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Riadh Ben Jelili

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Send correspondence to:
Riadh Ben Jelili
The Arab Investment and Export Credit Guarantee Corporation "DHAMAN"
riadh@dhaman.org

[1] Director of Research & Country Risk Department, The Arab Investment and Export Credit Guarantee Corporation "DHAMAN", Arab Organizations Headquarters Building, P.O.Box 23568, Safat 13096, State of Kuwait.

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**Abstract**

The scarcity of affordable and opportune trade financing schemes, including export credit guarantee programs, has been part of the cause to the fairly modest trade growth recorded during the last five years. In view of that, it is important further investigating this matter to better understand the nexuses between financing/risk mitigation and trade performance. The existing literature on the effect of export credit insurance programs on export promotion are mainly focused on European countries. On the other hand, very little is known about the influence of export credit guarantees on exports in the Arab region, where the structure of export industries and key trading partners differ significantly from other regions. The purpose of this paper is to bridge this gap in the literature by investigating empirically the significance of the relationship between exports and credit-worthiness of importing countries, using data on Arab merchandise export values.

Corroborating evidence for this type of rapport would provide scientific backing to the practicality of specialized export financial institutions to financing exports, mitigating credit risk, and preventing trade finance markets in Arab countries from drying up. A dynamic panel approach is adopted in this paper and the empirical results, based on a balanced panel of 107 Arab partner countries (importer countries) observed between 1997 and 2017, provide a strong and robust validation of the valuable role export credit insurance and guarantee programs can play in promoting merchandise exports in the Arab region.

**Keywords**: Export, export credit agencies, economic risk, Arab countries, trade finance.
**JEL Classifications:** F10, F14, F36, G20, G28.

## 1. Introduction

Promoting and selling goods into foreign markets always encounter numerous risks emanating from the likes of the country/political situation, the status of the banking systems, the commercial/counterparty state of affairs, the foreign currency position, etc. Risks can arise from voluntary default actions of private or government buyers, as well as involuntary default actions by buyers, caused by their countries' unexpected economic, financial, and political circumstances. Export credit insurance offers companies' trouble-free ways to manage such risks. By insuring their account receivables, exporters can reduce their exposures to both commercial and political risks. Accordingly, it is a crucial step for an exporter company to consider carefully any available information about foreign buyers when reviewing a new potential foreign market. The accuracy of the risk assessment would presumably help the exporter define the export profitability conditional on non-payment risks, as well as to assess the worthiness of seeking appropriate export credit insurance instruments for the purpose of mitigating or effectively managing risks related to export businesses.

Risk mitigation instruments designate financial instruments that transfer certain defined risks from exporters to creditworthy third parties (guarantors and insurers) that have better capacities to assume such risks. These instruments are even more useful for developing country governments and local firms that may not be sufficiently creditworthy, or would not necessarily have a credible track record of importing goods without support. Effective risk mitigation in international trade often involves trade and export finance banks, or other providers working in partnership with Export Credit Agencies (ECAs), international financial institutions or private risk insurers, to deliver the right level of mitigation for a particular market, trading relationships or individual counterparties, e.g., a foreign bank.

With an increasingly short-term nature of private financial markets, ECAs and public financial institutions play progressively a critical role for exporters and investors. For instance, in 2017, new business underwritten by members of the Berne Union, an international organization representing the credit and investment insurance industry including both public and private institutions, totaled USD 2.33 trillion in export credits and investment insurance, the equivalent of 14% of the world merchandise trade (Bern Union, 2018).

Twenty years ago, the ECAs world was an exclusive club of public agencies established in some rich OECD countries, with their long-term activities mostly focused on supporting exporters through export credits. Over the last 15 years, the situation has been changing dramatically, particularly because of the emergence of new players, mostly in developing countries. Various other players, principally multilaterals and private insurers, also have emerged in the market insurance of long-term trade loans. As a result, the market share of non-OECD ECAs has increased from 28% in 2012 to 41% in 2016 (ICC, 2018).

The Arab countries are relatively new in the business of export credit support, as compared to OECD countries. Out of the 22 Arab League members, only 12 have ECAs, Export-Import banks or similar programs (cf. Table 1). In addition to the national ECAs/Programs listed in the table above, two multilateral ECAs in the region serve member countries. These are:

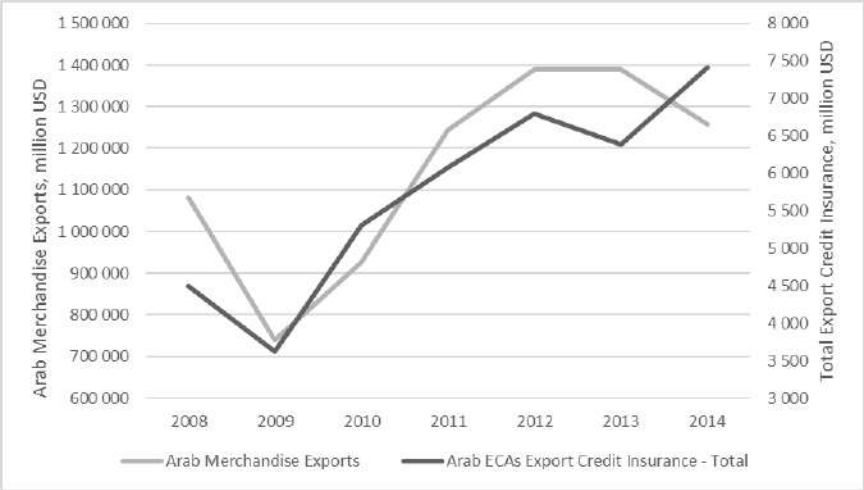
1. The Arab Investment and Export Credit Guarantee Corporation (Dhaman), which is a multinational institution, with full juridical personality and multilateral status, established in 1974 by 21 Arab countries and 4 Arab regional financial institutions, with a general aim to help promoting the economic development in the Arab region. It has been operating since then by offering a mechanism of insurance of inter-Arab investments against political risks. In 1986, Dhaman started guaranteeing also exports of member states against both commercial and political risks. In 2017, Dhaman's total risk exposure was almost 1404 million USD.
2. The Islamic Cooperation for the Insurance of Investment and Export Credit (ICIEC) is established in 1994 based on an agreement between members of the Organization of the Islamic Cooperation (OIC), and as a member of the Islamic Development Bank (IDB) Group. The main objective of ICIEC is to provide investment and export credit insurance based on *Sharia* principles, also known as Takaful Insurance. In 2017, ICIEC's total exposure was assessed at 4659 million USD.

**Table 1. Arab Countries with ECA Facilities and Corresponding Entity**

| Country | Entity Providing Facilities | Status | Established |
|---|---|---|---|
| **Algeria** | Compagnie Algérienne Assurance et de Garantie des Exportations (CAGEX) | Public Corporation | 1996 |
| **Bahrain** | Export Credit Guarantee Program under Bahrain Development Bank | Other – Program | 2011 |
| **Egypt** | Export Development Bank of Egypt (EDBE) | Joint-Stock Company | 1985 |
| | Export Credit Guarantee Company of Egypt (ECGE) | Joint-Stock Company | 1992 |
| **Jordan** | Jordan Loan Guarantee Corporation (JLGC) | Public Shareholding Company | 1994 |
| **Lebanon** | The Lebanese Credit Insurer (LCI) | Private Company | 2001 |
| **Morocco** | Société Marocaine d'Assurance à l'Exportation | Mixed Company | 1992 |
| **Oman** | Export Credit Guarantee Agency of Oman (ECGA) | Closely-held Company | 1991 |
| **Qatar** | Qatar Export Development Agency (TASDEER/QDB) | Closed Shareholding Company | 2011 |
| **Saudi Arabia** | Saudi Export Program (SEP) under the Saudi Fund for Development (SFD) | Other – Program | 1999 |
| **Sudan** | National Agency for Insurance and Finance of Exports (NAIFE) | Public Corporation | 2005 |
| **Tunisia** | Compagnie Tunisienne pour l'assurance du commerce extérieur (COTUNACE) | Public Company | 1984 |
| **United Arab Emirates** | Export Credit Insurance Company of the Emirates (ECIE) | State-owned Company | 2008-2017 |
| | Etihad Export Credit Insurance (or Etihad Credit Insurance – ECI) | Public Joint Stock Company | Late 2017 |

The data published from the Arab ECAs of their respective business volumes shows the relative sizes of the programs, as well as their offerings to national exports. Only 11 entities, including Dhaman and ICIEC, publish this data, although out-of-date for the most part. Figure 1 below illustrates the evolution of both global trade and export credit insurance (short-, medium- and long-term) volumes provided by those entities from 2008 to 2014. Merchandise trade volumes dropped sharply between 2008 and 2009 and have been recovering gradually since then. Mirroring trade volumes, total insurance commitments by the Arab Aman Union's members have also dropped between 2008 and 2009[1]. Total insurance volumes have recovered along with trade volumes since 2009, not including 2013 and 2014, probably due to the endured downward trend in oil prices since 2012.

**Figure 1: Arab Merchandise Exports and Arab ECAs Export Credit Insurance, 2008-2014**




Sources: Aman Union for credit export insurance series covering 9 Arab ECAs plus ICIEC and Dhaman; UnctadStat for merchandise exports series.

Intuitively, a growing volume of trade will most likely produce an increase in the demand for trade insurance and guarantees, independently of any change in the risk environment. However, it is striking that insurance volumes have fallen at a lesser pace (-19.4 %) than Arab merchandise trade volumes (- 31.6 %) during the financial crisis of 2008. According to Chauffour et al. (2010), *the finding that insurance volumes fell by less than trade volumes during the most severe period of the crisis […] is consistent with earlier anecdotal evidence suggesting that trading partners have resorted to more formal, bank intermediated instruments to finance trade since the outbreak of the financial crisis in order to reduce the high probability of default in open account financing.*

For those Arab ECAs that have published data, the ratios of average business volumes to exports during the period 2008-2014 range from a minimum of 0.10 % in UAE to a maximum of 4.47 % in Lebanon, which are very low by international standards. Notwithstanding the overall weakness in terms of shares of merchandise exports covered by export credit insurance, it is important to draw attention to the overall progressing upward trend of this share from 0.37 % in 2008 to 1.02 % in 2014.

The existing research work on the effects of ECA's export guarantees on export promotion is mostly focused on a number of European countries, such as Germany (Moser et al., 2006; Felbermayr and Yalcin, 2013), Austria (Egger and Url, 2006), Switzerland (Herger and Lobsiger, 2010) and the Czech Republic (Janda et al., 2013). Yet, very little work about the influence of export credit guarantees on exports in the Arab region is conducted. Indeed, the structure of their export industries and their key trading partners differ significantly from other regions. This is explained in large part by the deficiency in terms of detailed statistics on the activities of ECAs in the Arab world. Arab ECAs are indeed very reticent about revealing information about their

financial operations, including past and current project data, figures on guarantees issued, amounts recovered and outstanding claims, all of which are only reported on aggregate levels and only for few countries. Because of this deficiency, it is not possible to adopt a direct empirical strategy to test whether public export credit guarantees lead to a significant amount of additional exports.

The purpose of this paper is to contribute to bridge this gap by investigating empirically the significance of the relationship between exports and creditworthiness of importing countries, using merchandise export values for a balanced panel of 107 Arab partner countries (importer countries) between 1997 and 2017, totalizing in average 85% of the total Arab merchandise exports (898.5 billion US$ in 2017). Corroborating evidence on this topic will only give further backing to the significance of specialized export financial institutions to finance exports, mitigate credit risks and keep trade finance markets in Arab countries from drying-up.

The estimation results suggest a direct and a significant positive relationship between credit worthiness and exports coming from Arab countries. The magnitude of the relationship, especially in the long-run, leaves little doubt about the importance of the repayment risk as a key determinant of goods exports in the Arab region. Subsequently, the results provide a clear and compelling justification to the valuableness of specialized export financial institutions to financing exports, mitigating credit risks, and keeping trade finance markets from drying up, particularly in the Arab non-oil exporting countries where export finance is relatively scarce.

The remainder of the paper is organized as follows. Section 2 provides a short overview of the literature and outlines a simple model that takes into account the non-payment risks relative to the importing countries to define the relationship between exports and credit-worthiness. Section 3 details the econometric methodology. Section 4 is devoted to some concluding remarks.

## 2. Economic Effect of Export Credit Guarantees on Export Promotion

Government credit insurance schemes play an important role in financing and insuring the export business, which is confirmed in the literature about the positive effect of insured or directly financed transactions on trade. In this regard, Meon and Sekkat (2004) provide evidence that suggests that political risks restrain the participation of higher risk countries in Middle East and North African countries in the international trade arena. Bernard and Jensen (2004) argue that ECAs may have a positive effect on export participation by gathering information on foreign markets, and thereby reducing entry sunk costs. Auboin and Engemann (2014) reveal a significantly positive effect of insured transactions on international trade. Moser et. al., (2008) and Egger and Url (2006) also provide evidence in support of a causal link between ECAs support and merchandise exports. Others, such as Chor and Manova (2012) as well as Amiti and Weinstein (2011), illustrate the effect of trade credit on trade. Associated with other economic development

instruments, Klasen (2012) highlights the role of ECAs in terms of fostering innovation, diversifying the economy and supporting foreign direct investment.

To define the relationship between exports and non-payment risks or non-creditworthy partner, a risk averse representative-exporting firm *i* facing default and various political risks on its exports in the foreign market is considered; yet it has the opportunity to hedge against such risks. The exporting firm's decision problem is to choose the level of export and amount of insurance coverage. Following Abraham and Dewit (2000) and Rienstra-Munnicha and Turvey (2002), a mean-variance approach could be adopted to simplify the optimization of the certainty-equivalent profit function $U_i$:

$$MaxU_i = E(\pi_i) - \tfrac{\lambda}{2} Var(\pi_i) \quad (1)$$

where $E(.)$ is the expectation operator, $\pi$ is the random profit function of the exporting firm, $\lambda$ denotes the coefficient of risk aversion and $Var(.)$ is the variance operator. $E(\pi_i)$ and $Var(\pi_i)$ denote expected profits and variance of profits respectively, defined as follows:

$$E(\pi_i) = (1 - \bar{\alpha}_i)P_iX_i + \bar{\alpha}_i\beta_iP_iX_i - \delta\omega_iX_i - cX_i - F \quad (2)$$

$$Var(\pi_i) = \sigma_\pi^2 = (1 - \beta_i)^2 X_i^2\, \sigma_i^2 \quad (3)$$

where $X_i$ is the exporting volume, $P_i$ is the negotiated contract price of the exporting merchandise, $\alpha_i$ symbolizes the share of the unpaid contract value assumed to be a stochastic variable with mean $\bar{\alpha}_i$ and variance $\sigma_i^2$, $\beta_i$ is the insured share in the total value of the export contract, $\delta$ represents the administrative cost of providing the insurance scheme, $\omega_i$ is the premium per-unit of the exporting good, *c* denotes the constant marginal cost of exporting in the absence of non-payment risks, and *F* is the constant fixed cost of production.

In equation (2), the insurance premium rate per-unit of the exporting good is defined as a function of the expected probability of non-payment $\bar{\alpha}_i$, the price $P_i$ and the coverage level $\beta_i$:

$$\omega_i = \omega(\bar{\alpha}_i, \beta_i, P_i) \text{ , with } \frac{\partial \omega_i}{\partial x} > 0 \text{ for } x = P_i, \bar{\alpha}_i, \beta_i \quad (4)$$

According to the proportional reimbursement method, the compensation paid by the underwriter in case of non-payment is in proportion of the purchased amount of coverage. Consequently, the certainty-equivalent profit function maximization problem can be expressed as follows:

$$\underset{X_i}{\text{Max}} \left\{ (1 - \bar{\alpha}_i)P_iX_i + \bar{\alpha}_i\beta_iP_iX_i - \delta\omega(\bar{\alpha}_i, \beta_i, P_i)X_i - cX_i - F - \frac{\lambda}{2}(1 - \beta_i)^2 X_i^2\, \sigma_i^2 \right\} \quad (5)$$

The first order condition of the maximization problem (5) with respect to $X_i$ is formulated as:

$$(1 - \bar{\alpha}_i)P_i + \bar{\alpha}_i\beta_iP_i - \delta\omega(\bar{\alpha}_i, \beta_i, P_i) - c - \lambda(1 - \beta_i)^2 X_i^*\, \sigma_i^2 = 0 \quad (6)$$

Solving equation (6) in terms of the exporting quantity $X_i^*$ leads to:

$$X_i^* = \frac{(1-\bar{\alpha}_i)P_i + \bar{\alpha}_i\beta_i P_i - \delta\omega(\bar{\alpha}_i,\beta_i,P_i) - c}{\lambda(1-\beta_i)^2\sigma_i^2} \quad (7)$$

Hence, in the absence of an insurance contract ($\beta_i = 0$), the exporting quantity would be formulated as:

$$X_i^0 = \frac{(1-\bar{\alpha}_i)P_i - c}{\lambda\sigma_i^2} \quad (8)$$

However, in presence of any export credit insurance, the level of exports increases with an increasing share of the insured value in the contract of the total value of exports $\beta_i$. Indeed, from equation (7), the partial derivative with respects to $\beta_i$ is as follows:

$$\frac{\partial X_i^*}{\partial \beta_i} = \frac{\bar{\alpha}_i P_i - \delta\frac{\partial \omega_i}{\partial \beta_i}}{\lambda(1-\beta_i)^2\sigma_i^2} + \frac{2X_i^*}{(1-\beta_i)} \quad (9)$$

Given that $X_i^* > 0$, the second term of the right side of equation (9) must be positive. The partial derivative $\frac{\partial \omega_i}{\partial \beta_i}$ is also positive; so it is reasonable to assume that $\bar{\alpha}_i P_i \geq \delta\frac{\partial \omega_i}{\partial \beta_i}$, which means that the expected benefit of the insurance contract is greater than its marginal cost, otherwise the exporting firm chooses no coverage. As a result, the firm increases exports in the presence of an export credit insurance contract with a "fair" marginal cost.

The premium subsidy is generally granted by the public insurance agency to strengthen the competitive position of the local exporting firm, given that a lower premium is translated into a decrease of the export price, leading ultimately to an expansion of exports. The impact of the subsidized premium can be analyzed by taking the partial derivative of (9) with respect to the loading factor $\delta$:

$$\frac{\partial^2 X_i^*}{\partial \beta_i \partial \delta} = -\left(\frac{\frac{\partial \omega_i}{\partial \beta_i}}{\lambda(1-\beta_i)^2\sigma_i^2} + \frac{2\omega}{\lambda(1-\beta_i)^3\sigma_i^2}\right) < 0 \quad (10)$$

The impact can also be evaluated by taking the partial derivative of equation (7) directly:

$$\frac{\partial X_i^*}{\partial \delta} = -\frac{\omega}{\lambda(1-\beta_i)^2\sigma_i^2} < 0 \quad (11)$$

Accordingly, the larger the proportion of subsidized insurance premium, the greater is the exported volume.

Even in presence of export credit insurance at a fair premium rate, a higher degree of risk aversion by the exporting firm entails a lower exports volume. This result is derived directly from the partial derivative of equation (7) with respect to:

$$\frac{\partial X_i^*}{\partial \lambda} = -\frac{(1-\bar{\alpha}_i)P_i+\bar{\alpha}_i\beta_i P_i-\delta\omega(\bar{\alpha}_i,\beta_i,P_i)-c}{\lambda^2(1-\beta_i)^2\sigma_i^2} = -\frac{X_i^*}{\lambda} < 0 \tag{12}$$

The impact of the exporting firm's risk attitude can be offset by increasing the coverage level:

$$\frac{\partial^2 X_i^*}{\partial \lambda \partial \beta_i} = -\frac{1}{\lambda}\frac{\partial X_i^*}{\partial \beta_i} < 0, \tag{13}$$

or by increasing subsidization:

$$\frac{\partial^2 X_i^*}{\partial \lambda \partial \delta} = -\frac{1}{\lambda}\frac{\partial X_i^*}{\partial \delta} > 0 \tag{14}$$

However, if the risk attitude results fundamentally from informational asymmetries, it may be possible for a decision-maker to reduce risk aversion by intensifying the flow of credible and accurate information to the exporter. Accordingly, $\lambda$ will decrease and $X_i^*$ will increase.

More fundamentally, the level of exports volume is greater in presence of an export credit insurance scheme with a fair premium rate. Indeed, it is easy to verify that $X_i^*$ can be rewritten as follows:

$$X_i^* = \underbrace{\frac{1}{(1-\beta_i)^2}}_{>1} X_i^0 + \underbrace{\frac{\bar{\alpha}_i\beta_i P_i-\delta\omega(\bar{\alpha}_i,\beta_i,P_i)}{\lambda(1-\beta_i)^2\sigma_i^2}}_{\substack{Expected\ net\ benefit\ of\ the\ insurance \\ contract,\ \ assumed\ to\ be\ positive}} \tag{16}$$

Finally, it is straightforward to highlight the impact of non-payment risk on exports and to prove that the exporting quantity decreases (increases) in presence of a prior probability of non-payment (creditworthiness partner). Given that the variance of $\alpha_i$ increases with a prior probability of non-payment ($\partial\sigma_i/\partial\bar{\alpha}_i > 0$), it follows that:

$$\frac{\partial X_i^*}{\partial \bar{\alpha}_i} = -\left(\frac{(1-\beta_i)P_i+\delta\frac{\partial \omega_i}{\partial \bar{\alpha}_i}}{\lambda(1-\beta_i)^2\sigma_i^2} + \frac{2X_i^*}{\sigma_i}\frac{\partial \sigma_i}{\partial \bar{\alpha}_i}\right) < 0 \tag{15}$$

This final result is empirically investigated in the next section. Specifically, the following section details the econometric methodology employed to provide evidence that supports positive relationship between importer creditworthiness and exports.

## 3. Econometric Methodology

### 3.1. Data and Empirical Strategy

In this sub-section, an attempt is made to provide evidence that supports such relationship by conducting an empirical analysis focusing on the impact of countries economic risk scores on exports. Before presenting the empirical results, the data in use and the methodology for estimation are briefly described. Finally, the results along with robustness checks are presented.

A balanced panel of 107 Arab partner countries (importer countries) between 1997 and 2017 are used, totalizing in average 85% of the total Arab merchandise exports (898.5 billion US$ in 2017). The relatively short time periods (*T*) with respect to the relatively large number of cross-section units (*N*) in the considered sample does not call into question the (short) panel data approach appropriateness for this study.

The data used come from various sources: The United Nations Conference on Trade and Development UNCTADstat database (for the export series by product groups and partner, population, FDI inward stocks), the International Monetary Fund World Economic Outlook database (GDP, GDP on purchasing-power-parity, GDP deflator), and the Fitch Solutions Database (short term and long term economic risk components and indices).

In line with methodological approaches in Egger and Url (2006), Nestmann and Wedow (2008) and Janda et al. (2013), the considered level-log model specification is as follows:

$$ln(Export_{it}) = c + \alpha ln(Creditw_{it}) + \beta ln(FDI_{it-1}) + \gamma ln(Manuf_{it}) + \varepsilon_{it} \quad (17)$$

where subscript *i* stands for the receiving (importing) country and subscript *t* for time (year). The dependent variable, $ln(Export_{it})$, corresponds to the natural logarithm of real exports value per capita at importing country *i* from the Arab region at year *t*. In consequence, data are normalized across importing countries. The set of regressors includes:

- $ln(Creditw_{it})$, the natural logarithm of creditworthiness index of the partner *i* at year *t*,
- $ln(FDI_{it-1})$, the natural logarithm of real inward FDI stock per capita in country *i* at year *t,* and
- $ln(Manuf_{it})$, the natural logarithm of the share of manufacturing imports in the overall imports in country *i* at year *t*.

$\varepsilon_{it}$ corresponds to a random error term defined as a sum of the country unobserved effects $\mu_{it}$ and an error term $u_{it}$ with a zero mean and a constant variance. All variables are converted in real terms by using the appropriate GDP deflator.

Using a restricted number of independent variables may seem questionable, especially because of the possible omission of hypothetical relevant explanatory variables commonly introduced, e.g., GDP, exchange rate, distance or tariff and regulatory trade barriers. On the other hand, it is important to give emphasis to the components of credit score derived from Fitch Solutions Database. Indeed, the credit score components are based on two correlated indices, the short-term economic risk index, and the long-term economic risk index. The former includes five sub-components and the latter has six sub-components covering a broad range of economic, monetary, fiscal, external and financial indicators (see Table A1 and Table A2 in the appendix). Accordingly, adding-in additional explanatory variables would raise the possibility of multicollinearity. Principal component analysis (PCA) approach was used to develop on the basis of the indices mentioned above a creditworthiness score or index (the variable $Creditw$). In equation (17), this index is then transformed using an inverse hyperbolic sine transformation in order to deal with potentially zero or negative values preventing log conversion. A high credit score indicates very limited risk in the importing country. It is then expected that the coefficient on $Creditw$ shall be positive ($\alpha > 0$).

FDI and international trade are often seen as complementary. As a stylized fact, this complementarity is widely supported by empirical evidence. In the late 1990s, a unified approach has been developed by Markusen et al. (1996) and Markusen (2000), under the name of knowledge-capital models, that endogenizes multinational firms (MNCs) in general-equilibrium trade models. Their key findings suggest that vertical multinationals dominate, and so does the complementarity between trade and FDI, predominantly when countries differ in their relative factor endowments. Conversely, as horizontal multinationals dominate, so does the substitutability between trade and FDI, principally when trade costs are moderate to high, and countries are similar in size and in relative endowments. Accordingly, the sign of the coefficient $\beta$ tied to $ln(FDI_{it-1})$ would depend on whether there is substitutability or complementarity between imports and FDI in relevant partner countries. The lag structure in the adopted specification is intended to capture the relatively longer time period that may be required for the impact of FDI on trade to be felt.

As in Egger and Url (2006), we include the country's share of manufacturing imports in overall imports, $Manuf$, to be used as a proxy for its relative factor endowment. $\gamma$ is expected to be negative, as the Arab region has relatively low levels of intra-industry trade, i.e., exports are, ceteris paribus, directed to countries with a dissimilar factor endowment. Most countries in the region do not take part in value chain production and trade arrangements that have driven growth in East Asia and in Central and Eastern European countries (Hoekman, 2016).

The starting point in the empirical analysis is to use a standard static model as a benchmark, and estimate the static regression model given by equation (17). However, economic theory, as well as

a large number of empirical work, corroborate the hypothesis that trade is a dynamic process, and that estimating static equations may generate upward biased estimates. So, the next step is to explicitly introduce dynamics in the specification by controlling for the lagged effects of the dependent variable, and detecting the short-term influences of $Creditw$ and of all other variables that affect Arab exports. Past exports is than assumed to exert a significant effect on current exports. A dynamic specification of this kind is mainly motivated by repeated interactions between business partners and sunk costs linked to distribution and service networks (Eichengreen and Irwin 1996). This specification would be as follows:

$$ln(Export_{it}) = c + \theta ln(Export_{it-1}) + \tilde{\alpha} ln(Creditw_{it}) + \tilde{\beta} ln(FDI_{it-1}) + \tilde{\gamma} ln(Manuf_{it}) + \tilde{\varepsilon}_{it} \quad (18)$$

The long-run solution is defined as follows:

$$ln(Export) = \frac{c}{1-\theta} + \frac{\tilde{\alpha}}{1-\theta} ln(Creditw) + \frac{\tilde{\beta}}{1-\theta} ln(FDI) + \frac{\tilde{\gamma}}{1-\theta} ln(Manuf)$$

Accordingly, the long-run effect of $Creditw$ on $Export$ is measured by $\frac{\tilde{\alpha}}{1-\theta}$.

A significant complexity arises with the one-way fixed effects model in the context of a dynamic panel data model, particularly in the small *T* - large *N* context. If trade is a static process, the fixed-effect estimator would be consistent for a finite time dimension and a large number of partners. However, if trade is a dynamic process as assumed in equation (18), the transformation needed to eliminate the country-specific fixed effects would produce a correlation between the lagged dependent variable and the transformed error term, rendering the least square estimator biased and inconsistent. To circumvent the inconsistency problem, Arellano and Bond (1991) derive one-step and two-step GMM estimators, using moment conditions in which lagged levels of the dependent and predetermined variables are used as instruments in the difference equation. Arellano and Bover (1995) describe how additional moment conditions would increase efficiency, in case the original equations in levels are added to the system of first-difference equations.

Blundell and Bond (1998) have refined the system GMM estimator. They propose a system estimator that uses moment conditions in which lagged differences are considered as instruments for the level equation, in addition to moment conditions of lagged levels as instruments for the difference equation. Due to the relatively short time period in data, and the relevance of persistence effect in the modified gravity model, the system GMM estimator would be the right choice for our empirical investigation. It is worth noting that taking first difference of the equation removes fixed effects and time invariant regressors. If the latter are of interest, the resulting loss of information may well be a severe nuisance.

### 3.2. Empirical Results

This sub-section presents the results of the estimation. Table 2 reports the estimate results and related tests of the static model. Given that our panel contains most of the partner countries (85 % of Arab total exports of goods), and not just a random sample of them, we would consider the fixed effects in the static model as benchmark undertakings. Our choice is corroborated by the Hausman test (used to differentiate between fixed effects model and random effects model in panel data), i.e., as the null hypothesis that the preferred model is random is rejected. The quality of the regression, in terms of data variability, is very good with an R-squared of 92 % and a highly significant F-test. It is important to note that fixed effects absorb a very significant part of the variation in the dependent variable (rho coefficient of 88 %).

The relationship between credit worthiness and Arab total real exports per capita in the importing countries is unambiguously positive and statistically significant. The magnitude of the $Creditw$ variable effect is also very significant. A 10 % increase in the credit score of an importing partner suggests an expected increase of 4.14 % in the volume of Arab total goods exports per capita to that partner. The estimated elasticity is robust to the introduction of other explanatory variables.

The coefficients of the other explanatory variables are as expected. The volume of exports per capita is positively influenced by the previous period's per capita FDI inward stock in the importing country. The estimated coefficient value of 0.277 implies than a 10 % change in the level of inward FDI stock per capita in previous year in the importing country is expected to be associated with almost 2.8 % increase in Arab exports per capita to that country in the next year. This indicates that the complementarity relationship between trade and FDI does dominate. One possible explanation is that FDI decision-makers in the importing country, rather than engaging in import substitution activities, they do engage more in import activities of inputs of production. Another explanation may be that FDI decision-makers focus more on production of goods and services that are complementary to other import products, which leads ultimately to their increase.

The negative and statistically significant coefficient of $ln(Manuf_{it})$ indicate that a larger share of manufacturing imports in total imports in the importing country is expected to be associated with less imports or less exports from the Arab region. The result is in harmony with the very low intra-industry trade index in the region, as an indicator of Arab countries' ability to compete in a more open trade setting. All other things being equal, Arab exports are directed to countries with a dissimilar factor endowment.

**Table 2. Summary Results - Estimation of the Static Model**

| | *Fixed Effects* | *Random Effects* | *Fixed Effects* |
|---|---|---|---|
| $ln(Creditw_{it})$ | 0.562*** | 0.593*** | 0.414*** |
| | (0.041) | (0.041) | (0.099) |
| $ln(FDI_{it-1})$ | - | - | 0.277*** |
| | | | (0.085) |
| $ln(Manuf_{it})$ | - | - | -1.149*** |
| | | | (0.317) |
| *Number of observations* | 2247 | 2247 | 2140 |
| *Number of partners* | 107 | 107 | 107 |
| *R-squared* | 0.90 | 0.90 | 0.92 |
| *F test for FE and Wald Chi2 for RE* | 186.70*** | 212.69*** | 22.81*** |
| *Hausman test* | Ho: difference in coefficients not systematic | | |
| | chi2(1) = 26.03*** | | |

Notes:
Robust White heteroscedastic consistent standard errors are in parentheses. All variables are in natural logarithms. Specific effects dummies are included but not shown. The response variable is the natural logarithm of real total export of goods per capita of importing country. *** Significant at 1 %, ** Significant at 5 % and * Significant at 10 %.

As has been mentioned by Moser et al. (2008), two important econometric caveats could possibly undermine the regression analysis presented so far. First, the estimates for both the short- and long-run effects of the contemplated regressors would likely be biased if the underlying data-generating process is in fact dynamic. Second, the static specification given by equation (17), may well be undergoing an endogeneity problem that can cause biasness and inconsistencies of the estimated coefficients. In actual fact, the causality may also run in the opposite direction, with Arab exporters necessitating more credit worthiness for countries to which they export more.

In order to deal with both issues, the dynamic specification given by equation 18 is estimated by applying the instrumental variable approach or the system GMM estimator developed by Blundell and Bond (1998). Table 3 reports the estimation results and related tests of the dynamic model. The results confirm that the data generating process is indeed dynamic. The coefficient of the lagged dependent variable $ln(Export_{it-1})$ is positive and significant. The magnitude of the persistence effect is in line with the empirical literature. Arellano-Bond tests for AR(1) and AR(2) confirm the consistency of the System GMM estimator. The Sargan test of over-identifying restrictions indicates that the hypothesis that all moment restrictions are satisfied is not rejected.

The dynamic specification reveals that the long-run effect of credit worthiness on exports is given by an elasticity of 0.39 $(\tilde{\alpha}/(1-\theta) = 0.185 \;/\; (1 - 0.525))$, thus slightly lower than of the static specification. Accordingly, a 10 % increase in the credit score of an importing country is expected to lead to nearly 4% increase in Arab exports of goods to that country.

If the long-term effect is captured appropriately by the dynamic specification, then the estimation results would suggest a direct and a significant positive relationship between credit worthiness and exports coming from Arab countries. The magnitude of the relationship, especially in the long-run, leaves little doubt about the importance of the repayment risk as a key determinant of goods exports in the Arab region. Factors such as guarantees, reduced loadings, subsidies and a lower default probability, are all factors that contribute significantly to the credit worthiness of any given importing country, hence leading to higher exports.

**Table 3. Summary Information - Estimation of the Dynamic Model**

| | *System GMM* |
|---|---|
| $ln(Export_{it-1})$ | 0.525*** |
| | (0.049) |
| $ln(Creditw_{it})$ | 0.185*** |
| | (0.072) |
| $ln(FDI_{it-1})$ | 0.238*** |
| | (0.037) |
| $ln(Manuf_{it})$ | -1.189*** |
| | (0.313) |
| *Dummy variable for years 2008 and 2009*[1] | -0.076*** |
| | (0.026) |
| *Number of observations* | 2033 |
| *Number of partners* | 107 |
| *Wald Chi2* | 547.76*** |
| *Sargan test of overidentifying restrictions p-value* | 1.00 |
| *Arellano-Bond AR(1) p-value* | 0.00*** |
| *Arellano-Bond AR(2) p-value* | 0.21 |

Notes:

Robust White heteroscedastic consistent standard errors are in parentheses. All variables are in natural logarithms. Specific effects dummies are included but not shown. The response variable is the natural logarithm of real total export of goods per capita of importing country. *** Significant at 1 %, ** Significant at 5 % and * Significant at 10 %.

[1] Global merchandise trade sharply declined in late 2008 and early 2009. Therefore, a crisis dummy variable is added as an independent variable; it takes the value one for years 2008-2009 and 0 otherwise.

### 3.3. Robustness of the Results

In this sub-section, the robustness of the results for non-high income countries is checked. The principal argument for excluding this category of countries is the fact that short-run and long-run economic risks tend to be potentially more substantial in non-industrial countries. It is therefore appealing to verify and authenticate the impact of the credit score for this category of importing countries.

Separate regressions for each export product group, defined according to the Standard International Trade Classification (SITC) Revision 3 are conducted. In addition to initial total merchandise product groups, three broad sub-categories have also been introduced, i.e., separate groups for primary commodities, manufactured goods, and machinery and transport equipment. The results

summarized in Table 4 show that the coefficients for credit score is significant and substantially large across the product groups. The long-run effect of credit worthiness on exports ranges between 0.64, for primary commodities, and 1.01, for machinery and transport equipment. Based on these results, a 10 % increase in the credit score of any importing non-high income country leads to an expected increase of 6.4 % in the value of Arab primary commodity exports to that country, and likewise, an expected 10 % in the value of Arab machinery and transport equipment exports.

Despite their popularity in practical empirical work with dynamic panel regression, it is well understood that GMM approaches to the estimation of autoregressive parameters in dynamic panels often endure tricky situations involving inefficiencies and substantial bias, especially in presence of a weak instrumentation, as in the commonly occurring cases of persistent or near unit root dynamics. In this paper, one may arguably be concerned about a unit-root process in the export series. However, it is worth noting that the estimation approach adopted, and proposed by Arellano and Bover (1995) and Blundell and Bond (1998), provides a convenient solution to the weak instrument problem. This approach focuses on the levels equation, where there is no loss of signal in the unit root case. It uses differenced lagged variables, as instruments, under the assumption that the fixed effects are uncorrelated with the idiosyncratic errors. Nonetheless, it is necessary to address the concerns related to any presence of any unit-root process in the series. For this purpose, and taking the small T-dimension of the considered panel into account, the Harris–Tzavalis test (Harris and Tzavalis, 1999), which assumes that the number of panels tends to infinity as the number of time periods is fixed, is used. The test has a null of unit root versus an alternative with a single stationary value. As shown in Table 5, an overwhelming evidence against the null hypothesis of a unit root is founded, and therefore there is no evidence of any unit-root process in the series under consideration.

**Table 4. Summary Information - Estimation of the Dynamic Model for Non-High Income Countries and 4 Product Groups System GMM, 1997-2017**

| | *Total Goods* | *Primary Commodities* | *Manufactured Goods* | *Machinery and Transport Equipment* |
|---|---|---|---|---|
| $ln(Export_{it-1})$ | 0.571*** | 0.473*** | 0.602*** | 0.585*** |
| | (0.051) | (0.072) | (0.064) | (0.055) |
| $ln(Creditw_{it})$ | 0.302*** | 0.339*** | 0.273*** | 0.419*** |
| | (0.070) | (0.092) | (0.071) | (0.084) |
| $ln(FDI_{it-1})$ | 0.179*** | 0.178*** | 0.252*** | 0.250*** |
| | (0.042) | (0.059) | (0.071) | (0.072) |
| $ln(Manuf_{it})$ | -0.920*** | -1.347*** | -0.176 | -0.062 |
| | (0.338) | (0.551) | (0.175) | (0.236) |
| *Dummy for 2008 and 2009*[1] | -0.115*** | -0.084* | -0.085** | -0.091 |
| | (0.041) | (0.051) | (0.042) | (0.060) |
| *Number of observations* | 1197 | 1197 | 1197 | 1197 |
| *Number of partners* | 63 | 63 | 63 | 63 |
| *Wald Chi2* | 429.37*** | 193.93*** | 488.06*** | 466.16*** |
| *Sargan test p-value* | 1.00 | 1.00 | 1.00 | 1.00 |
| *Arellano-Bond AR(1) p-value* | 0.0011*** | 0.0045*** | 0.0004*** | 0.0006*** |
| *Arellano-Bond AR(2) p-value* | 0.158 | 0.126 | 0.794 | 0.326 |

Notes:

Robust White heteroscedastic consistent standard errors are in parentheses. All variables are in natural logarithms. Specific effects dummies are included but not shown. The response variable is the natural logarithm of real total export of goods per capita of importing country. *** Significant at 1 %, ** Significant at 5 % and * Significant at 10 %.

[1] Global merchandise trade sharply declined in late 2008 and early 2009. Therefore, a crisis dummy variable is added as independent variable; it takes the value one for years 2008-2009 and 0 otherwise.

**Table 5. Summary Information, the Harris-Tzavalis (HT) Test of Unit-Root**

| *Series* | *HT Statistic* |
|---|---|
| $ln(Export_{it})$ | |
| *Total Goods* | 0.657*** |
| | (0.000) |
| *Primary Commodities* | 0.474*** |
| | (0.000) |
| *Manufactured Goods* | 0.736*** |
| | (0.000) |
| *Machinery and Transport Equipment* | 0.656*** |
| | (0.000) |
| $ln(Creditw_{it})$ | 0.821*** |
| | (0.009) |
| $ln(FDI_{it})$ | 0.763*** |
| | (0.000) |
| $ln(Manuf_{it})$ | 0.591*** |
| | (0.000) |

Notes:

P-value in parentheses. *** Significant at 1 %, ** Significant at 5 % and * Significant at 10 %.

## 4. Conclusion and policy recommendations

The existing research on the effects of risk mitigation on export promotion is mostly concentrated on several European countries. Very little is known about the influence of export credit guarantees on exports in the Arab region, where the structure of export industries and key trading partners differ significantly from other well investigated regions. The paper contributes to bridge this gap by investigating empirically the significance of the relationship between exports and credit worthiness of importing countries, using data on Arab merchandise export values.

Evidence that supports the existence of such a relationship is provided. Specifically, evidence in support of an economically significant effect of credit worthiness on exports is highlighted. The long-run effect of credit worthiness on exports is given by an elasticity of 0.39, slightly lower than the estimated elasticity based on a static specification. In addition, the results confirm that the estimates with regard to the impact of credit scores hinge crucially on the feature of the sample of countries, and the export product groups. In fact, based on a sample of non-high income countries alone, the credit worthiness has been found to be effective over the entire period under consideration. The principal argument for excluding high-income countries is that both short-run and long-run economic risks are potentially more prominent in non-industrial countries. Accordingly, it is particularly insightful to assess the impact of the credit score in the context of this sub-group of importing countries. The long-run estimated elasticities exceeded significantly the values derived over the whole sample. They range between 0.64, in the group of primary commodities, and 1.01 in the group of machinery and transport equipment.

In other words, the empirical results provide a clear and compelling justification to the usefulness of specialized export financial institutions to financing exports and mitigating credit risk, particularly in Arab non-oil exporting countries. Establishing or developing an already present public ECA could help relieve export constraints, by facilitating access to credit for exporters through mitigating risk and increasing banks' willingness to lend. This can also be supported by helping exporters to offer better payment terms to importers, in addition to backing all efforts to enhance confidence in both relevant Arab banks and enterprises.

Most Arab countries are in need to set up ECAs, or to take steps towards boosting the effectiveness of existing ones, to finance exports and alleviate market failures and market imperfections. However, establishing public financial institutions of this kind represents an intervention into the resource allocation process of the domestic economy. The question of whether such interventions add value should be assessed carefully, given the complexity of the issues involved. More specifically, Chauffour et al. (2010) highlight two main dimensions regarding the impacts of any financial institution that aims to play a part in the financing of exports in any country, the financial sector dimension and the real sector one. The former refers to the variations in the structure of the financial sector and the impacts on the behaviors of other financial institutions. The second

dimension is about the incentive framework changes in the real sector. The net result of these impacts depends on many factors, ranging from the structure of the real economy and its competitive position, to the overall governance environment in the country.

Furthermore, ECAs are also fundamental financial institutions operating as insurers and/or lenders. Similar to commercial organizations, they do require a robust risk management frameworks and systems for enterprise risk management linked to business models and objective settings, in order to better identify, assess, monitor and manage their risks. Taking into account this requisite adds a new dimension, which the authors call a business model dimension.

A specialized export finance institution requires in the first place comprehensive understandings and analyses of the current conditions and trends within the financial sector of the country in question. The substance of this should be detecting any market failures and imperfections that may adversely affect the volume of exports. For that purpose, the depth of the financial system and actual lending practices should be carefully assessed.

Despite reform efforts, there are still various financial sector constraints in many countries in the Arab region that hamper the competitiveness of exporters and hold back the expansion and upgrading of exports. These include several financial market regulations and institutional shortcomings that cause difficulties for transactions between foreign and local entities in many Arab countries. The affected entities include businesses and banks, thereby rendering local suppliers less attractive to foreign buyers. In particular, the lack of access to trade finance (and credit more generally) imposes constraints on the cash flow of exporters. Many exporting SMEs in the region, as they have purchase orders from foreign buyers, or letters of credit (L/C) from foreign banks, do commonly face severe problems converting payment promises into liquidity or cash to meet their financial needs during production times, and between shipments of goods and received payments from foreign buyers.

The Arab region is also characterized by severe shortages in the supply of trade finance products. Referring to banks surveyed for a trade finance study by the Asian Development Bank (Di Caprio et al., 2017), the study estimates the global trade finance gap at $1.5 trillion, 14 % of which originate in the Middle East and Africa. About three-quarters of all rejected trade finance transactions come from SMEs and midcap firms. While there are no separate estimates for Arab countries in this regard, and given the region's comparatively low levels in terms of both financial sector depth and access, it seems reasonable to expect that trading companies there face a significant trade finance gap.

There are a number of reasons that trade finance may be insufficient to meet demand in the Arab region. The common ones relate to high risks, the lack of necessary regulations to offer different

instruments, the deficiency in demand, and the low profitability. To this list, we could add two additional factors that prevent markets from meeting demand, even as trade finance default rates are low and firms are willing to pay higher prices. The first factor is related to the limited capacity of local markets to offer trade finance products. The second one is in connection with the banks inabilities to establish correspondent relations globally (Auboin and Di Caprio, 2017). Accordingly, strengthening capacity to provide adequate trade finance flows by local banks represents a challenge in many of the Arab countries.

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# Appendix

## The 107 Importing Countries in the Sample

| | | | | | |
|---|---|---|---|---|---|
| Albania | Burundi | Finland | Jordan | Nigeria | Sri Lanka |
| Algeria | Cambodia | France | Kazakhstan | Norway | Sweden |
| Angola | Cameroon | Georgia | Korea, | Oman | Switzerland, Liechtenstein |
| Argentina | Canada | Germany | Kuwait | Pakistan | Tajikistan |
| Armenia | China | Ghana | Kyrgyzstan | Panama | Tunisia |
| Australia | China, Hong Kong | Greece | Latvia | Paraguay | Turkey |
| Austria | Colombia | Guatemala | Libya | Philippines | Uganda |
| Azerbaijan | Côte d'Ivoire | Guyana | Lithuania | Poland | Ukraine |
| Bahrain | Croatia | Honduras | Madagascar | Portugal | United Kingdom |
| Bangladesh | Cyprus | Hungary | Malaysia | Romania | Tanzania |
| Barbados | Czechia | Iceland | Malta | Russia | United States of America |
| Belarus | Denmark | India | Mauritius | Saudi Arabia | Uzbekistan |
| Belgium | Dominican Republic | Iran | Mexico | Senegal | Venezuela |
| Bolivia | Ecuador | Ireland | Mongolia | Singapore | Viet Nam |
| Bosnia and Herzegovina | Egypt | Israel | Morocco | Slovakia | Yemen |
| Brazil | El Salvador | Italy | Netherlands | Slovenia | Zambia |
| Bulgaria | Equatorial Guinea | Jamaica | Nicaragua | South Africa | Uruguay |
| Burkina Faso | Estonia | Japan | Niger | Spain | |

## Short term and long term economic risks index components

## Table A1. BMI's Short Term Economic Risk Index Components

| Component | Sub-Component | Rationale |
|---|---|---|
| **Economic activity** | **GDP growth, %** | Strong growth is generally a positive. Scores are weighted by economic development (proxied by GDP per capita), as developing states often have higher trend growth rates. |
| | **Unemployment, %** | Sustained high unemployment risks undermining the country's growth potential. |
| | **Real investment spending growth, %** | Fast growth is a more positive factor than slow growth, especially for developing states, but overly rapid expansion may generate investment bubbles. |
| | **Real household spending growth, %** | Fast growth is more positive than slow growth, especially for developing states, but overly rapid expansion can lead to overheating. |
| **Monetary indicators** | **Inflation, %** | A small amount of inflation is good, but high inflation and deflation can cause problems. |
| | **Real interest rates, %** | High real interest rates constrain investment, while very low or negative rates suggest misaligned monetary policy. Our scoring system considers the position of the economic cycle. |
| **Fiscal indicators** | **Fiscal balance, % of GDP** | Excessive deficit spending can be a source of vulnerability and is penalized. Our scoring system does take into account whether the economy is growing below trend. |
| | **Government debt, % of GDP** | The larger the better, though we are more tolerant of lower levels for states with a floating currency regime, as the currency's ability to move acts as an automatic stabilizer. |
| **External indicators** | **Import cover, months of goods and services imports** | High debt is a negative, and we also take into account three-year average debt as a percentage of exports (another distress indicator). |
| | **External debt, % of GDP** | A large deficit is a negative, but our scoring system is more lenient if growth is above trend. |
| | **Current account, % of GDP** | A long and deep local sovereign yield curve enables the government to efficiently manage its local debt pile and provides corporates with local benchmarks. |
| **Financial indicators** | **Local debt markets** | Local corporates and inward investors benefit from a wide variety of financial market instruments that help them to better manage liabilities. Examples include interest rate swaps, forward rate agreements, interest rate futures, cross-currency swaps and currency forwards. Not all products are available in all currencies/markets. |
| | **Sophistication of financial market** | Most countries have some form of restriction or regulations on the inflow and outflow of funds. This can range from full capital controls, which impede local and foreign businesses, to relatively benign anti-money laundering regulations. Businesses benefit from fewer restrictions. |
| | **Capital control risk** | Few states can source all of their budgetary financing needs from the domestic market and instead need to access international credit or money markets. States have varying degrees of access to foreign credit, given their perceived creditworthiness and credit history. The key proxy is the length of the foreign currency debt curve of the government and/or key quasi-sovereigns. |
| | **External borrowing capabilities** | Strong growth is generally a positive. Scores are weighted by economic development (proxied by GDP per capita), as developing states often have higher trend growth rates. |

## Table A2. BMI's Long Term Economic Risk Index Components

| Component | Sub-Component | Rationale |
|---|---|---|
| **Structure of economy** | **Primary sector, % of GDP** | A large primary sector leaves the economy vulnerable to commodity price volatility. |
| | **GDP per capita** | This indicator is a proxy for the state's absolute economic development. |
| | **GDP volatility** | A history of volatile growth is detrimental to the quality of economic growth. |
| | **Trade concentration** | Diversified export markets limit risks arising from a shock to a key trading partner. |
| | **Reliance on commodity imports** | A high reliance on commodity imports leaves a state vulnerable to fluctuating commodity prices. |
| | **Percentage of exports from a single sector** | An over-reliance on a single sector indicates greater vulnerability to an economic shock. |
| | **Central bank independence** | Government control of monetary policy increases the risk that it will follow the political cycle rather than the economic cycle. |
| **Economic activity** | **GDP growth, %** | Strong growth results in higher scores, but above-trend growth is a concern. The risks from fast growth are greater in rich states than poor states. |
| | **Unemployment, %** | Sustained high unemployment risks undermining the country's long-term growth potential. |
| **Monetary indicators** | **Inflation, %** | High inflation damages competitiveness and will most likely exacerbate currency volatility. Very low inflation and deflation tends to indicate a decline in money supply, which typically results in low growth. |
| | **Real interest rates, %** | High real interest rates constrain investment. Very low or negative interest rates suggest inappropriate monetary policy. |
| **Fiscal indicators** | **Fiscal balance, % of GDP** | A surplus is good; a small deficit is acceptable. We have greater tolerance for moderate deficits (-1.5 to -5.0% of GDP) for developing states, as they require greater capital investment. |
| | **Government debt, % of GDP** | Government debt must be serviced; this places a burden on government finances and suggests a need for higher tax levels over the longer term. |
| | **Government revenue, % of GDP** | A large but not overbearing tax base is essential to maintaining sound fiscal credentials into the long term. |
| **External indicators** | **Import cover, months of goods and services imports** | The larger the better, though we are more tolerant of lower levels for states with a floating currency regime, as the currency's ability to move acts as an automatic stabilizer. |
| | **External debt, % of GDP** | High levels of foreign debt leave the economy vulnerable to currency fluctuations. If this is government debt it will result in lower spending and can crowd out private sector investment. |
| | **Current account, % of GDP** | A high current account deficit leaves the currency - as well as inflation and growth - vulnerable to capital flow volatility. |
| **Financial indicators** | **Local debt markets** | A long and deep local sovereign yield curve enables the government to efficiently manage its local debt pile and provides corporates with local benchmarks. |
| | **Sophistication of financial market** | Local corporates and inward investors benefit from a wide variety of financial market instruments that help them to better manage liabilities. Examples include interest rate swaps, forward rate agreements, interest rate futures, cross-currency swaps and currency forwards. Not all products are available in all currencies/markets. |
| | **Capital control risk** | Most countries have some form of restriction or regulations on the inflow and outflow of funds. This can range from full capital controls, which impede local and foreign businesses, to relatively benign anti-money laundering regulations. Businesses benefit from fewer restrictions. |
| | **External borrowing capabilities** | Few states can source all of their budgetary financing needs from the domestic market and instead need to access international credit or money markets. States have varying degrees of access to foreign credit given their perceived creditworthiness and credit history. The key proxy is the length of the foreign currency debt curve of the government and/or key quasi-sovereigns. |

## Countries Outside the Interquartile Range Based on Creditworthiness Index

| 1997-2001 | 2013-2017 |
|---|---|
| ***Less than Q1*** | |
| Albania | Angola |
| Angola | Armenia |
| Armenia | Belarus |
| Azerbaijan | Bosnia and Herzegovina |
| Belarus | Burkina Faso |
| Bosnia and Herzegovina | Burundi |
| Burkina Faso | Cambodia |
| Burundi | Cameroon |
| Cameroon | Equatorial Guinea |
| Equatorial Guinea | Ghana |
| Georgia | Guyana |
| Ghana | Iran (Islamic Republic of) |
| Kazakhstan | Jamaica |
| Kyrgyzstan | Kyrgyzstan |
| Madagascar | Libya |
| Mongolia | Madagascar |
| Nicaragua | Mongolia |
| Niger | Nicaragua |
| Romania | Niger |
| Singapore | Senegal |
| Tajikistan | Tajikistan |
| Ukraine | Tunisia |
| United Republic of Tanzania | Ukraine |
| Uzbekistan | Venezuela (Bolivarian Rep. of) |
| Yemen | Yemen |
| Zambia | Zambia |
| ***More than Q3*** | |
| Australia | Australia |
| Austria | Austria |
| Belgium | Belgium |
| Canada | Canada |
| China | China |
| China, Hong Kong SAR | China, Hong Kong SAR |
| Cyprus | Czechia |
| Denmark | Denmark |
| Finland | Estonia |
| France | Finland |
| Germany | France |
| Iceland | Germany |
| Ireland | Israel |
| Israel | Korea, Republic of |
| Italy | Malaysia |
| Japan | Malta |
| Kuwait | Netherlands |
| Malta | Norway |
| Netherlands | Philippines |
| Norway | Saudi Arabia |
| Portugal | Singapore |
| Spain | Slovakia |
| Sweden | Sweden |
| Switzerland, Liechtenstein | Switzerland, Liechtenstein |
| United Kingdom | United Kingdom |
| United States of America | United States of America |

## Summary Statistics

| Variable | | | Mean | Std. Dev. | Min | Max | Observations |
|---|---|---|---|---|---|---|---|
| **Real Exports Total Goods, per capita** | US dollar | overall | **256.14** | **773.86** | **0.01** | **8626.78** | **N = 2247** |
| | | between | | 721.00 | 0.33 | 5149.54 | n = 107 |
| | | within | | 289.23 | -3058.73 | 3747.69 | T = 21 |
| **Real Exports Primary Commodities, per capita** | US dollar | overall | **155.69** | **540.33** | **0.00** | **7211.84** | **N = 2247** |
| | | between | | 476.69 | 0.05 | 4237.48 | n = 107 |
| | | within | | 258.35 | -3391.42 | 3661.96 | T = 21 |
| **Real Exports Manufactured Goods, per capita** | US dollar | overall | **84.88** | **313.75** | **0.01** | **3252.69** | **N = 2247** |
| | | between | | 293.84 | 0.27 | 2214.73 | n = 107 |
| | | within | | 113.43 | -1464.24 | 1639.99 | T = 21 |
| **Real Exports Machinery Transport & Equipment, per capita** | US dollar | overall | **25.86** | **111.35** | **0.00** | **1679.30** | **N = 2247** |
| | | between | | 100.99 | 0.04 | 788.27 | n = 107 |
| | | within | | 47.86 | -643.20 | 916.89 | T = 21 |
| **Real FDI Inward Stock per capita** | US dollar | overall | **11140.03** | **36541.71** | **0.00** | **479322.60** | **N = 2247** |
| | | between | | 28653.78 | 10.50 | 208938.70 | n = 107 |
| | | within | | 22837.88 | -194234.30 | 281523.90 | T = 21 |
| **Short Term Economic Risk Index** | Indicator from 0 to 100 | overall | **56.84** | **15.43** | **12.90** | **95.20** | **N = 2247** |
| | | between | | 12.48 | 25.60 | 86.12 | n = 107 |
| | | within | | 9.14 | 15.81 | 88.17 | T = 21 |
| **Long Term Economic Risk Index** | Indicator from 0 to 100 | overall | **54.70** | **14.62** | **14.00** | **87.20** | **N = 2247** |
| | | between | | 13.11 | 26.85 | 81.07 | n = 107 |
| | | within | | 6.59 | 25.34 | 80.92 | T = 21 |
| **Share of Manufactured goods in total Imports** | Percent | overall | **66.97** | **10.35** | **28.74** | **91.57** | **N = 2247** |
| | | between | | 8.37 | 45.21 | 84.55 | n = 107 |
| | | within | | 6.14 | 25.05 | 85.50 | T = 21 |

**Correlation Matrix**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **1. Real Exports Total Goods, per capita** | 1 | | | | |
| **2. Real FDI Inward Stock per capita** | 0.2856 | 1 | | | |
| **3. Short Term Economic Risk Index** | 0.1815 | 0.2164 | 1 | | |
| **4. Long Term Economic Risk Index** | 0.2011 | 0.2678 | 0.8515 | 1 | |
| **5. Share Manufactured goods in total Imports** | -0.0518 | 0.013 | 0.3207 | 0.3414 | 1 |

[1] Aman Union was launched on 28th October, 2009 following an agreement between DHAMAN and ICIEC to join their efforts for establishing a union for commercial and non-commercial risks Insurers and Reinsurers in their respective Member Countries. It aims at promoting and developing the commercial and non-commercial risks insurance industry in Member Countries and strengthening the mutual relationships among members through a range of activities including encouragement of exchange of information, technical assistance, expertise and consultation among Members.