

Do Geopolitical Risks Raise or Lower Inflation?

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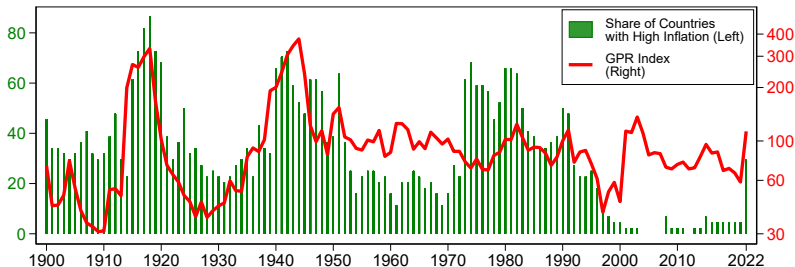
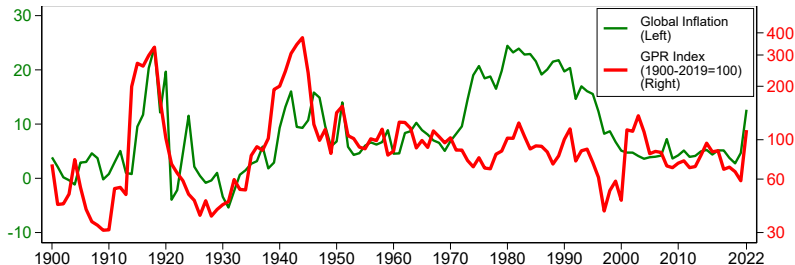
September 21, 2023

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Introduction

- What is the relationship between adverse geopolitical events (GPR) and inflation?
- Unclear from a theoretical standpoint:
 - ▶ Adverse supply effects ($\pi \uparrow$)
 - ▶ Adverse demand effects & uncertainty ($\pi \downarrow$)
 - ▶ Monetary & fiscal policy ($\pi ?$)
 - ▶ Commodity prices and dollar ($\pi \uparrow$)
- We use 120 years of data and various empirical techniques to examine the historical association between higher GPR and inflation.

Main Finding: Geopolitical Risks Raise Inflation



Geopolitical Risk and Inflation in the News

Argentines See Jump In Inflation
By JAMES M. MARKHAM Special to The New York Times (1923-); May 12, 1982; pg. D1

Argentines See Jump In Inflation

War Strains, Spending Cited

By JAMES M. MARKHAM

But the consensus in Argentina's business community is that the financial strains and dislocations that the conflict in the South Atlantic have caused — combined with a wave of spending by the military — have guaranteed that inflation will soar in the months ahead, and that a free-market, belt-tightening experiment under Economics Minister Roberto Alemann is just about over.

Well-placed bankers economists

VAST INFLATION ERUPTS FROM CHINA'S LONG W.
By TILLMAN DURDIN Special to THE NEW YORK TIMES.
New York Times (1923-); Feb 16, 1947; ProQuest Historical Newspapers: 1 pg. E4

VAST INFLATION ERUPTS FROM CHINA'S LONG WARS

End of Mediation Effort and Lack of U. S. Credits Contribute to the Crisis

By TILLMAN DURDIN
Special to The New York Times

A major element in the present state of affairs is the long-standing unsatisfactory fiscal position of the Central Government. Throughout eight years of the Japanese war, the Government met most of its domestic expenditures by issuing steadily increasing amounts of paper currency. Revenues during these Japanese war years never amounted to more than 30 per cent of disbursements; thus the new notes consistently represented 70 per cent of heavy war-time costs.

Internal Strife a Factor

INFLATION A PERIL IN SOUTH VIETNAM
By NEIL SHEEHAN Special to The New York Times
New York Times (1923-); Nov 5, 1965; ProQuest Historical News pg. 3

INFLATION A PERIL IN SOUTH VIETNAM

U.S. Helps Saigon Wage War on Economic Front

By NEIL SHEEHAN
Special to The New York Times

With much of its transportation system wrecked by war or severed by guerrillas and most of the rice-producing Mekong delta, the economic heartland of the country, in Communist hands, South Vietnam is being squeezed in the vise of a burgeoning money supply but a shrinking market of goods, services and facilities.

WAR BOOM HAS ITS DARK SIDE, BANKERS WARN
Forester, Leland
Chicago Daily Tribune (1923-1963); Oct 1, 1939; ProQuest Historical News pg. B1

WAR BOOM HAS ITS DARK SIDE, BANKERS WARN

Fear Vast Inflation in Long Conflict.

BY LELAND FORRESTER.

Other bankers, speaking at the meeting, said that unwise laws impair the efficiency of industry at a time when the nation should be using every economic means to make itself secure. They termed the government's cheap money policy a failure and said interest rates now are heading upward.

Economic Data

1. Country-Level Historical Annual Data:

- ▶ **Coverage:** 1900 through 2021, 44 countries (17 AEs).
- ▶ **Inflation:** IMF IFS, Jordà et al. (2017), Reinhart and Rogoff (2009).
- ▶ **Real GDP:** WB WDI, Barro and Ursua (2012).
- ▶ **Policy Indicators:** Military expenditures, public debt, money growth, trade (imports + exports).
- ▶ **Text Data:** Two newly constructed news indexes to measure shortages and aggregate demand (US only).

2. Global Time-Series Monthly Data:

- ▶ **Coverage:** 1974 through 2022.
- ▶ **Macro variables:** world GDP, world inflation, consumer confidence
- ▶ **Financial variables:** stock prices, dollar exchange rate, oil prices, commodity prices index.

Geopolitics and Geopolitical Risk

- **Geopolitical Risk** is the threat, realization, and escalation of adverse events associated with wars, terrorism, and any tensions among states and political actors that affect the peaceful course of international relations.
- The GPR index is a continuous measure of risk. Higher values measure:
 - ▶ higher current intensity of negative events (e.g. more wars)
 - ▶ higher probability of negative events in the future
 - ▶ higher expected intensity of future negative events

Measurement: Newspaper Searches

- The geopolitical risk (GPR) index is measured by the **frequency** of newspaper articles discussing adverse geopolitical events.

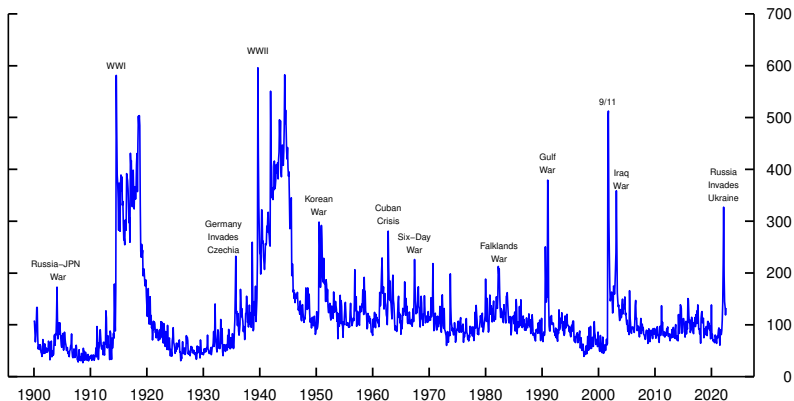
$$GPR \propto \frac{\mathcal{G}}{\mathcal{U}}$$

\mathcal{G} : number of articles mentioning adverse geopolitical events

\mathcal{U} : total number of articles

- An article mentioning geopolitical risks must contain:
 - ▶ “topic” words (e.g. war words, nuclear words, terrorism words)
 - ▶ “threat” or “act” words for each topic
- **Historical indexes since 1900**: NYT, Chicago Tribune, and WaPo

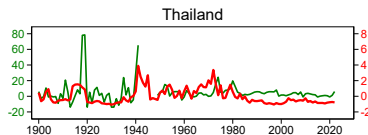
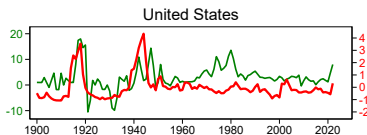
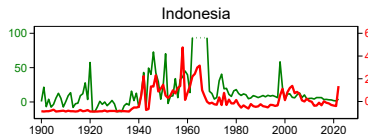
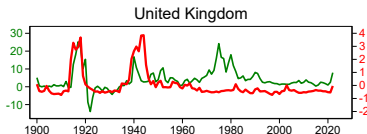
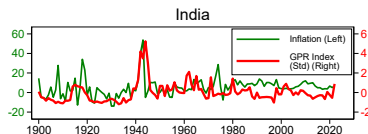
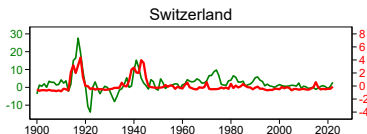
The Geopolitical Risk Index



Note: Data from Historical Index until 1984, and from Recent Index from 1985. Index equals 100 in the 1985-2019 period.
GPR available at <https://www.matteoiacoviello.com/gpr.htm>

Country-Specific GPR & Inflation

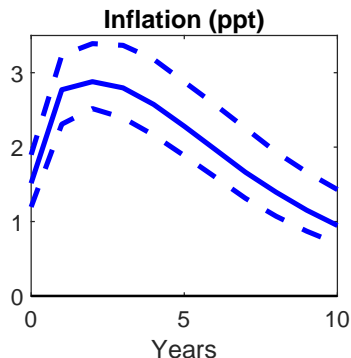
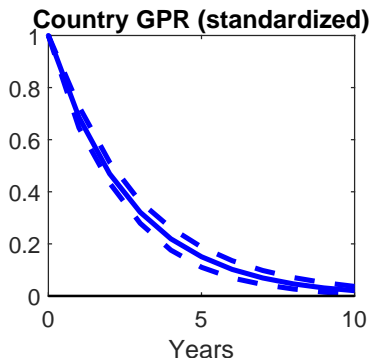
- GPRC: share of GPR articles naming country in question.
- High GPRC correlated with higher inflation.



Panel VAR: GPR and Inflation

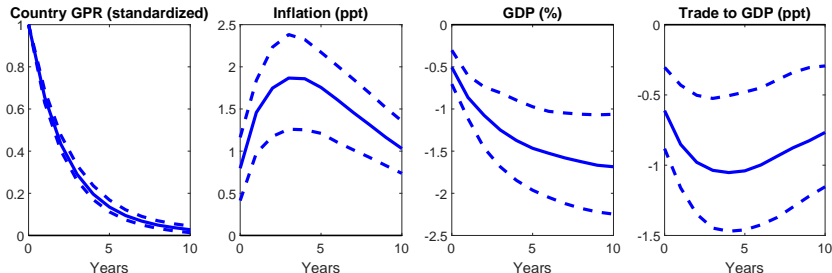
- Two-variable model to maximize observations.
- Cholesky with GPRC indexes ordered first

GPR shocks raise inflation



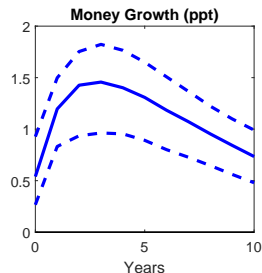
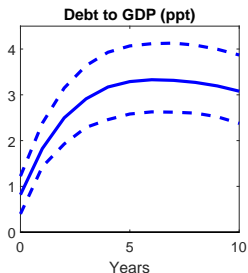
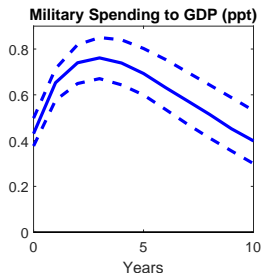
Panel VAR: Inspecting the Transmission (I)

- Seven-variable model to dig into transmission.
- Adverse supply developments dominate transmission:
 - ▶ Negative comovement between inflation and real GDP.
 - ▶ Decline in trade.



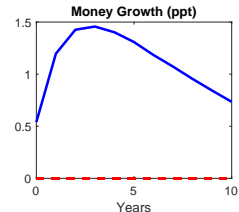
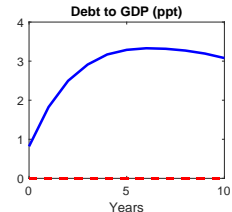
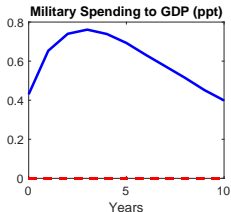
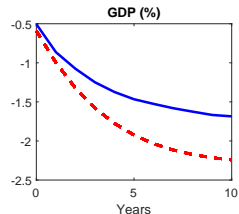
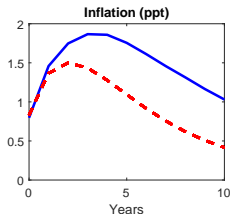
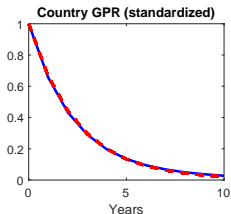
Panel VAR: Inspecting the Transmission (II)

- Expansionary monetary and fiscal policies:
 - ▶ To finance military spending,
 - ▶ To stabilize activity,
 - ▶ but can exacerbate inflationary pressures.



Panel VAR: Switching off policy

- Absent policy expansion:
 - ▶ Larger activity drop, smaller and shorter-lived inflation rise.
 - ▶ Note: Accounting exercise (Lucas critique).



Panel VAR: Country Heterogeneity

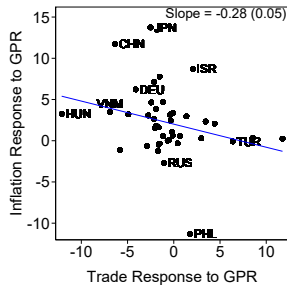
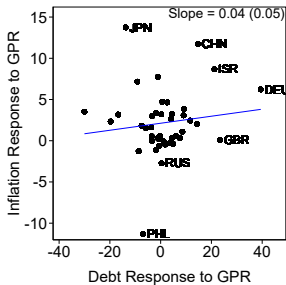
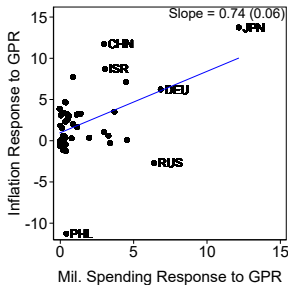
Predictive regressions allowing for heterogeneous country responses.

$$\Delta X_{i,t+3} = \alpha_i + \beta_i GPRC_{i,t} + u_{i,t}$$

where X_t : π , Mil/GDP, Debt/GDP, Trade/GDP.

- Response of π varies across countries: mostly positive.
- Response of π correlates with responses of mil. spending (+), debt (+), trade (-).

Country Heterogeneity in Response to GPR



Robustness and Inflation Risk

Table 2: Effects of an Increase in Country-specific Geopolitical Risk

Inflation	Horizon				
	t	$t+1$	$t+2$	$t+3$	$t+4$
Baseline	1.14 (0.30)	1.66 (0.47)	1.36 (0.49)	0.87 (0.67)	0.46 (0.74)
Robustness					
Global GPR Control	0.82 (0.34)	1.20 (0.42)	0.89 (0.39)	0.74 (0.47)	0.86 (0.51)
Advanced Economies	1.14 (0.44)	1.72 (0.86)	1.74 (0.92)	1.15 (1.35)	0.38 (1.38)
Emerging Economies	1.14 (0.39)	1.60 (0.49)	1.01 (0.45)	0.61 (0.52)	0.53 (0.61)
Post-1950s	0.94 (0.36)	1.28 (0.49)	1.06 (0.48)	0.68 (0.54)	0.52 (0.66)
Quantiles					
q10	-0.86 (0.34)	-1.37 (0.48)	-2.00 (0.53)	-2.76 (0.57)	-3.09 (0.64)
q50	1.22 (0.26)	1.80 (0.33)	1.50 (0.38)	1.00 (0.40)	0.56 (0.42)
q90	3.56 (0.45)	5.03 (0.65)	5.05 (0.76)	4.84 (0.73)	4.65 (0.71)
Observations	4,689	4,632	4,577	4,523	4,471
Number of Countries	44	44	44	44	44

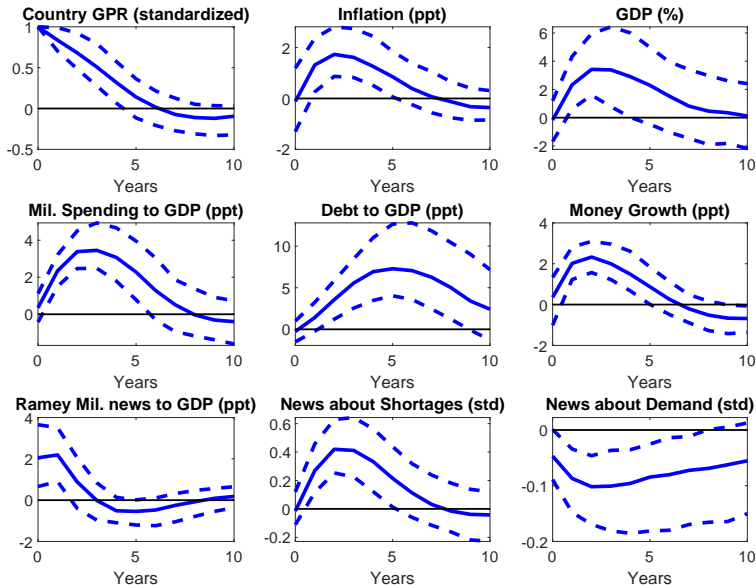
Standard errors in parenthesis clustered by country and year.

US VAR: Validating transmission

Why is instructive to zoom into the US?

1. U.S. unique experience in geopolitical events:
 - ▶ Involvement in all major conflicts
 - ▶ No conflict happening on U.S. soil (except 9/11).
2. More data to validate transmission:
 - ▶ Supply side: News index about shortages
 - ▶ Demand side: News index about aggregate demand.
3. Interplay of GPR with military news data (Ramey)

US VAR: Validating transmission



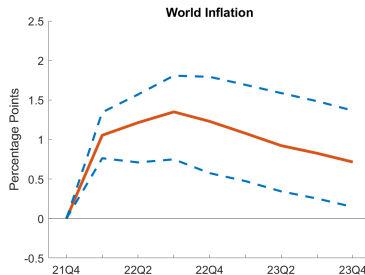
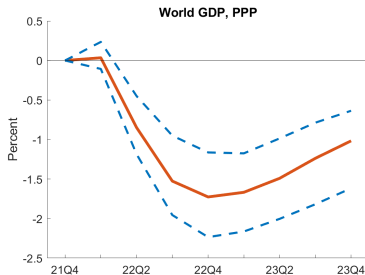
Global Effects of GPR since 1970s

Application to the Russian Invasion of Ukraine

- Global monthly VAR from 1970s:
 - ▶ Examine role of **global** factors (dollar, comm prices)
 - ▶ **Monthly** frequency required to trace effects on fast-moving variables.
- Estimation uses GP Acts and GP Threats indexes:
 - ▶ **GPA** capture realization of adverse geopolitical events.
 - ▶ **GPT** capture higher threat of future adverse geopolitical events.
- Russia-Ukraine War Scenario:
 1. Extract historical GPT and GPA shocks.
 2. Construct simulation that tracks the dynamic effects of GPR shocks between Jan and Apr 2022.

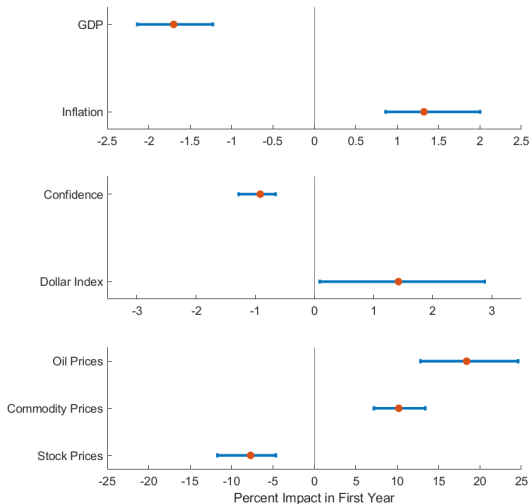
Russia-Ukraine War Scenario: Global Effects

GPA & GPT Shocks Observed between Jan and Apr '22



Russia-Ukraine War Scenario: Transmission

GPA & GPT Shocks Observed between Jan and Apr '22



Conclusions

- Geopolitical risk raises inflation.
- Panel regressions since 1900: GPR predicts higher inflation through adverse supply-side effects and expansionary policies.
 - ▶ Effects vary over time and across countries.
- Global monthly VAR since 1974: GPR predicts higher inflation through higher commodity prices and dollar appreciation.
 - ▶ Russian invasion of Ukraine estimated to increase global inflation of nearly 1.5 ppt.

APPENDIX

Measurement: Selecting Terms in set \mathcal{G}

- An article mentioning geopolitical risks must contain:
 - ▶ “topic” words (e.g. war words, nuclear words, terrorism words)
 - ▶ “threat” or “act” words for each topic
- The selection of topic words is based on:
 - ▶ definition of the phenomenon itself;
 - ▶ human reading and textual analysis of 44,000 front pages of NYT;
 - ▶ analysis of language around key dates.
- Notes:
 - ▶ We exclude from searches articles containing words (such as movies, anniversaries, obituaries, books) associated with false positives.
 - ▶ We account for the evolution of language over time.

The Search Terms

TABLE 1—SEARCH QUERY FOR THE GPR INDEX

Category	Search query	Peak (month)	Contribution to index percent		
			Full sample	1900–1959	1960–2019
Panel A. Search categories and search queries					
Threats					
1. War threats	War_words N/2 Threat_words	Germany invades Czech. (September 1938)	13.5	17.9	9.2
2. Peace threats	Peace_words N/2 Peace_disruption_words	Iran crisis of 1946 (April 1946)	3.5	4.3	2.7
3. Military buildup	Military_words AND buildup_words	Cuban Missile Crisis (October 1962)	23.5	21.3	25.8
4. Nuclear threats	Nuclear_bigrams AND Threat_words	Nuclear ban negotiations (August 1963)	10.1	4.2	16.0
5. Terrorist threats	Terrorism_words N/2 Threat_words	9/11 (October 2001)	2.7	0.3	5.0
Acts					
6. Beginning of war	War_words N/2 War_begin_words	WWII begins (September 1939)	18.8	26.8	10.7
7. Escalation of war	Actors_words N/2 Actors_fight_words	D-Day (June 1944)	19.6	23.9	15.3
8. Terrorist acts	Terrorism_words N/2 Terrorism_act_words	9/11 (September 2001)	8.3	1.3	15.2

The Search Terms

Panel B. Search words

Topic sets

War_words

war OR conflict OR hostilities OR revolution* OR insurrection OR uprising OR
revolt OR coup OR geopolitical

Peace_words

peace OR truce OR armistice OR treaty OR parley

Military_words

military OR troops OR missile* OR “arms” OR weapon* OR bomb* OR warhead*

Nuclear_bigrams

“nuclear war” OR “atomic war” OR “nuclear missile” OR “nuclear bomb”
OR “atomic bomb” OR “h-bomb” OR “hydrogen bomb” OR “nuclear test” OR
“nuclear weapon”

Terrorism_words

terror* OR guerrilla* OR hostage*

Actor_words

allie* OR enem* OR insurgen* OR foe* OR army OR navy OR aerial OR troops
OR rebels

Threat/act sets

Phrases

Threat_words

threat* OR warn* OR fear* OR risk* OR concern* OR danger* OR doubt* OR
crisis OR troubl* OR disput* OR tension* OR imminen* OR inevitable OR footing
OR menace* OR brink OR scare OR peril*

Peace_disruption_words

threat* OR menace* OR reject* OR peril* OR boycott* OR disrupt*

Buildup_words

buildup* OR build-up* OR sanction* OR blockad* OR embargo OR quarantine
OR ultimatum OR mobiliz*

War_begin_words

begin* OR start* OR declar* OR begun OR began OR outbreak OR “broke out”
OR breakout OR proclamation OR launch*

Actor_fight_words

advance* OR attack* OR strike* OR drive* OR shell* OR offensive OR invasion
OR invad* OR clash* OR raid* OR launch*

Terrorism_act_words

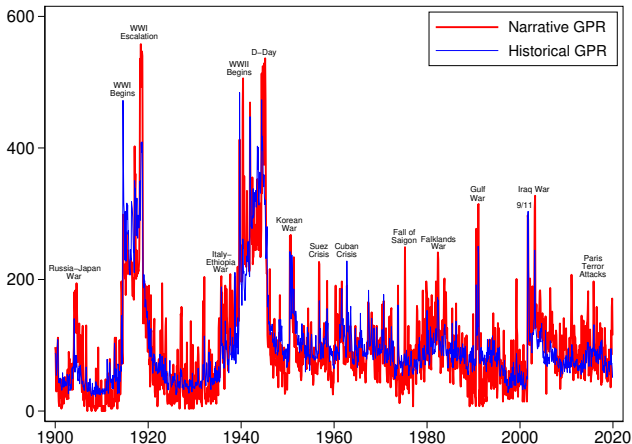
attack OR act OR bomb* OR kill* OR strike* OR hijack*

The 2022 paper contains several exercises showing validity of the index

- Index Passes a Plausibility Test
- Index Uses Words that Reflect Changes in the Use of Language
- Index is Compared with Other Indicators of Conflict and War News

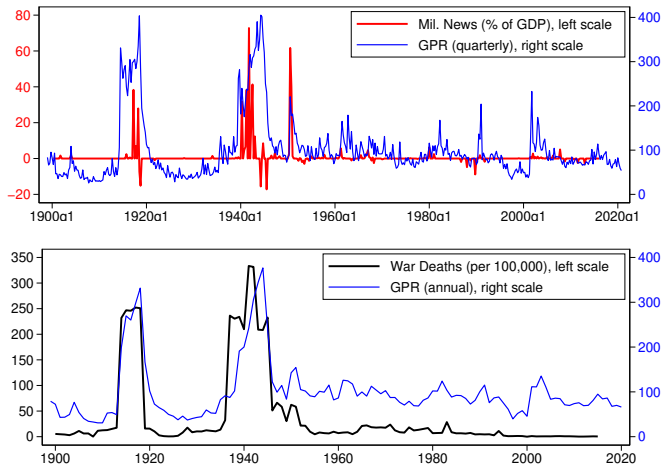
The Narrative GPR Index

We read 44,000 daily front pages of NYT and code them 0, 1, 2, or 5 depending on coverage of geopolitical events



Note: Data from 1900 through 2019. Both series indexed to 100 in the 1900-2019 period.

GPR and Other War Indicators

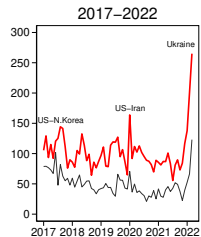
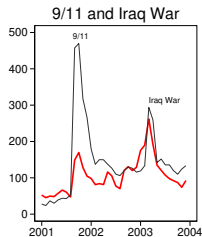
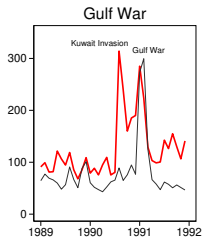
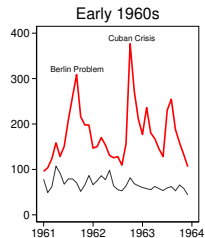
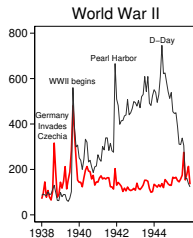
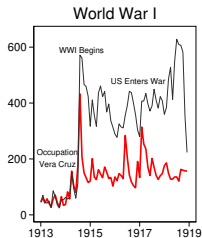


NOTE: Comparison of GPR Index and GPR shocks with Military News variable from Ramey (2011) and with war deaths.

Geopolitical Threats and Geopolitical Acts

- GPR index captures a convolution of shocks to various moments of the distribution of geopolitical events.
- We break the index down into:
 - ▶ Geopolitical Threats (GPT): Search categories 1 to 5;
 - ▶ Geopolitical Acts (GPA): Search categories 6 to 8.
- Many spikes in GPT and GPA associated with occurrence of geopolitical acts, yet some movements in GPT may happen when no underlying act materializes.

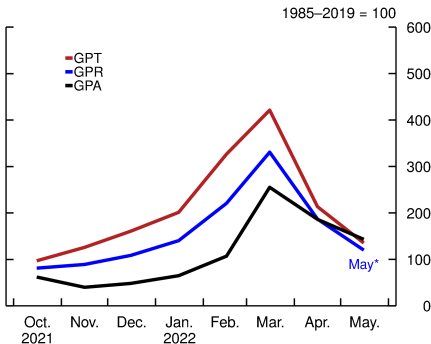
Geopolitical Threats and Geopolitical Acts



Threats and Acts in 2022

- GPT index surged between January and March, declined in April.
- GPA index spiked in the aftermath of the invasion.
- Indexes align well with firm-level GPR measure.

A. Recent GPR



B. Firm Geopolitical Concerns

