Economics Bulletin

Volume 39, Issue 1

Evaluating the effect of geopolitical risks on the growth rates of emerging countries

Barış Soybilgen
Istanbul Bilgi University

Huseyin Kaya
Istanbul Medeniyet University

Dincer Dedeoglu
Bahcesehir University

Abstract

In this study, we analyze the relationship between geopolitical risks and growth using annual panel data from 18 emerging countries for the period from 1986 to 2016. For a robustness check, we use panel data with 5-year intervals. The news-based indices of Caldara and Iacoviello (2018) were used as a proxy for geopolitical risks. Our results show that the effect of geopolitical risks on growth rates is negative and significant. A 10 point increase in the geopolitical risk index causes a 0.2–0.4% decline in the GDP growth rate.

Citation: Barış Soybilgen and Huseyin Kaya and Dincer Dedeoglu, (2019) "Evaluating the effect of geopolitical risks on the growth rates of emerging countries", *Economics Bulletin*, Volume 39, Issue 1, pages 717-725
Contact: Barış Soybilgen - baris.soybilgen@bilgi.edu.tr, Huseyin Kaya - huseyin.kaya@medeniyet.edu.tr, Dincer Dedeoglu - dincer.dedeoglu@eas.bau.edu.tr.
Submitted: October 01, 2018. **Published:** March 28, 2019.

Economics Bulletin

Submission Number: EB-18-00785

Evaluating the effect of geopolitical risks on the growth rates of emerging countries

Barış Soybilgen
Asst. Prof.

Huseyin Kaya
Assoc. Prof.

Dincer Dedeoglu
Asst. Prof.

Abstract

In this study, we analyze the relationship between geopolitical risks and growth using annual panel data from 18 emerging countries for the period from 1986 to 2016. For a robustness check, we used panel data with 5-year intervals. The news-based indices of Caldara and Iacoviello were used as a proxy for geopolitical risks. Our results show that the effect of geopolitical risk on growth rates is negative and significant. A 10% increase in the geopolitical risk index causes a 2–4% decline in the GDP growth rate. Key Words: Geopolitical Risk; Growth, Emerging Markets, Panel Data.

Submitted: October 01, 2018.

1. Introduction

Since the early 90s, researchers exhaustively study the determinants of countries' growth rates using cross-sectional and panel data sets (Barro, 1991; Islam, 1995; Sala-I-Martin, 1997). The logic behind these studies is based on conditional convergence: countries with the same characteristics and initial endowments should have similar growth rates. Studies show that variables related to macro-economics, trade openness, regional characteristics, and political structure affect the growth rate of countries. In this study, we show that geopolitical risk is also an important determinant for economic growth.

Geopolitical uncertainties and instabilities are ranked among the key determinants of economic decision-making processes (ECB, 2017; IMF, 2017), so it can be expected that geopolitical uncertainties and adverse geopolitical events will significantly affect the growth rate of countries. There are several studies in the literature aimed at analyzing effects of wars, terrorism incidents, revolutions, coups, and government changes on the growth rate of countries. For example, Alesina et. al. (1996) analyze the effect of government changes as a proxy of political instability on economic growth for 113 countries between 1950-1982 and clearly show that political stability reduces growth especially when the government changed as a result of a coup. In another study, Gaibulloe & Sandler (2008) use a panel data set of 18 European countries to assess the impact of domestic and transnational terrorism on economic growth for the period of 1971-2004 and show that both types of terrorism, especially transnational one, reduced income per capita growth in Western Europe during the investigated period. Similarly, Murdoch & Sandler (2002) analyze the impact of civil wars on economic growth using a sample of Africa, Asia and Latin American countries covering the period of 1960-1995 and their results clearly indicate that civil wars negatively affect per capita income growth at home and in neighbors. Finally in a comprehensive cross-section study which tests the effect of 62 variables on economic growth, Sala-I-Martin (1997) show that wars, revolutions, and coups negatively affect the growth rate of countries. In all of these studies and other similar studies in the literature, researchers analyze the effects of realized adverse political or geopolitical events on economic growth, but this only constitutes one part of political or geopolitical instability. In many cases, countries will threaten each other or terrorist organizations will vow to strike a country, but there will not be any incident after these threats. Even though these threats are expected to have an effect on economic growth, there is no study that analyzes the effect of both geopolitical adverse effects and geopolitical threats on the growth rate of countries probably due to lack of a robust measure that also includes geopolitical threats. Our aim is to analyze the effect of geopolitical risk covering both threats and acts on economic growth.

In this study, we use a new index that aims to analyze geopolitical adverse events and threats called the geopolitical risk index (GPR) index to conduct our analysis. Caldara & Iacoviello (2018) and Caldara, Iacoviello, & Markiewitz (2018) develop the GPR index for both the USA and 18 emerging countries. By following the methodology of Saiz & Simonsohn (2013) and Baker, Bloom, & Davis (2016), Caldara & Iacoviello (2018) construct the GPR index by counting keywords related to geopolitical risks in news outlets. Caldara & Iacoviello (2018) define geopolitical risk as the risk associated with wars, terrorist acts, and the tension between states that affect the regular course of international relations. Based on this definition, they count the occurrence of words that are grouped into six categories: geopolitical threats, nuclear threats, war threats, terrorist threats, war acts, and terrorist acts. Even though the GPR index covers both realized adverse geopolitical events and threats, Caldara & Iacoviello (2018) show that the GPR index is mostly driven by threats perceived by the public.

In this study, we aim to estimate the effect of geopolitical risks on economic growth of emerging countries by utilizing the GPR index. We investigate the relationship between

economic growth and the GPR index by using an annual panel data set that includes 18 emerging economies and covers the period from 1986 to 2016. As a robustness check, we also conduct another analysis by utilizing a panel data set with 5-year intervals. After controlling for other economic factors such as investment, human capital, government expenditure, and trade openness, our results consistently show that a 10-point increase in the geopolitical risk index causes a 0.2–0.4% decline in the real GDP growth rate.

The remainder of the paper is organized as follows. Section 2 describes the data set and the methodology. Section 3 presents the empirical results and Section 4 provides the conclusion.

2. Methodology and Data

In order to shed light on whether geopolitical risks affect the economic growth rate of countries, we carried out a panel regression relying on the recent growth literature. We employ the following model:

$$\text{Growth}_{it} = \alpha \text{GPR}_{it} + \beta X_{it} + f_i + \lambda_t + \varepsilon_{it}, \quad (1)$$

where the dependent variable is the real GDP growth rate[1] as in Jude (2010); the GPR is the new index of geopolitical risk, which is measured based on the frequency of occurrence of words related to geopolitical tension for 18 emerging economies[2]; X_{it} includes all the control variables; f_i is country-specific fixed effects, λ_t is time-fixed effects, and ε_{it} is the error term.

There are many control variables used in the empirical growth literature. Analyzing the current and previous literature such as Alesina et al. (1996), Barro (2003), Batten & Vo (2009), Teixeira & Queiros (2016), we choose five control variables to be included in our regression: lag of real GDP growth (Growth(-1)), human capital (HC), the investment expenditure ratio (INV), the government expenditure ratio (GOV), and trade openness (TRADE). For the level of human capital, we use human capital index which is a measure based on the average year of schooling and rate of return to education. For investment expenditure, we use total investment expenditure as a percentage of GDP. For trade openness, we use the trade share of GDP (export plus import over GDP). For government expenditure, we use government expenditure as a percentage of GDP.

Table 1: Summary Statistics

VARIABLES	MEAN	STD. DEV.	MIN	MAX
GROWTH	3.97	4.98	-22.93	18.29
GPR	101.71	30.19	35.92	260.77
HC	2.41	0.49	1.38	3.69
INV	23.55	6.51	11.96	45.51
TRADE	61.33	36.93	12.35	220.41
GOV	14.91	5.45	2.98	35.22
LN(GPC)	8.59	0.96	6.10	10.33

For the robustness check, we also estimate the equation (1) using the nonoverlapping 5-year averages of the variables such as Barro (2003), Carcovic & Levine (2005), Dreher (2006). In this setup, following the literature, we replaced lagged growth rates with the initial income,

1 Using real per capita income growth rates instead of real GDP growth rates don't change results. Results with real per capita income growth rates are available upon request.

2 Turkey, Mexico, Korea, Russia, India, Brazil, China, Indonesia, Saudi Arabia, South Africa, Argentina, Colombia, Venezuela, Thailand, Ukraine, Israel, Malaysia, and the Philippines.

which is proxied by the log GDP per capita in the first year of these 5-year intervals (LN(GPC(-5))). Moreover, following Barro (2003), we use the initial level of the human capital index, the index value in the first year of 5-year intervals, instead of the 5-year averages.

The GPR index is obtained from Caldara et al. (2018). The human capital index is obtained from Penn World Table (Feenstra et. al., 2015). All the other data is retrieved from the World Bank. The data set covers the period from 1986 to 2016. The summary statistics of the variables are given in Table 1.

Figures 1 to 3 present the GPR indices for each country by geographical areas. Figure 1 shows the indices for countries in the Middle East, Africa, and Europe. A spike can be clearly seen around 1990 and 1991 in Eastern Europe and Middle Eastern countries, which is attributed to the Iraq War and the dissolution of the Soviet Union. The Syrian Civil War affected both Turkey and Saudi Arabia from 2010. There was another important spike in 2014 for Ukraine and Russia owing to the Ukrainian revolution.

Figure 1: GPR Index of Middle East, Africa and Eastern Europe

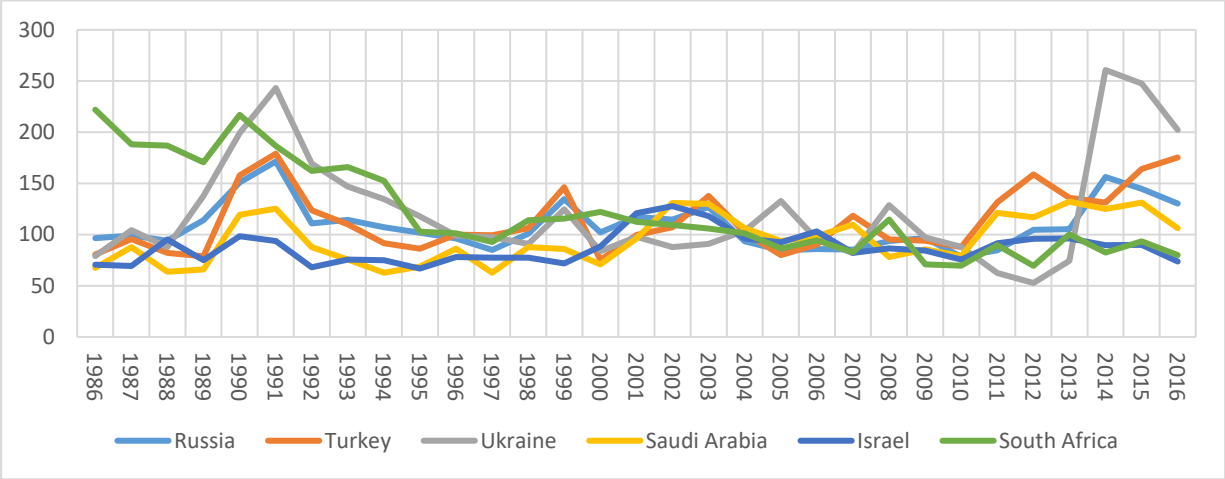


Figure 2 shows the GPR indices for countries in the Far East and Central Asia. The events in the 1990s indicated above seem to affect also these countries. Another spike can be seen in this region after the 1997 Asian financial crisis. There are also some individual country spikes in the graph, such as the sharp increase in Thailand's GPR index after the 2006 Coup.

Figure 2: GPR Index of Far East and Central Asia

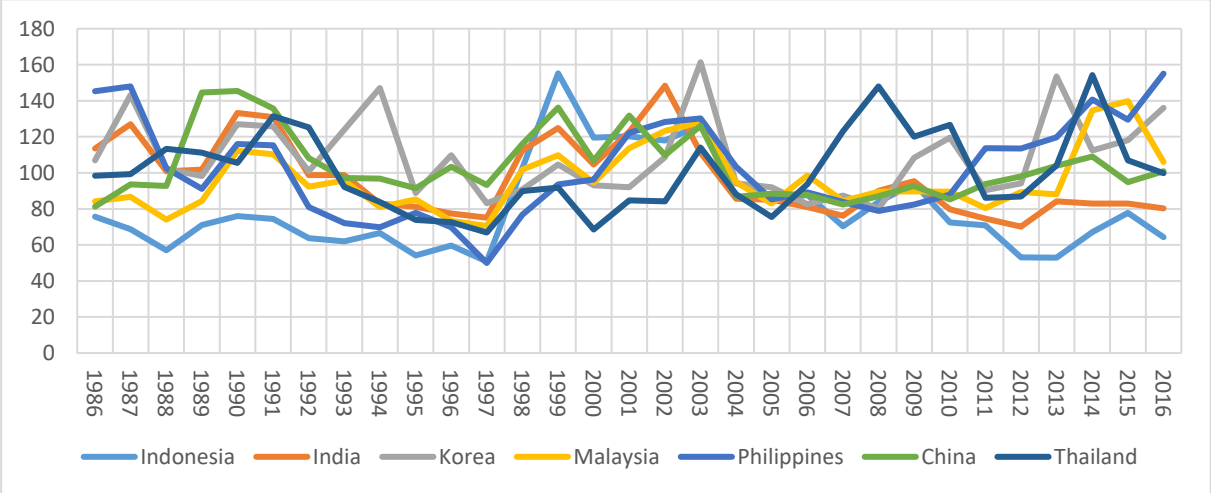


Figure 3 presents the GPR indices of South and Central American countries. The most significant spike occurred after 2001 in this region as a result of financial and political instability throughout the region.

Finally, we present the unconditional relationship between growth and the GPR index. Figure 4 shows 5-year averages of the annual growth rate and the GPR index for the 18 countries over the period of 1986-2016. From the figure, we see that the growth rate and the GPR index are inversely related with a correlation of -0.27.

Figure 3: GPR Index of South and Central America

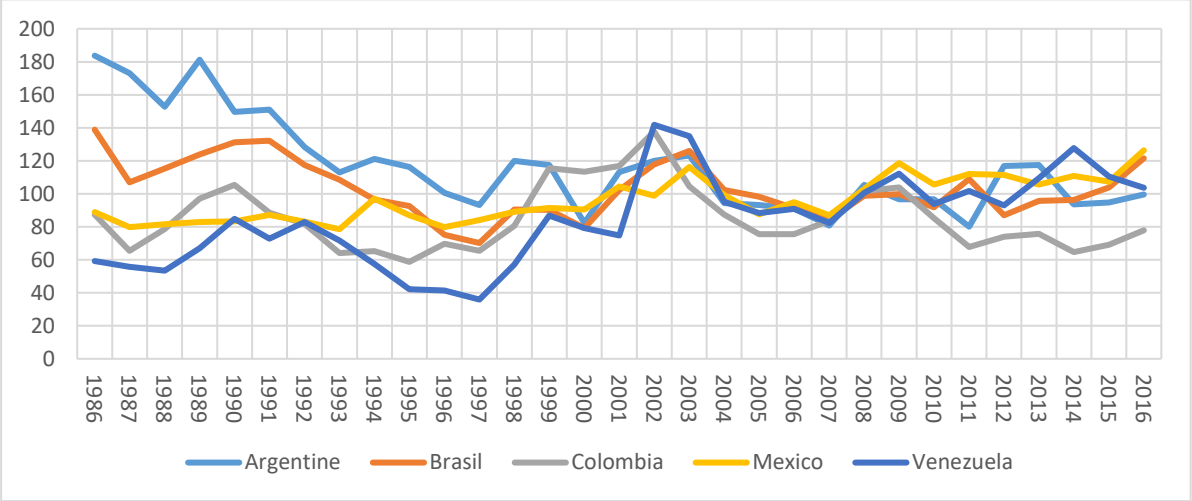
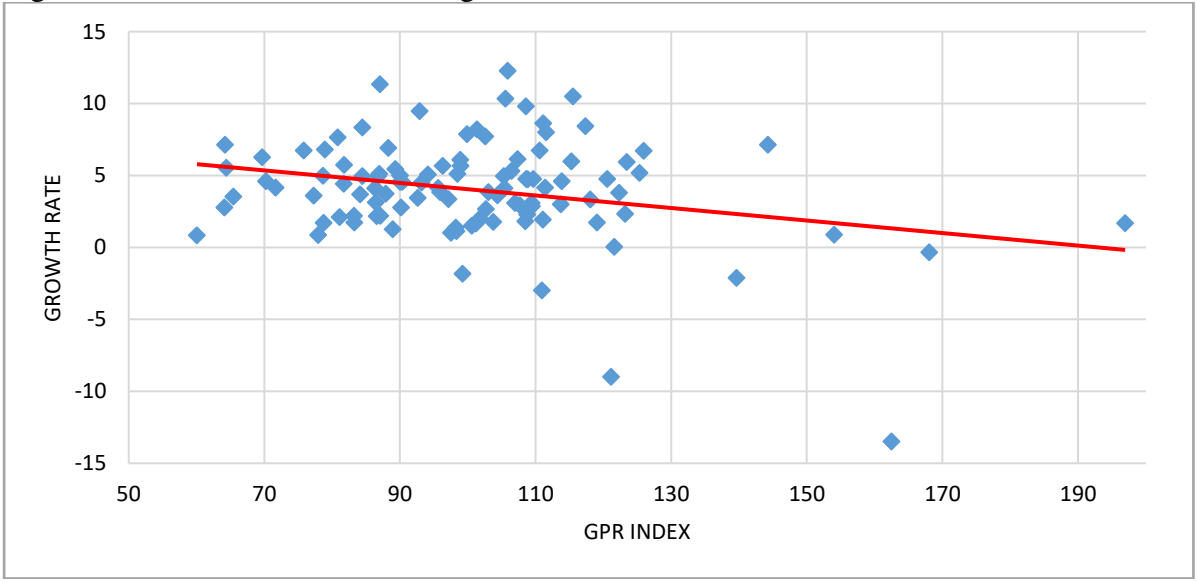


Figure 4: GPR index and real GDP growth rate



3. Estimation Results

Table 2 shows the estimation results of five different models. The model 1 is the simplest one in which we regress the growth rate on only the lagged growth rate and the GPR index. Then in other models, we expand the regression by gradually including the investment ratio, the human capital index, trade openness, and the government expenditure ratio.

The results of Model 1, which is reported in the second column of Table 2, show that both the lagged growth rate and the GPR index are significant at 1% level. The coefficient of the lagged growth rate indicates the existence of persistency in the growth rate. In line with the

expectations, the sign of the coefficient of the GPR index is found to be negative. The results suggest that a one standard deviation increase in the GPR index (30.2) reduces the real GDP growth rate by 0.83 percentage points. When we add the human capital index to the model, the coefficient of the GPR index slightly increases. While the human capital index has a positive but insignificant coefficient, the GPR index remains significant at 1% level. The results of Model 3 show that the investment ratio is an important determinant of growth. It has a positive and significant effect on growth. A one standard deviation increase in the investment ratio (6.5) increases the real GDP growth rate by 0.75 percentage points. Finally, the results of Model 4 and Model 5 show that trade openness and government expenditure are not significant determinants of economic growth. In both cases, the coefficient of the GPR index is still significant at 1% level.

Table 2: Fixed effects panel estimations

	Model 1 Growth	Model 2 Growth	Model 3 Growth	Model 4 Growth	Model 5 Growth
Growth (-1)	0.302***	0.297***	0.268***	0.267***	0.272***
	(0.041)	(0.043)	(0.044)	(0.044)	(0.044)
GPR	-0.027***	-0.032***	-0.032***	-0.033***	-0.036***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
HCI		1.139	1.586	1.950	1.398
		(2.930)	(2.922)	(2.936)	(2.938)
INV			0.116**	0.113**	0.104**
			(0.050)	(0.050)	(0.050)
TRADE				-0.017	-0.019
				(0.014)	(0.014)
GOV					-0.0710
					(0.077)
N	548	513	513	513	512
R^2	0.458	0.456	0.463	0.464	0.469

Note: Growth, GPR, INV, HCI, TRADE, and GOV denote the real growth rate, the geopolitical risk index, the investment to GDP ratio, the human capital index, sum of exports and imports as a percentage of GDP, and the final government expenditure as a percentage of GDP. Heteroskedasticity and autocorrelation consistent standard errors are given in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

When we consider the results of all models, we see that the lagged growth rate, the GPR index, and the investment ratio are the most relevant variables for the growth rate of countries. While coefficients of the lagged growth rate and the investment ratio tend to decline when new explanatory variables are added to the regression, the coefficient of the GPR index tends to increase. The results of the most generous model indicate that a one standard deviation increase in the GPR index reduces the real GDP growth rate by one percentage points. These findings imply that geopolitical risk has a very harmful effect on the economic performance of countries.

Annual growth rates can lead to volatile estimation results, so another approach used in the literature is applying non-overlapping 5-year averages to obtain more robust estimation results. Using non-overlapping 5-year averages, we estimate the same models and report the estimation results in Table 3. In this setup, we replace the lagged growth rate with the initial income, which is proxied by the log GDP per capita in the first year of these 5-year intervals. More precisely, the log GDP per capita in 1986 is used for the 1986-1990 period; the log GDP per capita in

1991 is used for the 1991-1995 period and so on. Similar to the initial level of income, we use the initial level of the human capital index following Barro (2003).

Table 3: Fixed effects panel estimations (5 Year Averages)

	Model 1 Growth	Model 2 Growth	Model 3 Growth	Model 4 Growth	Model 5 Growth
LN(GPC(-5))	-6.250***	-6.287***	-7.120***	-7.169***	-7.170***
	(1.089)	(1.095)	(1.030)	(1.063)	(1.070)
GPR	-0.042***	-0.043***	-0.040***	-0.039***	-0.039***
	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)
HCI		1.404	2.768	2.666	2.678
		(3.720)	(3.455)	(3.494)	(3.519)
INV			0.273***	0.275***	0.275***
			(0.069)	(0.070)	(0.071)
TRADE				0.004	0.004
				(0.020)	(0.020)
GOV					0.005
					(0.110)
N	106	106	106	106	106
R^2	0.677	0.678	0.732	0.732	0.732

Note: Growth, LN(GPC(-5)), GPR, INV, HCI, TRADE, and GOV denote the real growth rate, the log GDP per capita in the first year of 5-year intervals, the geopolitical risk index, the investment to GDP ratio, the human capital index, sum of exports and imports as a percentage of GDP, and the final government expenditure as a percentage of GDP. Heteroskedasticity and autocorrelation consistent standard errors are given in parentheses standard errors are given in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The second column of Table 3 reports the estimation results of Model 1. In line with the neoclassical growth theory, the coefficient of the initial level of income is negative and significant at 1% level. Countries with the low GDP per capita have higher growth rates than their richer counterparts. The coefficient of the GPR index is found to be negative and significant at 1% level. The results indicate that a one standard deviation increase in the GPR index (21.5) reduces the real GDP growth rate by 0.9 percentage points. When we include the initial level of the human capital index as an independent variable in Model 2, we find that its coefficient is positive but insignificant. On the other hand, the GPR index remains significant at 5% level with a coefficient of -0.043. The results of Model 3 show that investment is highly significant and has a positive effect on the growth rate. A one standard deviation increase in the investment ratio (6.14) increases the real GDP growth rate by 1.68 percentage points. Adding trade openness and government expenditure in Models 4 and 5 doesn't change the results. In all models, the GPR index has a negative and significant coefficient at 1% level. On average, a one standard deviation increase in the GPR index causes a 0.84 percentage points decline in the growth rate.

As a result, we find that the estimation results of non-overlapping 5-year averages are in line with the estimation results of the annual data. All the results conclude that geopolitical risk is an important determinant of the growth rate of countries and a rise in the perceived geopolitical risk significantly reduces the growth rate.

4. Conclusion

In this study, the relationship between the GPR index and the economic growth rate is analyzed using an annual panel data set consisted of 18 emerging countries between 1986 and 2016. As control variables, we use investment expenditure as a percentage of GDP, the human capital index, trade openness (exports plus imports as a share of GDP), and final government expenditure as a percentage of GDP. As a robustness check, we use a panel data set with 5-year intervals covering the same period and countries. In the second case, we use the log GDP per capita instead of the first lag of real GDP growth.

The results show that the effect of the GPR index on the growth rate is negative and significant. A 10 points increase in the GPR index causes a 0.2–0.4% decline in the real GDP growth rate. Our results also show that investment expenditure has a positive and significant effect on the growth rate whereas effects of government expenditure, the human capital index, and trade openness are insignificant.

References

Alesina, A., Özler, S., Roubini, N., & Swagel, P. (1996). Political instability and economic growth. *Journal of Economic growth, 1*(2), 189-211.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics, 131*(4), 1593–1636.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics, 106*(2), 407-443.

Barro, R. J. (2003). Determinants of economic growth in a panel of countries. *Annals of Economics and Finance,* 4, 231-274.

Batten, J. A., & Vo, X. V. (2009). An analysis of the relationship between foreign direct investment and economic growth. *Applied Economics, 41*(13), 1621-1641.

Caldara, D., & Iacoviello, M. M. (2018). Measuring geopolitical risk. International Finance Discussion Papers No. 1222, Board of Governors of the Federal Reserve System.

Caldara, D., Iacoviello, M. M., & Markiewitz, A. (2018). Country-specific geopolitical risk. Mimeo.

Carkovic, M. & Levine, R. (2005). Does foreign direct investment accelerate economic growth?, in T. Moran, E. Graham and M. Blomström (eds), *Does Foreign Direct Investment Promote Development?* Institute for International Economics and Center for Global Development, Washington, DC, 195– 220.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics, 38*(10), 1091-1110.

ECB. (2017). Economic Bulletin. Retrieved from https://www.ecb.europa.eu/pub/pdf/ecbu/eb201704.en.pdf

Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World table. *American Economic Review, 105*(10), 3150–3182.

Gaibulloev, K., & Sandler, T. (2008). Growth consequences of terrorism in Western Europe. *Kyklos, 61*(3), 411-424.

IMF. (2017). World Economic Outlook. Washington, DC. Retrieved from

https://www.imf.org/en/Publications/WEO/Issues/2017/09/19/world-economic-outlook-october-2017

Islam, N. (1995). Growth empirics: a panel data approach. *The Quarterly Journal of Economics, 110*(4), 1127-1170.

Jude, E. C. (2010). Financial development and growth: A panel smooth regression approach. *Journal of Economic Development, 35*(1), 15-33.

Murdoch, J., & Sandler, T. (2002). Civil wars and economic growth: A regional comparison. *Defence and Peace Economics, 13*(6), 451-464.

Saiz, A., & Simonsohn, U. (2013). Proxying for unobservable variables with internet document-frequency. *Journal of the European Economic Association, 11*(1), 137–165.

Sala-I-Martin, X. (1997). I just ran two million regressions. *American Economic Review, 87*(2), 178-83.

Teixeira, A. A., & Queirós, A. S. (2016). Economic growth, human capital and structural change: A dynamic panel data analysis. *Research Policy, 45*(8), 1636-1648.