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ORIGINAL PAPER

Does the impact of geopolitical risk reduce with the financial structure of an economy? A perspective from market vs. bank-based emerging economies

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Abstract

In this paper, we investigate if negative effect of geopolitical risk on economic growth reduces with the financial structure of emerging economies. Although previous studies do not find market-based structure to boost economic growth, we cast a light upon why countries still opt for shifting to that structure. We mainly utilize panel autoregressive distributed lag (ARDL) for the period between 1985 and 2021 and employ country-based geopolitical risk (GPR) indices for 15 emerging markets. Findings depict that market-based structure reduces negative impact of geopolitical risk on economic growth, which might be attributed to increasing transparency and hence investors feeling less hesitant in investing market-based economies. On the other hand, we also show that market-based system reduces the adverse effects of GPR on consumption, whereas bank-based system has the same effect on investment growth in the long-run. Therefore, our paper asserts that the financial system is not irrelevant in terms of growth perspective, if the geopolitical risk is a key factor for an emerging country.

Keywords Geopolitical risk · Emerging markets · Financial structure · Economic growth · Panel ARDL

JEL Classification G10 · G20 · O10

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1 Introduction

Geopolitical risk is one of the key factors whilst giving an investment decision both for individuals and corporations and hence heightened geopolitical risk has several economic and financial consequences such as shrinkage in output (Cheng & Chiu, 2018), substantial flee from equity market and thus significant change in portfolio allocations (Omar et al., 2017). Geopolitical risk decreases the economic output through risk-averse agents who are reluctant to get economic incentives and invest abroad with an increase in geopolitical risk. Therefore, in times of instability, private investment declines, which results in a reduction in economic growth (Bilgin et al., 2020). Furthermore, an increase in the geopolitical uncertainty enhances the motivation of precautionary savings that makes firms to delay their investments and consumers to postpone their consumption (Bloom, 2009). It is also significantly worthwhile to note that economies which are more prone to geopolitical risk are also economically more fragile. Therefore, it is of utmost importance to understand how geopolitical risk alters policy-making through economic structures. We approach this phenomenon by means of a novel perspective.

Financial systems could be classified as market- or bank-based depending on which major tool investors or corporations access funds in a country; banks or financial markets. Two examples to bank and market-based economies are Japan and Bangladesh, respectively (Beck & Levine, 2002). Although, there are advantages and disadvantages to both classifications, the aspire of emerging markets to pull international funds make them shift towards market-based system (or rather have a blend of bank and market-based system) further with the globalization phenomenon. Market-based systems are perceived to be more transparent through releasing more information. However, could having a market-based system also reduce the negative impact of geopolitical risks on economic growth in the long run? We seek to find a satisfactory answer to this question in our paper.

The major contribution of our paper is showing the negative impact of geopolitical risk on economic growth to diminish significantly, as the emerging economy gets further market-based. This finding shed light on the dilemma why the emerging markets are switching to the market-based system from a bank-based system, though neither of these systems is found to be superior to the other in the previous studies. The underlying reason for the shift towards market-based economy—even if it does not help the economic growth—could be due to policymakers discretely or openly stating that they are becoming more transparent. This transparency might be positively perceived by investors, which could reduce the negative effect of geopolitical risk on financial markets in the long run.

Furthermore, our findings demonstrate that while having a market-based system reduces the negative effect of GPR on consumption growth, when it comes to investment growth, bank-based system diminishes negative impact of GPR in the long-run. Since banks lock in a significant amount of funds for a longer period of time, investments could have been affected less in a bank-based environment during turbulent times. Moreover, we empirically document that emerging markets examined in this study display consumption-led growth. This finding might

explain why having a market-based system diminishes adverse effects of geopolitical risk on economic growth in the long-run, whilst enhancing in the short-run.

Another contribution of our paper is utilizing panel ARDL methodology with country-based GPR indices. Panel ARDL allows one to analyze both short and long-run relationships and it offers consistent estimators (Pesaran et al., 1999). Furthermore, our paper uses country based GPR indices, so that we can analyze each and every country by its own dynamics.

The remaining parts of the study are structured as follows. Section two summarizes related literature, three provides data and methodology employed in this paper. The empirical findings are discussed in section four and section five provides further robustness tests. Finally, section six concludes the paper.

2 Literature review

Our paper mainly spans two strands of literature, one examines the impact of geopolitical risk on economic growth, consumption and investment, and the second investigates whether the classification of market or bank-based system generates a difference in output generation.

Although geopolitical risk has been present since political history, researchers started to investigate the impact of terrorist events on economic conditions, rather recently, especially after 9/11 crisis (Drakos & Kallandranis, 2015). Eckstein and Tsiddon (2004) theoretically show that a rise in terrorist activity reduces investment, income, and consumption, thereby resulting in economic contraction. For instance, Kunreuther et al. (2003) show that 9/11 attack had approximately $80 to $90 billion cost on the economy. Obviously, related studies are not limited to the US economy and 9/11 attack. Eckstein and Tsiddon (2004) show that proviso Israel had not had suffered from terrorism in the 2000s, their output per capita would have been 10% higher by 2004 and similar drop is found for the Basque region terrorist acts in late 1960s (Abadie & Gardeazabal, 2003). On the other hand, some papers claim that uncertainty in policy increases economic growth by diminishing private investment and rising expenditure on public investment (Bui, 2018).

However, one should consider that geopolitical risk includes but definitely is not limited to terrorist events or military coups. For instance, geopolitical risk also contains frictions across nations, elections which might have a significant impact on political stability or nuclear threats. Therefore, investigating the impact of geopolitical risk on economic status is not straightforward. Recently, Caldara and Iacoviello (2018) created an index (GPR benchmark index) based on the count of selected risk associated words in 11 different newspapers starting from 1985 for 19 countries. Therefore, through making the measurement much easier, this index paved the way for investigating the impact of geopolitical risk further and more comprehensive. Among others, Cheng and Chiu (2018) find that geopolitical risk leads to a 13–22% decrease in 38 emerging countries' economic output. Likewise, by employing Toda–Yamamoto (1995) approach, Saint Akadari et al. (2020) show a unidirectional and negative relationship between geopolitical risk and economic growth for Turkey from geopolitical risk to growth.

There are also studies which examine the link between investment and consumption with GPR, though relatively few in numbers. Baker et al. (2016) show that there is a negative impact of political instability on investment and output. Likewise, Bloom et al. (2007) and Dissanayake et al. (2018) present the negative correlation between GPR shocks and firm-level capital investment consumption level. Later, Cheng and Chiu (2018) materialize the negative relationship and show that one standard deviation shock in the GPR index leads to one and two percent reduction in consumption and investment, respectively. As consumption and investment are considered as the main transmission channel for the impact of GPR on economic growth, this paper adds to the scant literature by demonstrating the impact of financial structures on the effect of GPR on the consumption and investment growths.

The second strand of the literature related to our study investigates how different financial systems affect economic growth. There are considerably high number of studies which investigate the advantages/disadvantages of bank-based and market-based systems over each other. Supporters of the bank-based theory underline the important position of the banks in economic growth, as banks are superior in dealing with the moral hazard and perform better in an environment of poor contract implementation (Uzunkaya, 2012). This theory implies, especially in early periods of economic development, bank-based systems outperform market-based systems, as banks are better at finding decent investments and mobilizing savings (see Goldsmith, 1969; Stulz, 2000). The advocators of the market-based theory, in contrast, assert market-based system is better than a bank-based system, as it is superior at overcoming incomplete information problems, distributing capital, and offering risk management instruments (see Allen & Gale, 1999). On the other hand, some other studies claim these two systems are complementary rather than competitor (see Levine, 2002; Arize et al., 2018).

Although early empirical studies are unable to find one system is consistently better than others from a growth perspective (see Beck & Levine, 2002; Bekaert et al., 2005; Boyd & Smith, 1998; Demirgüç-Kunt and Levine, 2004; Levine & Zervos, 1998), many developing countries have started to switch to market-based systems in the last decade (Allen & Gale, 1999; Bats & Houben, 2020; Chakraborty & Ray, 2006). Recent studies explain this phenomenon via demonstrating that bank-based systems are more vulnerable to systemic risk than market-based systems (Bats & Houben, 2020) since banks limit credit markets much more compared to financial markets during recessions (Pagano et al., 2014). Therefore, this study aims to move these discussions one step ahead by showing that although the financial structure is claimed irrelevant from a growth perspective, it has a binding effect by reducing the negative impact of GPR on economic growth.

3 Data and methodology

3.1 Data

Data for all variables employed in this paper are on a yearly frequency for the period between 1986 and 2021 for 15 emerging markets, namely, Argentina, Brazil, China,

Colombia, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Russia, Saudi Arabia, South Africa, Thailand, and Turkey. We select countries which are indexed under MSCI emerging market index as of 2020 and have available country-based GPR index data.

As a geopolitical risk measure, we employ country based GPR index, which is constructed via counting selected geopolitical-tension-associated words, such as wars, political conflict, and terrorist actions, in major international newspapers such as The New York Times, The Wall Street Journal, The Guardian (Caldara & Iacoviello, 2018). This index is available both in a global and country basis (Caldara et al., 2017), and Figs. 1 and 2 present historical levels of benchmark GPR index and country-based, respectively. As one can note, all countries display much different fluctuations than the benchmark GPR. Therefore, it is of utmost importance to have a methodology utilizing country characteristics differently.

Although country-based GPR data is available on a monthly basis, we convert the data to annual via average method due to the availability of other economic data. It is worthwhile to mention that we employ log difference of yearly change of GPR index data in our analysis.

Following Beck and Levine (2002), we calculate financial structure variable by taking the first principal component of two variables which measure comparative *Activity* and *Size* of both banks and markets. *Activity* is measured by the log of the ratio of Value Traded to Bank Credit. Value Traded is measured by stock traded as a percent of Gross Domestic Product (GDP) and Bank Credit is the amount of domestic credit by banks to the private sector as a percent of GDP. We calculate *Size* by the log of the ratio of Market Capitalization to Bank Credit. Market capitalization is total value of listed shares in a selected country divided by GDP. By construction, an increase in the value of this variable indicates becoming more market-based. All data are gathered from the World Bank databank, World development indicators. Figure 3 presents the average level of FS variable over the sample period for sample set of countries. As one can note, Argentina is a bank-based country, whereas Turkey is more market-based, according to our measure. However, please note that this

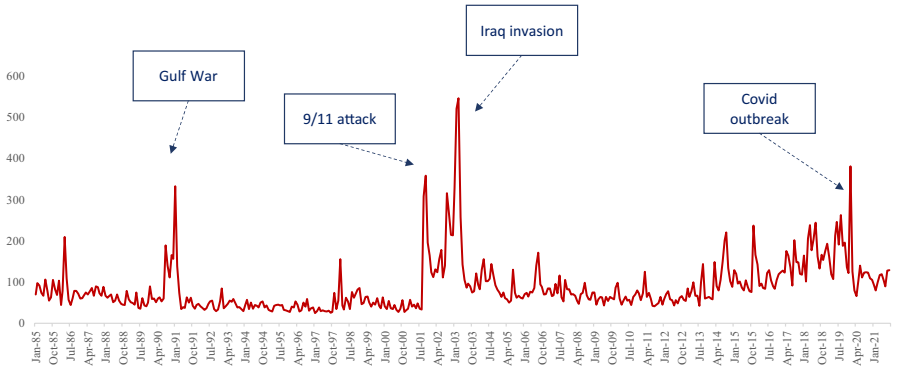


Fig. 1 Benchmark GPR index for the period between 1985 and 2021. For country based GPR figures please refer to Appendix. Source: Caldara et al. (2017), author calculations

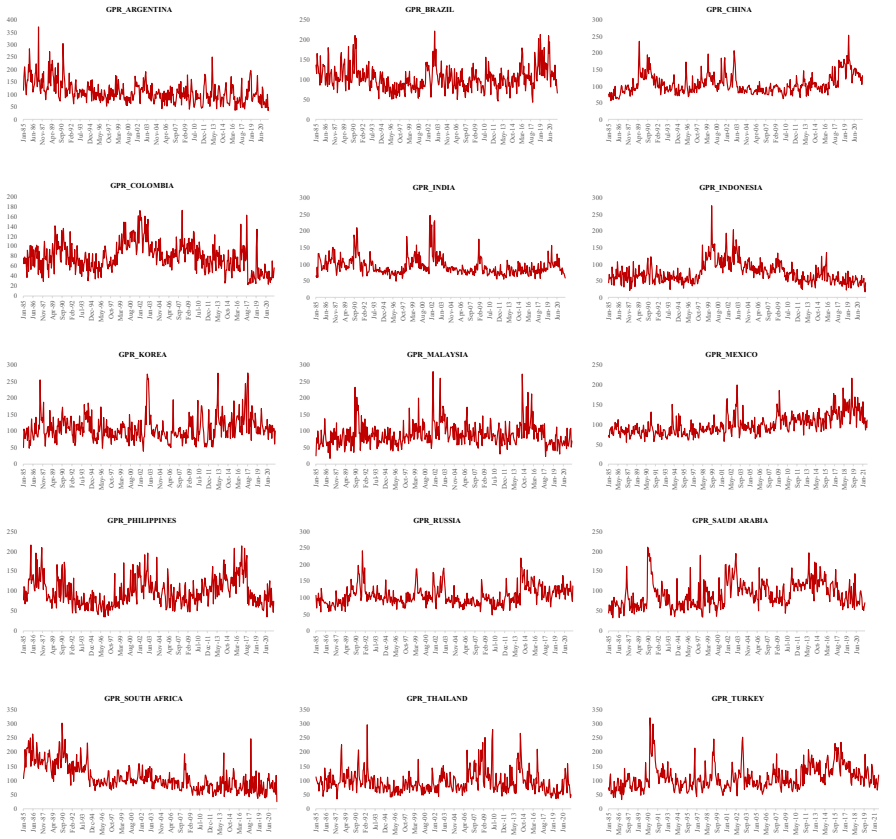


Fig. 2 Monthly country-based GPR indices for the period between January 1985 and August 2021. Source: Caldara et al. (2017), author calculations

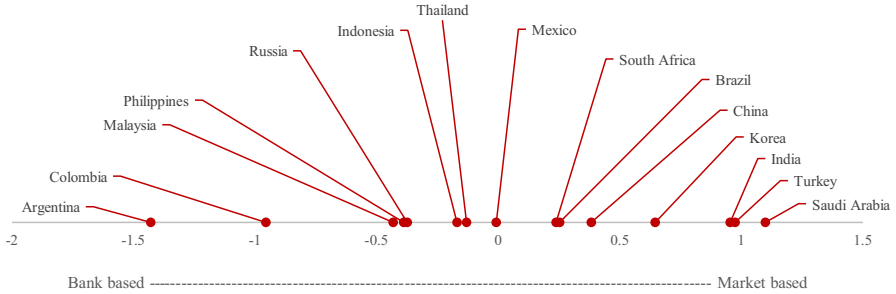


Fig. 3 Average level of FS variable for sample countries during the period 1985 and 2021. We calculate financial structure variable by taking the first principal component of two variables which are comparative *Activity* and *Size* of both banks and markets. *Activity* is measured by the log of the ratio of Value Traded to Bank Credit. Value Traded is measured by stock traded as a percent of Gross Domestic Product (GDP) and Bank Credit is the amount of domestic credit by banks to the private sector as a percent of GDP. We calculate *Size* by the log of the ratio of Market Capitalization to Bank Credit. Market capitalization is total value of listed shares in a selected country divided by GDP. By construction, an increase in the value of this variable indicates becoming more market-based. Source: World Bank databank, author calculations

is an average level, on year basis country financial structures might deviate. Therefore, we also present the dynamic version of FS based on country in Fig. 4. We see that financial structure deviate with the economic conditions. For instance, Thailand experience a significant shift towards bank-based system during Asia crisis, which is quite plausible.

Following the literature, growth in the Gross Domestic Product per capita, hereafter GDPPCG, is used as an economic growth indicator (see Levine & Zervos, 1998; Calderon & Liu, 2003; Nasreen et al., 2020). The growth is the log difference of the real GDP per capita. The data is obtained from the World Bank databank, World Development Indicators.

We also include an interaction term between GPR and FS to capture the effect of GPR on economic growth for different levels of financial structure measure. The interaction term is demonstrated by INT.

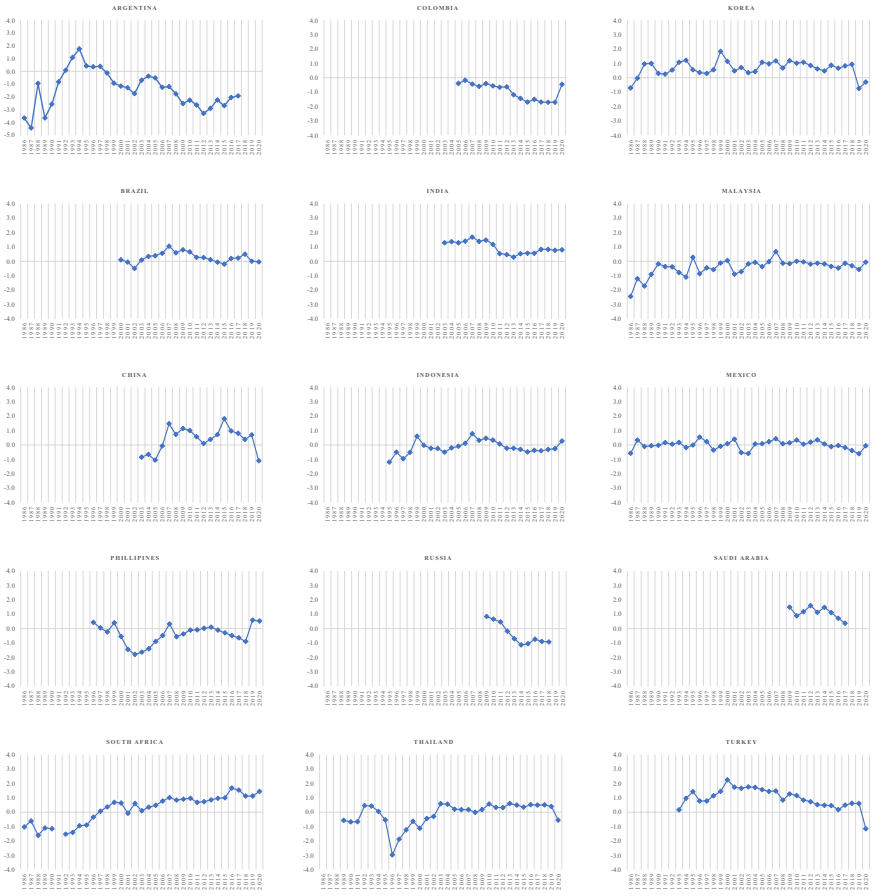


Fig. 4 Dynamic FS variable for sample countries during the period 1985 and 2021. By construction, an increase in the value of this variable indicates becoming more market-based. Source: Author calculation

As an investment growth proxy, growth in the gross fixed capital formation annual percentage growth, hereafter INVG, is used. The final consumption expenditure annual percentage growth, hereafter CONG, is employed as a consumption growth variable. These data are gathered from the World Bank databank, World Development Indicators.

Finally, the natural log value of the broad money as a percent of GDP, hereafter BM and annual percentage change in the consumer price index, hereafter INFLATION, are employed as control variables following the literature (see Beck et al., 2000; Becketti & Morris, 1992). Data are obtained from the World Bank databank, World Development Indicators. Table 1 presents the descriptive statistics of each variable. The number of observations varies from 359 to 510 depending on the data availability.

3.2 Methodology

We mainly employ dynamic panel data models, namely mean group (MG) estimator, pooled mean group estimator (PMG), and dynamic fixed effects (DFE), due to their four major advantages. First, Pesaran et al. (1999) demonstrate that panel ARDL methodology offers consistent estimators, independent of the stationary of variables at levels, integrated of order 1, or a mixture of these two, the panel ARDL methodology offers consistent estimators. Second, even though co-integration is not existent, panel ARDL models still make it available to get interpretations of short- and long-run causality. Third, by determining the lag lengths of the variables sufficiently, the endogenous regressors problem can be solved with this methodology. Finally, the long-run coefficients infer elasticities if log values of the variables are used (Pesaran et al., 1999).

In the first step of the analysis, we find integration levels via applying panel unit-root tests of Im-Pesaran-Shin (IPS) and Fisher-type. According to Pesaran et al.

Table 1 Descriptive statistics

	Mean	Std. dev	Min	Max	Observations
GDPPCG	1.13	2.28	− 11.48	9.68	537
GPRG	− 0.15	8.17	− 32.59	32.04	540
FS	0.00	0.99	− 4.44	2.24	374
CON	4.12	4.10	− 12.83	14.78	505
INV	6.56	11.61	− 55.10	45.12	477
Inflation	33.93	204.69	− 3.20	2947.73	498
BM	4.02	0.58	2.36	5.36	501

Source: GDPPCG, CONG, INVG, INFLATION, and BM from World Bank databank, GPR from Caldara et al. (2017), FS from author calculations

GDPPCG, GPR, FS, CONG, INVG, INFLATION, and BM indicate GDP per capita growth, changes in geopolitical risk, financial structure index, consumption growth, investment growth, inflation rate, and log value of the broad money to GDP ratio

(1999), variables should be integrated of order less than two to apply panel ARDL models. The panel unit-root tests have superiority over the individual time-series ones since the information in cross-section and time-series data are merged (Breitung, 2000; Hadri, 2000). In these tests, rejecting the null hypothesis implies that the variable is stationary at the panel level (Im et al., 2003).

After finding stationarity levels of each variable, panel ARDL models are tested. ARDL specification of the models analyzed in this paper are demonstrated in Eqs. (1)–(3) as follows;

$$GDPPCG_{it} = \sum_{j=1}^{p} \beta_{ij} GDPPCG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij} GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij} FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij} INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij} BM_{i,t-j} + \mu_i + \varepsilon_{it} \tag{1}$$

$$INVG_{it} = \sum_{j=1}^{p} \beta_{ij} INVG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij} GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij} FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij} INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij} INFLATION_{i,t-j} + \mu_i + \varepsilon_{it} \tag{2}$$

$$CONG_{it} = \sum_{j=1}^{p} \beta_{ij} CONG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij} GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij} FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij} INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij} INFLATION_{i,t-j} + \mu_i + \varepsilon_{it} \tag{3}$$

where p and q are order of dependent and explanatory variables, respectively. β and γ s are the coefficients of dependent and independent variables. Countries and year are shown by i and t.

Equations (4), (5) and (6) demonstrate after reparameterization error-correction forms of Eqs. (1)–(3);

$$\Delta GDPPCG_{it} = \theta_i \left(GDPPCG_{i,t-1} - \vartheta_i X_{it} \right) + \sum_{j=1}^{p} \beta_{ij} \Delta GDPPCG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij} \Delta GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij} \Delta FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij} \Delta INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij} \Delta BM_{i,t-j} + \mu_i + \varepsilon_{it} \tag{4}$$

$$\Delta INVG_{it} = \theta_i \left(INVG_{i,t-1} - \vartheta_i X_{it} \right) + \sum_{j=1}^{p} \beta_{ij} \Delta INVG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij} \Delta GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij} \Delta FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij} \Delta INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij} \Delta INFLATION_{i,t-j} + \mu_i + \varepsilon_{it} \tag{5}$$

$$\Delta CONG_{it} = \theta_i\left(CONG_{i,t-1} - \vartheta_i X_{it}\right) + \sum_{j=1}^{p} \beta_{ij}\Delta CONG_{i,t-j} + \sum_{j=0}^{q} \gamma_{1ij}\Delta GPR_{i,t-j} + \sum_{j=0}^{q} \gamma_{2ij}\Delta FS_{i,t-j} + \sum_{j=0}^{q} \gamma_{3ij}\Delta INT_{i,t-j} + \sum_{j=0}^{q} \gamma_{4ij}\Delta INFLATION_{i,t-j} + \mu_i + \varepsilon_{it} \quad (6)$$

where β and γ s are short-term coefficients of the lagged dependent and explanatory variables, respectively. As the coefficients of the first-differenced variables display the short-run impacts, short-run can be defined as a year in this study. The long-term coefficient is shown by ϑ. The speed of adjustment of the dependent variable toward the long-term equilibrium confirming an alteration in explanatory variables, Xs, is demonstrated by θ. θ_i<0 guarantees the existence of the long-run relationship.

Three prominent methods to estimate dynamic heterogenous models are MG, PMG, and DFE as we mention above. PMG model permits country-specific changes in short-term coefficients, while MG model allows both the long- and short-term slopes to change over countries. Therefore, the estimator of MG error-correction representation of the ARDL model is suitable for the panels in which heterogeneity exists across groups, while PMG estimator is reliable under the long-run slope homogeneity assumption (Pesaran & Smith, 1995; Pesaran et al., 1999). DFE estimator, on the other hand, allows the intercepts to change across the country but keep the slopes fixed. We employ Hausman test of long-run homogeneity of the parameters, to ensure whether the pooling of long-term coefficients is proper. Unable to reject the null hypothesis of homogeneity in long-run coefficients indicates that applying PMG estimator is appropriate (Pesaran et al., 1999). Next section presents the results of these empirical analyses.

4 Empirical results

In the first step of the analysis, panel unit-root tests are applied. Since panel ARDL models can be applied to variables which are either at levels, I(1), or the mixture of these two; the unit-root tests are still necessary to make sure variables are not integrated at the order of two or more. Fisher-type and Im-Pesaran-Shin panel unit-root tests are employed and results are presented in Table 2. Findings indicate that all variables, except BM, are stationary. BM, on the other hand, is integrated of order 1. As all variables in this model are integrated of either order 0 or 1, applying panel ARDL models suits well (Pesaran et al., 1999).

The impact of the financial structure on the relationship between economic growth and GPR at which Table 3 presents findings. First of all, we estimate all equations for MG, PMG and DFE estimators and run a Hausman test to find the most suitable estimator for our analysis. When the test is run between the MG and PMG estimators, the null hypothesis of homogeneity between long-run coefficients cannot be rejected; while it is rejected when the test is applied between PMG and DFE estimators. Therefore, we can conclude that the DFE estimator is efficient for this model. Hence, only the results of the DFE model will be discussed further.

Table 2 Unit-root test results

	Fisher type		IPS	
	Statistics	p-value	Statistics	p-value
Panel A: levels				
GDPPCG	– 9.15	0.00	– 8.43	0.00
GPRG	– 16.28	0.00	– 15.59	0.00
FS	– 2.79	0.00	– 2.49	0.00
CON	– 7.96	0.00	– 7.27	0.00
INV	– 9.36	0.00	– 6.31	0.00
Inflation	– 6.56	0.00	– 5.93	0.00
BM	– 0.50	0.31	– 0.49	0.31
Panel B: first-differences				
GDPPCG	– 19.68	0.00	– 19.22	0.00
GPRG	– 24.16	0.00	– 24.68	0.00
FS	– 9.29	0.00	– 8.33	0.00
CON	– 17.25	0.00	– 16.43	0.00
INV	– 18.96	0.00	– 18.13	0.00
Inflation	– 19.03	0.00	– 17.82	0.00
BM	– 13.10	0.00	– 13.41	0.00

GDPPCG, GPR, FS, CONG, INVG, INFLATION, and BM indicate GDP per capita growth, changes in geopolitical risk, financial structure index, consumption growth, investment growth, inflation rate, and log value of the broad money to GDP ratio. IPS refers to Im-Pesaran-Shin unit-root test. Panel A demonstrates the panel unit-root tests results for levels of the variables. Panel B shows the panel unit-root tests results for the first-differences of the variables

Findings suggest that in the long-run, the impact of geopolitical risk on economic growth is significantly negative. This finding is in line with Cheng and Chiu (2018) and Saint Akadiri et al. (2020) among others (see Alesina & Tabellini, 1990; Cukierman et al., 1992) that shows deleterious impact of geopolitical instability over economic growth. This finding is critically important especially for emerging markets which are more prone to geopolitical risk and more vulnerable in terms of economic development. Therefore, policy-makers should look for potential ways to reduce the negative impact of geopolitical risks and overcome the negative perception of these countries.

When we check findings regarding the relationship between financial structure and economic growth, results indicate that having a market-based structure has a significant positive effect on economic growth for emerging economies, which is in line with Gambacorta et al. (2014). Although some of the extant studies cannot find a significant impact of the financial structure on economic growth (see Boyd & Smith, 1998; Levine & Zervos, 1998), the significant effect presented in this study might result simply because of the different datasets employed, or as these developing countries emerged economically throughout the years, which leads different results with the earlier data samples and the current ones (see

Table 3 ARDL estimation results (dependent variable: GDPPCG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	− 0.041	0.605	− 0.066	0.000	− 0.066	0.001
FS	− 3.264	0.416	0.340	0.009	0.568	0.000
INTFS	− 0.038	0.724	0.051	0.002	0.076	0.000
BM	− 21.321	0.314	− 3.968	0.000	− 2.156	0.000
Panel B: short-run						
ΔLNGPR	0.011	0.715	0.032	0.223	0.029	0.011
ΔFS	− 0.456	0.182	− 0.106	0.712	− 0.091	0.610
ΔINTFS	− 0.030	0.532	− 0.049	0.229	− 0.043	0.000
ΔBM	− 8.685	0.007	− 6.939	0.014	− 1.894	0.029
Constant	1.723	0.855	13.503	0.000	8.374	0.000
ECT	− 0.829	0.000	− 0.765	0.000	− 0.846	0.000
	Hausman test result (MG-PMG)—2.11 (0.716)					
	Hausman test result (DFE-PMG)—10.84 (0.03)					

GDPPCG, GPR, FS, INTFS, and BM indicate GDP per capita growth, changes in geopolitical risk, financial structure index, interaction term of geopolitical risk and financial structure (GPR*FS), and log value of the broad money to GDP ratio. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance levels

Gambacorta et al., 2014). Demirgüç-Kunt et al. (2013) indicate that relationship could be really complex and might depend on the economic development of the country specifically. Their findings propose the role of banks reduce and financial markets proliferate as a country gets economically more developed. Therefore, policy-makers could be shifting towards market-based system further to reduce the negative impact of geopolitical risks. Indeed, we check the interaction term between FS and GPR and see that having a market-based financial structure reduces the negative impact of the geopolitical risk on economic growth, as the coefficient of the interaction term is significant and positive.

The underlying reason for this finding might be that a market-based system delivers a higher amount of information for the public than a bank-based system, and market-based systems are better in resolving incomplete information issues (see Uzunkaya, 2012; Moradi et al., 2016). Therefore, by releasing a greater amount of information, market-based systems reduce uncertainties that can be occurred in high geopolitical risk times. Additionally, our finding supports market-based system advocates who assert a market-based system is better in providing risk management instruments and subject to less systemic risk. Pagano et al. (2014) indicate that bank-based systems are subject to systemic risk more than market-based systems, since banks exaggerate and mismanage credit in good times and limit credit in bad times more than financial markets.

In the short-run, on the other hand, the signs and significances of the coefficients are meaningfully different. Geopolitical risk has a significant positive short-run impact on economic growth, which is consistent with Sevastianova (2009), who states wars can lead to economic growth in the short-run by increasing productivity through mobilizing resources. Additionally, having a market- or bank-based financial structure does not seem to have a significant impact on economic growth in the short-run.

Interestingly, the interaction term has a significant negative coefficient indicating, although financial structure does not matter for economic growth in the short-run, having a market-based system actually reduces the positive impact of GPR on economic growth. These findings can be attributed to the quick flee of abroad money from financial markets during a (geopolitical) crisis, whereas banks lock in a significant amount of money and cannot transfer in a short period of time. To examine this, we test the impact of GPR and interaction term on the Foreign Direct Investments (FDI) net outflow by employing panel ARDL technique. Table 9 in Appendix presents the findings of this analysis. Hausman tests results state that the PMG estimator is efficient for this model. According to Table 9, although GPR does not have significant impact on FDI outflow, the interaction term has a significant positive coefficient in the long-run, which suggests in market-based systems, increase in the GPR leads to greater FDI outflows. Last but not least, we find the error-correction

Table 4 ARDL estimation results (dependent variable: INVG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	3.590	0.269	− 0.741	0.000	− 0.431	0.004
FS	47.212	0.237	3.290	0.000	4.168	0.004
INTFS	8.492	0.350	− 0.279	0.003	0.432	0.014
Inflation	− 0.323	0.558	0.051	0.306	− 0.024	0.680
Panel B: short-run						
ΔGPR	0.331	0.017	0.630	0.030	0.179	0.027
ΔFS	− 1.616	0.526	− 0.881	0.655	− 1.148	0.412
ΔINTFS	0.454	0.059	− 0.088	0.754	− 0.255	0.006
ΔInflation	− 0.150	0.654	− 0.360	0.037	− 0.132	0.078
Constant	3.649	0.097	2.595	0.004	4.235	0.000
ECT	− 0.672	0.000	− 0.626	0.000	− 0.765	0.000
	Hausman test result (MG-PMG)—3.69 (0.450)					
	Hausman test result (DFE-PMG)—0.52 (0.971)					

INVG, GPR, FS, INTFS, and INFLATION indicate investment growth, changes in geopolitical risk, financial structure index, interaction term of geopolitical risk and financial structure (GPR*FS), and inflation rate. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance level

term is − 0.846, which indicates that 84.6% of the deviation from the long-term equilibrium is corrected in one year.

Consumption and investment are considered as two of the most critical factors behind the growth, in the literature (Kim, 2017). Reduction in consumption causes lower revenues for firms and the government, which decreases economic growth. Moreover, neoclassical growth theory states a rise in investment and its efficiency lead to higher economic growth. Therefore, we also examine the linkage between investment and consumption with geopolitical risk, separately. Table 4 shows findings for Eq. (2) where investment growth is the dependent variable. We first run Hausman tests and findings indicate that the most appropriate estimator is the PMG for this model. As Table 4 presents, geopolitical risk has a significant negative impact on investment growth in the long-run. This finding is consistent with Eckstein and Tsiddon (2004) who show uncertainties associated with terrorism decrease the investment as it threatens life and decreases the value of the future relative to the present, and Baker et al. (2016) who empirically present the inverse impact of the political instability over investment since firms tend to postpone investment in high uncertainty. Although having a market-based system increases investment growth, a negative and significant interaction term suggests that market-based system actually increases the negative impact of the geopolitical risk on investment growth. In other words, having a bank-based system diminishes the negative impact of GPR on investment growth. This finding can be attributed to firms needing staged financing

Table 5 ARDL estimation results (dependent variable: CONG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	− 0.314	0.154	− 0.125	0.000	− 0.126	0.013
FS	3.009	0.044	1.965	0.000	1.017	0.036
INTFS	− 0.243	0.530	0.007	0.754	0.165	0.005
Inflation	− 0.254	0.493	− 0.009	0.695	− 0.013	0.528
Panel B: short-run						
ΔGPR	0.366	0.159	0.311	0.154	0.054	0.014
ΔFS	− 0.439	0.709	− 0.268	0.724	0.265	0.518
ΔINTFS	− 0.207	0.401	− 0.211	0.277	− 0.075	0.002
ΔInflation	− 0.073	0.727	− 0.172	0.163	− 0.104	0.000
Constant	1.334	0.231	1.849	0.001	2.694	0.000
ECT	− 0.556	0.000	− 0.479	0.000	− 0.676	0.000
	Hausman test result (MG-PMG)—1.20 (0.878)					
	Hausman test result (DFE-PMG)—13.77 (0.008)					

CONG, GPR, FS, INTFS, and INFLATION indicate consumption growth, changes in geopolitical risk, financial structure index, interaction term of geopolitical risk and financial structure (GPR*FS), and inflation rate. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance levels

can obtain external resources from banks easier than the markets as banks can reliably promise to provide extra funding available in the future (Stulz, 2000). In the short-run, neither the financial structure nor the interaction term has a significant impact on investment growth. Change in geopolitical risk has a significant positive influence on investment growth, which is in line with Bui (2018) that claims political instability enhances public investment.

Finally, Table 5 demonstrates the results of the analysis, in which the consumption growth is the dependent variable. We first run Hausman tests, and findings indicate that the most appropriate estimator is the DFE for this model. In the long-run, an increase in GPR reduces consumption growth, while having a market-based financial system increases the consumption, significantly. Cheng and Chiu (2018) support this finding by showing that consumption is reduced by nearly 1% when there is a one-standard-deviation shock to the GPR. However, unlike investment growth, consumption growth is affected by the interaction term significant and positively, which indicates that having a market-based system reduces the negative impact of GPR on consumption. This finding infers that the incentive for precautionary saving during uncertainty is lower if there is a market-based financial system (Bloom, 2009).

In the short-run, on the other hand, while the geopolitical risk has a significant positive influence on consumption growth, having a market-based system reduces this positive influence. This finding supports the findings of Berkman et al. (2011) and Sonje et al. (2014). Sonje et al. (2014) state that consumption responses to changes in stock wealth in market-based systems greater than in bank-based systems. So, the financial structure has a vital role in the conduction of asset prices' changes to consumption. Together with the findings of Berkman et al. (2011) presenting the negative effect of international political crises on the stock prices resulting in a reduction in consumption, the negative interaction term can be interpreted as the increase in the GPR leads to lower stock market prices, which reduces consumption more in market-based systems than the bank-based systems. In order to test this view, we investigate the effect of GPR on stock traded, and the impact of stock traded on the consumption growth, and present the results in Appendix in Tables 10 and 11, respectively. Table 10 shows the panel ARDL results, where the log value of stock traded (STOCK) is employed as a dependent variable and GPR year average is included as an independent variable. STOCK refers the log value of stock traded as a percent of Gross Domestic Product (GDP). Hausman tests results indicate that PMG estimator is appropriate for this model. Results show that both in the long- and short-run, increase in GPR reduces the value of stock traded significantly. Then, we examine the impact of value of stock traded and the interaction term between value of stock traded and financial structure on consumption growth, and present the findings in Table 11. Hausman tests results state the MG estimator is efficient for this model. Table 11 shows while neither value of stock traded nor the interaction term have a significant influence on consumption growth in the long-run, in the short-run, the interaction term between financial structure and GPR has a significant positive coefficient. This finding suggests in the market-based systems decrease in the value of stock traded reduces the consumption growth, while there is no significant influence in bank-based systems. Additionally, the financial structure does not have a unique significant impact on consumption growth in the

short-run. Finally, as in investment growth, inflation has a significant negative impact on consumption growth only in the short-run. The error-correction term indicates that 67.6% of the departures from the long-term equilibrium is fixed in a year.

It is important to note that the signs and the significances of the coefficients in Table 5 are similar to the coefficients in Table 3, which suggests emerging markets display consumption-led growth. This finding resonates well with the literature that states while the GDP has a stronger link with investment in developed countries as they distribute higher capital for investment, it has a stronger relationship with consumption in emerging ones. The private consumption constructs 70 to 75% of GDP in these countries. Therefore, economic growth is mostly consumption-led in emerging economies rather than investment-led (see Diacon & Maha, 2015; Mishra, 2011).

5 Robustness tests

To test the validity of our empirical results, we apply several robustness checks in this section. Beck and Levine (2002) state that there is no consensus on the financial structure definition in the empirical litreture. In addition to the relative size and activity of banks and markets, they include the regulatory restrictions on banks and the degree of the state-ownership of banks as financial structure measures. The robustness of our findings is tested by employing Heritage index of economic freedom score to capture the alternative financial structure measures. This index reflects

Table 6 Robustness test- ARDL estimation results (dependent variable: GDPPCG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	− 0.037	0.426	− 0.068	0.000	− 0.081	0.000
LNEFREE	− 2.605	0.816	− 2.370	0.117	− 0.789	0.637
INTLNEFREE	− 0.784	0.631	2.290	0.000	1.376	0.018
BM	0.752	0.667	− 3.071	0.000	− 2.700	0.000
Panel B: short-run						
ΔLNGPR	0.033	0.105	0.031	0.001	0.033	0.003
ΔLNEFREE	− 1.610	0.769	− 1.058	0.790	− 3.944	0.152
ΔINTLNEFREE	0.017	0.974	− 0.228	0.642	− 0.610	0.094
ΔBM	− 11.657	0.000	− 9.671	0.000	− 7.340	0.000
Constant	15.197	0.407	18.370	0.000	13.268	0.021
ECT	− 0.766	0.000	− 0.779	0.000	− 0.849	0.000
	Hausman test result (MG-PMG)—3.80 (0.43)					
	Hausman test result (DFE-PMG)—77.12 (0.00)					

GDPPCG, GPR, LNEFREE, INTLNEFREE and BM indicate GDP per capita growth, changes in geopolitical risk, index of economic freedom score, interaction term of geopolitical risk and index of economic freedom score (GPR*LNEFREE), and log value of the broad money to GDP ratio. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators. The numbers in parenthesis under Hausman-test results are the significance levels

Table 7 Robustness test-ARDL estimation results (dependent variable: INVG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	− 6.412	0.258	− 0.646	0.000	− 0.513	0.000
LNEFREE	58.183	0.616	− 25.781	0.039	− 42.140	0.004
INTLNEFREE	330.003	0.324	4.566	0.254	3.963	0.305
BM	− 44.904	0.424	− 11.581	0.000	− 4.642	0.223
Panel B: short-run						
ΔLNGPR	0.496	0.052	0.301	0.000	0.209	0.004
ΔLNEFREE	33.794	0.196	− 6.063	0.766	23.039	0.231
ΔINTLNEFREE	2.077	0.680	− 3.500	0.046	− 4.776	0.042
ΔBM	− 38.238	0.069	− 31.931	0.062	− 28.219	0.000
Constant	206.770	0.195	112.989	0.000	161.262	0.001
ECT	− 0.857	0.000	− 0.712	0.000	− 0.811	0.000
	Hausman test result (MG-PMG)—1.67 (0.80)					
	Hausman test result (DFE-PMG)—0.14 (0.99)					

INVG, GPR, LNEFREE, INTLNEFREE and BM indicate investment growth, changes in geopolitical risk, index of economic freedom score, interaction term of geopolitical risk and index of economic freedom score (GPR*LNEFREE), and log value of the broad money to GDP ratio. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators. The numbers in parenthesis under Hausman-test results are the significance levels

the degree of policy control that the governments exercised and the openness of the market. The data is obtained from the World Bank TCdata360 databank, and the period is between 1995 and 2021. The impact of the financial structure proxied by the index of economic freedom on the relationship between economic growth and GPR is presented in Table 6. Hausman tests findings indicate that the most appropriate estimator is the DFE for this model. DFE estimator results show that the findings are similar to the results presented in Table 3.

The impact of the financial structure proxied by the index of economic freedom on the link between investment growth and GPR, and the link between consumption growth and GPR are demonstrated in Tables 7 and 8, respectively. As in Tables 4 and 5, the impact of the interaction term is significantly negative when the investment growth is employed as a dependent variable, and significantly positive when the consumption growth is employed as a dependent variable. These results support the findings of having a market-based system reduces the negative impact of GPR on consumption, while having a bank-based system reduces the negative impact of GPR on investment growth. Therefore, we conclude that our results are robust even an alternative financial structure measure is employed.

Table 8 Robustness test-ARDL estimation results (dependent variable: CONG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPR	− 0.326	0.002	− 0.128	0.000	− 0.158	0.001
LNEFREE	− 3.615	0.782	− 7.031	0.061	− 6.142	0.117
INTLNEFREE	3.013	0.211	3.789	0.002	1.795	0.189
BM	− 11.008	0.240	− 5.560	0.000	− 4.505	0.000
Panel B: short-run						
ΔLNGPR	0.092	0.031	0.061	0.000	0.062	0.005
ΔLNEFREE	− 2.161	0.832	− 3.062	0.714	− 3.330	0.555
ΔINTLNEFREE	− 0.215	0.816	− 0.758	0.254	− 1.003	0.171
ΔBM	− 15.992	0.002	− 14.361	0.000	− 10.448	0.000
Constant	43.979	0.107	40.903	0.000	35.668	0.002
ECT	− 0.792	0.000	− 0.721	0.000	− 0.739	0.000
	Hausman test result (MG-PMG)—2.39 (0.67)					
	Hausman test result (DFE-PMG)—1.34 (0.86)					

CONG, GPR, LNEFREE, INTLNEFREE and BM indicate consumption growth, changes in geopolitical risk, index of economic freedom score, interaction term of geopolitical risk and index of economic freedom score (GPR*LNEFREE), and log value of the broad money to GDP ratio. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance levels

6 Conclusion

Geopolitical risk is one of the most critical risk factors for individuals and corporations while making investment decision. Therefore, policy-makers should be highly cautious on any act heightening geopolitical risk and even amend policies to reduce it further.

One of the key takeaways of emerging economies to promote investment is increasing transparency and the option to pull back their investment when needed. Therefore, emerging economies might be shifting towards market-based economic system, which is well-known for giving those advantages. Could this act be also reducing the negative impact of geopolitical risk on economic growth? We are aiming to find an answer to this question.

To the best of our knowledge, our study is the first study, which examines the linkage between market structure and geopolitical risk. Since investment and consumption are the two main ways to boost economic growth, their relationship with geopolitical risk are also investigated.

We mainly employ panel ARDL methodology and our dataset includes 15 emerging markets for the period between 1986 and 2021. Findings present that market-based system significantly reduces the negative impact of the geopolitical risk on economic growth in the long-run, whereas the case is just opposite in the short run. These results could be attributed to the potentiality of market-based system on reducing information asymmetry and hence diminishing uncertainty in a geopolitically unstable environment in the long run (see Uzunkaya, 2012; Moradi et al., 2016). On the other hand, reverse impact in the short run might be due to the quick reaction of investors to uncertain situations in market-based economic systems. Conversely, banks blockade significant amount of funds for relatively longer period of time and cannot act as quickly as financial market players.

Since economic growth is derived mainly from consumption and investment (Kim, 2017) we also check the linkage between financial system, geopolitical risk, investment and consumption growths. Results present that while a market-based system reduces the adverse impact of geopolitical risk on consumption growth, it enhances the negative impact of geopolitical risk on investment growth in the long-run. In a risky geopolitical environment, while firms obtain external resources easier from banks than the markets (see Stulz, 2000), the consumers' precautionary saving motivation is lower under market-based system compared to the bank-based system. Finally, empirical results show that the impact of the financial system on the relationship between geopolitical risk and economic growth is similar to the impact on consumption growth rather than investment growth. This finding adds to the literature indicating that emerging markets display consumption-led economic growth instead of investment-led economic growth (see Diacon & Maha, 2015; Mishra, 2011).

As of our knowledge, our paper is the first to demonstrate the importance of the financial structure to handle the adverse effects of geopolitical risks. Moreover, findings justify why emerging countries are opting for shifting toward the market-based system in emerging countries. In respect of growth perspective, the market-based system is superior to the bank-based system in the long-run if there is an unstable geopolitical environment. Hence, this study has implications for policymakers in deciding which financial system to support, and for firms in assessing the effect of possible geopolitical risks on their external capital accessibility under different financial systems.

Appendix

See Tables 9, 10 and 11.

Table 9 ARDL estimation results (dependent variable: FDIOUTFLOW)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPRAVERAGE	− 0.017	0.212	− 0.002	0.225	− 0.001	0.770
INTFSGPR	0.022	0.129	0.006	0.000	0.008	0.008
Panel B: short-run						
ΔLNGPRAVERAGE	− 0.002	0.347	− 0.002	0.159	− 0.004	0.086
ΔINTFSGPR	0.002	0.908	− 0.001	0.731	0.001	0.302
Constant	0.670	0.108	0.525	0.002	0.250	0.176
ECT	− 0.597	0.000	− 0.562	0.000	− 0.367	0.000
	Hausman test result (MG-PMG)—1.15 (0.56)					
	Hausman test result (DFE-PMG)—0.73 (0.70)					

FDIOUTFLOW, GPRAVERAGE, INTFSGPR indicate foreign direct investments net outflow, year average geopolitical risk, interaction term of geopolitical risk and financial structure (GPRAVERAGE*FS). EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance level

Table 10 ARDL estimation results (dependent variable: STOCK)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
GPRAVERAGE	− 0.002	0.586	− 0.006	0.017	− 0.006	0.153
BM	− 0.013	0.986	0.906	0.000	0.557	0.097
Panel B: short-run						
ΔGPRAVERAGE	− 0.003	0.057	− 0.003	0.051	− 0.001	0.290
ΔBM	1.017	0.003	0.952	0.001	− 0.227	0.154
Constant	0.895	0.383	0.028	0.740	0.358	0.296
ECT	− 0.429	0.000	− 0.316	0.000	− 0.248	0.000
	Hausman test result (MG-PMG)—1.30 (0.52)					
	Hausman test result (DFE-PMG)—0.090 (0.95)					

STOCK, GPRAVERAGE, and BM indicate the log value of stock traded, year average geopolitical risk, and log value of broad money. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance level

Table 11 ARDL estimation results (dependent variable: CONSG)

EV	MG estimates		PMG estimates		DFE estimates	
	Coefficient	p-values	Coefficient	p-values	Coefficient	p-values
Panel A: long-run						
Stock	7.01	0.325	0.087	0.907	− 1.756	0.015
Intstock	− 0.021	0.967	− 0.327	0.299	0.723	0.027
Inflation	− 0.317	0.003	− 0.023	0.207	− 0.023	0.261
Panel B: short-run						
ΔStock	− 0.641	0.630	− 1.040	0.199	0.081	0.890
ΔIntstock	0.522	0.021	0.625	0.002	0.164	0.419
ΔInflation	− 0.276	0.179	− 0.345	0.010	− 0.104	0.000
Constant	11.163	0.119	2.977	0.000	5.658	0.000
ECT	− 0.674	0.000	− 0.584	0.000	− 0.675	0.000
	Hausman test result (MG-PMG)—9.19 (0.03)					
	Hausman test result (DFE-PMG)—2.86 (0.41)					

CONSG, STOCK, INTSTOCK, and INFLATION indicate the consumption growth, log value of stock traded, interaction term of the value of stock traded and financial structure (STOCK*FS), and inflation rate. EV refers to explanatory variables. The MG, PMG, and DFE state mean-group, pooled mean-group, and dynamic fixed effect estimators

The numbers in parenthesis under Hausman-test results are the significance level

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