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The impact of economic uncertainty and geopolitical risks on bank credit

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ABSTRACT

This paper compares the effects of economic uncertainty and geopolitical risks on bank credit growth. Using a sample of 2439 banks from 19 countries for the period of 2010–2019, our findings indicate that economic uncertainty causes a significant decrease in overall bank credit growth while no such significant overall effect of geopolitical risks is documented. Further analysis on loan types shows that the highest negative impact of economic uncertainty is observed on corporate loans. Geopolitical risk, however, dampens consumer and mortgage loans. Additional analyses on bank heterogeneity reveal that the credit behavior of foreign and publicly listed banks are more immune to such risks.

1. Introduction

Domestic credit plays a vital role in the performance of economies; and the credit volume in the financial sector is a keystone for promoting economic growth. Public and private investments are mainly financed with bank credit; and they are important components of GDP. Likewise, household consumption is primarily financed with bank credit. Therefore, it is crucial to explore the possible underlying sources that would potentially induce changes in the growth of bank credit in economies. Moreover, concerns regarding the increases in economic uncertainty have increased globally since the 2008 global financial crisis; and it is considered to be the main reason for lower economic performance in many countries (Ahir et al., 2018). Moreover, growing adversities in terms of wars, conflicts, terrorist attacks, and nuclear threats have raised the need for understanding the geopolitical risks of countries (Kannadhasan & Das, 2020; Gupta et al., 2019). Regulatory bodies and governments closely follow the dynamics of both economic uncertainty and geopolitical risks as they capture different risk aspects and require different policy approaches. In this light, this paper aims to examine and compare the effects of economic uncertainty and geopolitical risks on bank credit growth.

As proxies of economic uncertainty and geopolitical risks, this paper focuses on the World Uncertainty Index (WUI) and the Geopolitical Risk Index (GPR), respectively. WUI is introduced by Ahir et al. (2018), following the spirit of the Economic Policy Uncertainty (EPU) Index of Baker et al. (2016). WUI is calculated by counting the frequencies of the word “uncertainty” in the Economist Intelligence Unit (EIU) country reports. The WUI index captures uncertainty related to economic and political developments, regarding both short-term and long-term concerns (Ahir et al., 2018). Since their introduction, EPU and WUI have been extensively used as proxies for economic uncertainty in the literature. Caldara and Iacoviello (2018) construct the Geopolitical Risk

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Index (GPR) by counting the frequency of articles in leading newspapers that discuss geopolitical tensions. Geopolitical Risk Index is defined as “risk associated with wars, terrorist acts, and tensions between states that affect the normal and peaceful course of international relations” (Caldara & Iacoviello, 2018, p.2). GPR Index and WUI capture different aspects of uncertainty; and there are fundamental differences in terms of the estimation and nature of the indices (Kannadhasan & Das, 2020). While the GPR index captures events that are more likely to be exogenous to the business and financial cycles and includes risk components related to the war, terror, and war-like tensions; WUI instead depicts uncertainty concerning the real economy and quantifies uncertainty associated with economic and political development.

The previous literature examines the impact of (mainly) economic uncertainty and geopolitical risks on bank lending separately. Regarding the influence of economic uncertainty, Bilgin et al. (2020) show that economic uncertainty (WUI) causes a decline in the credit growth of conventional banks but does not affect Islamic banks’ credit growth. Bordo et al. (2016), Chi and Li (2017), and Hu and Gong (2019) use EPU as a proxy for economic uncertainty and document that it harms credit growth of banks. The negative relationship is also confirmed by Caglayan and Xu (2019) and Gozgor et al. (2019) on the macro-level. There is relatively scant empirical evidence with regard to the influence of geopolitical risks on bank lending. Zhou et al. (2020) show that geopolitical risks lower domestic credit to the private sector. By using macro-level data, Zhou et al. (2020) document that a rise in geopolitical risks lowers the level of domestic credit to the private sector in the emerging markets. Unlike those studies that focus on their separate influences, our paper compares the impacts of WUI and GPR on bank lending behavior and sheds light on this under-researched area. There are some studies which compare the effects of WUI and GPR on stock returns. For instance, Kannadhasan and Das (2020) compare the effect of EPU and GPR on the Asian stock markets and find that while global EPU harms stock returns in all quantiles, GPR is negatively associated with stock returns only in lower quantiles. Das et al. (2019) argue that the effect of EPU on stock returns of emerging economies is mostly profound and significant compared to the GPR. Hoque et al. (2019) find that GPR Index has indirect impacts on aggregated stock market prices while global EPU is found to be more pervasive at both aggregated and sectoral levels.

While both WUI and GPR would be expected to assert a negative effect on credit growth, the underlying mechanisms and the magnitudes are likely to differ. Considering the mechanisms regarding the demand side, economic policies and regulations are adjusted by governments in time and through such policies they have major and broad influences on the decisions of economic actors (McGrattan & Prescott, 2005). Households and corporations can make better and more informed decisions if this process is smooth, transparent, and predictable (Ashraf & Shen, 2019). On the contrary, if the decision process is less transparent and unpredictable, investment activities and credit needs of corporations would be severely affected and either be canceled or postponed because the option value of waiting for better information increases during such uncertain periods (Dixit & Pindyck, 1994). Corporations will be reluctant to apply for credit and invest during such unpredictable and uncertain periods. Likewise, economic uncertainty is likely to affect households’ demand for credit. The uncertainty increases the default risk of corporations, which, in turn, leads to increases in unemployment rates, causing dissaving of households. This makes households more reluctant to apply for credit for their consumption or investment needs. With regard to the supply side mechanisms, banks become less willing to finance the investments of corporations and households as default risks of borrowers rise (Ashraf & Shen, 2019); and future prospects of investment projects become less predictable under economic uncertainty. Rising economic uncertainty will lead to an additional risk premium for the loan prices; and banks will, therefore, charge higher interest rates for loans which will lead to a reduction in credit levels.

Geopolitical risks can also influence the growth of bank credits via several channels. War threats and acts, terrorist attacks, military tensions, and conflicts can lead to the cancellation or postponement of investments of domestic firms. Those shocks are likely to increase the fear of consumers and dampen consumer confidence. This will lower the demand for durable goods, real estate, automobiles and other purchases, which are mainly financed with consumer loans and mortgages. The supply of domestic credits will be also hit by geopolitical risks due to decreases in capital inflows (Zhou et al., 2020).

This paper contributes to the literature in the following ways. First, to our knowledge, this is the first paper examining and comparing the impact of WUI and GPR on bank credit growth. To investigate this, we use a sample of 2439 banks from 19 countries for the years 2010–2019 and employ panel data fixed effects estimation techniques and further control for potential endogeneity issues using two-step difference generalized methods of moments (GMM) estimators. Our findings indicate that economic uncertainty has a negative effect on credit growth while no effect is observed for the case of geopolitical risks. We contribute by showing that while banks’ credit behavior is more responsive to economic uncertainty, it is resilient to geopolitical risks and economy-related uncertainty is more relevant for banks to adjust their overall credit behavior. Second, we provide deeper insights by considering the impacts of WUI and GPR on the growth of the different loan types such as corporate, consumer and mortgage loans. We contribute by showing that while the credit needs of corporations through corporate loans would be severely affected under economic uncertainty, geopolitical risks generate more fear in consumers; and such risks severely decrease the growth of consumer and mortgage loans. We offer various policy implications to regulatory bodies and governments in terms of the differential impact of economic uncertainty and geopolitical risks on these different loan types. Third, we explore bank heterogeneity and find that the credit behavior of (1) foreign banks, (2) publicly listed banks, and (3) banks with foreign subsidiaries are immune to economic uncertainties and geopolitical risks. We contribute by showing that, under economic uncertainty and geopolitical risks, banks with different ownership structures behave differently in terms of their lending behaviors.

The paper is structured as follows. Section 2 explains the methodology and data. Section 3 presents the findings. Section 4 discusses the findings and implications; and the last section concludes the paper.

Table 1
The list of countries, number of banks, WUI and GPR averages.

Countries	Number of banks	WUI	GPR
Argentina	12	0.40	96.93
Brazil	141	0.42	105.55
China	197	0.13	110.73
Colombia	60	0.23	70.33
Hong Kong	60	0.10	98.87
India	237	0.13	82.74
Indonesia	128	0.13	61.90
Israel	11	0.16	84.02
Malaysia	85	0.09	90.88
Mexico	103	0.31	119.46
Philippines	60	0.13	109.49
Russia	915	0.24	112.09
Saudi Arabia	14	0.13	105.64
South Africa	44	0.70	78.14
South Korea	131	0.20	120.38
Thailand	47	0.19	95.47
Turkey	58	0.37	132.00
Ukraine	121	0.27	149.28
Venezuela	15	0.26	110.05
Total	2439	0.24	101.79

Note: The table lists the list of countries and number of banks based on Fitch Connect database along with WUI and GPR averages for each country. GPR stands for Geopolitical Risk Index of [Caldara and Iacoviello \(2018\)](#) and WUI represents World Uncertainty Index of [Ahir et al. \(2018\)](#).

2. Data and methodology

2.1. Methodology

To compare the influences of WUI and GPR on bank credit growth, we use the following models:

$$CreditGrowth_{it} = \alpha + \beta * WUI_{jt} + \gamma * X_{it} + \delta * Y_{jt} + \omega_i + \theta_t + \varepsilon_{ijt} \tag{1}$$

$$CreditGrowth_{it} = \alpha + \beta * GPR_{jt} + \gamma * X_{it} + \delta * Y_{jt} + \omega_i + \theta_t + \varepsilon_{ijt} \tag{2}$$

where i, j and t stand for bank, country, and time, respectively. Our main estimations are conducted using bank-fixed effects (ω_i) to control for heterogeneity between banks and time-fixed effects (θ_t) to account for differences through time and business cycles. ε_{ijt} stand for the unobserved error terms. X and Y indicate bank and country controls, respectively.

To account for the persistence of the growth of bank credit and endogeneity concerns, we also estimate the regressions using dynamic panel data estimation techniques with two-step difference generalized methods of moments (GMM) estimators and robust standard errors ([Blundell & Bond, 1998](#); [Baltagi, 2008](#)). We consider the lagged dependent variable and the bank-level controls as predetermined and instrument them GMM-style. In order to limit the number of instruments, following [Bouvatier and Lepetit \(2012\)](#) and [Bouvatier et al. \(2014\)](#), we restrict the lag range used in generating them at four. Following the extant literature, the WUI, GPR and country-controls are taken as strictly exogenous and instrumented by themselves ([Arellano & Bond, 1991](#); [Roodman, 2009](#)). Orthogonal transformations of instruments are used to account for possible cross-sectional fixed effects. We use the following dynamic models in which i, j and t represent bank, country and time indices, respectively:

$$CreditGrowth_{it} = \alpha CreditGrowth_{it-1} + \beta WUI_{jt} + \gamma * X_{it} + \delta * Y_{jt} + \omega_j + \theta_t + \varepsilon_{ijt} \tag{3}$$

$$CreditGrowth_{it} = \alpha CreditGrowth_{it-1} + \beta GPR_{jt} + \gamma * X_{it} + \delta * Y_{jt} + \omega_j + \theta_t + \varepsilon_{ijt} \tag{4}$$

Country and time fixed effects are included to consider the cross-country heterogeneity and business cycles. Finally, as additional analysis, we explore the heterogeneity between banks and include interaction terms in the model. We aim to test whether banks which are (1) foreign, (2) listed, and (3) with foreign subsidiaries behave differently under economic and geopolitical uncertainties; and we use the following models:

$$CreditGrowth_{it} = \alpha + \beta * WUI_{jt} + \varnothing * WUI_{jt} * Z_{it} + \partial * Z_{it} + \gamma * X_{it} + \delta * Y_{jt} + \omega_i + \theta_t + \varepsilon_{ijt} \tag{5}$$

$$CreditGrowth_{it} = \alpha + \beta * GPR_{jt} + \varnothing * GPR_{jt} * Z_{it} + \partial * Z_{it} + \gamma * X_{it} + \delta * Y_{jt} + \omega_i + \theta_t + \varepsilon_{ijt} \tag{6}$$

where Z indicates the dummies for the foreign and listed banks, and banks with foreign subsidiaries, which will be explained in detail in the next section.

Table 2
Variable descriptions.

Variables	Descriptions	Data source
<i>Dependent variables</i>		
Credit Growth	Annual growth of gross loans	Fitch Connect
Consumer Loan Growth	Annual growth of consumer loans	Fitch Connect
Corporate Loan Growth	Annual growth of corporate loans	Fitch Connect
Mortgage Loan Growth	Annual growth of mortgage loans	Fitch Connect
<i>Bank-specific variables</i>		
WUI	Average quarterly country-specific World Uncertainty index (WUI)	Ahir et al. (2018) (http://www.policyuncertainty.com/) Ahir et al. (2018)
WUI_v2	The weighted average of the quarterly country-specific WUI with weights 1 and 2 for the first and last 6 months of a year.	Ahir et al. (2018)
WUI_v3	The weighted average of the quarterly country-specific WUI with weights from 1 to 4 to each subsequent quarter in a year.	Ahir et al. (2018)
GPR	Average monthly country-specific Geopolitical Risk Index (GPR) with weights of 1 (2) for the first (last) 6 months of a year.	Caldara and Iacoviello (2018)
GPR_v2	The weighted average of the monthly country-specific GPR with weights 1 and 2 for the first and last 6 months of a year.	Caldara and Iacoviello (2018)
GPR_v3	The weighted average of the monthly country-specific GPR with weights from one to four to each subsequent quarter in a year.	Caldara and Iacoviello (2018)
SIZE	The natural logarithm of total assets	Fitch Connect
EQUITY TO ASSETS	Equity/ Total assets	Fitch Connect
LIQUIDITY	Liquid assets/ Total assets	Fitch Connect
ROA	Return on assets	Fitch Connect
LLR	Loan loss reserves/ Gross loans	Fitch Connect
LISTED	A dummy variable that equals 1 for publicly listed banks; 0 otherwise	Fitch Connect
FOREIGN	A dummy variable that equals 1 for banks whose ultimate owner is foreign; 0 otherwise	Fitch Connect
FOREIGN SUB	A dummy variable that equals 1 for banks that have foreign-owned subsidiaries (i.e. subsidiaries based in a foreign country); 0 otherwise	Fitch Connect
<i>Country-controls</i>		
GDP PC GROWTH	GDP per capita growth	Fitch Connect
INFLATION	The annual growth rate of the GDP implicit deflator	World Bank World Development Indicators
TRADE OPENNESS	The sum of exports and imports of goods and services measured as a share of GDP	World Bank World Development Indicators
OIL RENTS	The difference between the value of crude oil production at world prices and total costs of production/ GDP	World Bank World Development Indicators

Note: The table presents the list of variables used in the study with their descriptions and data sources.

2.2. Data and variables

The bank-level variables are collected from the Fitch Connect database; and our sample includes 19 countries for which GPR Index is available. Initially, we consider all available banks from these countries in the database, which makes 4,208 banks. Then, we perform filtration and only consider banks with loans and financial data available for at least three consecutive years (Beck et al., 2013), leaving us with 2,439 banks for the years 2010–2019. The list of countries and the respective number of banks are provided in Table 1.

Table 2 provides a description of the variables and sources of data. Our dependent variable is bank credit growth (*Credit Growth*), measured as the annual growth of gross loans. We further analyze the impacts of WUI and GPR on the growth of the three types: consumer, corporate and mortgage loans. We use *Consumer Loan Growth*, *Corporate Loan Growth* and *Mortgage Loan Growth* as dependent variables. Table 3 displays the descriptive statistics and we observe that the average credit growth in our sample is 19.16%.

Economic uncertainty is proxied by the World Uncertainty Index (*WUI*), which is constructed by Ahir et al. (2018). It is calculated by counting the frequencies of the word “uncertainty” in the Economist Intelligence Unit (EIU) country reports. To construct WUI, Ahir et al. (2018) scaled the raw counts of the word “uncertainty” by the total number of words in the reports¹. The index captures uncertainty related to economic and political developments, regarding both short-term and long-term concerns (Ahir et al., 2018) and measures the uncertainty concerning the real economy.

WUI index is available on a quarterly basis; and to construct our main yearly *WUI* measure, we take the simple average of the four

¹ A detailed presentation of WUI can be reached from: <https://worlduncertaintyindex.com/>.

Table 3
Descriptive statistics.

Variables	N	Mean	Min	Max	p50	SD
Credit Growth (%)	17,828	19.16	-74.43	302.66	11.69	47.74
Consumer Loan Growth (%)	16,302	12.66	-75.03	299.85	7.17	48.73
Corporate Loan Growth (%)	11,131	11.53	-90.17	390.46	4.34	62.79
Mortgage Loan Growth (%)	3973	17.13	-87.00	518.28	5.54	73.54
WUI	209	0.24	0.00	1.34	0.19	0.21
WUI_v2	209	0.24	0.00	1.43	0.19	0.21
WUI_v3	209	0.24	0.00	1.47	0.19	0.22
GPR	209	101.79	35.75	261.26	95.77	33.42
GPR_v2	209	101.39	35.53	260.53	94.17	33.96
GPR_v3	209	102.15	33.04	271.09	98.55	34.89
SIZE	18,958	6.56	1.69	12.90	6.28	2.67
EQUITY TO ASSETS (%)	18,997	19.96	1.96	93.59	13.23	18.43
LIQUIDITY (%)	19,009	24.27	0.45	86.20	18.97	18.88
ROA (%)	17,986	1.13	-12.20	13.35	1.00	2.89
LLR (%)	17,284	7.38	0.01	57.42	3.92	9.73
LISTED	24,390	0.13	0	1	0	0.34
FOREIGN	19,840	0.28	0	1	0	0.45
FOREIGN SUB	24,390	0.12	0	1	0	0.33
GDP PC GROWTH (%)	186	2.20	-14.38	10.10	2.35	3.57
INFLATION (%)	186	6.92	-16.91	45.94	4.10	9.08
TRADE OPENNESS (%)	186	83.58	22.11	442.62	59.43	81.96
OIL RENTS (%)	168	4.00	0.00	49.29	1.02	8.61

Note: The definition and data source of each variable are explained in Table 2. We have fewer observations on mortgage loans (3,973) due to data availability.

quarters. To construct our yearly *WUI* measure, we further perform two alternative calculation methods (*WUI_v2* and *WUI_v3*) for robustness checks whose descriptions are provided in Table 2. Table 2 documents that the average *WUI* in our sample is 0.24. Table 1 provides country-wise averages of *WUI*; and it is observed that the highest average *WUI* is from South Africa with 0.70; and the lowest is from Malaysia (0.09).

Geopolitical risk is measured by the Geopolitical Risk Index (*GPR*) constructed by Caldara and Iacoviello (2018). The index is available monthly for 19 countries, which are our focus when forming our sample. It counts the number of articles related to geopolitical risk as a share of the total number of news articles in 11 leading national and international newspapers; and then normalizes to an average value of 100². They use words from the following groups: explicit mentions of geopolitical risk and geopolitical events, military-related tensions, nuclear tensions, war, and terrorist threats. Country-specific *GPR* indices are available monthly and to generate our baseline yearly *GPR* measure, we take the simple average of all months in a year. We further implement some alternative calculation methods for robustness and comparability (*GPR_v2* and *GPR_v3*), and we follow exactly similar calculation procedures implemented for the *WUI* index. Table 2 shows that the average *GPR* in the sample is 101.79 and Table 2 displays that the highest average *GPR* is from Ukraine with 149.28 and the lowest is 61.90 from Indonesia³⁴.

The correlation coefficients are presented in Table 4. The pairwise correlation between the main measures of *WUI* and *GPR* is 0.22, not very high in absolute terms, indicating that they are not highly correlated; and it is relevant to compare their relative impacts on bank credit growth. For the rest of the variables, the correlation coefficients are relatively low as well which shows that there is no indication of multicollinearity.

We control for a set of bank-specific characteristics following the literature (Chi and Li, 2017; Hu and Gong, 2019; Nguyen et al., 2020; Bordo et al., 2016). These include bank size (*SIZE*) calculated as the natural logarithm of total assets, the share of equity in total assets (*EQUITY TO ASSETS*) as a measure of capitalization, liquid assets to total assets (*LIQUIDITY*) as a measure of liquidity, return on assets (*ROA*) for profitability, and the share of loan loss reserves in gross loans (*LLR*) for credit risk.

For additional analysis in models 5 and 6, we include some bank characteristics and their interactions with *WUI* and *GPR* to explore

² For details on the calculation of the *GPR* index, refer to <https://www.matteoiacoviello.com/gpr.htm>.

³ Figures A.1–A.3 in the Appendix provide box-plots of *GPR*, *Credit Growth* and *WUI* which help us to analyze the distributional characteristics of the indices across time. The variables are first averaged by country and then across countries and an equal weight is given to each country. The blue columns represent inter-quartile ranges which correspond to the middle 50% of the variables. We observe the box plots for *GPR* and *WUI* are wider for some years and narrower for others, indicating variability of these variables across years. The box plot for *Credit Growth* is comparatively shorter and shows a decreasing pattern through the years.

⁴ Figure A.4 presents information on the times series evolution of the three indices simultaneously: *GPR*, *WUI* and *Credit Growth*. The variables are averaged by country first and then across countries by using an equal weight for each country. There seems to be a close negative correspondence between the time series pattern of *GPR* and *WUI*, and *Credit Growth* which is an initial indication that *GPR* and *WUI* and *Credit Growth* are negatively correlated over time. While the maximum value for the yearly average *GPR* is observed in 2014 with a value of 116, the maximum value for *WUI* index occurs in 2016 with a value of 0.30.

Table 4
Correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) WUI	1																	
(2) WUI_v2	0.9895	1																
(3) WUI_v3	0.9788	0.9950	1															
(4) GPR	0.2207	0.2071	0.2122	1														
(5) GPR_v2	0.2234	0.2102	0.2154	0.9967	1													
(6) GPR_v3	0.1948	0.1808	0.1884	0.9619	0.9648	1												
(7) SIZE	-0.1001	-0.0978	-0.0851	-0.1065	-0.0978	-0.1018	1											
(8) EQUITY TO ASSETS	0.0463	0.0443	0.0400	0.0378	0.0361	0.0332	-0.4698	1										
(9) LIQUIDITY	0.0374	0.0383	0.0313	0.0056	0.0008	0.0156	-0.2326	0.1386	1									
(10) ROA	-0.0002	0.0012	0.0024	-0.0711	-0.0700	-0.0649	0.0196	0.2073	0.0176	1								
(11) LLR	0.0988	0.0899	0.0750	0.1939	0.1868	0.1804	-0.3236	0.2698	0.2193	-0.1668	1							
(12) LISTED	-0.0462	-0.0448	-0.0412	-0.1027	-0.0976	-0.1039	0.3589	-0.0523	-0.1571	0.0343	-0.1093	1						
(13) FOREIGN	0.0184	0.0186	0.0215	-0.0161	-0.0137	-0.0154	0.1823	-0.0554	0.0612	-0.012	-0.1089	-0.0643	1					
(14) FOREIGN SUB	-0.0088	-0.0087	-0.005	-0.0221	-0.0195	-0.0212	0.1549	-0.0193	0.0835	-0.0211	-0.1031	-0.0536	0.6643	1				
(15) GDP PC GROWTH	-0.3948	-0.3826	-0.3740	-0.4748	-0.4640	-0.4527	0.2872	-0.1071	-0.0686	0.0530	-0.2213	0.0833	-0.0220	0.0331	1			
(16) INFLATION	0.0503	0.0641	0.0617	0.1176	0.1029	0.1153	-0.3282	0.1030	0.1248	-0.0163	0.1815	-0.1183	-0.0645	-0.0467	-0.1421	1		
(17) TRADE OPENNESS	-0.1741	-0.1797	-0.1792	-0.0096	-0.0057	-0.0166	0.1286	0.0952	-0.0308	-0.0044	-0.0698	0.1548	0.1550	0.1373	-0.0101	-0.1301	1	
(18) OIL RENTS	-0.0148	-0.0052	-0.0103	0.0311	0.0204	0.0509	-0.3320	0.1115	0.2149	0.0381	0.1734	-0.1010	-0.1017	-0.1211	-0.1925	0.3498	-0.1977	1

Note: The table presents the correlation coefficients among the variables. Please refer to [Table 2](#) for variable definitions.

Table 5
The comparison of influences of WUI and GPR on bank credit growth.

	(1) (WUI)	(2) (WUI)	(3) (WUI_v2)	(4) (WUI_v3)	(5) (GPR)	(6) (GPR)	(7) (GPR_v2)	(8) (GPR_v3)
WUI	-7.473*** (2.74)	-6.380* (3.27)	-8.390*** (2.58)	-9.357*** (2.54)				
GPR					0.026 (0.02)	0.018 (0.02)	0.014 (0.02)	0.038* (0.02)
SIZE	1.15 (1.75)	2.64 (2.01)	1.118 (1.74)	1.161 (1.74)	1.473 (1.73)	2.853 (2.00)	1.491 (1.73)	1.358 (1.73)
EQUITY TO ASSETS	-0.569*** (0.11)	-0.553*** (0.12)	-0.570*** (0.11)	-0.569*** (0.11)	-0.554*** (0.11)	-0.543*** (0.12)	-0.555*** (0.11)	-0.555*** (0.11)
LIQUIDITY	-0.332*** (0.06)	-0.363*** (0.06)	-0.333*** (0.06)	-0.333*** (0.06)	-0.327*** (0.06)	-0.359*** (0.06)	-0.328*** (0.06)	-0.325*** (0.06)
ROA	1.040*** (0.33)	0.984*** (0.35)	1.042*** (0.33)	1.040*** (0.33)	1.044*** (0.33)	0.988*** (0.35)	1.041*** (0.33)	1.048*** (0.33)
LLR	-1.295*** (0.12)	-1.287*** (0.13)	-1.293*** (0.12)	-1.294*** (0.12)	-1.312*** (0.12)	-1.299*** (0.13)	-1.309*** (0.12)	-1.310*** (0.12)
GDP PC GROWTH	1.655*** (0.19)	1.359*** (0.21)	1.654*** (0.19)	1.647*** (0.19)	1.896*** (0.22)	1.530*** (0.24)	1.816*** (0.21)	1.977*** (0.21)
INFLATION	0.470*** (0.09)	0.351*** (0.10)	0.476*** (0.09)	0.476*** (0.09)	0.501*** (0.09)	0.363*** (0.10)	0.497*** (0.09)	0.507*** (0.09)
TRADE OPENNESS		0.151** (0.06)				0.142** (0.06)		
OIL RENTS		1.000*** (0.28)				1.055*** (0.28)		
CONSTANT	31.808** (13.01)	10.587 (16.25)	32.227** (12.98)	32.152** (12.92)	23.979* (13.14)	5.383 (16.50)	25.426* (13.15)	23.116* (13.00)
R2	0.0913	0.0961	0.0915	0.0917	0.091	0.0959	0.0909	0.0912
Observations	15,031	13,747	15,031	15,031	15,031	13,747	15,031	15,031
Number_of_Banks	2358	2350	2358	2358	2358	2350	2358	2358
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table displays the regression results of the impact of WUI (World Uncertainty Index) and GPR (Geopolitical Risk Index) on credit growth of banks in emerging economies. The dependent variable is CREDIT GROWTH in all columns. Bank and time fixed effects are included in all estimations. The regressions in Columns 1–4 and Columns 5–8 present estimations for WUI and GPR, respectively. Standard errors are reported in parentheses. * p < 0.10, ** p < 0.05, *** p < 0.010

whether these banks behave differently under uncertainty and geopolitical risk. For this purpose, we use three indicator variables. First, an indicator variable for listed banks (*LISTED*), which equals 1 for publicly listed banks and 0 otherwise. Table 2 shows that 13% of the banks in our sample are listed. Second, we perform a deeper investigation for foreign banks and use a dummy variable (*FOREIGN*) that equals 1 for banks whose ultimate owner is foreign and 0 otherwise. We observe from Table 2 that 28% of the banks in our sample are foreign. Third, we use a dummy variable that equals 1 for banks that have foreign-owned subsidiaries (*FOREIGN SUB*) i. e. subsidiaries based in a foreign country, and 0 otherwise. 12% of the banks in our sample are observed to have foreign-owned subsidiaries.

Finally, we include a set of country controls that account for the macroeconomic differences between the countries. These variables are obtained from the World Bank World Development Indicators. These include GDP per capita growth (*GDP PC GROWTH*), inflation (*INFLATION*), trade openness (*TRADE OPENNESS*) calculated as the sum of exports and imports of goods and services measured as a share of GDP, and *OIL RENTS* which is constructed as the share of oil rents in GDP where oil rents are calculated as the difference between the value of crude oil production at world prices and total costs of production (Gozgor et al., 2019; Bitar and Tarazi, 2019).

3. Findings

3.1. Baseline findings

Table 5 presents the findings on the comparison of the impacts of WUI and GPR on credit growth. Column 1 and 2 use WUI as the explanatory variable of interest where Column 1 includes the bank controls and the main country controls (*GDP PC GROWTH* and *INFLATION*); and Column 2 incorporates additional country controls (*TRADE OPENNESS* and *OIL RENTS*)⁵. For comparison purposes,

⁵ General political risk might be an omitted variable and it can potentially bias the results. We, therefore, conduct the regressions including the Political Stability and Absence of Violence index extracted from the World Bank Worldwide Governance Indicators. After including this index, our main findings continue to hold and we would like to thank the anonymous reviewer for this proposition.

Table 6
Robustness checks.

	(1) (WUI Lag)	(2) (GPR Lag)	(3) (WUI and GPR)	(4) (WUI GMM)	(5) (GPR GMM)
L.CREDIT GROWTH				0.138*** (0.04)	0.263** (0.11)
L.WUI	-11.674*** (3.02)				
L.GPR		0.033 (0.02)			
WUI			-7.960*** (2.77)	-8.809*** (3.28)	
GPR			0.021 (0.02)		0.048 (0.04)
SIZE	-0.174 (1.98)	2.497 (2.15)	1.12 (1.74)	-4.206* (2.37)	-1.964 (4.48)
EQUITY TO ASSETS	-0.654*** (0.12)	-0.583*** (0.12)	-0.567*** (0.11)	-0.229 (0.33)	-0.372 (1.30)
LIQUIDITY	-0.335*** (0.07)	-0.402*** (0.07)	-0.328*** (0.06)	0.855*** (0.16)	0.591 (0.61)
ROA	0.939*** (0.35)	0.839** (0.35)	1.044*** (0.33)	1.137 (0.91)	1.749 (1.81)
LLR	-1.232*** (0.13)	-1.068*** (0.13)	-1.301*** (0.12)	-2.135*** (0.30)	-1.797** (0.70)
GDP PC GROWTH	2.080*** (0.22)	1.144*** (0.26)	1.791*** (0.21)	0.831*** (0.22)	1.531*** (0.39)
INFLATION	0.519*** (0.09)	0.345*** (0.12)	0.479*** (0.09)	0.366*** (0.09)	0.443*** (0.12)
CONSTANT	41.563*** (14.55)	28.562* (15.81)	29.366** (13.30)		
R2	0.0964	0.1087	0.0914		
Observations	13,657	13,657	15,031	10,565	10,565
Number of Banks	2322	2322	2358	2202	2202
Number_ofinstr				191	32
AR1 pvalue				0.000	0.000
AR2 pvalue				0.797	0.493
Hansen p-value				0.185	0.519
Bank FE	YES	YES	YES	NO	NO
Time FE	YES	YES	YES	YES	YES
Country FE	NO	NO	NO	YES	YES

Note: Column 1 and 2 presents the estimations including the lagged values of WUI (World Uncertainty Index) and GPR (Geopolitical Risk Index), respectively. In Column 3, both WUI and GPR are included in the estimations. GMM estimations are presented in columns 4 and 5. The dependent variable is CREDIT GROWTH in all columns. Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$.

Columns 5 and 6 use similar specifications with *GPR* as the independent variable of interest. The coefficients of *WUI* in Columns 1 and 2 are negative and significantly reveal that economic uncertainties hamper bank credit growth. The impact is also economically significant which can be interpreted as one-unit increase in *WUI* leads to on average 7.5% decrease in bank credit growth, holding all else constant⁶. In other words, one standard deviation increase in economic uncertainty (0.21) decreases the growth rate of credits by 1.57% (7.473×0.21). This is a significant decrease in terms of credit growth magnitude as it corresponds to 8.2% of the sample mean of bank credit growth over the sample period (19.16%)⁷. However, the *GPR* coefficient in Column 5 appears insignificant, showing that the geopolitical risk does not affect the growth of bank credit⁸. Our results hold with additional country controls included in Columns 2 and 6. Moreover, we use alternative calculations of *WUI* and *GPR* in Columns 3–4 and 7–8; and our results still hold. *WUI* is consistently negative and significant; and the influence of *GPR* is statistically insignificant.

This implies that while bank credit is responsive to economic uncertainty, geopolitical risks do not affect the credit behavior of banks. As explained above, there are fundamental differences in the nature and estimation of *WUI* and *GPR*. Specifically, while *WUI* measures the uncertainty related to the economy and politics, *GPR* captures geopolitical risk and geopolitical events, military-related tensions, nuclear tensions, war, and terrorist threats, etc. Our findings are in line with [Das et al. \(2019\)](#) who compare the impacts of EPU and GPR on the major stock indexes of 24 emerging markets and observe that market indices are comparatively more sensitive to

⁶ In the unreported regressions, we conduct the unconditional regressions by excluding *WUI* in Column 1. While excluding *WUI* generates in an R-squared value 9.09%, further incorporating the *WUI* variable results in an R-squared of 9.13%, implying better explanatory power of the model. Our results for the unconditional regressions are available upon request.

⁷ To provide a benchmark of the impact of *WUI* on bank credit growth, we observe from [Table 5](#) that a one standard deviation decrease in GDP growth (3.57%) decreases the credit growth by 5.90% and a one standard deviation decrease in inflation (9.08%) decreases the credit growth by 4.27%. Therefore, the economic impact of *WUI* on bank credit growth is half as strong as the impacts of GDP growth and inflation.

⁸ We also exclude *GPR* variable and conduct the unconditional regressions for Column 5. While excluding *GPR* leaves with an R-squared value 9.09%, further including the *GPR* variable improves R-square up to 9.10%. Our results are available upon request.

Table 7
The impact of WUI and GPR on different loan types.

	(1) (Consumer Loan Growth)	(2) (Corporate Loan Growth)	(3) (Mortgage Loan Growth)	(4) (Consumer Loan Growth)	(5) (Corporate Loan Growth)	(6) (Mortgage Loan Growth)
WUI	-7.755*** (2.92)	-24.164*** (4.96)	-16.980* (9.91)			
GPR				-0.116*** (0.02)	-0.032 (0.03)	-0.136*** (0.05)
SIZE	11.786*** (1.92)	12.444*** (3.02)	27.349*** (7.81)	12.123*** (1.90)	13.766*** (2.99)	26.687*** (7.92)
EQUITY TO ASSETS	-0.218* (0.11)	-0.12 (0.18)	0.788 (0.56)	-0.219* (0.11)	-0.083 (0.18)	0.722 (0.57)
LIQUIDITY	-0.172*** (0.06)	-0.148 (0.09)	-0.174 (0.25)	-0.186*** (0.06)	-0.149 (0.09)	-0.227 (0.25)
ROA	-0.122 (0.32)	-0.325 (0.55)	-0.726 (1.21)	-0.162 (0.32)	-0.343 (0.55)	-0.964 (1.22)
LLR	-1.432*** (0.12)	-1.300*** (0.19)	0.254 (0.38)	-1.417*** (0.12)	-1.328*** (0.19)	0.318 (0.37)
GDP PC GROWTH	5.225*** (0.21)	5.216*** (0.36)	4.405*** (0.78)	4.519*** (0.24)	5.175*** (0.40)	3.833*** (0.80)
INFLATION	0.271*** (0.09)	-1.140*** (0.14)	1.389*** (0.43)	0.240** (0.09)	-1.121*** (0.14)	1.597*** (0.43)
CONSTANT	-59.945*** (14.04)	-48.812** (21.94)	-253.764*** (73.06)	-49.090*** (13.79)	-60.253*** (21.82)	-234.300*** (75.92)
R2	0.1524	0.0758	0.0274	0.1547	0.0736	0.029
Observations	13,927	10,453	3513	13,927	10,453	3513
Number of Banks	2363	1873	706	2363	1873	706
Bank FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES

Note: This table displays the regression results of the impact of WUI (World Uncertainty Index) and GPR (Geopolitical Risk Index) on the growth of loan types namely "Consumer Loan", "Corporate Loan", and "Mortgage Loan". Bank and time fixed effects are included in all estimations. Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

EPU rather than the GPR. Our finding that banks' credit behavior is more responsive to economic uncertainty but resilient to geopolitical risks could be explained by the fact that economy-related uncertainty is more relevant for banks to adjust their behavior as compared to geopolitical risks. Moreover, while the WUI index is a broad index capturing uncertainty in many economic fundamentals and the real economy, GPR is rather narrow and specific to a certain class of events such as wars and war-like threats (Püttmann, 2018; Das et al., 2019).

Considering the impact of control variables, many of them are able to explain the credit growth and the findings are in line with theoretical expectations. While higher profitability, GDP per capita growth, inflation, trade openness and oil rents have a positive and significant influence on bank credit growth, higher capitalization, liquidity and credit risk through more loan loss reserves share in gross loan deteriorations which stalls the growth of lending⁹.

3.2. Robustness checks

We perform robustness checks in Table 6. In Columns 1 and 2, the first lags of WUI and GPR are used as independent variables of interest, and our results are consistent. The magnitude of the coefficient of the lagged WUI term is even higher (-11.674) which implies that one standard deviation increase in last year's uncertainty (0.21) hampers the credit growth rate by 2.45% (11.674*0.21). The GPR term is still insignificant, which shows that bank credit is immune to last year's geopolitical risks as well.

In Column 3, we include both WUI and GPR in the regression and implement bank and time fixed effects. Our results remain unchanged when we include both terms in the regression. By the use of GMM estimators in Columns 4 and 5, we account for persistence in bank credit growth. The insignificant AR (2) and Hansen J statistics support the validity and reliability of our instruments. The coefficient of the lagged credit growth is positive and significant, documenting that credit growth at any year improves next year's growth. Our findings regarding the negative impact of WUI and the insignificant impact GPR on credit growth remains unchanged.

⁹ Due to the concerns regarding different country trends for the variables in the sample, we checked our findings by normalizing our variables. Our results continue to hold when we normalize all the variables in our regression and available upon request. We would like to thank the anonymous reviewer for proposing this.

Table 8
Additional analyses.

	(1) (WUI FOREIGN)	(2) (WUI LISTED)	(3) (WUI FOREIGN SUB)	(4) (GPR FOREIGN)	(5) (GPR LISTED)	(6) (GPR FOREIGN SUB)
WUI ($\omega 1$)	-5.746** (2.58)	-5.332** (2.57)	-5.991*** (2.24)			
WUI*FOREIGN ($\omega 1$)	8.408* (4.62)					
FOREIGN ($\omega 2$)	-0.737 (1.39)			2.22 (3.12)		
$\omega 1 + \omega 2$	7.67					
$\omega 1 + \omega 2$ p-value	0.50					
WUI*LISTED ($\omega 3$)		3.312 (4.28)				
LISTED		-2.671* (1.58)			-0.762 (3.03)	
WUI*FOREIGN SUB			7.126 (7.09)			
FOREIGN SUB			-0.283 (2.00)			-0.68 (3.85)
GPR				0.021 (0.02)	0.02 (0.02)	0.016 (0.02)
GPR*FOREIGN				-0.01 (0.03)		
GPR*LISTED					-0.011 (0.03)	
GPR*FOREIGN SUB						0.019 (0.03)
Constant	30.815*** (2.75)	37.650*** (2.75)	38.347*** (2.67)	26.683*** (3.37)	33.629*** (3.21)	34.719*** (3.13)
R2	0.0785	0.0784	0.0778	0.0777	0.0776	0.0776
Observations	12,794	15,031	15,031	12,794	15,031	15,031
Number of Banks	1912	2358	2358	1912	2358	2358
Bank FE	NO	NO	NO	NO	NO	NO
Time FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES

Note: This table displays the regression results of the impact of WUI and GPR on credit behavior of foreign banks, publicly listed banks, and banks with foreign subsidiaries. Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

3.3. The influence of WUI and GPR on loan types

Next, we perform a deeper investigation and explore whether the influences of WUI and GPR differ for the loan types, namely consumer, corporate, and mortgage loans. In Table 7, Columns 1–3 (4–6) explore the influence of WUI (GPR) on the growth of loan types. Even though the negative effect of WUI holds for the growth of credits with all types, the coefficient is highest for corporate loans. Specifically, one standard deviation increase in uncertainty dampens the growth rate of corporate loans by 5.07% (24.164×0.21). The magnitude of decrease in the growth of corporate loans is significant because it corresponds to 44% of the sample mean of corporate loan growth over the sample period (11.53%).

Considering the impact of GPR on the growth of three loan types, we observe that an increase in GPR hampers the growth of consumer and mortgage loans, but corporate loan growth is immune to geopolitical risks. Specifically, one standard deviation increase in GPR (33.42) dampens the growth rate of consumer and mortgage loans by 3.88% (-0.116×33.42) and 4.55% (0.136×33.42), respectively. The magnitudes of these drops are significant considering that the mean growth rates of consumer and mortgage loans are 12.66% and 17.13%, respectively.

Overall, our findings indicate that, while the growths of all three types of loans are responsive to economic uncertainty, the highest magnitude occurs with corporate loans. This could be explained by the fact that the investment activities and credit needs of corporations would be severely affected and either be canceled or postponed under economic uncertainty because the option value of waiting for better information increases during such uncertain periods (Dixit et al., 1994). Moreover, as firms rely more on banks for access to finance, they would be more likely to be hit and decrease their demand for credit due to rising uncertainty (Beck & Demirgüç-Kunt, 2008). Conversely, while the growth of corporate loans is immune to geopolitical risks, consumer and mortgage loans respond negatively. This could be explained by the fact that geopolitical risks generate fear in consumers and they are more likely to postpone their spending and investment decisions in such periods when their safety conditions are less certain.

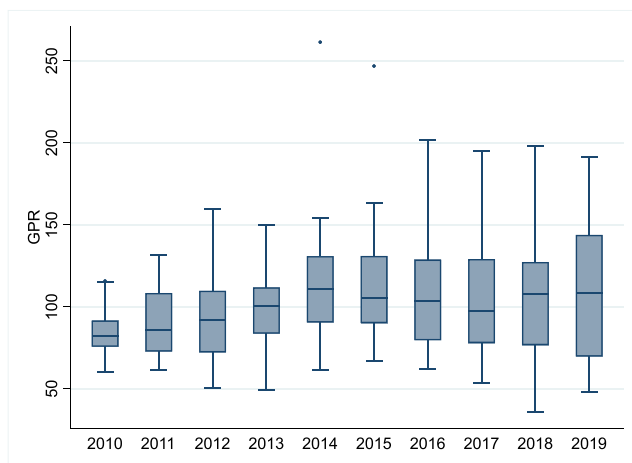


Fig. A.1. Box-plot of Geopolitical Risk Index.

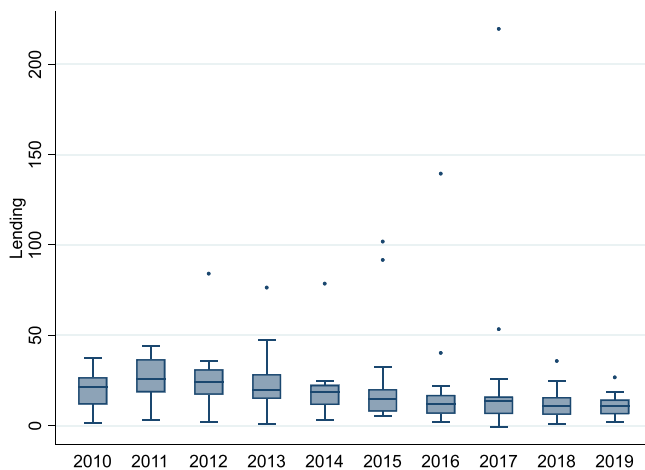


Fig. A.2. Box-plot of Credit Growth.

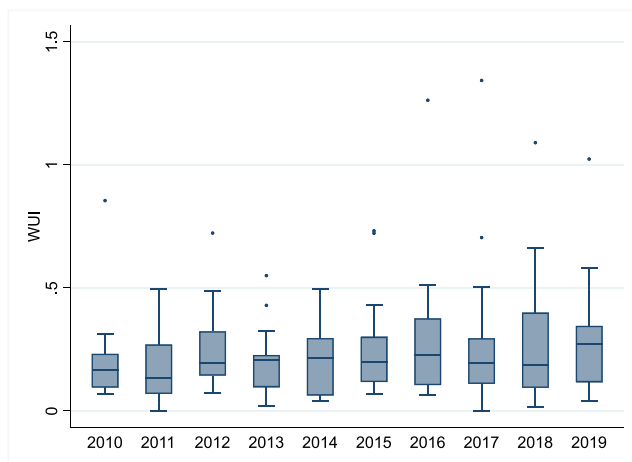


Fig. A.3. Box-plot of World Uncertainty Index.

3.4. Bank heterogeneity

We investigate the heterogeneity between banks by considering whether the credit behavior of (1) foreign banks, (2) publicly listed banks, and (3) banks with foreign subsidiaries are different under economic uncertainties and geopolitical risks. To test this, we use Equations (5) and (6) and include interaction terms in the models. In Table 8, the coefficient of the *WUI* term in Column 1 indicates the influence of *WUI* for domestic banks, and it keeps its negative and significant sign. While the coefficient of the interaction term *WUI*FOREIGN* is positive and significant, the sum of coefficients of *WUI* and *WUI*FOREIGN* variables is insignificant. This shows that we observe no significant effect of *WUI* on foreign banks' credit growth and foreign banks are immune to economic uncertainty in their host countries. Columns 1 and 2 focus on listed and foreign-owned subsidiary banks' credit behavior under economic uncertainty; and the interaction terms *WUI*LISTED* and *WUI*FOREIGN SUB*, being insignificant, document that listed banks and banks with foreign subsidiaries are also immune to economic uncertainties. Columns 4–6 perform a similar analysis for *GPR*; and we obtain similar results with interaction terms being insignificant.

Our results indicate that foreign banks, banks listed on a stock exchange and banks with foreign subsidiaries are resilient to economic uncertainties and geopolitical risks. This could be explained by the fact that bank ownership structures have an influence on bank lending behaviors, particularly under uncertainty (Allen et al., 2017). Our finding for foreign banks is in line with the literature that documents the stabilizing effect of foreign banks on the credit supply in host countries during a domestic banking crisis (Allen et al., 2017; de Haas & van Lelyveld, 2004) because foreign bank entry brings better access to credit and lowers the cost of credit during such periods. In contrast, domestic banks are observed to contract their credit levels during crisis periods (de Haas & van Lelyveld, 2006). However, credit availability from the foreign-owned subsidiaries of domestic banks allows them to balance the decreased level of credit in the local markets (de Haas & van Lelyveld, 2006; Cull & Martínez Pería, 2013). Meanwhile, the listed banks are generally larger and are more diversified; and therefore, their credit levels would be less affected under uncertainty.

4. Discussions and implications

Our findings indicate that while economic uncertainty decreases the growth of all credit measures, namely consumer, corporate, and mortgage loans, the negative impact is higher in magnitude for corporate loans. On the demand side, governments could provide a more stable and predictable economic environment through their economic policies which will increase the credit demand of corporations, which will then stimulate economic growth. Moreover, governments could provide tax reductions or exemptions, land allocation, or social security premium support for domestic or international firms to trigger corporate investments (Demir et al., 2019). For the supply side, if the level of economic uncertainty cannot be lowered in the short-term, governments could increase the availability of different credit channels to encourage firms to undertake investments or to provide short-term liquidity. Regulatory bodies can also act as a guarantor to a certain degree for the loans.

As for geopolitical risks, our findings indicate that these risks dampen consumer and mortgage loans but not corporate loans. Therefore, if a country is experiencing a period of rising geopolitical risks, actions to stimulate consumer demand are needed. For instance, governments can provide refinancing availabilities, decreases in value-added taxes of some certain product groups, extensions of the duration of consumer credits, declines in the down payment of mortgages, and decreases in real estate transaction tax. However, the medium to long-term aim of the governments should be towards controlling the geopolitical risks.

Finally, our analysis of bank heterogeneity further shows that foreign banks, publicly listed banks and banks with foreign subsidiaries are resilient to economic uncertainties and geopolitical risks. Therefore, on the supply side, regulatory bodies could focus more on improving the lending conditions of domestic and private banks as compared to foreign and publicly listed ones during such times.

5. Conclusions

In this paper, we use World Uncertainty Index (*WUI*) and Geopolitical Risk Index (*GPR*) as measures of economic uncertainty and geopolitical risks, respectively; and we compare their relative influences on bank credit growth. Using a sample of 2,439 banks from 19 countries for 2010–2019, we find that while economic uncertainty deteriorates bank credit growth, geopolitical risks do not exert a significant influence. We perform various robustness checks and our results continue to hold. We then perform a deeper investigation of the loan types (consumer, corporate, and mortgage loans) and our findings reveal that economic uncertainty dampens the growth of all three types of loans but the coefficient is highest for corporate loans. Considering the impact of *GPR* on the growth of three loan types, we observe that an increase in *GPR* hampers the growth of only consumer and mortgage loans. Additional analyses on bank characteristics imply that the credit behavior of (1) foreign banks, (2) publicly listed banks, and (3) banks with foreign subsidiaries are immune to economic uncertainties and geopolitical risks.

Future research could focus on different country contexts and explore how economic uncertainty and geopolitical risks could influence other bank behaviors such as bank stability, capital, and performance. Moreover, they could also examine whether the exact loan supply or loan demand driven responses are more attributable to the decrease in bank credit following the increases in economic uncertainty and geopolitical risks.

CRedit authorship contribution statement

Ender Demir: Data curation, Methodology, Formal analysis, Writing - original draft, Writing - review & editing. **Gamze Ozturk**

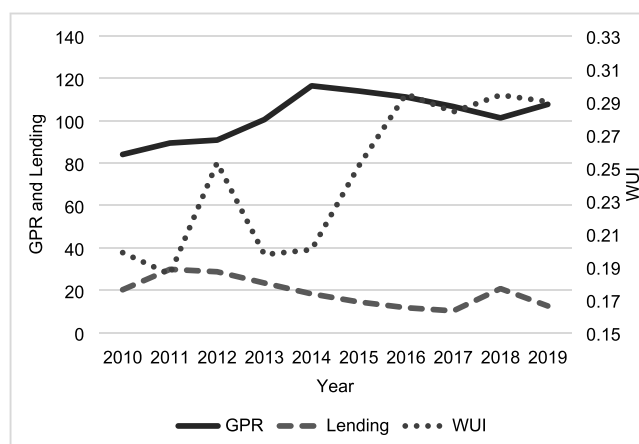


Fig. A.4. WUI, GPR and Credit Growth over time .

Danisman: Conceptualization, Supervision, Writing - original draft, Writing - review & editing.

Appendix A. Time series evolution of Geopolitical Risk Index, World Uncertainty Index and Credit Growth

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