

**EXPORT QUALITY AND ECONOMIC VULNERABILITY:
INSIGHTS FROM 88 DEVELOPING COUNTRIES***

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Previous literature shows that trade liberalization causes economic vulnerability due to external shocks. This study endeavours to highlight potential cures based on export quality. The twostep system generalized methods of moment estimate is applied to deal with endogeneity. The area and year fixed effects are also controlled for a sample of 88 developing economies comprising two subsamples due to the availability of export quality index. The empirical results are consistent and unbiased, thus verifying the decreasing effect of export quality on economic vulnerability. This implies that improvements in export quality can help developing countries absorb the risk from trade liberalization. The results are found to be consistent in investigating 48 low- and lower-middle-income economies, but there is no statistical significance evidence for 40 upper-middle and high-income economies). This suggests that trade liberalization without upgrading export product quality reflects a vulnerable aspect of economic integration for low- and lower-income economies.

Keywords: Trade, Export Quality, Product Quality, Economic Vulnerability, Resilience
JEL Classification: F13, F15, L15, L25

1. INTRODUCTION

Globalization has brought benefits, but it has also had major consequences (Sachs and Warner, 2001; Singh and Zammit, 2019). A recent trend for nationalism is challenging globalization and the current trade system, as highlighted by the US-China trade war and Brexit (Berberoglu, 2019; Malešević, 2019). The literature shows that the trade liberalization process is usually along with increasing in export diversification. This process likely has both pros and cons on economic vulnerability. The trade liberalization would lead to higher economic vulnerability as the exposures to the global economic activities (Gnangnon Sena, 2016; Montalbano, 2011). In contrast, the

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diversification of exporting (products and/or trading partners) may absorb this exposure as the benefits of diversification (Imbs and Wacziarg, 2003).

Beside export diversification, the export quality is observed as a raising topic among economists (e.g., see Nguyen and Su, 2021; Henn et al., 2020; Ndubuisi and Solomon, 2020). Gaglio (2017) reviews the topics of trade liberalization and export performance and notices some interesting points. Gaglio observes that emerging and developing economies put much energy to strive for a stable position in international markets by moving from labor- to capital- and skill-intensive production, which implying the improvements in export quality. However, the effects of export quality on economic vulnerability are still underexplored.

This study analyzes the influences of export quality on economic vulnerability. The investigation of the influence of export quality on economic vulnerability is crucial to the literature by showing that differences in the globalization process, namely exporting policies of upgrading product quality, may signify causes, thereby offering solutions to the economic vulnerability by trade liberalization. That is, the choice of appropriate exporting policies towards higher quality of exporting products in the process of globalization may help countries derive potential benefits from this process while limiting any side-effects. The study goes on to perform a global analysis of most developing countries in addition to an investigation conducted into two subsamples by income level. These analyzes provide comprehensive insights into the global economic landscape, which are intended to be precursors to the consideration of policy implications.

Empirically, the index of export quality is collected from the IMF, while the economic vulnerability index (EVI) is obtained from www.ferdi.fr/en/ free of charge. The study controls for institutional quality, economic development level, FDI net inflows, government expenditures. The two-step system generalised methods of moment (GMM) estimate is applied as the main estimator. The results are interesting that (i) index of export quality has a significant negative effect on economic vulnerability index; (ii) the effects of export quality are significant and consistent in LMEs but they are statistical insignificance in UHEs. Our results mean that improvements in export product quality can perfectly remedy the consequences of trade liberalization concerning domestic economic resilience, especially for LMEs. That is, the results are assumed to stimulate policymakers to strike a balance between increased trade openness and upgrading product quality to foster resilient development in the process of economic integration.

The literature review is in next section. The methodology, data, and estimate are presented in Section 3. Section 4 reports and discusses the results. The conclusion is in the final section.

2. LITERATURE REVIEW

The economics literature has focused mainly on fluctuations in economic growth or

economic cycles over the past century (Mathonnat and Minea, 2018). This trend underlines the fact that understanding economic cycles is essential to economic policies. Recent studies pay more attention to the economic cycles of emerging economies. Horvath (2018), for example, shows that output fluctuations and consumption volatility are positively correlated in emerging economies. Despite the significance of economic cycles, an emerging trend in the literature indicates that economic cycles are not as critical as economic vulnerability or economic resilience since economic cycles can only capture growth fluctuations (Noy and Yonson, 2018).

Briguglio (1993) and Briguglio (1995) are the pioneering works that look specifically at economic vulnerability. Economic vulnerability is defined as the “resilience risk” (Gnangnon Sena, 2016), which is broader than business cycles (Noy and Yonson, 2018). As explained in the literature, economic vulnerability is the probability of an economy being adversely affected by external shocks (Naudé et al., 2009). The concept of economic vulnerability is receiving more attention from scholars in recent years. It is the subject of increasing debate among economists on account of the importance of the resilience of the economy to any shocks (Briguglio et al., 2009). In-depth studies on the determinants of economic vulnerability are, nevertheless, still few and far between.

Bussière and Mulder (2000) detect greater economic vulnerability in the period of an election. Kerschner et al. (2013) indicate that the vulnerability of the US economy is linked with the oil price, especially in a period of peak oil. Feldkircher (2014) shows that rapid economic growth would lead a country to be more vulnerable in the 2008 global financial crisis. Recently, Barrot et al. (2016) notice that global monetary shocks are the main external source of fluctuation in the output of developing countries. Furthermore, they indicate that greater openness is a primary stimulus to the increasing trend of external exposure in developing countries. Kimm (2016) add that trade liberalization leads to economic shocks having a greater impact on developing countries. It is generally believed that a country with trade liberalization leading to greater openness is a country with greater exposure to international shocks. That is, the domestic economy is involved deeply in the global chain of production through exports and imports (Cattaneo et al., 2010), which leads to reduced independence or less resilience to international shocks (Barrot et al., 2016). Vulnerability in the process of trade liberalization can be implied as a consequence of globalization, as documented in the literature (see Dutt et al., 2009; Pupato, 2017).

However, the literature is not likely to draw to a close at that point. Meanwhile, the literature on international trade shows that export quality is an important feature of exporting activity (Osakwe et al., 2018) and can account for the dynamics of domestic economic activity (Nguyen and Su, 2020) and social issues (Le et al., 2020). This line of literature is along with the trend to consider globalization and economic factors with a broader view by extending literature from different fields (i.e., energy economics (Zaidi et al., 2019), social welfares (Antràs et al., 2017) or, more critically, asymmetric globalization (Lee and Huang, 2017)).

There has been limited literature taking account of the roles of export quality. An improvement in export quality means specialisation in production and enhancing the quality of the production system and technology (Alcalá, 2016). The process of specialisation and upgrading of product quality relates to a shift in labour demand towards high-skilled workers, which may lead to increased income inequality as a result of increases in the relative wages of high-skilled workers (Meschi and Vivarelli, 2009). That is, the increases in export quality may cause the social issue of inequality, especially for unskilled labour (Castilho et al., 2012). The improvement in export quality may also increase competition among economic agencies as the emergence of new businesses (entrepreneurs). However, the improvement in export quality may equip domestic producers with substantial competitiveness and power in international markets. As exporters of higher quality goods, not only can domestic producers approach a larger number of consumers with more consistent consumption behaviour, but they are also capable of bringing about changes in global markets. That is, they can function as global producers that exercise more market power than other producers. As a result, they may be less vulnerable to international shocks than others. The hypothesis can be proposed as follows:

H1: Improvement in export quality may decrease economic vulnerability.

3. MODEL

To examine the impact of export quality on economic vulnerability, this study bases on the baseline model as suggested in previous literature (e.g., Barrot Araya et al., 2016; Malik and Temple, 2009; Duncan, 2014; Mathonnat and Minea, 2018). Specifically, the study uses two main control variables of economic vulnerability: overall institutional quality (*Inst*), economic development level (*Income*). Overall institutional quality, in particular, represents the institutional framework. The literature on institutional economics shows that better institutional quality can provide incentives for economic activity (Nguyen et al., 2018b), while it is argued as being a critical factor ensuring efficient social welfare and environmental protection (Hartmann et al., 2017; Lin and Fu, 2016; Nguyen et al., 2018a). Thus, better institutional quality can be assumed to be inextricably linked with lower economic vulnerability. Economic development, in addition, is usually linked with vulnerability (Feldkircher, 2014). The baseline equation is as follows:

$$EV_{it} = \beta_0 + \beta_1 Inst_{it} + \beta_2 Income_{it} + \varepsilon_{it}, \quad (1)$$

in which i , t denotes country i at year t ; β is coefficient; ε is residual term; EV is economic vulnerability.

Then, export quality (EQ) is introduced as an augmented driver of the dynamics of economic vulnerability, respectively. Accordingly:

$$EV_{it} = \beta_0 + \beta_1 Inst_{it} + \beta_2 EG_{it} + \beta_3 EQ_{it} + \varepsilon_{it}. \quad (2)$$

To check the consistency of the findings, FDI inflows (*FDI*), government expenditures (*Govex*) are used as additional control variables.

4. EMPIRICAL INVESTIGATIONS

4.1. Data Description

We advance this study by utilising two of the latest databases for economic vulnerability and export quality. Regarding economic vulnerability, recent studies show that any method employed to measure economic vulnerability should consider three dimensions: instability in economy (Kerschner et al., 2013), instability in society (de Loyola Hummell et al., 2016), and instability in environment (Nguyen and Liou, 2019). Feindouno and Goujon (2016) calculate and introduce the EVI, a weighted index of instabilities from “trade activities, agricultural production, natural disasters, environmental issues, economic structures, populations, and the remoteness of sub-regions in a country”.¹ This index helps to capture the instabilities from three above dimensions. It provides a space for further investigation on the economic vulnerability. Furthermore, the EVI is calculated from the exposure index and the shock index. The shock index likely represents for the size and likelihood of shocks for the economy. The exposure index likely represents for the exposure and resilient capability of an economy to shocks. Therefore, this study also recruits both sub-indices for empirical analysis. Three indices are available for 145 countries from 1990 to 2018.

The topic of export dynamics has been addressed by the IMF² with the introduction of novel datasets on export quality that provide a sound basis for further empirical research (Osakwe et al., 2018). As for export quality, economists have paid much attention for a long time (see Donnenfeld and Mayer, 1987). Latterly, the literature seeks to measure export quality quantitatively by using unit values of exports (see Schott, 2004; Hummels and Klenow, 2005; Hallak, 2006). The IMF database is calculated based on the methods in Cadot et al. (2011) and Henn et al. (2017), which is considered a new estimate of export quality basing on the model in Hallak (2006). The index is used to proxy for export quality. The data of export quality index is only available to 2014.

Six indicators³ from the Worldwide Governance Indicators of World Bank (WGIs) are collected and calculated the mean to proxy for overall institutional quality. There are other indicators of institutional quality, but the WGIs are currently seen as the most suitable (Canh et al., 2019). The WGIs are available from 1996, but annually only from 2002. Real GDP per capita (in logarithm form), FDI net inflows (% GDP), and general

¹ See <http://byind.ferdi.fr/en/>

² See <https://www.imf.org/external/np/res/dfidimf/diversification.htm>

³ Control of corruption, rule of law, government effectiveness, regulatory quality, political stability and absence of violence, voice and accountability

final government expenditures (% GDP) are collated from the World Development Indicators - WDIs to proxy for economic development level, FDI inflows, and government expenditures, respectively. These variables are available from the 1960s to 2019. Variables, definitions, calculations, sources, availability, and data description are presented in Table 1.

Table 1. Variables, Definitions, Calculations, Sources, Data Availability, and Data Description

Variable	Definition	Calculation	Source	Availability	Obs	Mean	S.D.	Min	Max
EV	Economic vulnerability	Economic vulnerability index	FERDI	1995–2018	1,144	31.32	10.87	10.88	69.97
Shock	Economic vulnerability: Shock factor	Sub-EVI: Shock index	Ferdi	1995–2018	1,144	30.12	14.24	2.37	87.74
Exposure	Economic vulnerability: Exposure factor	Sub-EVI: Exposure index	Ferdi	1995–2018	1,144	32.52	11.10	3.72	65.12
EQ	Export quality	Export quality index	IMF	Until 2014	1,144	0.76	0.16	0.20	1.07
Income	Economic development level	Log of real GDP per capita	WDIs	1960–2019	1,144	7.88	1.26	5.62	11.01
Inst	Overall institutional quality	Average of six institutional indicators	WGIs	2002–2019	1,144	-0.34	0.66	-1.75	1.57
FDI	FDI net inflows	Foreign direct investment, net inflows (% of GDP)	WDIs	1960–2019	1,144	5.72	15.85	-5.21	280.1

Notes: Economic vulnerability indices are collected from free online source of the FERDI, which is the Foundation for studies and Research on International Development (see <https://ferdi.fr/en>); WGIs is Worldwide Governance Indicators database of World Bank with six institutional indicators including Control of Corruption, Rule of Law, Government Effectiveness, Regulatory Quality, Voice and Accountability, Political Stability and Absence of Violence; The data of export quality is collected from IMF (see <https://www.imf.org/external/np/res/dfidimf/diversification.htm>), in which higher values mean higher quality of exporting products; WDIs is World Development Indicators database, World Bank (WDIs).

All data are collected, combined, and matched, while time availability is controlled for the final sample of 88 economies from 2002 to 2014, which is deemed the best

available (see Table A1, Appendix, for the list of countries)⁴. The sample is divided into two subsamples of 48 LMEs and 40 UHEs (see Table A2, Appendix). In the UHEs, there are 7 high-income economies (The Bahama, Chile, Israel, Oman, Panama, Saudi Arabia, Singapore) that are still classified as developing countries in the EVI dataset, even though they qualified as upper-middle-income economies in some years in the period 2002–2014. As Roodman (2009) indicates that GMM estimation with a number of cross-sections of 20 or less is worrisome, we add the 11 high-income economies to the group of upper-middle-income economies to form UHEs.

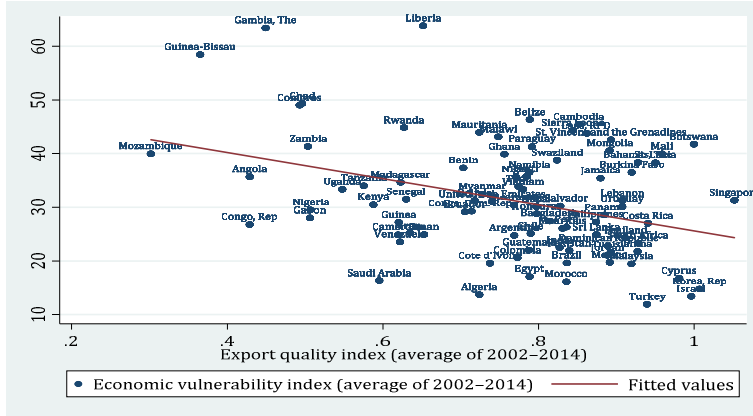
Table 2 presents the correlation matrix between variables. There is a significant negative correlation between export quality (EQ) and economic vulnerability (EV) [-0.35] with a significance value of 0.00. The export quality also has significant negative correlations with two sub-indices (shock and exposure) of EVI. Figure 1 is provided to exemplify these relationships for full sample. Figures 2 and 3 depict the relationships between export quality with economic vulnerability index and its two sub-indices in LMEs and UHEs, respectively. It shows that the negative relationships between two factors are properly existed in LMEs but not in UHEs.

Table 2. Correlation Matrix

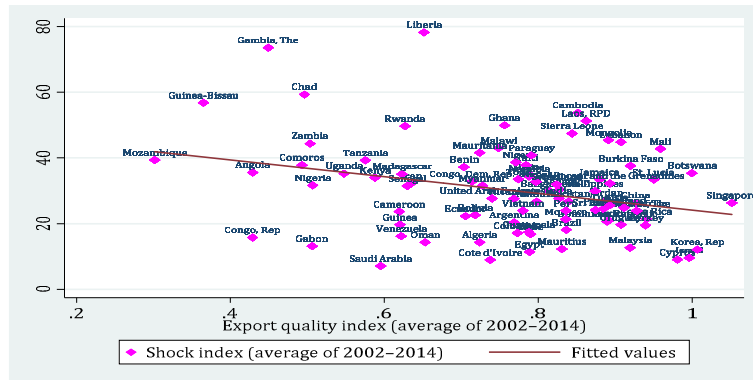
Correlation	EV	Shock	Exposure	EQ	Income	Inst	FDI	Govex
EV	1.00							
Shock	0.87***	1.00						
<i>p-value</i>	0.00							
Exposure	0.84***	0.46***	1.00					
<i>p-value</i>	0.00	0.00						
EQ	-0.35***	-0.28***	-0.32***	1.00				
<i>p-value</i>	0.00	0.00	0.00					
Income	-0.43***	-0.56***	-0.16***	0.41***	1.00			
<i>p-value</i>	0.00	0.00	0.00	0.00				
Inst	-0.13***	-0.29***	0.08***	0.53***	0.67***	1.00		
<i>p-value</i>	0.00	0.00	0.01	0.00	0.00			
FDI	0.01	0.00	0.02	0.11***	0.11***	0.18***	1.00	
<i>p-value</i>	0.72	0.95	0.48	0.00	0.00	0.00		
Govex	-0.10***	-0.18***	0.02	0.12***	0.26***	0.30***	0.10***	1.00
<i>p-value</i>	0.00	0.00	0.46	0.00	0.00	0.00	0.00	

Note: *, **, *** are significant levels at 10%, 5%, and 1%, respectively.

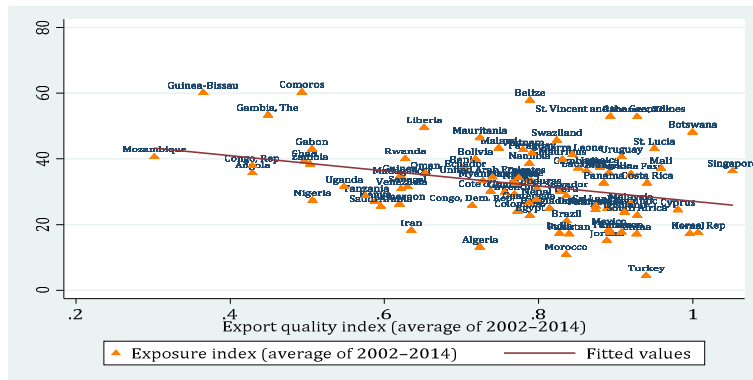
⁴ The data of export quality is available to 2014, while data of institutions is available from 2002.



1a) Overall Economic Vulnerability

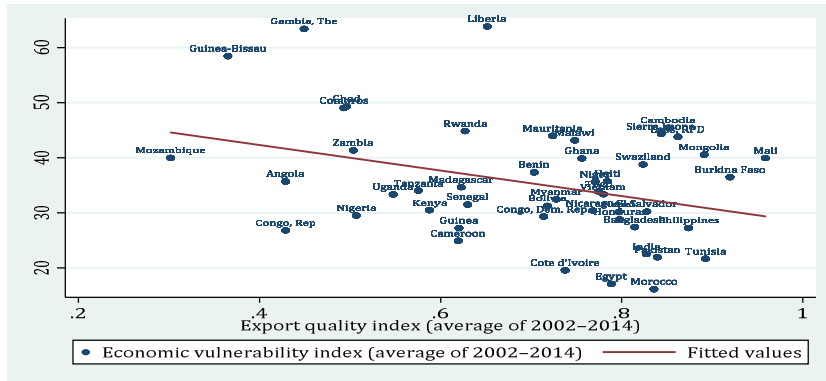


1b) Shock Factor of Economic Vulnerability

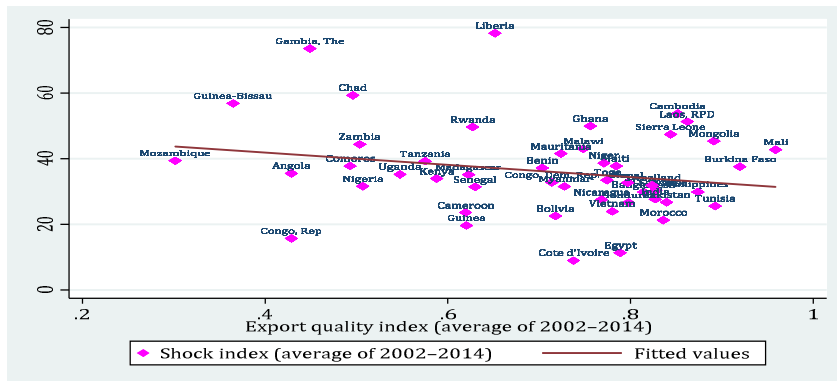


1c) Exposure Factor of Economic Vulnerability

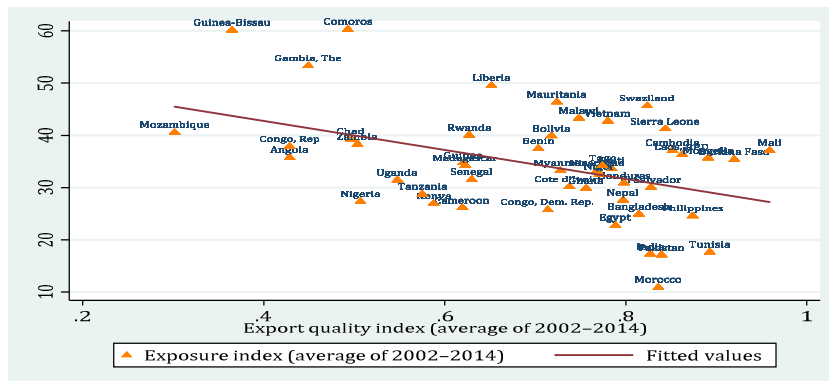
Figure 1. Export Quality and Economic Vulnerability



2a) Overall Economic Vulnerability

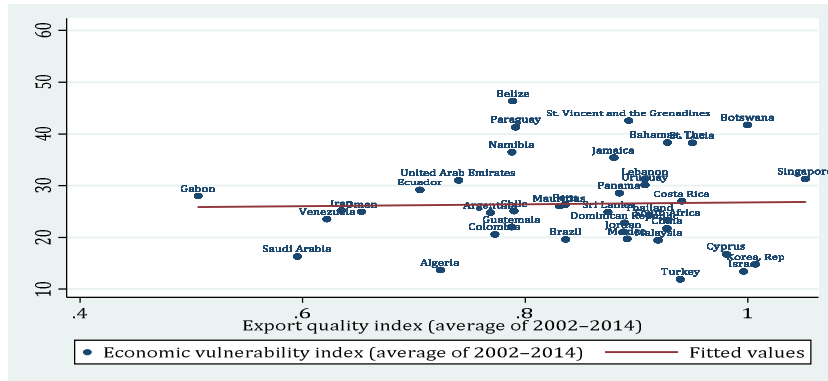


2b) Shock Factor of Economic Vulnerability

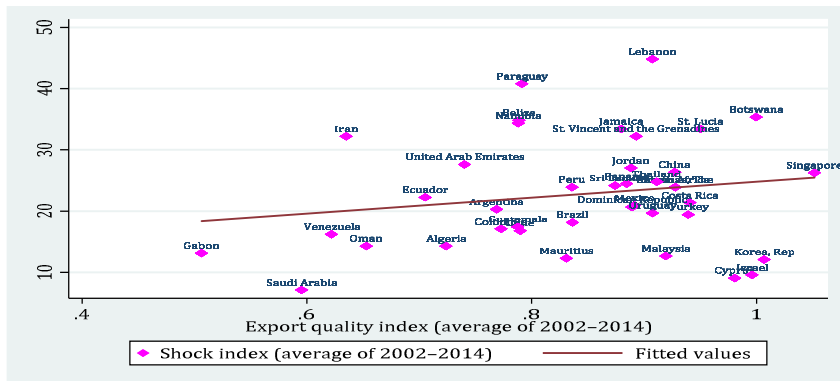


2c) Exposure Factor of Economic Vulnerability

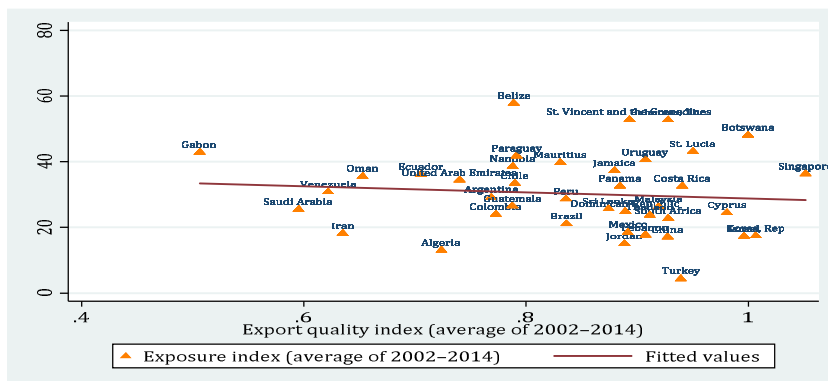
Figure 2. Export quality and Economic Vulnerability in Low and Lower Middle-Income Economies



3a) Overall Economic Vulnerability Index



3b) Shock Factor of Economic Vulnerability



3c) Exposure Factor of Economic Vulnerability

Figure 3. Export Quality and Economic Vulnerability in Upper Middle and High Income Economies

4.2. Econometric Estimates

In estimating Eq(2), an endogeneity problem may potentially exist as a result of possible effects of the dependent variable (economic vulnerability) on the independent variables (e.g., economic development (Ferrarini and Hummels, 2014)). The first difference method is introduced by Anderson and Hsiao (1982) to deal with endogeneity in panel data. Latterly, Arellano and Bond (1991) introduce the GMM estimator and indicate that it is a more efficient technique. However, the Arellano-Bond GMM estimator is criticised for the bias in unbalanced panel data (Roodman, 2006). To deal with these problems, Arellano and Bover (1995) introduce the system GMM estimator, later advanced by Blundell and Bond (1998) is introduced for short panels as two-step system GMM (Roodman 2009). Our sample includes 88 economies (large N) in the period from 2002 to 2014 (short T , 13 years); thus, we use the two-step system GMM of Blundell and Bond (1998). For a robustness check, the study adds control variables one by one in the estimation to check.

4.3. Empirical Results

The key results obtained in this study are presented in Tables 3 to 4. As stated, the two-step system GMM is employed as the main estimator; all estimates with this estimator show insignificant statistics of the AR(2) and Hansen tests, which demonstrates the robustness and unbiased nature of the GMM results (Roodman, 2009).

Table 3 reports the impacts of export quality on economic vulnerability and its sub-indices (shock index and exposure index) for full sample. The results are consistent when control variables are added one by one. The results show that export quality index has a significant negative effect on economic vulnerability index (models 1 to 3). This result confirms our hypothesis that improvements in export quality would reduce economic vulnerability. Furthermore, the results are consistent for both shock index (models 4 to 6) and exposure index (models 7 to 9). Interestingly, the results for two sub-indices show that the negative impacts of export quality on shock index (around -12) are stronger than on exposure index (around -1)

Next, the impact of export quality on economic vulnerability is examined in two subsamples (LMEs and UHEs). The results are presented in Table 4 shows additional findings. The effects of export quality index on economic vulnerability index and its two sub-indices are found to be consistent in LMEs. The export quality has significant negative impacts on economic vulnerability index (models 1 and 2), shock index (models 3 and 4), and exposure index (models 5 and 6). The effects on shock index (models 3 and 4) are likely stronger than effects on exposure index. The results have re-affirmed the hypothesis that export quality has a significant decreasing impact on economic vulnerability in LMEs. Meanwhile, the effects of export quality in economic vulnerability index and its two sub-indices in UHEs (models 7 to 12) are statistical insignificance.

Table 3. Export Quality and Economic Vulnerability

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. var:	EV – overall economic vulnerability index		Shock – Shock index		Exposure – Exposure index				
1-year lag of dep. var	0.924*** [0.015]	0.926*** [0.016]	0.929*** [0.014]	0.897*** [0.015]	0.897*** [0.015]	0.911*** [0.014]	1.002*** [0.005]	1.001*** [0.006]	0.998*** [0.005]
Income	-0.431** [0.175]	-0.342* [0.183]	-0.205 [0.180]	-0.779*** [0.270]	-0.641** [0.312]	-0.557* [0.301]	-0.018 [0.076]	-0.016 [0.078]	-0.036 [0.076]
Inst	-0.130 [0.344]	-0.050 [0.350]	-0.094 [0.435]	-0.366 [0.525]	-0.332 [0.550]	-0.355 [0.640]	0.041 [0.100]	0.017 [0.103]	0.037 [0.103]
EQ	-5.976*** [0.870]	-6.581*** [0.895]	-6.499*** [0.894]	-12.25*** [1.472]	-12.09*** [1.459]	-10.65*** [1.312]	-1.022*** [0.342]	-1.125*** [0.343]	-0.941*** [0.308]
FDI		0.018*** [0.006]	0.020*** [0.005]	0.011 [0.009]	0.011 [0.009]	0.008 [0.008]	0.002 [0.001]	0.002 [0.001]	0.002 [0.001]
Govex			0.005 [0.027]	0.006 [0.045]	0.006 [0.045]	0.006 [0.045]			0.006 [0.006]
Cons.	9.620*** [2.216]	0.000 [0.000]	7.363*** [2.461]	0.000 [0.000]	0.000 [0.000]	14.72*** [3.740]	0.381 [0.717]	0.042 [0.758]	0.148 [0.713]
Area fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,056	1,056	1,018	1,056	1,056	1,018	1,056	1,056	1,018
No. of countries	88	88	88	88	88	88	88	88	88
No. of IVs	70	71	72	70	71	72	70	71	72
AR(2) test-p-value	0.874	0.911	0.912	0.753	0.760	0.744	0.052	0.056	0.100
Hansen test-p-value	0.481	0.637	0.437	0.493	0.440	0.278	0.099	0.074	0.073

Notes: The twostep system GMM estimators; standard errors are in []; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.

Table 4. Export Quality and Economic Vulnerability in Two Subsamples

Model Group: Dep. var.	Low and lower middle income economies (LMIEs)			Upper middle and high income economies (UHEs)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	EV	EV	Shock	Shock	Exposure	Exposure	EV	Shock	Shock	Shock	Exposure	Exposure
1-year lag of dep. var	0.969*** [0.016]	0.953*** [0.016]	0.980*** [0.020]	0.962*** [0.028]	1.015*** [0.008]	1.033*** [0.008]	0.934*** [0.078]	0.915*** [0.108]	0.945*** [0.061]	0.961*** [0.062]	1.003*** [0.016]	0.996*** [0.021]
Income	1.944*** [0.438]	2.173*** [0.719]	3.164*** [0.757]	4.201*** [1.272]	0.226 [0.180]	0.139 [0.201]	-0.227 [1.134]	-0.538 [1.546]	0.777 [0.836]	0.977 [0.767]	0.750 [0.590]	0.256 [0.784]
Inst	-0.801*** [0.280]	-1.634*** [0.375]	-2.395*** [0.660]	-3.814*** [0.827]	-0.172** [0.076]	-0.217** [0.106]	0.648 [1.171]	0.755 [1.756]	0.604 [1.179]	0.002 [1.115]	-0.426 [0.366]	-0.202 [0.539]
EQ	-0.544 [1.315]	-3.894*** [1.269]	-3.970*** [1.454]	-6.870*** [3.266]	-0.996*** [0.278]	-1.137** [0.425]	-1.639 [2.868]	-0.845 [4.034]	-2.900 [4.412]	-5.028 [4.326]	1.908 [1.844]	1.349 [3.476]
FDI	-0.009** [0.003]	-0.003 [0.004]	-0.016* [0.009]	-0.007 [0.012]	-0.004** [0.002]	-0.005*** [0.002]	-0.026 [0.037]	-0.041 [0.044]	-0.032 [0.052]	-0.043 [0.042]	-0.001 [0.005]	-0.004 [0.006]
Govex		-0.076* [0.040]		-0.087 [0.095]		-0.026*** [0.009]		-0.133 [0.181]		0.159 [0.104]		0.011 [0.073]
Cons.	0.000 [0.000]	-10.280 [6.372]	0.000 [0.000]	0.000 [0.000]	-1.861 [1.374]	-1.748 [1.693]	0.000 [0.000]	4.364 [19.544]	-7.423 [11.681]	-10.027 [11.423]	-11.272 [8.073]	0.000 [0.000]
Area fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	576	548	576	548	576	548	480	470	480	470	480	470
No. of countries	48	48	48	48	48	48	40	40	40	40	40	40
No. of IVs	49	50	49	50	49	49	27	28	27	28	27	28
AR(2) test-p-value	0.991	0.910	0.865	0.775	0.100	0.114	0.416	0.241	0.366	0.341	0.340	0.982
Hansen test-p-value	0.118	0.385	0.408	0.677	0.190	0.109	0.471	0.864	0.328	0.292	0.003	0.142

Notes: The twostep system GMM estimators; standard errors are in []; *, **, *** are significance levels at 10%, 5%, and 1%, respectively.

4.4. Some Discussion

Recalling that the influence of trade liberalization on the domestic economy is controversial. Trade openness is documented as making a significant positive contribution to domestic economic activities (Nguyen et al., 2019; Nguyen et al., 2019), such as through productivity gains and employment (see Bresnahan et al., 2016). Trade openness is, however, also justifiably criticised for leading to social issues, such as unemployment (Dutt et al., 2009) and income inequality (Pupato, 2017). Indeed, most economists agree that increases in trade openness would increase exposure to external shocks, thus leading to economic vulnerability (Barrott et al., 2016; Kimm, 2016). Thus, conceivably regarded as inviting yet challenging, is the question as to how trade liberalization and the benefits of globalization can be effectively sustained while their side-effects are limited or balanced by domestic economic resilience. Therefore, the results of this study provide interesting evidence of a possible solution for side-effects of trade liberalization, upgrading export quality.

Our empirical results show that improving product quality creates competitive capacity for domestic producers in global markets, which boosts their underlying resilience to international shocks. The benefits of upgrading export quality to economic resilience is basing on the reduction in the shocks and also exposure to shocks of domestic economy. The results imply that higher trade openness may increase exposure of the economy to external shocks (e.g., see Kimm, 2016), but the product quality upgrading can absorb this vulnerable effect. Alternatively, the consequences of trade liberalization may be accelerated if a country chooses to not invest in upgrading product quality. The results carry a crucial policy implication for governments concerning trade liberalization, not least where they must liberalize their trade account in conjunction with the upgrading of export quality. Indeed, the upgrading of export quality in the process of globalization should allow a country to achieve sustainable development in the process of globalization.

Our results further show that the decreasing effect of export quality on economic vulnerability are statistical significance and consistency in LMEs but not statistical significance and consistency for UMEs. The results mean that the decreasing effects of export quality in economic vulnerability properly exist in LMEs but not for UHEs. It is worthy to notice that LMEs are under-developed economies, which have low product quality, thus the improvements in export quality would improve their competitive capability in exporting and then bring benefits for domestic economies. In addition, the literature shows that export quality significantly benefits the domestic economy in low income (Le et al., 2020) and possibly lead to institutional reform (Gilbert, 2004). The improvements in export quality can also boost domestic economic activity in low income countries (through entrepreneurship (Schrack, 2005), create more jobs in different sectors (Egger and Etzel, 2012), and reduce poverty (Le et al., 2020). Meanwhile, UHEs are characterised with higher economic development levels and higher involvements in international markets thus they face more competitions from

advanced economies (Gaglio, 2017). They also have relatively large volumes of exporting thus the improvements in export quality may bring less benefits for domestic economy in term of economic vulnerability.

At last, it is interesting to notice that the previous literature pays much attention to business cycles (Mathonnat and Minea, 2018), while the concept of economic vulnerability has attracted more attention only in recent decades (Briguglio et al., 2009). This study has empirically examined the effects of export quality on economic vulnerability and also its two sub-indices. The results show significant evidence of decreasing effects of export quality. The results advocate for further studies on the determinants of economic vulnerability, especially in facing to new vulnerability such as current pandemic.

5. CONCLUSION

The economics literature shows several benefits and also consequences of trade openness (Singh and Zammit, 2019), while debates on topics related to globalization are growing. The literature indicates that one of the consequences of trade liberalization is the vulnerability of the domestic economy due to its exposure to external shocks (Barrot et al., 2016; Kimm, 2016). The primary contributions of this study are twofold. First, the study examines the effects of export quality, an important feature of trade activities, on economic vulnerability. Second, the study considers the impact of export quality on economic vulnerability in both LMEs and UHEs.

In following this approach, the study is more advantage by using two advanced and recent databases on economic vulnerability and export dynamics. The EVI is used as a proxy for economic vulnerability. Index of export quality is collected from the IMF. Moreover, we control the investigation with a set of factors in the estimates, namely overall institutional quality, economic development, FDI inflows, and government expenditures. On account of the availability of data sources, the final sample comprises 88 economies (48 LMEs and 40 UHEs) over the period 2002–2014. The twostep system GMM estimate is applied as main estimator.

The findings show that: (i) export quality has a significant negative effect on economic vulnerability; (ii) the effect of export quality on shock index is stronger than the effect on exposure index; (iii) the decreasing effects of export quality on economic vulnerability are significant and consistent in LMEs, while they are statistical insignificance and inconsistency in UHEs. The results of this study provide compelling evidence on the dynamics of trade liberalization on domestic economic vulnerability. That is, trade liberalization leads to the vulnerability of the economy, but appropriate exporting policies focusing on upgrading quality would be effective in overcoming this problem. Alarmingly, nonetheless, the findings imply that trade liberalization without upgrading product quality is a materially detrimental aspect of economic integration, especially in the case of low or lower middle-income economies.

APPENDIX

Table A1. List of Countries

Low and lower middle-income economies (48)					
Country	Income group	Area	Country	Income group	Area
Angola	Lower middle income	Sub-Saharan Africa	Malawi	Low income	Sub-Saharan Africa
Bangladesh	Lower middle income	South Asia	Mali	Low income	Sub-Saharan Africa
Benin	Low income	Sub-Saharan Africa	Mauritania	Lower middle income	Sub-Saharan Africa
Bolivia	Lower middle income	Latin America & Caribbean	Mongolia	Lower middle income	East Asia & Pacific
Burkina Faso	Low income	Sub-Saharan Africa	Morocco	Lower middle income	Middle East & North Africa
Cambodia	Lower middle income	East Asia & Pacific	Mozambique	Low income	Sub-Saharan Africa
Cameroon	Lower middle income	Sub-Saharan Africa	Myanmar	Lower middle income	East Asia & Pacific
Chad	Low income	Sub-Saharan Africa	Nepal	Low income	South Asia
Comoros	Lower middle income	Sub-Saharan Africa	Nicaragua	Lower middle income	Latin America & Caribbean
Congo, Dem. Rep.	Low income	Sub-Saharan Africa	Niger	Low income	Sub-Saharan Africa
Congo, Rep	Lower middle income	Sub-Saharan Africa	Nigeria	Lower middle income	Sub-Saharan Africa
Cote d'Ivoire	Lower middle income	Sub-Saharan Africa	Pakistan	Lower middle income	South Asia
Egypt	Lower middle income	Middle East & North Africa	Philippines	Lower middle income	East Asia & Pacific
El Salvador	Lower middle income	Latin America & Caribbean	Rwanda	Low income	Sub-Saharan Africa
Ghana	Lower middle income	Sub-Saharan Africa	Senegal	Lower middle income	Sub-Saharan Africa
Guinea	Low income	Sub-Saharan Africa	Sierra Leone	Low income	Sub-Saharan Africa
Guinea-Bissau	Low income	Sub-Saharan Africa	Swaziland	Lower middle income	Sub-Saharan Africa
Haiti	Low income	Latin America & Caribbean	Tanzania	Low income	Sub-Saharan Africa
Honduras	Lower middle income	Latin America & Caribbean	The Gambia	Low income	Sub-Saharan Africa
India	Lower middle income	South Asia	Togo	Low income	Sub-Saharan Africa
Kenya	Lower middle income	Sub-Saharan Africa	Tunisia	Lower middle income	Middle East & North Africa
Laos, RPD	Lower middle income	East Asia & Pacific	Uganda	Low income	Sub-Saharan Africa
Liberia	Low income	Sub-Saharan Africa	Vietnam	Lower middle income	East Asia & Pacific
Madagascar	Low income	Sub-Saharan Africa	Zambia	Lower middle income	Sub-Saharan Africa

Table A1. List of Countries (con't)

Upper middle and high income economies (40)					
Country	Income group	Area	Country	Income group	Area
Algeria	Upper middle income	Middle East & North Africa	Malaysia	Upper middle income	East Asia & Pacific
Argentina	Upper middle income	Latin America & Caribbean	Mauritius	Upper middle income	Sub-Saharan Africa
Belize	Upper middle income	Latin America & Caribbean	Mexico	Upper middle income	Latin America & Caribbean
Botswana	Upper middle income	Sub-Saharan Africa	Namibia	Upper middle income	Sub-Saharan Africa
Brazil	Upper middle income	Latin America & Caribbean	Oman	High income	Middle East & North Africa
Chile	High income	Latin America & Caribbean	Panama	High income	Latin America & Caribbean
China	Upper middle income	East Asia & Pacific	Paraguay	Upper middle income	Latin America & Caribbean
Colombia	Upper middle income	Latin America & Caribbean	Peru	Upper middle income	Latin America & Caribbean
Costa Rica	Upper middle income	Latin America & Caribbean	Saudi Arabia	High income	Middle East & North Africa
Cyprus	High income	Europe & Central Asia	Singapore	High income	East Asia & Pacific
Dominican Republic	Upper middle income	Latin America & Caribbean	South Africa	Upper middle income	Sub-Saharan Africa
Ecuador	Upper middle income	Latin America & Caribbean	Sri Lanka	Upper middle income	South Asia
Gabon	Upper middle income	Sub-Saharan Africa	St. Lucia	Upper middle income	Latin America & Caribbean
Guatemala	Upper middle income	Latin America & Caribbean	St. Vincent and the Grenadines	Upper middle income	Latin America & Caribbean
Iran	Upper middle income		Thailand	Upper middle income	East Asia & Pacific
Israel	High income	Middle East & North Africa	The Bahamas	High income	Latin America & Caribbean
Jamaica	Upper middle income	Middle East & North Africa	Turkey	Upper middle income	Europe & Central Asia
Jordan	Upper middle income	Latin America & Caribbean	United Arab Emirates	High income	Middle East & North Africa
Korea, Rep	High income	East Asia & Pacific	Uruguay	High income	Latin America & Caribbean
Lebanon	Upper middle income	Middle East & North Africa	Venezuela	Upper middle income	Latin America & Caribbean

Notes: in UHEs, there are only 11 countries with high income classification including The Bahama, Chile, Israel, Oman, Panama, Saudi Arabia, Singapore. But they are still defined in FERDI as developing countries. A too small number of countries leads to difficulty in estimation thus they are incorporated into upper middle-income economies to form UHEs. In fact, several of 11 high income economies are still upper middle income in the period of 2002–2017.

Table A2. Data Description for Two Subsamples

Variable	Obs	Mean	S.D.	Min	Max
49 LMEs					
EV	624	35.35	10.84	14.84	69.97
Shock	624	36.29	14.46	6.89	87.74
Exposure	624	34.41	10.07	10.38	65.12
EQ	624	0.70	0.17	0.20	1.06
Income	624	6.93	0.67	5.62	8.43
Inst	624	-0.70	0.41	-1.75	0.25
FDI	624	4.81	8.84	-5.21	103.34
Govex	593	12.54	4.47	0.95	28.73
43 UHEs					
EV	520	26.49	8.72	10.88	50.43
Shock	520	22.71	9.72	2.37	67.99
Exposure	520	30.26	11.84	3.72	59.34
EQ	520	0.84	0.13	0.44	1.07
Income	520	9.03	0.74	7.52	11.01
Inst	520	0.08	0.65	-1.38	1.57
FDI	520	6.82	21.39	-4.89	280.13
Govex	509	14.48	4.15	6.73	26.88

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