading costs.

Political risk is not a phenomenon limited to African countries; developing countries, in general, are politically risky (Collier and Pattillo, 2000; Asiedu, 2006; Osabutey and Okoro, 2015). South African exporters face the ongoing challenge of political risks and higher trading costs associated with exporting to African countries.

To counter the harmful effects of political risk, Export Credit Agencies (ECAs) provide insurance for political risk. Subject to contractual terms and conditions, an export credit insurer will guarantee that if an importer fails to pay for goods and services purchased, the insurer will indemnify the exporter. ECAs provide insurance for exports and reduce the political risk for trading partners (Auboin and Engemann, 2014).

Export credit insurance mitigates the impediments to international trade flows by transferring the risk that an importing firm experience. The shift in the risk of failure to honor payment from the exporting firm to the ECA provides the exporting firm with the assurance that the exporting firm will recover all monies owed. Governments can promote exports by establishing ECAs that grant export credit insurance to exporting firms faced with political risk (Moser, Nestmann and Wedow, 2008).

In the international trade literature, evidence on the link between political risk, trade finance (credit or insurance), and trade is scarce. This is because political risk and trade finance data are hard to come by and are generally limited. However, recently, a growing number of studies aim to estimate the effects of trade finance and trade while controlling the exposure to political risks. These studies include Badinger and Url (2013), who investigate export credit guarantees by the Austrian ECA, using firm-level data on a cross-section of Austrian exporting firms for the year 2008. They find that key factors in export guarantee usage include firm size, exposure to revenue risk, research and development intensity, and being part of a multi-national corporation (MNC).

It is important to explicitly clarify that ECA's provide export insurance to domestic firms that are engaging in the export of goods and services in international markets. While exporting firms are insured against non-payment by importing firms, multinational businesses may also be allowed to purchase political risk insurance to mitigate certain political risks.

1.2 Background and context

Most ECAs are established to promote international trade and alleviate financial impediments experienced by firms exporting goods and services in international trade (Chauffour, Sabrowski and Soylemezoglu, 2010). ECAs are usually state institutions mandated to facilitate the promotion of exports by local firms. Most countries have established one or more ECAs. ECAs can be established as government departments; government agencies; independent institutions partly

owned by the government, or as private insurance companies (Gianturco, 2001). In South Africa export credit insurance is administered by the Export Credit Insurance Corporation (ECIC) of South Africa. The ECIC is the official South African export credit insurer. The ECIC acknowledges that political risk is an impediment to trade. Thus, export credit insurance is granted to cover exporters against political risk and assist in the promotion of exports (ECIC, 2018). The ECIC is a state-owned national export credit agency established in 2001 for providing political and commercial risk insurance to South African exporters of capital goods and services.

Figure 1-1 below depicts the percentage of South African capital goods exported that are insured through export credit insurance by the ECIC and the percentage of South African goods exports that the ECIC insured.

Figure 1-1: Percentage of insured exports

(Source: Own calculations based on data from UNCTAD and the ECIC)

In figure 1-1, it is noted that while a large amount of non-capital South African goods are exported without export credit insurance, in recent years, the export of capital goods is increasingly insured. Also, it is good to point out that in the last year 2017, 2.84% of total South African exports were insured against political risk of which 20.97% of capital exports were insured against political risk.

The scope of work and objectives of an ECA may differ from country to country. However, most ECAs are established on the grounds of market imperfections present within the market for export credit insurance. A lack of export credit insurance gives rise to high risks towards exporting firms and limits a firm's exports (Moser Nestmann and Wedow, 2008). Hence, the primary focus of an ECA is centered on removing and/or reducing uncertainties as well as risks within international trade.

On a more recent note, the ECIC has been engaging with partner trade groups, such as the Africa Export-Import Bank (AfreximBank). The partnership between the ECIC and the Afrexim Bank was established in order to facilitate trade and investment opportunities in Africa (ECIC, 2019). The ECIC is also conducting discussions with the New Development Bank (BRICS Bank) on how the partnership could facilitate greater trade opportunities between the member states. The ECIC has committed to working together with, as well as strengthening the cooperation of the BRICS ECAs (Global Africa Network, 2019).

The New Trade Theory builds models of international trade that factor in geographic transaction costs. Through the inclusion of economic geography, the new trade theory can be described as a genre of economic analysis that tries to explain the spatial structure of the economy (Krugman, 1998). According to Krugman (1998) in studies on the theoretical formulations of economic geography theory, transportation and transaction costs are essential. Transport costs can undermine the Dixit-Stiglitz (1977 and 1993) model's assumption of constant demand elasticity; however, this problem can be side-stepped through an additional assumption, first introduced by Paul Samuelson (1952) that in international trade theory, a fraction of any good shipped "melts away" in transit, therefore, transport costs are incurred in the imported goods, which support the view that transport costs can hamper international trade.

According to Grant (1994) the lack of sensitivity to geography by classical trade theory economists partly explains why there is no overall theoretical framework guiding spatial geographical research on international trade. The new trade theory attempts to address the shortcomings of classical trade theory by dealing with trade realities more sophisticatedly and considers the political economy of trade (Deraniyagala and Fine, 2001).

In the new trade literature, political risk is considered a cost and determinant of bilateral trade (Ranjan and Lee, 2007; Pomfret and Sourdin, 2010; Head and Mayer, 2013). And, poor institutional quality and lack of contract enforcement regulation can lead to higher transaction costs, which have an overall negative effect on the gains from trade (Hou, Wang and Xue, 2021). Also, according to Oh and Reuveny (2010), higher levels of political risk reduce bilateral trade substantially. Further, Oh and Reuveny (2010) view political risk as a transport cost, additions of which decrease bilateral trade amongst national economies.

Due to uncertainty in international markets, exporters may face the challenge, such as breaches in contract and the insolvency of the importer or the importer experiencing capital losses. Kouvelis and Zhao (2011) provide an example of a Chinese company where a Chinese exporting firm could not receive the entire payment for shipped goods due to the unexpected bankruptcy of its client's firm in Korea. With the purchase of export credit insurance, the Chinese exporter was indemnified and could recoup the remaining funds by collecting the defaulted claim from an export insurance agency (Hongping, Gongbing, Xiaoyong, Dong, 2020). ECAs thus represents an essential mechanism in financing international trade. Export credit insurance provided by ECAs is a tool that exporting firms can use to mitigate adverse trade effects and financial constraints experienced in international trade (Badinger and Url, 2013).

Exporting firms can obtain export credit insurance to alleviate the risk of non-payment for the goods and services they export to high-risk markets, located mostly

in developing countries (Abraham and Dewit, 2000). Additionally, recent studies (Chen and Wang, 2012; Jing et al., 2012 Kouvelis and Zhao, 2012; Yang and Birge, 2018) found that export credit insurance is beneficial for exporters and assists in boosting the sales of the exporters products and improving profitability. Auboin and Engemann, (2014) and Ahn, Amiti and Weinstein (2011) argued that the lack of export credit insurance contributed to the Great Trade Collapse in 2009, in the aftermath of the global financial crisis. According to Martin and Sunley (1996), an exporter may eliminate the risk of the importer's defaulting by using services of an export credit agency. Martin and Sunley (1996) further showed that exporters relied heavily on export credit insurance when destined for crisis-afflicted countries. Therefore, a lessened ability to insure against trade-related risks reduces international trade flows during times of crisis.

The new trade theorists also explore how transport costs cause international differences in the price of goods and ultimate revenue derived (Neary, 2009). An economic model used by many studies to investigate trade-related risks and transport costs is the gravity model of trade. The gravity model seeks to empirically demonstrate the geographic dynamics of new trade theory and spatial economics (Binh, Duong, and Cuong 2014). The gravity model incorporates the effects of spatial distance and costs across geography and includes variables such as distance, common language, common colonizer and landlocked (Anderson and Van Wincoop, 2004). Gravity models and estimation techniques differ in the literature. Methods include the Ordinary Least Squares (OLS), Fixed Effects (FE), Random Effects (RE), and more recently, the use of the Poisson-Pseudo Maximum Likelihood (PPML). The PPML estimation method is increasingly a preferred technique as it reduces the bias problems resulting from zero trade flows and potential heteroscedasticity (Santos Silva and Tenreyro, 2006). In recent years, studies on trade have increasingly used the PPML model (see Linders, Burger and van Oort, 2008; Burger, van Oort and Linders 2009; Martínez-Zarzoso 2013; Martin and Pham 2020). With this in mind, the study aims to use various alternative estimators of the gravity model, including the lower bias PPML in finding evidence of a relationship between political risk, export credit insurance and trade in South Africa.

1.3 Problem statement and significance of study

Against the above background, political risk is a transaction cost to international trade, and the provision of export credit insurance by ECAs can provide exporters with a way to reduce transaction costs. Essentially, political risk can impede trade and export credit insurance can facilitate international trade.

On the 27th of August 2019, the National Treasury of South Africa (National Treasury, 2019) published an economic policy paper titled, *"Economic transformation, inclusive growth, and competitiveness: Towards an Economic Strategy for South Africa."* Notably, the National Treasury recommends increasing trade through export promotion and lists 'export credit insurance' as a driver for promoting exports. Additionally, exporters need to be aware of the political dynamics of the country in which the exporters are trading with:

> "*South Africa needs to prioritize strategic regional value chains that facilitate mutually beneficial trade, considering the political dynamics of the countries we intend to trade with*" (National Treasury, 2019, p52).

This dissertation sets out to examine how exposure to political risk and export credit insurance between countries impacts the flows of bilateral trade for South Africa. The outcomes of this study should be useful to policymakers. Also, this study adds to the limited literature on this research topic. And the findings of this study may also identify other important factors for bilateral trade, thus providing additional insight for policy formulation.

1.4 Study objectives

The objective of this study is achieved using data, sourced from prominent online sources, to address the following specific aims:

- To investigate whether political risk affects South African exports.

- To investigate whether export credit insurance affects South African exports.
- To determine the extent to which political risk and export credit insurance have an impact on bilateral trade.

1.5 Structure of the study

Chapter 1 sets the background to the study. Chapter 2 then discusses the conceptual framework of political risk and export credit insurance in the South African context. Chapter 3 provides a survey of the theoretical, and empirical literature on political risk and export credit insurance. Chapter 4 provides a description of the model, data and methodology used in this study. The estimated results are presented and discussed in Chapter 5. Finally, chapter 6 concludes the study including some policy recommendations.

Chapter 2 The nature and measures of political risk and export credit insurance and trade in South Africa

2.1 Introduction

The purpose of this chapter is to provide an overview of the nature and measures of political risk, export credit insurance and trade in South Africa. This chapter first provides an in-depth discussion of the three main elements making up political risk, namely, (i) expropriation risk, (ii) political violence risk and (iii) currency inconvertibility risk. This chapter then discusses how political risk is measure, encompassing (i) the economic component, (ii) the financial component, (iii) the political component and three the composite risk rating. This chapter then discusses the market for export credit insurance. This discussion provides an overview of export credit insurance including the definition of export credit insurance, an overview of the general framework for export credit insurance and export credit agencies. This discussion further includes a discussion of the export credit agency mandated to provide credit insurance to South African exporters, and the recent partnerships entered by the South African export credit agency. In conclusion, the chapter discusses the evolution of trade policy in South Africa.

2.2 Definition and elements of political risk

There is no generally accepted definition of political risk. Baas (2010) highlights three schools of thought, each of which has different views on the definition of political risk. First, the *Catalogue School* equates political risk to the interference of government in business transactions. Second, the *System Event School* considers political risk to be a product of system failure and third, the *Micro Analysis School* contends that political risk arises from over nationalization of industries and firms (Baas, 2010).

The most significant claims against political risk insurance occurred during the 2002 Argentinian financial crisis. The reasons for the claims were the failure of the Argentinian government to honor contracts with foreign firms, and the restriction of capital transactions of foreign firms (Jensen, 2008). According to Badinger and Url

(2013), cash transactions are rare in international trade. More often an exporting firm grants credit to an importing firm, thus resulting in a payment delay. The payment delay by the importing firm creates the risk of non-payment by the importing firm, as the exporting firm needs to collect payment.

Weston and Sorge (1972) define political risk as:

> "*risks (that) arise from the actions of national governments which interfere with or prevent business transactions or change the terms of agreement or cause the confiscation of wholly or partially foreign owned business property*" (1972, p60).

MNCs conducting business in developing countries face some potential form of violation of property rights by the government (Graham, Johnston and Kingsley, 2018). The potential violation can be considered as a political risk (Root, 1968 and Graham; Johnston and Kingsley, 2018). The elements constituting political risk are further expanded and discussed in the next section.

2.2.1 Expropriation

According to Khattab, Anchor and Davies (2007) expropriation is the confiscation of an investment by the host government. Jensen, Malesky and Weymouth (2014) state that expropriation by the host government is only one of several different types of risk that investors are concerned about when considering a new business venture. Jensen, Malesky and Weymouth argue that expropriation may occur in several forms, including outright theft, executive overpayment, and asset stripping.

Expropriation occurs when the host government confiscates an investment by an MNC without providing reasonable compensation for the confiscation (Wang, Chung and Tzeng, 2000). The seizure may occur by a host government nationalizing an essential facility or a host government changing policy and taxation regimes after a project is complete to benefit from the profits associated with the given project

(Wang, Chung and Tzeng 2000). Therefore, expropriation risk is a term used to describe a host governments' actions that result in the involuntary divestiture of international investor's ownership of its FDI projects.

2.2.2 Political violence

According to De Jong (2010) political violence includes acts of war, terrorist attacks, state violence, which affects both local and international communities. Jensen and Young (2008) supplement De Jong (2010) and further posit that political violence is detrimental to local communities and negatively affects the host country's economic development.

Political violence can be viewed as the exercise of physical force with the direct intention to cause harm to the welfare of a foreign investor (Neumayer, 2004). Neumayer (2004) states that political violence is directly correlated with political instability. Political violence is regarded as an essential ingredient to the broader notion of political instability. (Neumayer, 2004; 260) defines political instability as a situation where:

> *"a host government has been toppled, or is controlled by factions following a coup, or where basic functional pre-requisites for social-order control and maintenance are unstable and periodically disrupted".*

2.2.3 Currency inconvertibility

Executives of MNCs consider currency inconvertibility as having a high impact on their companies' risk assessment before investing in a country (Graham, Johnston and Kingsley, 2018). Currency inconvertibility is often overlooked in political risk literature, and this may be because MNCs have identified currency inconvertibility as being infrequent (Graham, Johnston and Kingsley, 2018). Graham, Johnston and Kingsley (2018, p34) define currency inconvertibility as:

> *"The risk that foreign investors will be restricted from converting and transferring hard currency out of the host country".*

Currency inconvertibility deprives foreign investors of the benefits associated with the ownership of assets (Kobrin, 1979). Graham, Johnston and Kingsley (2018) state that host government policies aimed at currency inconvertibility are a means for governments to extract wealth from international investors. According to Jensen (2005) currency inconvertibility risks emerge during periods of financial crisis and are more common in developing countries. Currency inconvertibility risks occur when a host government converts a firm's savings into the local currency or refuses to honour the originally agreed prices and instead pays for services in the devalued local currency (Kobrin, 1979). Lastly, as Jensen (2005) stated, the risk of irredeemable currency is also detrimental for international investors and restricts capital flows for MNCs.

2.3 Measuring political risk

2.3.1 Overview

The ICRG provides a global clientele with political, economic, and financial risk ratings and forecasts for 140 countries. Leading investors and multinational firms use ICRG data. ICRG is the only political risk methodology and data series accepted by courts in commercial disputes involving the valuation of political risk (PRS, 2020).

The ICRG rating is made up of 22 variables, within three separate categories. These categories include (i) political category, (ii) financial category, and (iii) economic category. The political category comprises of the largest rating and thus based on 100 points, the financial and economic categories are based on 50 points each. Financial Risk on 50 points, and Economic Risk on 50 points. The total points obtained from the three categories are divided by two and produce the weightings for inclusion in the composite political risk score. As an index, the composite political risk score ranges 0 to 100. The index can be further separated into scores between 80 and 100, thus indicating extremely low risk countries, which indicate very high-risk countries (PRS, 2020).

2.3.2 Political risk rating

The political risk rating assesses the political stability of a country. Points are assigned to a group of factors called political risk factors. The minimum points that can be assigned to each component is 0 and the maximum 100. A high-risk point indicates low risk, and a low-risk point indicates greater risk.

2.3.3 Economic risk rating

The Economic Risk Rating provides a means of assessing the strengths and weaknesses of a country. When a country's strengths outweigh the weaknesses, the country is low risk, and when the countries weaknesses outweigh the strengths, the country is high risk. The minimum points that can be assigned to each component is 0 and the maximum 100. A high-risk point indicates low risk, and a low-risk point indicates greater risk.

2.3.4 Financial risk rating

The Financial Risk Rating aims to provide a means of assessing a country's ability to repay its financial obligations. The Financial Risk Rating is measured by assigning risk points to a group of factors, termed financial risk components. The minimum points that can be assigned to each component is 0 and the maximum 100. A high-risk point indicates low risk, and a low-risk point indicates greater risk.

2.3.5 The composite risk rating

The political risk rating contributes 50%, the financial rating contributes 25% and the economic risk rating contributes 25% of the composite rating. The calculation of the composite risk rating is shown below:

$$CPFER\ (country\ X) = 0.5\ (PR + FR + ER)$$

where

CPFER = Composite political, financial and economic risk ratings

PR = Total political risk indicators

FR = Total financial risk indicators

ER = Total economic risk indicators

The highest overall composite risk rating of 100 indicates the lowest risk, and the lowest overall composite risk rating of 0 indicates the highest risk. Table 2-1 illustrates the overall political risk rating level of an individual country.

Table 2-1:Political risk rating

Risk Level	Points
Very High	00.0 to 49.9
High	50.0 to 59.9
Moderate	60.0 to 69.9
Low	70.0 to 79.9
Very Low	80.0 to 100

Source: Political Risk Services Group

Table 2-1 shows the political risk rating. As depicted in the table, a country's political risk rating is ranked from very low to very high. Suppose a country has a risk rating between 80 to 100. In that case, it has a shallow political risk. If a country has a risk rating between 60 and 70, the country is then considered moderately risky. If a country has a political risk rating below 49, the country is in a precarious position and very risky.

2.4 Export credit insurance

2.4.1 Overview

Exporting firms face uncertainties with regards to their exporting strategies (Kunreuther and Kleindorfer, 1983). According to Moravcsik (1989), export credit

support manifests itself in the form of insurance for bank loans, or direct government funding. Export credit insurance involves exporting firms insuring themselves against the risk of a non-payment by an importing firm (Chauffor, 2010). The export credit insurer undertakes to reimburse the exporting firm in the event of non-payment (Chauffour, 2010). Dorozynski and Dorozynska (2016, p149) define an ECA as:

> "*An institution that finances and supports export and exporters by granting direct loans/borrowings, offering guarantees and insurance to commercial banks and exporters, and assuming risk that accompanies a given transaction*".

ECAs differ in size, structure and the type of activities they provide. ECAs further differ in terms of their philosophy and orientation (Seringhaus and Botschen, 1991). Export credit insurance falls within the domain of trade finance and is also known as trade credit insurance, credit insurance and business credit insurance. Export credit insurers provide insurance on trade credits. The provision of insurance on trade credits has the effect of reducing the political risks associated with international trade (Auboin and Engemann, 2014). Depending on the ECAs' philosophy, an ECA may also provide insurance for commercial risk. Commercial risk may for instance, include the risk of loss or alteration of the goods in transit.

2.4.2 The Export Credit Insurance in South Africa

The Export Credit Insurance Council (ECIC) in South Africa aims to remove and/ or reduce uncertainties and risks in international trade. The ECIC largely focuses on providing export credit insurance to South African exporters firms trading with African countries deemed highly risky (ECIC, 2018). The ECIC provides export credit and foreign investment insurance for both commercial and political risk (Engineering News, 2019). These include political (100%) and commercial (up to 85%) risk insurance cover (ECIC, 2018). Insurance cover for capital goods and related services for losses arising from the following risk events are covered by the ECIC (Berne Union, 2019):

Political Risk Events

- Expropriation, Nationalization and Confiscation, of any material part of the business or assets of the exporter.
- Civil Disturbance and War – losses incurred as a result of acts of war, revolution, insurrection, civil war and civil commotion.
- Currency Inconvertibility – losses incurred due to action taken by the host government that prevents the conversion of a local currency into the SA Rand or US Dollars or the transfer of SA Rand or US Dollars outside that country.
- Breach of Contract – loss incurred due to a host government's breach of contractual obligation(s).
- Protracted Default – payment default by a sovereign borrower/ guarantor or state-owned entity.
- Change in Law – discriminatory regulation by the host government that prevents the normal business operations of the enterprise.
- Acts of terrorism and piracy are covered on a case-by-case basis.

The ECIC has been engaging with partner trade groups, such as the Africa Export-Import Bank (Afrexim Bank), and the BRICS trade bloc. The BRICS-ECIC partnership has conducted discussions relating to a range of topics, including establishing a partnership between the ECIC and the Afrexim Bank, and trade and investment opportunities in Africa. The ECIC is also conducting discussions with the New Development Bank on how the partnership could facilitate greater trade opportunities between the BRICS member states (Global Africa Network, 2018a).

In the most recent year 2018, the ECIC and the Afrexim Bank have established a partnership to the value of $1 Billion to stimulate intra-Africa trade between South Africa and the rest of Africa. The program is termed the South African – Africa Trade

and Investment Promotion Program (SATIPP) (Global Africa Network, 2018b and ECIC, 2019). Under SATIPP the ECIC and Afrexim Bank collaboration aims to:

> *"identify, prepare and appraise trade transactions and projects; explore co-financing and risk-sharing opportunities; and share knowledge, with particular emphasis on intra-African trade matters, through technical cooperation, staff exchange, research and joint events"* (Global Africa Network, 2018b).

The priorities of SATIPP include deepening intra-African trade, industrialization, and export manufacturing and promotion. SATIPP offers numerous opportunities to South-African-based entrepreneurs expanding to the rest of Africa, including trade and project financing, guarantees, export logistics facilitation, capacity-building, and trade information or advisory services (Global Africa Network, 2018b). SATIPP aims to promote and expand intra-Africa trade and investment.

2.4.3 Recent trends in South African trade

The Figure 2-1 below depicts SA Intra-Africa trade, whereby, during the period 2003 to 2017, South Africa accounted for the largest proportion of intra-African trade estimated at 19%.

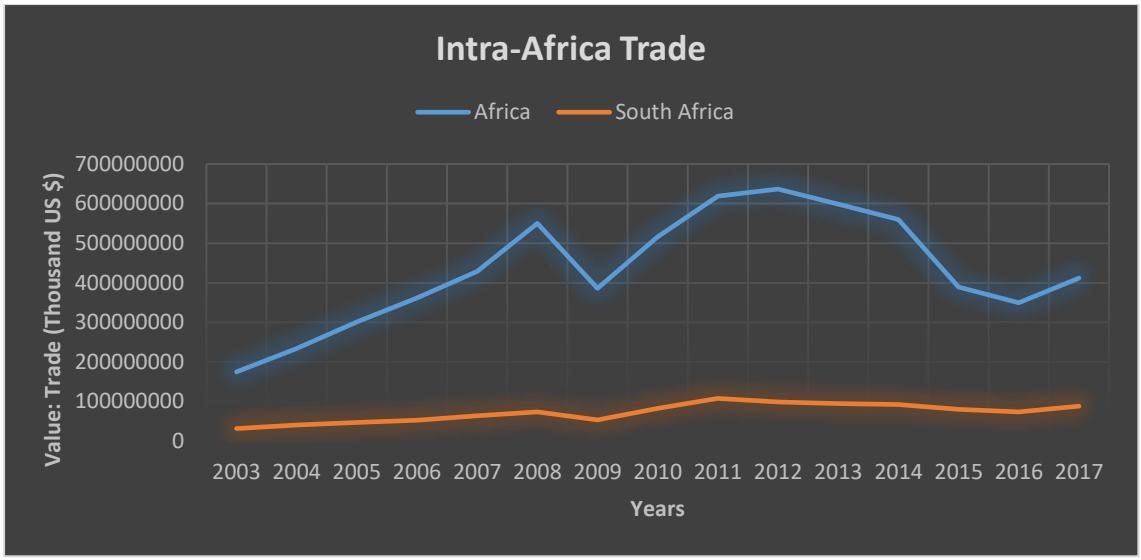

Figure 2-1: Intra-Africa trade

(Source: World Integrated Trade Solutions database)

A distinct fall can be observed in intra-Africa trade and South African intra-African trade from 2008 to 2009. During these periods, intra-African trade and South African intra-Africa trade have declined by 16.2% and 14.7%, respectively. Similarly, there was a decline in both intra-SADC and South African exports to SADC during 2008 and 2009 as shown in Figure 2-2. During these periods, intra SADC exports and South African exports to SADC fell by 3.9% and 4.8%, respectively. This drop in trade coincides and may be attributable to the 2008/2009 global financial crisis.

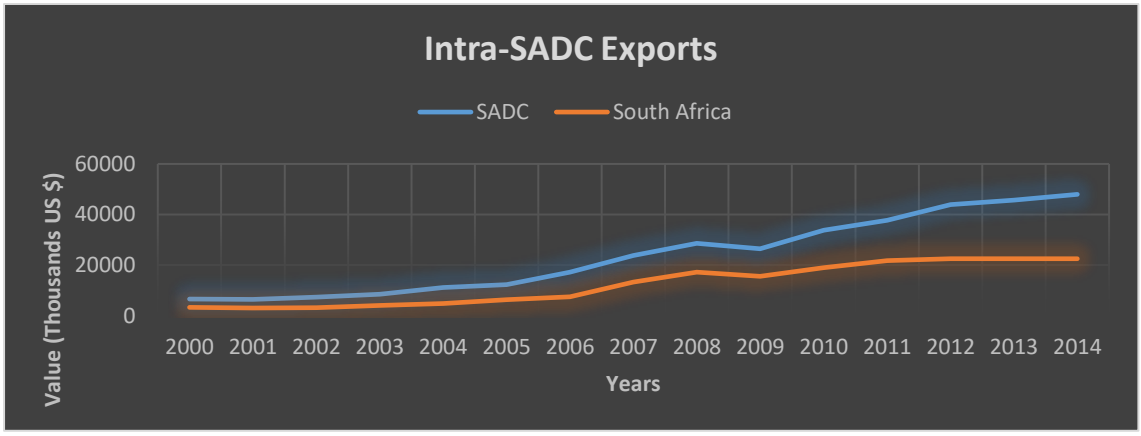

Figure 2-2:Intra-SADC Exports

(Source: Southern African Development Community database)

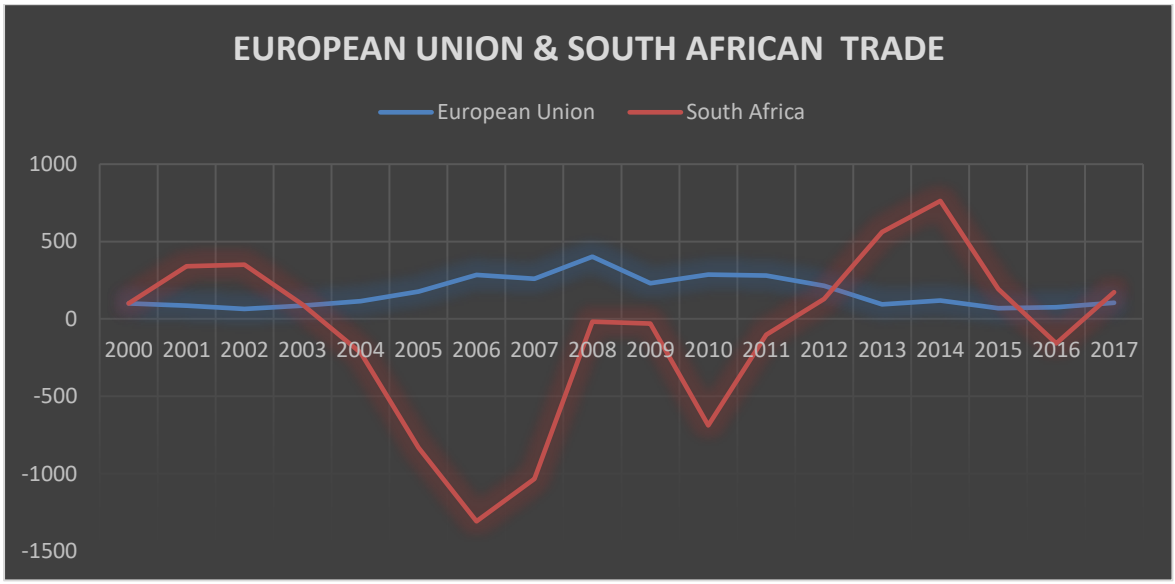

Figure 2-3:European Union & South Africa trade

(Source: United Nations Conference on Trade and Development data)

The Figure 2-3 above illustrates the trade trends in the European Union against the trade trends in South Africa (indexed to 100). Since 2000 the European union consistently achieved a positive index, unlike South Africa, showing greater volatility in trade and negative indexes over the period 2004 -2009.

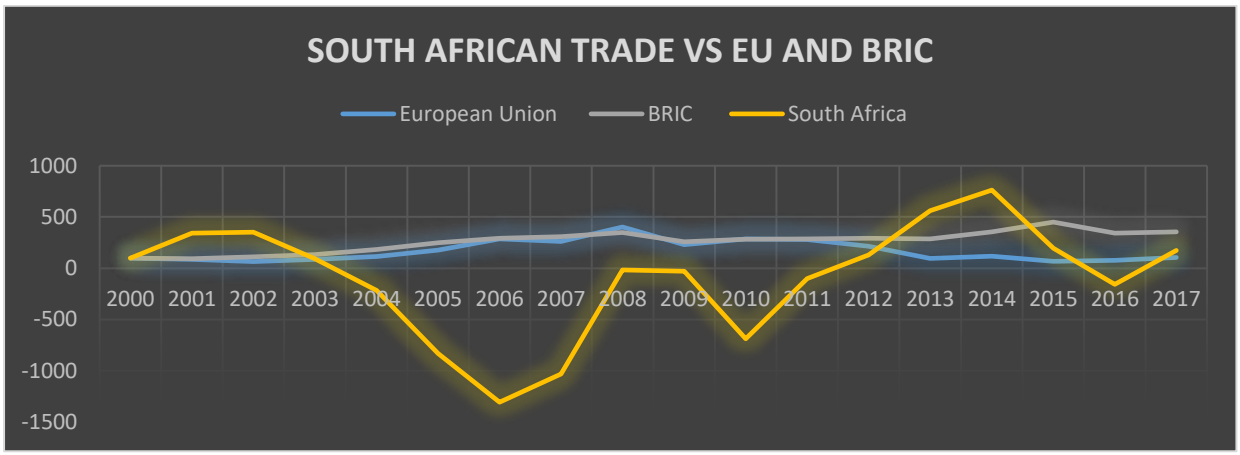

Figure 2-4:South African Trade vs Trading Partners

(Source: United Nations Conference on Trade and Development data)

The Figure 2-4 on the other hand shows the trade trends in South Africa and non-African key regional groupings where South Africa currently has signed a free trade agreement with, namely the European Union (EU) and Brazil Russia India China trade bloc (BRIC). The data is indexed to 100. Over the period 2000 to 2017, the EU and BRIC achieved stable trade flows. This contrasts sharply with South Africa's trade trends, which remain quite volatile. Although South Africa's trade flows were volatile, trade grew by 3.1% between 2000 to 2017. Growth in net trade for the EU and the BRIC trade blocs was 0.3%, and 7.3%, respectively.

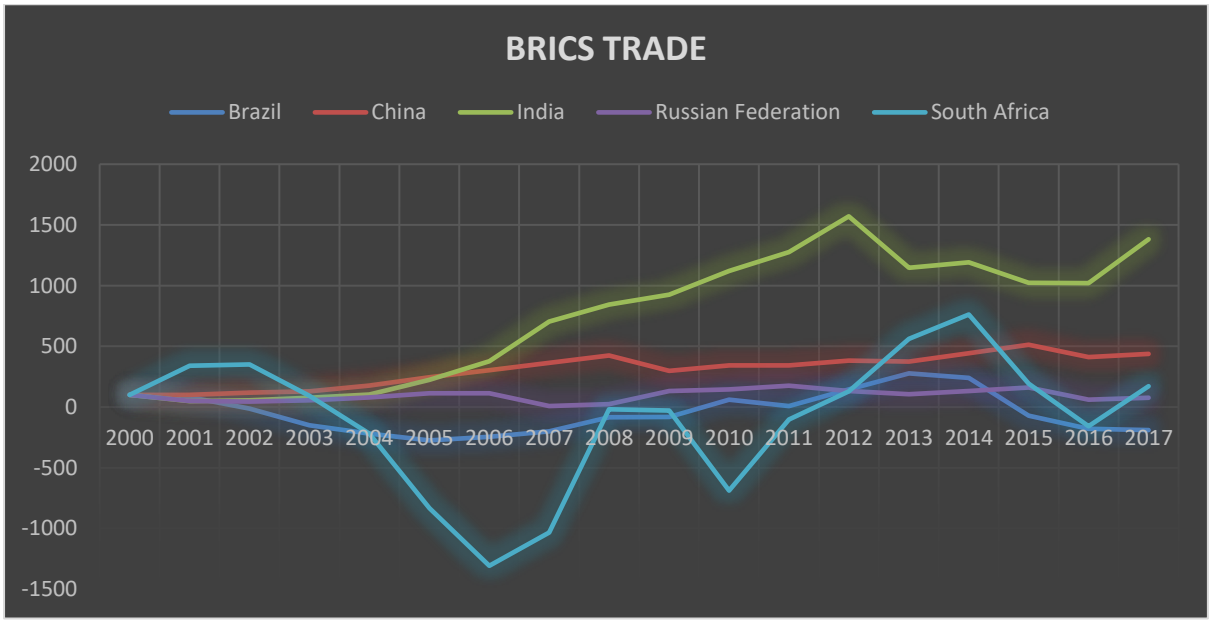

Figure 2-5:BRICS Trade

(Source: Author's calculations using UNCTAD data)

The above Table 2-5 shows a comparison of the trade figures for individual BRICS member states including South Africa. In terms of growth, India has exhibited the most growth relative to the BRICS member states. Indian net trade grew the most at 15,7%, followed by China whose net trade grew at 8.5%. Brazil's net trade grew by 3.7% and South Africa's net trade only grew by 1.4% over the period 2000-2017.

2.5 Evolution of South African trade policy and the promotion of exports

South Africa is an example of a country that switched from inward orientated trade policy characterized by high import tariffs and import substitution towards more liberalized export-oriented trade policies (Strydom, 1995). According to Stubbs (1999, 338) import-substitution industrializations are policies and strategies that "*emphasized the substitution of imports with domestically produced goods*". Prior to 1994, the South African government used trade policies to facilitate import substitution industrialization (Flatters, 2002). Post 1994, the South African government decided to change its stance and implement trade policies that facilitate and enhance export-oriented industrialization (Flatters, 2002). Black and Mitchell (2002) argue that the import substitution policies imposed high costs on importing firms. One of the reasons for the switch between import substitution to export orientation by the South African government was the lifting of sanctions by the international community (Levy, 1999).

International boycotts and sanctions against South Africa in the early 1990's, and an anti-export bias created by protectionism prohibited the South African government from venturing into export markets (Schneider, 2000). Post 1994, the high costs led to the South African government transition from import substitution to export promotion policies (Black and Mitchell, 2002). Post 1994, South Africa sought to liberalize trade and was faced with difficult challenges in realigning itself in international trade, since industries established under import substitution were considered uncompetitive (Black and Mitchell, 2002).

During the early 1990s, import substitution policies had fallen in developed countries (Black and Mitchell, 2002). Thus, developed countries had chosen to shift away from import substitution toward export promotion policies (Black and Mitchell, 2002). South Africa undertook to align itself with similar policies, hence shifting from pre-1994 import substitution towards export-oriented policies favoring export promotion (Black and Mitchell, 2002). Several developing countries undertook Stubbs (1999) and Schneider (2000) state that switching from import substitution to export-oriented

growth and industrialization. South Africa's shift towards export-oriented trade policies was to lower the anti-export bias that arose from protection (Edwards, 2006).

Stubbs (1995) argues that the change from import substitution to export oriented industrialization marked the beginning of rapid economic growth in several successful Asian economies (Japan, South Korea, Taiwan, Hong Kong, Singapore, Malaysia, and Thailand). Stubbs highlights the importance of state institutions and the business community in achieving export-oriented industrialization. Stubbs argues that a key condition for developing a successful export-oriented industrialization strategy is the achievement of a strong institutional state linked to the business community and thus able to adopt and implement the necessary policy reform.

Mandela (1993) argues that South Africa needs to implement trade policy reforms that address the levels of protection and the development of internationally accepted export-oriented policies and incentives. Mandela further argues that the consideration of the desirability of these export promotion policies should move beyond a general analysis of exchange rates and tariff to the structure, history, and dynamics of South Africa and the international community. According to Lewis (2002), the decline in tariff protection and increased exports would lead to sustained export growth and ultimately enable faster import expansion (Lewis, 2002). Van Nikerk and Viviers (2014) argue that South African policymakers should address and focus on increasing international trade by promoting exports.

Subsequently, it is not surprising that the National Planning Commission (2011), the Department of Trade and Industry (2017) and the National Treasury (2019) have identified 'export credit insurance' as a driver for export promotion. Government policy makers are applying more effort into export promotion and trade liberalization (Grater, Steenkamp and Viviers, 2011). The overarching goal is to increase international trade through export penetration (Grater, Steenkamp and Viviers, 2011).

The NDP provides an economic blueprint for South Africa up to the year 2030. The main objective of an export promotion agency is to assist firms in finding international markets of which their products can be sold and thus lead to export market diversification (Martincus and Carballo, 2008). Mzumara (2012) argues that the role of an export promotion agency should be to increase trade. Therefore, a selectivity bias may be required in implementing government-based export promotion activities (Cuyvers, 2004; Shankarmahesh Olsen and Honeycut, 2005).

To this end, the South African government acknowledges the role and importance of export promotion and international trade. Recently, the South African government released the National Development Plan (NDP) as its blueprint for and socio-economic growth and development strategy for the country. The NDP states that due to ‘’*South Africa’s low savings rate and the need to invest at a higher rate, it is important to grow exports*” (National Planning Commission, 2012, p39).

The National Planning Commission lists trade penetration into fast growing markets (namely Asia, Brazil and Africa), as a policy action that needs to be implemented by South Africa. More specifically, the National Planning Commission, mentions the importance of re-orienting trade to emerging economies. Lastly, the National Planning Commission recommends that South Africa aggressively expand trade and investment within the continent and internationally. Expanding trade can be pursued by promoting greater trade integration throughout the continent and collaborating with partners in Sub-Saharan and North Africa.

The importance of increasing South African trade is further discussed in the Industrial Policy Action Plan (IPAP). IPAP aims to boost industrialization, competitiveness and facilitate export-led growth (DTI, 2017). The DTI (2017) is the custodian of trade policy and argues that there is a need to enhance South African exports to encourage trade and has thus introduced the National Exporter Development Program (NEDP) (DTI, 2017). The objective of the NEDP is to increase exports of goods and services, contribute to employment creation and develop the

green economy (DTI, 2017). And more recently, in August 2019, the National Treasury of South Africa published an economic policy paper titled, *"Economic transformation, inclusive growth, and competitiveness: Towards an Economic Strategy for South Africa.".* Notably, the National Treasury (2019) recommends increasing trade through export promotion and cites 'export credit insurance' as a driver for promoting exports and further stresses the need to be aware of the 'political dynamics' of the country in which the exporters are trading with:

> "*South Africa needs to prioritize strategic regional value chains that facilitate mutually beneficial trade, considering the political dynamics of the countries we intend to trade with*" (National Treasury, 2019, p52).

2.6 Conclusion

The purpose of this chapter was to provide an overview of the nature and measures of political risk, export credit insurance and trade in South Africa. In providing the overview, the chapter critically discussed each of the three elements making up political risk. The elements discussed were (i) expropriation risk, (ii) political violence risk and (iii) currency inconvertibility risk. Subsequent to defining political risk, the chapter detailed the measurement of political risk. This significance of which is to guide the reader navigate through the empirical data. Following the discussion of measurement of political risk, this chapter outlined export credit insurance overall, and export credit insurance with reference to South Africa. In the South African discussion, this chapter introduced the export credit agency primarily responsible for insuring South African exporters, recent partnership entered unto by this organization and last the evolution of trade policy in South Africa.

An interesting observation is the trends that appear in South African trade, more especially intra Africa trade is increasing. The evolution of South African trade also indicates that South Africa has adopted more export-oriented trade policies and patterns. This observation necessitates the need for export credit insurance, not so much as a risk mitigation tool, but a tool to foster export promotion and international trade.

Chapter 3 Literature review

3.1 Introduction

The purpose of this chapter is to provide and outline previous studies undertaken in similar fields of economics, namely (i) the origins of international trade and its evolution to the current day, (ii) political risk, and the evolution of political risk factors, however, these are only briefly highlighted, as they are detailed in chapter 2, (iii) export credit insurance and (iv) the origins and evolution of the gravity model. Section 3.2 provides a theoretical literature review and is further split between sections 3.2.1 discussing international trade literature, section 3.2.2, discussing political risk literature, section 3.2.3 discussing export credit insurance and 3.2.4 the gravity model. In section 3.3, this chapter then discusses empirical workings carried out in areas of study covering international trade, political risk, and export credit insurance using a gravity model estimation. Section 3.3 further discusses the differences in the models and estimation techniques used by previous studies to conduct empirical estimation. Last, this chapter points out the gaps in existing literature that need further attention.

3.2 Theoretical literature

3.2.1 International trade literature

International trade theory can be traced back to 1776 and 1826, with the respective publications of Adam Smith's Wealth of Nations and David Ricardo's Principles of Economics. According to the publications of Adam Smith and David Ricardo when countries trade with each other, the countries benefit from specialization and efficient resource allocation (Binh, Duong and Cuong, 2014). According to Adam Smith and David Ricardo, foreign trade assists in obtaining new technologies and skills that lead to increased productivity. Adam Smith and David Ricardo's theories posit that countries engage in international trade because they have dissimilar natural resources (Bhagwati, 1964). The four assumptions underlying classical trade theory are that (i) there are two countries producing two goods, (ii) the economies are of equal size, (iii) there is perfect mobility of factors of production in the countries, and (iv) transportation costs are ignored (John S. Chipman, 1965).

Adam Smith stated that countries should specialize in producing goods in which the countries have an absolute advantage first, then trade with other countries. However, Adam Smith's absolute advantage theory failed to explain why countries without an absolute advantage still benefited from international trade (Binh, Duong and Cuong, 2014). David Ricardo addressed this question through his comparative advantage theory. Comparative advantage theory states that a country gains from trade by exporting goods and services in which the country has a large comparative advantage in productivity and import goods and services which the country has a low comparative advantage (Lindert, 1991). Classical trade theory postulates that countries trade to take advantage of their differences. David Ricardo postulated that each country has a comparative advantage in producing different goods - some goods can be produced more cheaply in different countries, giving rise to international trade opportunities. According to the Ricardo theory, each country will specialise and export the goods in which it has a comparative advantage.

David Ricardo's comparative advantage theory was later extended by Eli Hecksher and Bertil Ohlin. The Heckscher-Ohlin model acknowledges that comparative advantage arises from different relative factor endowments. The Heckscher-Ohlin model predicts that a country will export goods of which the country has surplus of resources and import resources that are scarce or in deficit. The Heckscher-Ohlin model asserts that bilateral trade flows occur between two countries with different factor endowments. The Heckscher-Ohlin model predicts that countries will specialize in producing the goods that they are abundantly endowed in and export such goods and, in return, will import the factors they are less endowed in. These views were amplified by Samuelson (1949, 1953) who predicted that international trade should involve the exchange of different goods, the gains from which will be greater as the countries differed in their relative production possibilities.

Accordingly, classical trade theory posits that countries with less similar relative factor endowments trade more than countries that have similar relative factor endowments. Classical trade theory is thus unable to explain trade between

countries with similar factor endowments. Therefore, countries with surplus capital can specialize in and export capital-intensive goods and labour abundant countries specialise in and export labour-intensive goods.

New trade theory was established in the 1980s and posits that international trade is based on (i) economies of scale, (ii) imperfect competition and (iii) product differentiation, thus contrasting classical trade theory (Krugman and Obstfeld, 2005). One model in new trade theory asserts that when specifying an export equation, one should specify the equation as a function of (i) country size and (ii) trade costs. Another new trade theory model asserts that exports should be a function of (i) country size, (ii) relative factor endowments and in addition (iii) bilateral distance (Grossman and Helpman 1991). The inclusion of distance is to measure transport costs as explanatory the last two variables being the explanatory variables in the model. Helpman (1987) shows that relative factor endowments are important determinants of bilateral trade flows. Funatsu (1986) states that most international business transactions are concluded on the exporting firm granting credit to the importing firm, thus subjecting the exporting form to risk of non-payment.

The new trade theory overcomes this shortcoming in that the new trade theory explains why countries with similar factor endowments engage in international trade. Krugman (1979) uses a Spence-Dixit-Stiglitz model of product differentiation to show that identical countries may trade to take advantage of scale economies. According to Krugman, when countries move to free trade, the number of varieties of goods in each country increases, thus enabling firms to lower costs. Therefore, there are gains from trade due to lower unit cost of production and consumers have access to more varieties through trade.

A benefit of the new trade theory is that it models trade in a more practical manner, and thus incorporates more factors to consider apart from relative factor endowments. A criticism of new trade theory and trade liberalization is that the effects of trade liberalization on growth when applied to a cross section of countries

is ambiguous. Cross sectional studies on liberalization and growth consist of 'before and after' studies (Greenaway et al., 1997), 'with and without' studies (Mosley et al.,1991) and country-specific time-series analysis (Onafowora et al., 1996). However, the results of these studies have quite often been ambiguous and complex. Another criticism lies in that ideally when modelling international trade, cross sections of countries should be applied, however with the new trade theory, so many variables are involved, and even if fewer variables were to be applied the outcomes would still be confusing, and potentially generate multiple equilibria and complex patterns of adjustment around them.

Based on new trade theory and economic spatial distance theory, the gravity model has been utilized intensively to explain bilateral trade flows between country groupings. The gravity model predicts that the size of the trade flow between two countries is a function of the economic size of each country and the distance between the two countries (Pollins, 1989). The determinants of the model are multiplicative and not additive, as a result, the gravity model is linear upon introducing logarithms on both sides of the equation. Feenstra, Markusen and Rose (2001) state that international trade flows are well described using a gravity model. Feenstra, Markusen and Rose further state that the gravity model should have bilateral trade flows that are a log linear function of the incomes and distances of the two countries. The log linear form of the gravity equation specifies that trade flows from origin i to destination j is explained by (i) the economic forces that are within the exporting country (ii) forces within the importing country and forces either assisting or deterring the flows movement from origin to destination (Bergstrand, 1985).

According to Pollins (1989), Bilateral trade flow models typically focus on three dimensions, the first being Supply Side factors, meaning the factors that can influence a country’s productive capacity for the international market; secondly, Demand Side factors, which are factors that shape the desire and ability of a consumer to purchase goods and services from the international market, and thirdly, factors that prevent international trade or trade resistance.

3.2.3 Political risk literature

Root (1968) describes political risk as the occurrence of a political event domestically, or internationally which may result in a loss of profits or assets in international trade. Robock (1971) conducts a study on identifying and assessing political risk. Robock distinguishes between political risk and political instability. Robock finds that political events that do not change the business environment represent instability and political events that do indeed change the business environment represent political risk.

Rodriguez and Carter (1976) equate political risk with instability and direct violence as well as constraints on operations such as expropriation and discriminatory taxation. Kobrin (1979) discusses political risk associated with FDI. Kobrin provides a review of the literature that has been advanced in dealing with political risk. Kobrin argues that the term political risk is limited to unwanted consequences of a political nature. Political risk is conceptualized in terms of state interference with business operations and its understanding is general, subjective and superficial (Kobrin, 1979).

Fatehi-Sedah and Sfizadeh (1989) conduct a study on the association between political instability and FDI. Fatehi-Sedeh and Safizadeh (1989) show that there is a decrease in the perceived level of political risk of investing in a country when the country is faced with socio-political events such as demonstrations, strikes and assassinations. A series of studies have been conducted to assess whether there is an inverse relationship between political risk and FDI (Fatehi-Sedeh and Safizadeh, 1989). These studies have not been consistent in discovering an inverse relationship between socio-political instability and FDI (Fatehi-Sedeh and Safizadeh, 1989).

3.2.3 Export credit insurance literature

Marx (1963) discusses US export credit insurance. Marx (1963) states that successful exporting depends on several parameters, these parameters include price, quality, delivery date, and the availability of finance. Leading manufacturing

nations provide export credit insurance at less than market rates or terms from agencies of the US government, and as a result these government agencies have broadened their export credit insurance schemes to assist in financing exports (Marx, 1963).

Greene (1965) conducts a study on the role of export credit insurance in expanding world trade. Greene discusses a theoretical foundation for the understanding of the conditions within which the Foreign Credit Insurance Association (FCIA) has developed. Greene states that there is increased interdependence in the world economy, this increases the need to enlarge world trade. Greene finds that there are barriers to entry in international trade, these barriers include political barriers such as different languages, cultures, emigration restrictions, and economic barriers such as tariffs, and import quotas. Further, Greene finds that there are many obstacles in increasing world trade. These obstacles include the risk of non-payment by an importer, export credit insurance currently being subject to restrictions limitations and difficulties in obtaining and interpreting financial and credit information.

Funatsu (1986) shows that export credit insurance is useful in protecting domestic exporting firms against political instability in international markets. Funatsu explains that government supported insurance should be priced in such a way that it is self-sustaining. Marx (1963) explains that due to the possibility of export credit insurance premiums being provided below their market rates, coordination and control of competition for export credit insurance has been provided by the International Credit Insurance Association and the Berne Union. Funatsu (1986) finds that in order to increase exports, the premium rate should be set relatively low. Funatsu further mentions that national governments can utilize export credit insurance to promote domestic exports by setting premium rates that are more than favorable to domestic exporting firms. In the instance whereby a government sets a more than favorable premium to domestic exporting firms, the government would be subsidizing domestic exporting firms (Funatsu, 1986).

A lack of knowledge on export insurance can put an international exporting firm at a disadvantage (Seringhaus and Botschen, 1991). Seringhaus and Botschen (1991, p117) list four specific goals underlying export promotion, these are:

- To develop a broad awareness of export opportunities and to stimulate interest for export in the business community.
- To assist firms in the planning and the preparation for export market involvement.
- To assist firms in acquiring the needed expertise and know how successfully to enter and develop export markets and.
- To support such foreign market activity tangibly through organizational help and cost sharing programs.

Welch et.al (1998) studies the importance of networks in export promotion. Welch et.al (1998) explore the policy issues that arise when networks among firms involved in international trade seek to achieve international coordination through export promotion. Welch et.al (1998) conclude that across the globe, policy makers are still searching for more effective ways to promote exports (Welch et.al, 1998).

Dorozynski and Dorozynska (2016) study the growth and role of ECAs in support of exports. Dorozynski and Dorozynska state that ECAs are equally used by both developed and developing countries. Dorozynski and Dorozynska provide a distinction between ECAs and Export-Import banks. Agencies offering solely cover support are referred to as export credit insurance agencies, whilst agencies that offer financial support schemes are referred to as Exim banks (Dorozynski and Dorozynska, 2016). Dorozynski and Dorozynska conclude that ECAs have become more important in the provision of trade finance, more so in times of financial crisis.

3.2.4 The gravity model of international trade literature

The gravity equation has been further augmented by Bergstrand (1985). Bergstrand sought to rework the basic gravity equation so the single equation may be related to a larger general equilibrium model of trade (Pollins, 1989). More recently, gravity

equations have been augmented with the addition of variables that either facilitate or deter trade (Ekanayake, Mukherjee and Veeramacheneni, 2010). Kimura and Lee (2006) state that the gravity equations can be derived using different Economic models. These models include the Herckscher-Ohlin (Deardorff, 1998), Ricardian (Eaton and Kortum, 2002), and monopolistic competition (Helpman and Krugman, 1985) models (Kimura and Lee, 2006; Sohn, 2005; Eita and Jordaan, 2007).

The gravity model has been used to depict various types of behavior that occurs between firms who operate in different locations (DeSarbo et.al, 2002). According to Bergstrand (1985), the gravity equation has been recognized for its empirical success consistently throughout different areas of study. The gravity equation has further been successful in its application on assessing different types of trade flows, for instance, commodity shipping, commuting, tourism, as well as migration (Bergstrand, 1985).

The gravity model was born through Sir Isaac Newton's formulation for the attraction of two objects. In the 17th Century Sir Isaac Newton (Newton) defined the law of Gravitation, where he stated that two bodies were subject to an attraction force that depended positively on the product of their masses and negatively on their distance (Filippini and Molini, 2003). According to Newton's gravity theory, a force is assumed to be dependent on the mass of the objects and the distance between the two forces (Tinbergen, 1962). The basic gravity equation is depicted as follows:

$$I(i,j) = a1 * \frac{Massi^{a2} * Mass\,j^{a3}}{Distance(i,j)^{-a4}} \qquad \textit{(equation 3.1)}$$

Where $I_{i,j}$ denotes a force, $Mass_i$ denotes the total weight of the first body, $Mass_j$ denotes the total weight of the second body and $Distances_{i,j}$ denotes the spatial distance between two bodies.

The gravity equation was first introduced into the study of Economics in the 1960s (Tinbergen, 1962). Economic translation of the terms used by sir Isaac Newton, the terms force, ($I_{i,j}$) refers to the amount of goods exported from country i to country j, $Mass_i$ refers to the GDP of any given country and $Distances_{i,j}$ refers to the geographic distance between country i and j. $Distances_{i,j}$ can further refer to language, culture and history, and can be measured using dummy variables (Filippini and Molini, 2003).

$$F(ij) = \frac{GDPi*GDPj}{Di,j} \qquad \textit{(equation 3.2)}$$

Equation 5.2 shows the gravity model proposed by Tinbergen (1962), where $F_{i,j}$ denotes exports from country i to j, GDP_i denotes the GDP of $Country_i$, GDP_j denotes the GDP of $Country_j$ and D_{ij} denotes the geographic distance between countries i and j. Taking logarithms on both sides of e*quation 5.2* and introducing general exponents, the gravity model can be transformed into a gravity equation and estimated using linear regression:

$$\ln(F_{i,j}) = lna_1 + lna_2(GDP_i) + lna_3(GDP_j) + lna_4(D_{i,j}) + \varepsilon \qquad \textit{(equation 3.3)}$$

Where GDP_i stands for the total GDP in country i, GDP_j stands for the total GDP in country j, and D_{ij} stands for the geographical distance between two countries. The log linear form of the gravity equation specifies that trade flows from origin i to destination j are explained by (i) the economic forces that are within the exporting country, (ii) economic forces within the importing country and (iii) forces either assisting or deterring the movement of the flows from origin to destination (Bergstrand,1985).

Anderson and Wincoop (2003) developed the following non-linear gravity model:

$$X_{ij}^{k} = \frac{Y_i^k E_j^k}{Y^k}\left(\frac{\tau_{ij}^k}{\prod_i^k P_j^k}\right)^{(1-\sigma_k)} e_{ij}^k$$ *(equation 3.4)*

Taking logs on both sides of *equation 5.4* yields the standard gravity equation in log-linear form:

$$\log X_{ij}^{k} = \log Y_i^k + \log E_j^k - \log Y^k + (1-\sigma_k)\left[\log \tau_{ij}^k - \log \prod_i^k - \log P_j^k\right] + \log e_{ij}^k$$ *(equation 3.5)*

In line with Newton's theory of Gravity, the gravity model (applied to Economic theory) predicts that the magnitude of bilateral trade between two countries is positively related to the GDP of the two countries and negatively related to the distance between the two nations (Boughanmi, 2008). More recent uses of the gravity model have been in analyzing trade flows in currency unions, regional agreements and common markets (Kepaptsoglou, Karlaftis and Tsamboulas, 2010. These studies use the gravity model to assess whether there has been trade creation or trade diversion. Linneman (1966) applies the gravity model in analyzing the factors that explain trade for a sample of 80 countries.

The gravity model was applied to the analysis of political risk and export credit insurance by Moser, Nestmann and Wedow (2008). The gravity model was augmented by Moser Nestmann and Wedow as follows:

$$ln\left(Exports_{i,t}\right) = \beta 0 + \beta_1 ln\left(GDP_{i,t}\right) + \beta_2 ln\left(Dist_{i,t}\right) + \beta_3 ln\left(Pop_{i,t}\right) + \beta_4 (Insurance_{i,j,t}) + \beta_5 ln(risk_{i,t}) + \beta_6 ln(other_{i,t}) + \mu_i + \mu_t + \varepsilon_{i,t}$$

(equation 3.6)

Where subscript i is for the host country and t for time (year). The dependent variable is $ln\left(Exports_{i,t}\right)$, which denotes the log of real exports from Germany to country i in year t. The set of regressors include $ln\left(GDP_{i,t}\right)$, which denotes the GDP

of country i in year t, $ln(Dist_i)$, which denotes the log of distance between Germany and country i; $ln(Pop_{i,t})$, which denotes the log of population for country i in year t; $(Insurance_{i,t})$, which denotes a dummy variable for export credit insurance provided to country i from country j in year t; $ln(risk_{i,t})$, which denotes the log of political risk index in country i in year t; and lastly, $ln(other_{i,t})$, denotes other control variables for country i in year t, namely a country's gross fixed capital formation to GDP ratio and the country's share of manufacturing imports in overall imports.

3.3 Empirical literature

Egger and Url (2006) study export credit insurance and international trade. Egger and Url use Austrian firm level panel data for the period 1996 to 2002 on 142 partner countries. Egger and Url use an augmented gravity model using two estimation techniques, first a standard random effects estimation technique and second a Mundalak-Type random effects estimation. The dependent variable is the log of goods exports, and the independent variables are (i) log of guarantees (export credit insurance), (ii) log of income (GDP), (iii) log of population size (iv) log of investment share, (v) log of import share (vi) log of distance. The variables for export credit insurance were obtained from the Austrian export credit insurer Oesterreichische Kontrollbank, and the political risk variables were obtained from the OECD. Egger and Url find that export credit insurance has a positive and statistically significant effect on Austrian exports. Egger and Url (2006) further find that political risk has a negative and statistically significant effect on Austrian exports.

Moser Nestmann and Wedow (2008) study political risk and export promotion. Moser Nestmann and Wedow investigate the claim that export credit insurance mitigates political risk and promote exports. Moser Nestmann and Wedow use a panel dataset of 23 countries from 1991 to 2003 to estimate the effect of political risk on German exports. The dependent variable is the log of real exports from German to country c, in year t. Independent variables include (i) log of real GDP of country c in year t, (ii) log of distance between Germany and country c, (iii) log of population for country c in year t, (iv) log of real newly granted guarantees for country c in year t, (v) the log of

political risk index in country c in year t and other control variables for country c in year t. These variables include the country's gross fixed capital formation to GDP ratio and the share of manufacturing imports ratio. The export credit insurance variable was obtained from the German export credit insurer Euler Hermes and the variable for political risk was obtained from Political Risk Solutions International Country Risk Guide. Moser Nestmann and Wedow use an augmented gravity model of trade. Moser Nestmann and Wedow find that political risk has a negative effect on exports. Further, Moser Nestmann and Wedow (2008) find that export credit insurance has a positive effect on exports and thus promotes exports. Moser Nestmann and Wedow conclude that export credit insurance may result in increased trade that might otherwise not occur as a result of the lack of financing and risk attached.

Baltensperger and Herger (2008) estimate the effect of export credit insurance on international trade. Baltensperger and Herger seek to establish the extent to which export credit insurance schemes enable international trade. Baltensperger and Herger (2008) use an augmented gravity model. Baltensperger and Herger estimate the extent to which insurance policy parameters such as payment risk, insurance coverage, premium rates and assert that claims end up affecting country's exports. Baltensperger and Herger use panel data on 30 countries (during 2009 there were only 30 OECD member countries) for the period 1999 to 2005. The authors use two models, each with two estimation techniques, these models are Random and Fixed effects models and two estimation techniques applied to each respectively are linear least squares applied to both models, whilst the Tobit (FET) applied to the Fixed effect model and the Tobit (RET) applied to the Random effects model. Data on political risk and export credit insurance was compiled from OECD member countries. Baltensperger and Herger (2008) find that despite the use of export insurance schemes, the risk of default continues to provide an impediment to countries facing heightened political and commercial risk. Finally, Baltensperger and Herger (2008) find that export credit insurance increases exports.

Long (2008) examines the influence of conflict on bilateral trade. Long (2008) uses a gravity model to investigate a panel dataset of 140 countries from 1984 to 1997. Further, the author uses the generalized least squares estimation technique. The author obtained political risk data from the Political Risk Services ICRG. Long (2008) finds that as political risk through armed conflict increased, bilateral trade flows decreased. The dependent variable is the log of exports, and the independent variables are (i) log of GDP, (ii) log of distance between countries in miles, (ii) dummy variable measuring if the countries are members of a preferential trade agreement (iv) population size, (v) log of the per-capita incomes of each country.

Oh and Reuveny (2010) assess the effects of political risk and climatic natural disasters on bilateral trade. The authors make use of a gravity model and use the ICRG by Political Risk Services to measure political risk. The estimation sample includes a panel dataset of observations of 116 countries from 1985 to 2003. The gravity model estimation employs an ordinary least squares estimation technique. The dependant variable is imports which measures the real value of the trade flows. The independent variables are (i) a measure used for climatic disasters (ii) a variable measuring political risks, (iii) a measure of real GDP, (iv) a measure of population size, (v) a measure of bilateral distance. Further, the authors use dummy variables to measures (vi) common border, (vii) common language, (viii) colonial relationship, (ix) regional trade agreement, (x) belong to the same currency union. The model employs a PRS ICRG country risk measure. Oh and Reuveny (2010) conclude with two main findings; (i) as the incidence of climatic natural disasters increase, bilateral trade flows decrease and (ii) as political risk increase, bilateral trade increases.

Badinger and Url (2013) examine export credit insurance and export promotion. The focus of Badinger and Url's study is on Australian firm level data. Badinger and Url use cross-sectional data on a cross section of 178 Austrian exporting firms during the year 2008 Data on export credit insurance is obtained from the Austrian ECA, the Kontrollbank. Badinger and Url (2013) find that the most crucial determinants of export insurance usage are (i) firm size; (ii) intensity of Research and Development; (iii) the firm's exposure to revenue risk and (iv) whether the firm is part of an MNC.

Badinger and Url also find that there are significant effects of export credit insurance usage on firm specific export performance. Several countries insure their exports against the possibility of payment default (Felbermayr and Yalcin, 2013). Felbermayr and Yalcin (2013) use panel data on German exports. Felbermayr and Yalcin control for unobserved heterogeneity on dimensions affecting the country-year, the sector year as well as the country sector. Felbermayr and Yalcin find that export credit insurance increases exports.

Janda, Michalikova and Skuhrovec (2013) conduct research on export promotion through export credit insurance in the Czech Republic. Janda Michalikova and Skuhrovec (2013) estimate a gravity model of exports for 160 countries from 1996 to 2008. The dependent variable used in the study is log of exports (mill. CZK), the independent variables include (i) Export promotion (mill. CZK), (ii) log of GDP (bill. CZK) (iii) log of population (mill.) (iv) log of distance (km) (v) log of gross fixed capital formation (% GDP), (vi)log of manufacturing Imports (% of imports) (vii) and log of political risk. Export credit insurance as measured by the export promotion variable was obtained from the Czech Export Bank, and the political risk variable was obtained from journal Euromoney. The authors estimated two gravity models of exports, a static model by least squares dummy variables and a dynamic model by system generalized methods of movements. Janda, Michalikova and Skuhrovec (2013), find that export credit insurance is a weak and insignificant factor influencing exports positively.

Auboin and Engemann (2014) assess the linkages between export credit insurance and international trade. Auboin and Engemann use data for insured trade credit from the Berne Union for 91 countries during the period 2005-2011. The authors independent variables include (i) log real GDP, (ii) log real effective exchange rate, (iii) financial crisis dummy, (iv) log of short-term insurance paid and (v) log of imports. The authors estimation uses a two stage-least-squares (2SLS), random effects instrumental variable estimator and fixed effects instrumental variable estimator. Auboin and Engemann find that the volume of insured trade credit is strongly correlated with a country’s economic, as well as financial conditions.

Further, Auboin and Engemann find that insured trade credit is determined by a country's level of liquidity and GDP. Auboin and Engemann (2014) find that a 1% increase in trade credit granted to a nation, lead to a 0.4% increase in real imports of that country.

Van der Veer (2015) investigate how export credit insurance affects international trade. Van der Veer argues that financial institutions play a critical role in enabling international trade. Van der Veer further argues that export credit insurance assists in insuring against the commercial risk of non-payment by an importer. Van der Veer (2015) uses an augmented gravity model to assess whether private export credit insurance assists in stimulating exports. Van der Veer's results suggest that for every Euro of privately insured exports, total exports increased by 1.3 Euros. The finding suggests that the reduction in risk due to export credit insurance increases exports to markets whereby had there been no export credit insurance, there might have been no exports (Van der Veer, 2015).

Polat and Yesilyaprak (2017) investigate export credit insurance and export performance in the Turkish economy. Polat and Yesilyaprak seek to establish how far the Turkish ECA fosters exports. Polat and Yesilyaprak (2017) use an augmented gravity model of 212 countries for the period 2000 to 2015 employ several estimation techniques, namely, (i) the fixed effects estimation technique, (ii) ordinary least squares estimation technique, and (iii) a Poisson pseudo maximum likelihood PPML estimation technique. The variables included in their gravity model are the log of nominal exports as a dependent variable, Eximbank Insurance, log of GDP per capita, Population, Real Exchange Rate, and country risk. Polat and Yesilyaprak obtained the variables for Eximbank Insurance from the Turkish EximBank and country risk from the OECD. Polat and Yesilyaprak find positive evidence that the Turkish ECA indeed fosters the increase of Turkish exports.

Hou, Wang and Xue (2020) investigate whether political risk through institutional quality impacts trade costs. Hou, Wang and Xue (2020) use a gravity model and a

panel dataset of 133 countries from 1995–2014 and use a generalized method of movements estimation technique. The authors calculate the data for trade costs by through a methodology adopted in Novy (2013). The dependent variable is a measure for trade costs and the independent variables are (i) political risk, (ii) distance, (iii) currency union dummy variable, (iv) a common border dummy variable, (v) a common language dummy variable (vi) a colonial relationship dummy variable and (vii) a regional trade dummy variable. The political risk variables are individually broken down into investment profile, non-corruption degree, institutional strength, law and order and ethnic tensions. The authors find that increased institutional quality is significant in reducing trade costs. As such, as political risk decreases trade costs decrease as well and therefore leading to increases international trade.

3.4 Gaps in the existing literature

The existing literature examines the effects of political risk, and export credit insurance in developed countries. None of the previous studies have attempted to examine the effects of political risk and export credit insurance on South African exports. Neither has there been any literature on the effects of political risk and export credit insurance in any other African country. This may be due to two reasons; first, African countries measured by several political risk indexes as risky; therefore, African countries are normally at the receiving end as risky importer countries. Second, African countries are developing countries, of which some do not have export credit agencies, therefore there may not be a need to assess export credit insurance for exporters because there are no ECAs. Also, because there are not ECAs there may be no data available to conduct empirical estimation on export credit insurance. Data may be difficult to obtain.

Muzindutsi and Manaliyo (2015) also assessed political risk, however the authors assessed political risk in domestic South African tourism market. Muzindutsi and Manaliyo use data from the ICRG to measure political risk in South Africa. Like Muzindutsi and Manaliyo, Barnard and Croucamp (2015) conduct a theoretical assessment on South African Political risk. The authors discuss political risk factors in the domestic South African economy affecting international firms. These authors

also make use of political risk data from the ICRG. This is different to this dissertation, as this dissertation assessed South African exporters facing political risk in the international markets. Barnard and Croucamp (2015) list the variables making up political risk. Makgetla, Levin and Mtanga (2019) argue that the ECIC remains far smaller relative to exports than other major suppliers of capital equipment to African and other developing countries. However, despite its relatively small size, the ECIC competes fiercely and has established a strong presence in the export credit insurance market in Southern Africa, Zambia to be specific.

3.5 Conclusion

The purpose of this chapter was to present and review theoretical and empirical literature on the topics of international trade, political risk, export credit insurance and the gravity model. As discussed in this chapter, international trade has evolved much from theories on absolute and comparative advantage, as the workings of Krugman and his new trade theory now dominates present day international trade theory. The linkages with trade risk and insurance were further presented in an empirical sense and prominent models and estimation reviewed. The review further included resent literature and studies. This chapter further identified gaps in present day literature. An interesting observation in the literature is that most several studies in South Africa assessing political and country risk using the ICRG risk rating have been conducted at a sectoral level, i.e., tourism (Muzindutsi and Manaliyo, 2015), equity and banking (Muzindutsi and Nhlapho, 2017) and housing prices (Muzindutsi, Jamile, Zibani and Obalade, 2020). These observations indicates that further research and analysis can be done for sectoral exports in future studies. The significance of this chapter is to provide a theoretical framework to guide empirical inspection in subsequent chapters.

Chapter 4 Data and methodology

4.1 Introduction

The purpose of this chapter is to outline (i) the data and sources of information to be used in this study, and (ii) the empirical methodology adopted in this study. The data and methodology inform the estimation results to be presented in the subsequent chapter. This chapter first discusses the baseline model for estimation, including a list and discussion of the choice of variables used in the model. The choice of model was adopted from prior studies outlined in the empirical literature review section. This chapter provides a discussion and results of a stationarity test, cointegration test and the Hausman test. The purpose of these tests is to inform estimation techniques and assess unit roots prior to estimating the empirical model. The chapter further discusses the possible estimation techniques, namely the fixed effects estimation technique and the random effects estimation technique. The choice as to which estimation technique is suitable to the data in question will be informed by the results of the Hausman test. The chapter also provides a critical discussion of the PPML estimation techniques.

4.2 Methodology

This section describes the methodology used in the study. This section presents a discussion on the baseline model and discusses the choice of the variables.

4.2.1 Baseline model for exports

The Baseline model for this dissertation is as follows:

$$ln(Exports_{i,j,t}) = a + \beta ln(SAGDP_t) + \beta ln(GDP_{i,t}) + \beta ln(FDI_{i,j,t}) \beta ln(Distance_{i,j}) + \beta ln(Population_{i,t}) + \beta ln(Risk_{i,t}) + \beta ln(Insurance_{i,j,t}) + \beta ln(ExRate_{i,t}) + \beta ln(FixedCap_{i,t}) + \beta ln(ManImp_{i,j,t}) + \beta ln(SADC_{i,t}) + \beta ln(EU_{i,t}) + \beta ln(BRICS_{i,t}) + \mu_{i,j} + \mu_t + \varepsilon_{i,j,t} \quad \textit{(equation 4.1)}$$

Where subscript i denotes the exporter and subscript j denotes the importer, subscript t denotes the time (year) and subscripts *α* and *β* are the coefficients to be estimated. The dependent variable is $Exports_{i,j,t}$, which measures the real value of total bilateral exports from South Africa to South Africa's trading partners.

The set of regressors includes:

- $\beta ln(SAGDP_t)$ = South African Real GDP in US$ in year t.
- $GDP_{i,t}$ = Real GDP in US$ of country i in year t.
- $Distance_{i,j}$ = Distance between the capital city of country i and j.
- $Population_{i,t}$ = Log of population for countries i in year t.
- $Risk_{i,t}$= Political risk index for countries i in year t.
- $Insurance_{i,j,t}$ = Dummy variable for export credit insurance provided to country i from country j in year t.
- $FDI_{i,j,t}$ = FDI inflows for country i in year t.
- $ExRate_{i,t}$ = Real effective exchange rate for country i at year t.
- $FixedCap_{i,t}$ = Gross fixed capital formation to GDP ratio for country i in year t.
- $ManImp_{i,j,t}$ = Manufacturing imports to total imports for country i from country j in year t.
- $\beta ln(SADC_{i,t})$ = SADC Dummy variable capturing whether country i was a member of the Southern African Democratic Community in year t.
- $\beta ln(EU_{i,t})$ = EU Dummy variable capturing whether country i was a member of the European Union in year t.
- $\beta ln(BRICS_{i,t})$ = BRICS Dummy variable capturing whether country i was a member of the BRICS trade bloc in year t.
- $\varepsilon_{i,j,t}$ = error term.

4.2.2 Choice of variables

The variables chosen for this study are described below:

GDP: The variable GDP is used in the gravity model to depict the size of the market. The study only includes the importing country's GDP because this analysis is based on South African exports to partner countries. The logic behind GDP depicting the size of the economy is, on average, *ceteris paribus*, the larger the size of an

importing country, the larger the demand for South African exports. Further, South African exporters have a greater chance of selling their products in larger markets, i.e., economies of scale when operating with larger countries.

Distance: The study expects a negative coefficient for the distance variable. The distance variable is a proxy for transportation and information costs (information costs can further relate to language, culture, history. Language, culture and history, can be accounted for using dummy/binary variables (Filippini and Molini, 2003).

Population: The study expects that the co-efficient associated with the population variable of a country may either be positive or negative. The sign of the co-efficient would depend on whether the country exports less when the country is big (the absorption effect) or whether a big country exports more than a small country (indicating economies of scale).

Political Risk: The study expects political risk to have a negative coefficient. The reason being higher political risk encompasses a friction on exporting firms. On average, *Ceteris Paribus*, the higher political risk within a country, the less exports the country will receive.

Insurance: The focus of this study lies on the question of whether export credit insurance fosters exports. The study expects a positive coefficient on the insurance variable.

Real effective exchange rate: When a country is open to more trade, trade partners no longer must rely as much on trade finance instruments. The study expects the real effective exchange rate to have a negative coefficient.

Gross fixed Capital Formation: The study includes a country's gross fixed capital formation to GDP ratio. This study expects the co-efficient on gross fixed capital formation to be positive.

Share of manufacturing imports in overall imports: Like Moser Nestmann and Wedow (2008), this study includes a country's share of manufacturing imports in overall imports. This variable is included as a reduced form measure of the importing country's relative factor endowments. The study expects a positive coefficient.

SADC: Dummy variable representing whether the country is in the Southern African Democratic Community free trade area. The study expects a positive coefficient.

EU: Dummy variable representing whether the country is in the European Union. The study expects a positive coefficient.

BRICS: Dummy variable representing whether the country is in the BRICS free trade area. The study expects a positive coefficient.

4.3 Data

The empirical analysis relies on data from various sources. Data on exports is obtained from the Word Integrated Trade Solutions (WITS). Data on GDP; population; exchange rate; FDI; gross fixed capital formation and manufacturing imports is obtained from the World Banks World Development Indicators. Data on bilateral distance is obtained from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Data on political risk is obtained from Political Risk Services (PRS). This Quantitative indicator represents political risk factors that potentially influence the risk of investing in a country. A higher political risk indicator implies higher risk within the importing country. To answer the research questions, this study relies on a panel dataset comprising observations from 85 countries from 1996 to 2018.

4.4 Stationarity test

According to Brooks (2008), when modelling long-run relationships in quantitative data, it is important to ascertain the behavior and properties of the data in question. Stationary data can have a strong influence on the behavior and properties of the data series in question. Brooks (2008) states that the use of non-stationary data in a quantitative model runs the risk of obtaining inaccurate and false result. According to Kennedy (2003), economic variables such as the real GDP, and Exports follow a non-stationary process. Both the original and augmented gravity models of trade make use of macroeconomic variables GDP, population and exports and these variables may not be mean reverting, therefore testing for unit roots is a pre-requisite for accurate, unbiased and consistent estimation results. According to Brooks

(2008), stationary data series can be defined as data that possesses constant mean, constant auto-covariance, and constant variance for each lag. In testing the presence of unit roots in all variables, this study applies the Levin Lin Chu (LLC) test.

Hu, et.al (2014) conventional stationarity testing for individual time series using the PP or ADF methods encompass lower power. Panel data allows the researcher to make use of a larger number of data points, a greater number of degrees of freedom, and reduced collinearity between regressors (Hu et.al, 2014). Panel data allows for more powerful statistical tests. Consequently, the test statistics follow a normal distribution as opposed to nonconventional distributions (Hu et.al, 2014). This is shown in the descriptive statistics section of this study.

The dissertation uses economic variables such as the real exchange rate and international trade represented through exports, which has been argued (Macdonald, 1996) that the variables follow a non-stationary process. This dissertation therefore tests for unit roots in these variables, to accurate estimation results. The LLC test was proposed by Levin, Lin, and Chu (2002). According to Levin Lin and Chu (2002) using tests that examine for individual unit root could erroneously result in the acceptance of the alternative hypothesis of stationarity; especially when there are highly insistent divergences from steady-state thus Levin, Lin and Chu (2002) propose a test for panel data. Levin, Lin, and Chu (2002) propose that instead of performing an individual unit root test, one could get a powerful test by performing panel data and pooling the sample size. The LLC test is therefore more powerful than testing for individual unit root test for each cross-section (Hlouskova and Wagner, 2006). The null hypothesis is that each individual series comprises a unit against the null that each series is stationary Levin, Lin, and Chu (2002). This study not only uses the LLC test, but also the test proposed by Im, Pesaran and Shin (2003).

Unit root testing is important because it assesses whether variables follow a random path. According to Levin Lin and Chu (2002) the initial null hypothesis is that;

$$\Delta y_{it} = p y_{i,t-1} + \sum_{L=1}^{P_i} \theta_{iL} \Delta y_{i,t-1} + \alpha_{mi} d_{mt} + \varepsilon_{it} \ldots\ldots \quad \text{m=1,2,3} \qquad \textit{(equation 4.2)}$$

Where Δy_{it} is the dependent variable for country i at time t; d_{mt} is the trajectory of deterministic parameters and α_{mi} is the matching vector of coefficients for each model (m=1, 2, 3). Since the lag order is unknown the LLC test recommends using a three step-method to perform the test.

$$\Delta y_{it} = p y_{i,t-1} + \sum_{L=1}^{P_i} \theta_{iL} \Delta y_{i,t-1} + \alpha_{mi} d_{mt} + \varepsilon_{it} \ldots\ldots \quad \text{m=1, 2, 3} \qquad \textit{(equation 4.3)}$$

The LLC test permits P_i (the lag order to vary across panel members), for a given time-series dimension (T), therefore, one must select a sufficient lag order P_{max} use the t-statistic of θ_{iL} to assess whether a smaller lag order is required. The t-statistic is normally distributed with zero mean and finite a variance with the null hypothesis ($\hat{\theta}_{iL}$=0), when P_i=0 and when P_i<0.

Once the lag order is known, two auxiliary regressions must be run to obtain the orthogonalized. This is conducted by running $\Delta y_{i,t-1}$ on $\Delta y_{i,t-L}$ (L = 1, … …,P_i) and d_{mt} to obtain $\hat{v}_{i,t-1}$. When the residuals have been found, the residuals are then standardized on auxiliary regressors to control for heterogeneous variances across partners $\hat{\tilde{e}}_{it} = \frac{\hat{\varepsilon}_{it}}{\hat{\sigma}_{ei}}$ and $\hat{v}_{i,t-1}=\frac{\hat{v}_{it}}{\hat{\sigma}_{\varepsilon i}}$, $\hat{\sigma}_{\varepsilon i}$ is the standard error from each ADF regression.

The final last step is to estimate the ratio of long to short-run standard deviation of the variable of interest. The long-run variance can be estimated by,

$$\hat{\sigma}_{yi} = \frac{1}{T-1} \sum_{t=2}^{T} \Delta y^2{}_{it+2} \sum_{L=1}^{\bar{k}} w\bar{k}L \left[\frac{1}{T-1} \sum_{t=2+L}^{T} \Delta y_{it}\, \Delta y_{i,t-L}\right] \ldots\ldots \qquad \textit{(equation 4.4)}$$

For Bartlett Kernel $w\bar{k}L = 1 - (\frac{L}{K+L})$ for each cross section, where $\bar{k}$ indicates a direct truncation lag that can also be endogenous to the data. The panel t-statistics can now be estimated. The t-statistic is estimated by running the pooled regression,

$$\hat{\varepsilon}_{it} = p\hat{v}_{i,t-1} + \tilde{\varepsilon}_{it}. \qquad \textit{(equation 4.5)}$$

It has been argued that the LLC test outperforms traditional time-series stationarity tests, however a limitation with the LLC test is that the LLC test assumes cross-sectional independence. The validity of the LLC test depends on the assumption in the entire cross-section is independent and the test is invalid if cross-section correlation is present (Breuer, McNown and Wallace, 2006). Hoang and McNown (2006) argue that when conducting the LLC test in the presence of cross-sectional dependence, the LLC test may suffer from size distortion among cross-sectional error terms. It is therefore important to control for cross-sectional dependence when running panel unit root tests.

4.5 Cointegration test

Macroeconomic variables time series data in certain instances tends to follow a trend. This has the effect of giving spurious regression results. This variables in this study may be subject to following a trend in the panel data used. This dissertation assesses the relationship between political risk and export credit insurance on exports, and in doing so makes use of a panel dataset to run a gravity model. Amongst the variables used in this dissertation are macroeconomic variables, such as real GDP, Exports, Population.

This study will employ a cointegration test proposed by Kao (1999). The Kao test tests for cointegration by assessing the behavior of residuals. As such the Kao test is a residuals-based test. If the residuals contain a unit root, the series is not cointegrated. However, if the residuals are stationary, this indicates that the series is cointegrated, and thus there is a long-run equilibrium amongst the series.

The Kao test is a panel test, and therefore exhibits better power to reject the null hypothesis of no cointegration (Oh, 1996; Kao, 1999). This indicates that panel cointegration test may have greater power than conventional cointegration tests.

One of the limitations of the Kao test is that it follows the all or nothing assumption. The all or nothing assumption means that all the series in the panel are cointegrated or all the series in the panel are not cointegrated. Breuer, McNown and Wallace (2001) asserted that if a panel contains several series that are not cointegrated, the Kao test will conclude that the series is not cointegrated.

The model to be estimated is as follows and only includes the variables that have been found to be nonstationary at level form, this is to examine whether the variables have some form of long-run association:

$$y_{i,t} = \beta_i + \beta'_{xit+\varepsilon it} \text{ ……., i=1…N and t=1…T} \qquad \textit{(equation 4.10)}$$

Where subscript i, represents individual member of the panel, t indicates time dimension, y is the dependent variable; in this case the log of exports, β represents individual intercept, β'_x is the vector of coefficients to be estimated based on a set of each member's characteristics and ε, is the error term, assumed to be identically and independently distributed across sections.

4.6 Estimation techniques

4.6.1 Fixed effects

According to Gastanga (1998) the fixed effects (FE) estimation is preferred when using ordinary least squares (OLS). Primarily because FE allows the model to be estimated whilst controlling for unobserved effects. OLS does not account for unobserved country-specific effects. Data to be regressed may contain unobserved country-specific effects that may need to be accounted for. FE eliminates the effects of the time-invariant characteristics from the explanatory variables. Therefore, allowing more accurate estimation of the explanatory variable.

An issue with FE, is that it removes all time-indifferent variables. FE is thus most useful when the study is analyzing the impact of observations that differ over time. FE assumes that each country's constant and error term should not be correlated with the constant and error terms of other countries in the study. FE is not suitable for when the constants and error terms are correlated, as inferences drawn may be incorrect.

4.6.2 Random effects

A second estimation technique available for estimation is the random effects (RE) method. RE is a weighted average of the estimates produced by the between and within effects of FE. When correlation is uniform, the RE is a form of weighted least squares. Unlike FE, RE allows for time invariant observations.

According to Green (2008), the Hausman tests may be conducted as a test to assess which estimation technique to choose, between the FE and RE. The null hypothesis of the Hausman test is that the coefficients estimated by RE are the same. The Hausman test shows whether country specific effects are correlated with the explanatory variables. Thus, it is a test between RE and FE estimation technique. The null hypothesis is that RE estimation technique is preferred and the alternative is that FE estimation technique is preferred (Green, 2008).

The random effects estimation technique estimates panel data where interference variables may be interconnected between time and individuals. With random effects estimation technique, the difference between intercepts is accommodated by the error terms of each country. The advantage of using the random effect estimation technique is the elimination of heteroscedasticity. Random effects estimation technique is like the Generalized Least Square (GLS) technique.

The fixed effects estimation technique assumes that differences between individuals can be accommodated from different intercepts. Fixed effects estimation technique is

sometimes called the Least Squares Dummy Variable (LSDV). The Fixed effect estimation technique uses the ordinary least square principle.

Hausman test is a statistical test to select whether the most appropriate estimation technique is the fixed or the random effects estimation technique. To decide between a random effects and fixed effects estimation technique, researchers rely on the Hausman (1978) specification test (Greene, 2008). The Hausman test is designed to detect violation of the random effects estimation assumption that the explanatory variables are orthogonal to the unit effects. If there is no correlation between the independent variable(s) and the unit effects, then estimates of coefficients in the fixed effects model should be like estimates of coefficients in the random effects model. The Hausman test statistic H is a measure of the difference between the two estimates.

4.6.3 Poisson pseudo maximum-likelihood

Estimation of the gravity model through Poisson binomial methods has become popular among scholars modelling international trade. These scholars include Shephard (2013); Krisztin and Fischer (2015); Metulini, Patuelli, and Griffith (2016). Poisson binomial methods permit accounting for variables with zero observations and extreme values in the distribution tail.

Recent contributions of the literature stress the importance of accounting for null trade flows and strongly advise these null trade flows to be accounted for when modelling international trade flows. Helpman, Melitz and Rubinstein (2008) argue that disregarding countries that do not trade with each other produces biased estimates. Santos Silva and Tenreyro (2011) propose a Poisson-type specification of the gravity model through a Poisson pseudo-maximum likelihood (PPML) estimator. The Poisson type specification is like the Poisson approach proposed by Flowerdew and Aitkin (1982). Several empirical studies of trade have applied the PPML estimator (see Linders, Burger and van Oort, 2008; Burger, van Oort and Linders 2009; Martínez-Zarzoso 2013; Martin and Pham 2020). Burger, van Oort and Linders (2009) Martin and Pham (2020) propose a zero-inflated extension of the Poisson gravity model. The gravity model is ubiquitous in the applied international trade

literature. Recent contributions have highlighted the shortcomings of traditional gravity model estimated using OLS estimation technique. Santos Silva and Tenreyro (2006) provide arguments for preferring PPML estimation technique. Santos Silva and Tenreyro (2006) argue that Poisson is the only (quasi) maximum likelihood estimator that preserves total trade flows.

To show that the Poisson is a (quasi) maximum likelihood estimator that preserves total flows, consider a general log likelihood function of the form:

$LogL = \sum_{ij} f(X_{ij}, \hat{X}_{ij}, \sigma)$ *(equation 4.11)*

σ are the parameters that are independent of the country pairs. Maximizing *equation 5.19* yields:

$\sum_{ij} \hat{X}_{ij} f_2(X_{ij}, \hat{X}_{ij}) = \sum_{ij} g(X_{ij}, \hat{X}_{ij}, \sigma) = 0$ *(equation 4.12)*

Where $g(X_{ij}, \hat{X}_{ij}) = \hat{X}_{ij} \frac{\partial L}{\partial \hat{X}_{ij}} \equiv \widehat{X_{ij}} f_2(X_{ij}, \hat{X}_{ij})$ total differentiating *equation 5.20* yields:

$\sum_{ij} g_1(X_{ij}, \hat{X}_{ij}) dX_{ij} + \sum_{ij} g_2(X_{ij}, \hat{X}_{ij}) d\hat{X}_{ij} = 0$ *(equation 4.13)*

Since the totals are conserved for the same pair $\{X_{ij} | \hat{X}_{ij}\}$ we also have:

$\sum_{ij} dX_{ij} - \sum_{ij} d\hat{X}_{ij} = 0$ *(equation 4.14)*

For the conditions in *equation 5.22* to impose no further restrictions on the model, the conditions must be proportional, hence:

$g_1(X_{ij}, \hat{X}_{ij}) = -g_2(X_{ij}, \hat{X}_{ij}) = \mathrm{C} \; \forall i, j$ *(equation 4.15)*

Integration thus yields:

$$\hat{X}_{ij} f_1(X_{ij}, \hat{X}_{ij}) = g_2(X_{ij}, \hat{X}_{ij}) = \mathrm{C}(X_{ij}, \hat{X}_{ij}) + D \qquad \textit{(equation 4.16)}$$

Since f is Quasi Maximum-Likelihood it should have a local maximum when the two variables are identical, thus $f_2(X_{ij}, \hat{X}_{ij}) = 0, and\ D = 0$, thus giving:

$$f_2(X_{ij}, \hat{X}_{ij}) = \mathrm{C}(\frac{X_{ij}}{\hat{X}_{ij}} - 1) \qquad \textit{(equation 4.17)}$$

Integrating once more gives:

$$f(X_{ij}, \hat{X}_{ij}) = X_{ij} \log(\frac{\hat{X}_{ij}}{X_{ij}}) - \hat{X}_{ij} + k(X_{ij}) \qquad \textit{(equation 4.18)}$$

That f is Quasi Maximum-Likelihood once more implies $f_1(X_{ij}, X_{ij}) = 0$. Therefore:

$$f_1(X_{ij}, X_{ij}) = -1 + k'(X_{ij}) = 0 \qquad \textit{(equation 4.19)}$$

Which means that $K(X_{ij}) = X_{ij}$. *equation 5.26* then becomes the Poisson Quasi Maximum-Likelihood:

$$f(X_{ij}, \hat{X}_{ij}) = X_{ij} \log(\frac{\hat{X}_{ij}}{X_{ij}}) - \hat{X}_{ij} + (X_{ij}) \qquad \textit{(equation 4.20)}$$

The Poisson estimator is becoming more popular in international trade literature for the following reasons (i) the Poisson estimator has several desirable properties for applied policy researchers using gravity models. The Poisson estimator is consistent in the presence of fixed effects. Fixed effects can be entered as dummy variables similarly to ordinary least squares; (ii) the Poisson estimator includes observations for which the observed trade flow is zero. Since the logarithm of zero is undefined, such observations are dropped when running Ordinary Least Squares regression.

4.7 Descriptive statistics

Table 4-1:Descriptive statistics

Variable	Observations	Mean	Median	Std. Dev.	Min	Max
Exports	1932	6.562419	6.764965	2.443107	.2497748	14.64192
GDP	1932	25.52076	25.68159	1.96843	20.26571	30.51339
SAGDP	1932	26.53749	26.60527	.19582	26.21501	26.78591
Distance	1932	9.006169	9.054213	.444706	7.093405	9.711297
Population	1932	16.33995	16.17522	1.792471	11.24396	21.05453
Polrisk	1932	-.4280281	-.3969786	.2827934	-2.268358	-.0037951
Exrate	1932	4.440228	4.601328	.8728202	1.00e-05	5.903166
FixedCap	1932	3.073756	3.110191	.4903637	-2.207275	4.094649
ManImp	1932	4.222313	4.255001	.165713	2.790864	4.519445

Source: Author's calculations based on data from World Integrated Trade Solutions, World Bank, CEPII ICRG

Table 4-1 presents the descriptive statistics for the variables used in the model. Descriptive statistics assists in prima facie analysis of measuring the central tendency, dispersion, nature, and statistical distribution of raw data and allows for the simplification of large datasets. Where the mean and median measures the central tendency, standard deviation measures the dispersion. The results displayed show that the data used follow a normal distribution. This observed by referring to the mean and median values that do not differ significantly.

4.8 Stationarity test results

Table 4-2 and Table 4-3 below displays the results of the stationarity test conducted on the complete dataset. The difference between both table is that the first table contains the stationarity test results tested for without a trend and the second table contains the stationarity results of the data with a trend.

Table 4-2:Stationarity test results (without trend)

VARIABLES	WITHOUT TREND	LLC
EXPORTS	Level	-16.4013***
GDP	Level	-5.2028***
SA GDP	Level	-14.1165***
POPULATION	Level	-4.8911***
POLRISK	Level	-20.0153***
FDI	Level	-22.1287***
EXRATE	Level	-13.6724***
FIXEDCAP	Level	-17.9159***
MANIMP	Level	-16.8192***

*Significant at 10 percent **Significant at 5 percent ***Significant at 1 percent

Table 4-3:Stationarity test results (with trend)

VARIABLES	TREND	LLC
EXPORTS	Level	-20.3896***
GDP	Level	-26.6708***
SA GDP	Level	-7.5839*
POPULATION	Level	-26.7697***
POLRISK	Level	-26.4041***
FDI	Level	-25.7433***
EXRATE	Level	-20.4299***
FIXEDCAP	Level	-23.2803***
MANIMP	Level	-20.0742***

*Significant at 10 percent **Significant at 5 percent ***Significant at 1 percent

As can be observed the variables are stationary at level forms when conducting the LLC stationary test. Similarly, with the inclusion of a trend, as depicted in Table 4-3, the variables are stationary at level form. It is thus not necessary to take the first difference of the variables, as they are stationary at level form.

4.9 Hausman test results

The Table 4-4 below displays the results of the Hausman test for the exports regression. Table 4-4 shows a high Chi^2 of 62.63 and the Prob>Chi^2 is 0.0000. These results show that there is not enough evidence to reject the null hypothesis and that the RE estimation technique is preferred to the FE estimation method at the 1% level of significance. Therefore, the study can conclude that the RE estimation technique would be preferred over the FE estimation technique given the data under consideration. However, given the well-known limitations in using RE, especially for small samples, the study also uses the PPML model. The PPML estimation can reduce bias in the presence of heteroskedasticity and zero trade flows. In addition, Santos Silva and Tenreyro (2011) and Martin and Pham (2020) argue that the PPML estimation technique is more appropriate than the traditional FE and RE estimation techniques. Thus, considering these shortcomings, the PPML estimation is the preferred method used in this study.

Table 4-4:Hausman test results

Hausman Test	Chi^2	62.63
	Prob>Chi^2	0.0000

4.10 Conclusion

The purpose of this chapter was to provide a framework to the empirical estimation in the next chapter. In doing so, this chapter outlined and discussed the research method implemented by previous studies assessing the relationship between political risk and export credit insurance on international trade, namely an augmented version of the standard gravity model of trade. These studies were outlined in chapter 3.3, the empirical literature section. This chapter included a discussion of the framework and presentation of the results of the stationarity test, cointegration test and the Hausman tests conducted. The results of the stationarity test showed that the variables were stationary at level term and were not required to be first differenced. In addition, the Hausman test results provided that the appropriate estimation technique was the RE estimation technique. Therefore, in

addition to the preferred PPML estimation technique, based, on the Hausman test results the study will employ the RE estimation technique.

Chapter 5 Estimation results

5.1 Introduction

This purpose of this chapter is to present, analyze and discuss the empirical estimation results. The chapter addresses the research questions and objectives of the study. As such, based on the objectives of the study, the main variables of interest are PolRisk, and Insurance. As these variables provide answers to the research questions posed in chapter 1 of this study. This chapter presents and discusses the results of the preferred PPML estimation technique. As a matter of interest, this section includes a comparison of the RE estimation results.

5.2 South Africa's global trading partners estimated results.

The Table 5-1 presents the regression results for the 85 trading partners using an augmented gravity model and two estimation techniques for robustness: the RE and PPML.

Table 5-1:Global trading partners estimation results

Variable	Dependent Variable: Ln Exports Method RE	Dependent Variable: LN Exports Method: PPML
GDP-PARTNER	.9883***	.2219***
GDP-SA	-.6021***	-.1083**
DISTANCE	-2.7313***	-.3716***
POPULATION	-.0652	-.0410***
POLITICAL RISK	-.6049***	-.1279***
EXPORTINSURANCE	.0252	.0367
EXCHANGE RATE	-.0642	.0131
FIXED CAPITAL	.1476	.0650***
MANUFACTEDIMPORT	-.8092***	-.0597
BRICS	.3716	-.1389***

EU	.6516	-.0336
SADC	-.4441**	.2387***
Constant	26.3472***	2.9808**
R-squared	0.6959	0.1409
Wald Chi2	514.30	
Pseudo log-Likelihood		-3861.57
Number of Observations	1932	1932

*Significant at 10 percent **Significant at 5 percent ***Significant at 1 percent

The objectives of this study were to assess the effect of (i) export credit insurance on South African exports, (ii) political risk on South African exports. The variables of interest in discussing the estimation results in relation to the study objectives are (i) Insurance, and (ii) PolRisk. The paragraphs below discuss these variables in relation to previous empirical studies undertaken by Egger and Url (2006); Moser; Nestmann and Wedow (2008); Jensen (2008); Janda, Michalikova and Skuhrovec (2013); Van der Veer (2015) and Polat and Yesilyaprak (2017). Under the RE estimation technique, the coefficient of *PolRisk* -0,6949 and is statistically significant at the 1% level of significance. Based on the RE estimation results, on average, *ceteris paribus*, a 1% increase in political risk leads to a 0,69% decrease in exports. The estimation results are therefore consistent with literature that political risk decreases exports.

The coefficient of *Insurance* equals 0.0367 and is positive. Based on the PPML estimation technique results, on average, *ceteris paribus* a 1% increase in export credit insurance leads to exports increasing by 0.0367%. Prior research by Felbermayr and Yalcin (2013), Auboin and Engemann (2014) and Polat and Yesilyaprak (2017) support this finding, as these authors also find that export credit insurance has a positive effect on exports. Further, these findings are supported by literature from Janda, Michalikova and Skuhrovec (2013) who also find that export credit insurance was a weak factor influencing exports positively. It is interesting because these authors also use an augmented gravity model very much like the one

used in this dissertation. This shows that export credit insurance can be used as both a risk mitigation tool and a tool to promote exports. Using the RE estimation technique, the *Insurance* variable .0252, and is positive, which supports the hypothesis that on average, *ceteris paribus*, greater export credit insurance leads to higher exports. The RE estimation corroborates the findings of the PPML estimation technique.

The coefficient of distance was found to be significant in both models. The *Distance* variable has the expected signs for both the RE and PPML estimation techniques. The coefficients are -2.7313 and -0,3716, respectively. These figures are both negative and statistically significant at the 1% level of significance. These findings support the hypothesis that the further away countries are, the less likely the countries engage in trade activity. On average, *ceteris paribus*, a 1% increase in geographic distance, leads to exports decreasing by either 2,7% or 0,37%. The finding on *Distance* is supported by literature by Moser, Nestman and Wedow (2008), Janda, Michalíková and Skuhrovec, (2013), and Polat and Yesilyaprak (2017). These authors find that *Distance* is both negative and statistically significant at the 1% level of significance.

The coefficient on *GDP* is 0,9883. This figure is positive and statistically significant at the 1% level of significance, meaning that on average, *ceteris paribus*, a 1% increase in the trading partners *GDP* leads to an approximate 1% increase in exports. *Population* is negative under both the RE and PPML estimation techniques, with a coefficient of -.0652 and -0,0410, which indicates that on average, *ceteris paribus*, a 1% increase in *population* leads to a 0,07% and 0,04% decrease exports. These findings are similar for both the FE and the PPML estimation technique and supported by literature by Egger and Url (2006), Moser, Nestman and Wedow (2008), Janda, Michalíková and Skuhrovec, (2013), and Polat and Yesilyaprak (2017). These authors also find that an increase in GDP leads increases in exports.

The remaining variables have the expected signs. Like the PPML estimation technique, Moser, Nestman and Wedow (2008) found that *FixedCap* was positive and statistically significant at the 1% level of significance. The PPML estimation technique shows that *Exrate* has the expected positive coefficient 0,0131 this finding

is supported by Polat and Yesilyaprak (2017). The last variable to be interpreted is *population*. Under RE estimation technique the coefficient on the *population* variable is -0,4979, which is negative and statistically significant at the 1% level of significance. The PPML estimation technique shows a similar finding, in the *population* coefficient -0,0363, and is statistically significant at the 1% level of significance.

5.3 Conclusion

This chapter has presented and analyzed the estimation results using two estimation techniques: the PPML and the RE estimation technique. Both estimation techniques corroborated each other's findings, therefore, overall, this study finds that political risk decreases exports and export credit insurance increases exports. This was what the study expected and very much like previous studies. The export credit insurance variable is however insignificant and does not play an influential role in South Africa's bilateral trade.

Chapter 6 Conclusion and recommendations

6.1 Conclusion

This study evaluates political risk and export credit insurance on trade in the case of South Africa. The study has provided a historical account of the uses and evolution of political risk and export credit insurance. The related discussions have identified the key elements and measures of political risk and export credit insurance to lay the foundation for a better understanding of the overall study. The study also offers snapshots of political risks and export credit insurance in South Africa. Additionally, this dissertation has reviewed both the theoretical and empirical literature. The theoretical review looks at the role and various relevant theories of trade. While the empirical literature review explores several studies, including recent ones in view of attempting to answer the primary research questions of this study.

In accordance with the specific research objectives of assessing whether political risk and export credit insurance can influence South African exports, the study uses an augmented gravity model and panel dataset from the time period 1996 to 2018. Using the RE and PPML methods and two separate regressions indicate the important influence of political risk on exports. The study found that political risk has a negative significant effect on bilateral trade as expected. However, export credit insurance has a positive but insignificant impact on bilateral trade. Other attributes, including the role of market power as measured by Gross Domestic Product (GDP), distance, and the regional groupings of African states through SADC, have clearly important bearings. An important policy implication is that African countries' inability to harness the gains from trade might be rooted in factors beyond trade finance constraints and more related to political risks and geographical constraints.

6.2 Limitations

It is important to highlight the challenges and limitations of this study. The dissertation found that data on export credit insurance was difficult to come by, and therefore used dummy variables for export credit insurance. As the data contains an excess of 80 countries, the data may be subject to cross-sectional dependence,

whereby countries in the same cross-section i.e., Europe are correlated. This may be attributed to unobserved factors common with these countries. These effects may be common to all countries yet affect each of country in a different way. Therefore, the data may be subject to cross sectional dependence.

6.3 Recommendations and further research

Against the backdrop of these results, the study found that export credit insurance has a positive effect on exports and can therefore assist in increasing international trade. The study therefore recommends that greater emphasis be placed on the awareness of export credit insurance. Export credit insurance can go beyond being a risk mitigation tool, to actively assisting in export promotion. The study recommends that export credit insurance be used to promote exports, as this will assist in facilitating international trade. Emphasis is placed on small and medium enterprises, because the department of trade industry and competition stresses the importance of small and medium enterprises in job creation and industrial development. As such small and medium enterprises can grow not only their businesses, but the encourage and foster economic development and growth through increasing exports and international trade. The ECIC has included the facilitation of exports from small and medium enterprises in strategic documentation, thus in line with the department of trade industry and competition. This presents an opportunity for development finance institutions to assist in facilitating international trade. Growing small and medium enterprises and increasing exports is part of the mandate of some development finance institutions, i.e., the Development Bank of Southern Africa and the Industrial Development Corporation. This dissertation therefore proposes further research into the role of development finance institutions in facilitating international trade.

Appendix A

List of countries used in the study.

Albania	Honduras	Nicaragua
Algeria	Hungary	Norway
Armenia	Iceland	Pakistan
Australia	India	Paraguay
Austria	Indonesia	Peru
Bahamas	Iran (Islamic Republic)	Philippines
Brazil	Ireland	Poland
Bulgaria	Israel	Portugal
Canada	Italy	Qatar
Chile	Jamaica	Romania
China	Japan	Russian Federation
China, Hong Kong SAR	Jordan	Saudi Arabia
Colombia	Korea, Republic	Seychelles
Costa Rica	Kuwait	Singapore
Croatia	Latvia	Slovakia
Cyprus	Lithuania	Slovenia
Czech Republic	Luxembourg	Spain
Denmark	Madagascar	Sri Lanka
Dominican Republic	Malawi	Sweden
Ecuador	Malaysia	Switzerland
Egypt	Malta	Thailand
Estonia	Mauritania	Tunisia
Fiji	Mauritius	Turkey
Finland	Mexico	United Kingdom
France	Morocco	United Republic of Tanzania
Germany	Nepal	United States
Greece	Netherlands	Viet Nam
Guatemala	New Zealand	Zambia

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