The Price of War

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The questions

**What is the macroeconomic impact of war?**

- Military buildups expansionary (Ramey Shapiro 1998, Ilzetzki 2024)
- Death and destruction of the <u>war-site</u> contractionary: many economic disasters associated with wars on country's own soil (Barro 2006)

What about other countries? Do they pay a price for the war as well?

- Potentially strong economic spillovers from war site to other countries
- Trading partners of war sites pay substantial price of war, even if not party to war

Countries exposed to war 1870–2023

Unconditional prob. war site: 6% v 20% for war next door
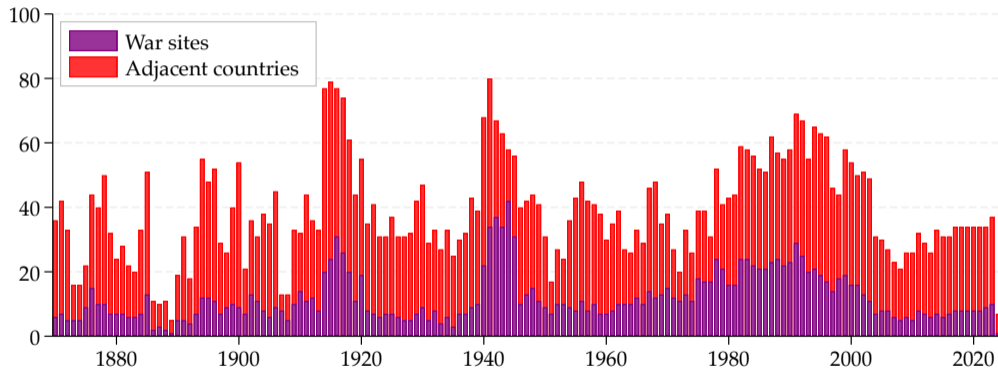
Empirical analysis

New data for all interstate, intrastate, and extrastate wars since 1870

- <u>Interstate:</u> Between two or more recognized states
- <u>Other wars:</u> Intrastate / extrastate wars (e.g., civil wars/independence)
- $\rightarrow$ **Geolocate war sites and—for interstate wars—identify casus belli narratively**

Dynamic response to average war

- War sites: GDP falls by up to 10%, consumer prices increase by some 20%
- Spillovers to <u>third</u> countries depend on trade integration
    - 0% imports from sites/GDP: Output remains stable; prices rise by 0.5%
    - 3% imports from sites/GDP: Output falls by 2%, prices rise by 3%

Related literature: economic impact of war . . .

on parties to the war

- Case studies: Oliver 1941, Harrison 1998, Davis Weinstein 2002, Tooze 2006
- Growth effect somewhat elusive: Rasler Thompson 1985, Barro Lee 1994, Caplan 2002, Acemoglu et al 2005, Thies and Baum 2020
- Stronger for civil wars: Abadie Gardeazabal 2003, Novta and Pugacheva 2021, Chupilkin Kóczán 2022
- Modelling war/military buildups: Ramey Shapiro 1998, Auray Eyquem 2019

on third countries/spillovers

- Trade/networks: Martin et al 2008, 2012, Glick Taylor 2010, Couttenier et al 2022, Korovkin Makarin 2023
- From civil wars, with focus on geography: Murdoch Sandler 2002, 2004, Qureshi 2013, Verdickt 2020, Mueller et al 2022

Data and basic facts

Annual observations: 1870–2023

Macroeconomic outcomes for up to 60 countries:

- Output and inflation (Jorda Schularick Taylor; Funke Schularick Trebesch , 2023); Capital stock and TFP (Bergeaud Cette Lecat, 2016); Interest rates (Müller et al., 2025); Equity returns (Jorda Schularick Taylor); Military personnel and spending (Correlates of War)

Trade between countries

- TradHist (Fouquin Hugot, 2016), imputed missing obs. via gravity estimation

Analysis centered around war sites

- *Correlates of War project* (Sarkees Wayman, 2010): all interstate, intrastate, and extrastate wars ($> 1\,000$ battle deaths) between 1816 and 2007 & updated (UCDP $+$ Invasion of Ukraine)
- Geolocate war sites

Geolocating war sites

Locating where fighting took place

For interstate wars

- Geolocate > 1500 battles: collect number of deaths, missing, wounded (casualties)
- Exclude battles taking place far from core territory (e.g., Aleutian Islands in WW2)
- Aggregate back to country level **using today's borders**
- Severity of war: casualties / local population
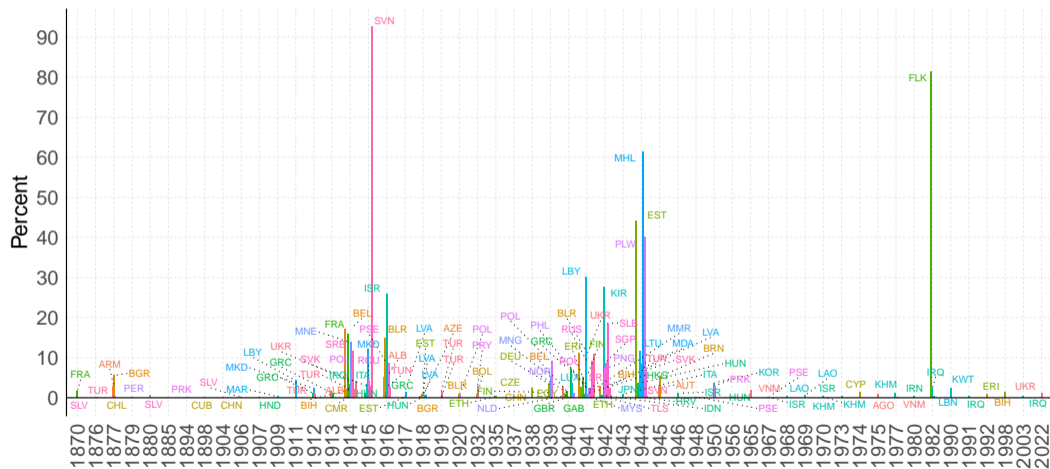
For other wars

- Civil wars and wars for independence usually not distributed across many countries
- Located using various sources

War sites

Wars	Casualties / pop. (in %)		Length		Macro time series for...		
Total	Mean	Median	Mean	Median	Sites	Belligerents	Third
Panel A: Interstate wars							
225	3.50	0.26	2.5	2	84	178	3,648
Panel B: Other wars							
469	0.74	0.13	3.3	2	141	164	6,788
Panel C: Combined sample							
694	1.65	0.15	3.0	2	220	319	7,126

Severity of interstate war

Severity: Casualties / local population; Restricted sample (population data)

Severity of other wars

Severity: Casualties / local population; Restricted sample (population data)
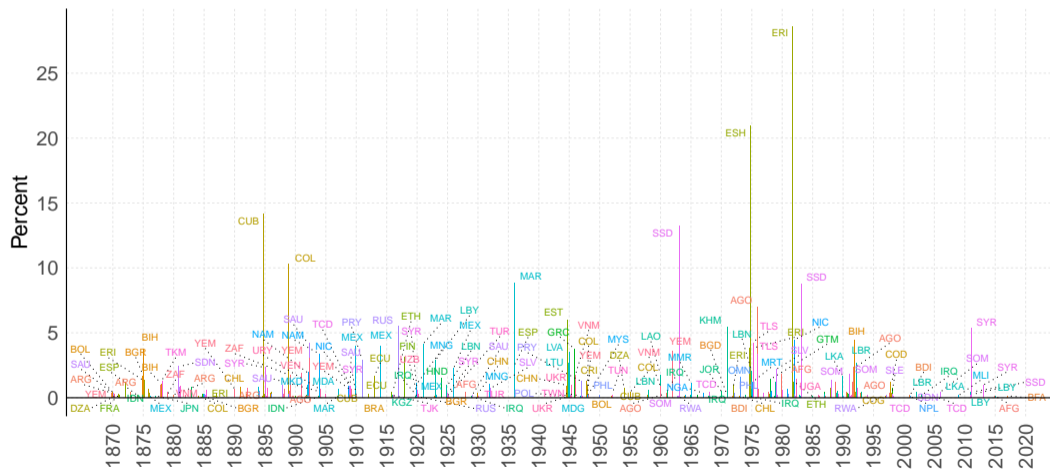
GDP drawdown in <u>war sites</u> depending on severity
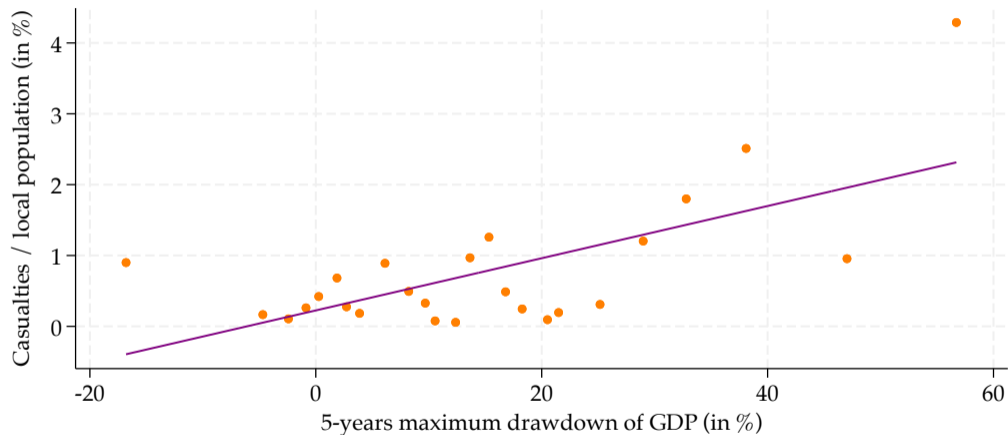
Empirical framework and results

Empirical framework

Estimate dynamic effect of war in sites, belligerents and third countries

$$y_{i,t+h} - y_{i,t-1} = \zeta_h' \mathbf{X}_{i,t} + \sum_{c \in \{S,B,T\}} \phi_{c,h}(\gamma_{i,c,t}' \cdot \mathbf{Sites_t})$$
$$+ \sum_{c \in \{B,T\}} \psi_{c,h}(\epsilon_{i,c,t-1}' \cdot \mathbf{Sites_t}) + u_{i,t+h}.$$

- $y_{i,t+h}$: output or inflation in projection horizon h (baseline)
- $X_{i,t}$: Controls, country fixed effects, 4 lags of dependent variable in first differences and regressors
- Standard errors robust to heteroskedasticity, serial, and cross-sectional correlation (Driscoll and Kraay, 1998)

Empirical framework: details (1/2)

Distinguishing between different stakeholders to war

$$y_{i,t+h} - y_{i,t-1} = \zeta_h' \mathbf{X}_{i,t} + \overbrace{\sum_{c \in \{S,B,T\}} \phi_{c,h}(\gamma_{i,c,t}' \cdot \mathbf{Sites_t})}^{\text{Relation to war sites}}$$
$$+ \sum_{c \in \{B,T\}} \psi_{c,h}(\epsilon_{i,c,t-1}' \cdot \mathbf{Sites_t}) + u_{i,t+h}\,.$$

- In relation to each war, a country is either a **S**ite, **B**elligerent, or **T**hird country
- If j goes to war with k in year t, and fighting only takes place on the soil of k...
    - kth row of $Sites_t$ is severity (casualties/local population); other rows 0
    - kth row of $\gamma_{k,S,t} = 1$; other rows 0
    - kth row of $\gamma_{j,B,t} = 1$; other rows 0
    - kth row of $\gamma_{i,T,t} = 1 \ \forall i \neq j, k$

Empirical framework: details (2/2)

Accounting for heterogeneous war sites

$$y_{i,t+h} - y_{i,t-1} = \zeta_h' \mathbf{X}_{i,t} + \overbrace{\sum_{c \in \{S,B,T\}} \phi_{c,h}(\gamma_{i,c,t}' \cdot \mathbf{Sites_t})}^{\text{Relation to war sites}}$$

$$+ \underbrace{\sum_{c \in \{B,T\}} \psi_{c,h}(\epsilon_{i,c,t-1}' \cdot \mathbf{Sites_t})}_{\text{(Bilateral) importance of war sites}} + u_{i,t+h} .$$

- In relation to each war, a country is either a Site, Belligerent, or Third country
- If j goes to war with k in year t, and fighting only takes place on the soil of k...
  - kth row of $Sites_t$ is severity (casualties/local population); other rows 0
  - kth row of $\varepsilon_{j,B,t-1}$ equals k's **population/world population**; other rows 0
  - kth row of $\varepsilon_{i,T,t-1}$ equals k's **population/world population** $\forall i \neq j, k$; other rows 0

Strong adverse effect on war site, small spillovers **on average**

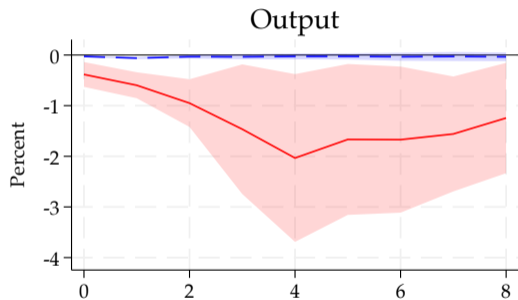Severity 2 percent (casualties/population); size of war site 3 percent (population/world population)
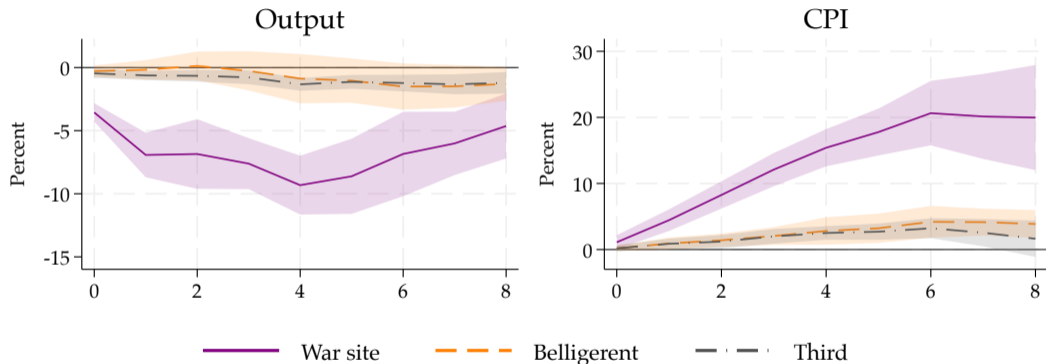
Zooming in: condition spillovers on **trade integration** vis-à-vis sites

$$y_{i,t+h} - y_{i,t-1} = \zeta_h' \mathbf{X}_{i,t} + \sum_{c \in \{S,B,T\}} \phi_{c,h}(\gamma_{i,c,t}' \cdot \mathbf{Sites_t})$$
$$+ \sum_{c \in \{B,T\}} \psi_{c,h}(\boldsymbol{\epsilon}_{i,c,t-1}' \cdot \mathbf{Sites_t}) + u_{i,t+h}.$$

- In relation to each war, a country is either a Site, Belligerent, or Third country
- If j goes to war with k in year t, and fighting only takes place on the soil of k...
  - kth row of $Sites_t$ is severity (casualties/local population); other rows 0
  - kth row of $\varepsilon_{j,B,t-1}$ equals j**'s imports from k relative to j's GDP**; other rows 0
  - kth row of $\varepsilon_{i,T,t-1}$ equals i**'s imports from k relative to i's GDP** $\forall i \neq j, k$; other rows 0

Strong adverse spillovers on **third countries** if close to war site

Severity 2 percent (casualties/population); scenarios of different trade exposure (imports from sites/gdp)
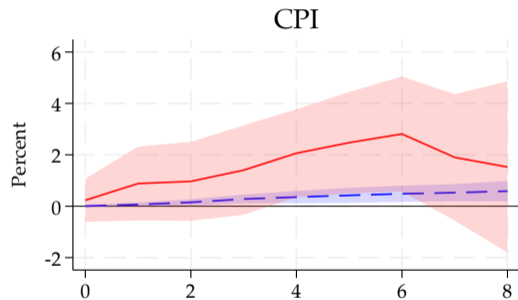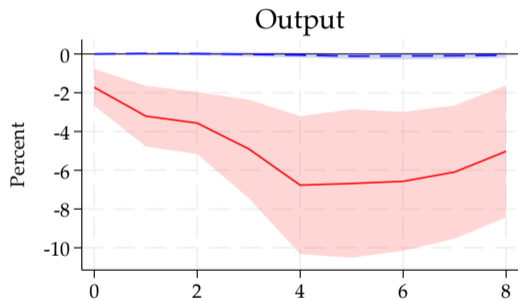
Spillovers on **belligerents**

Severity 2 percent (casualties/population); scenarios of different trade exposure (imports from sites/gdp)
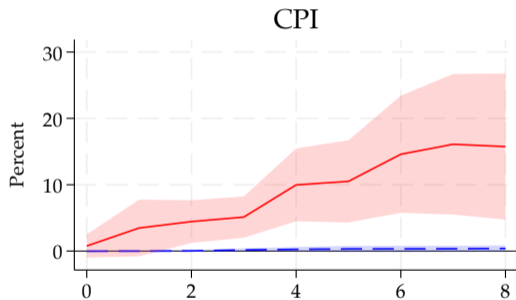
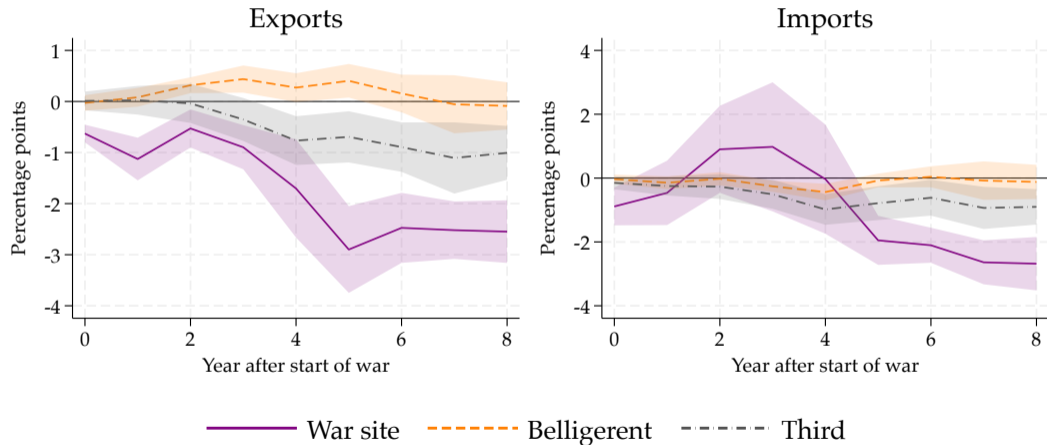# How trade responds

Trade in third countries conditional on integration vis-à-vis war sites

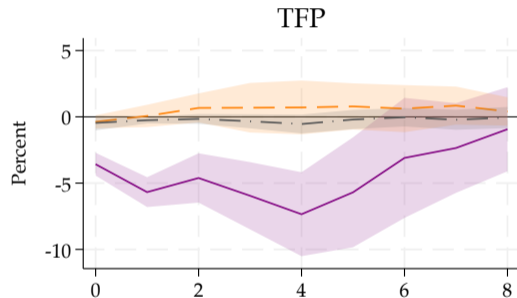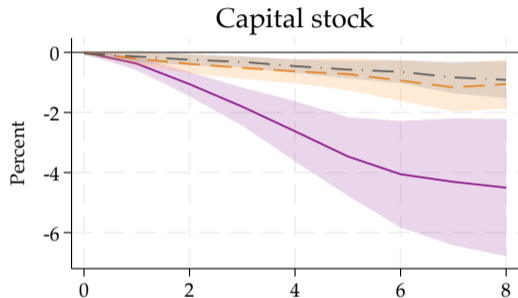Severity 2 percent (casualties/population); scenarios of different trade exposure (imports from sites/gdp)

Exports

Imports
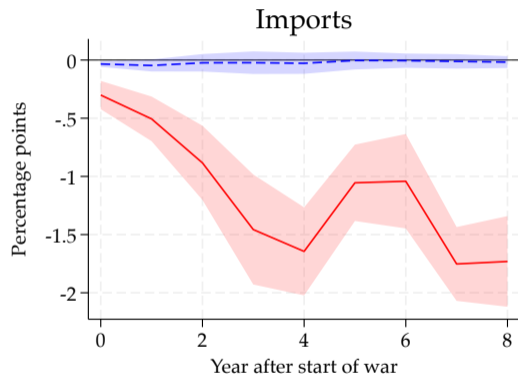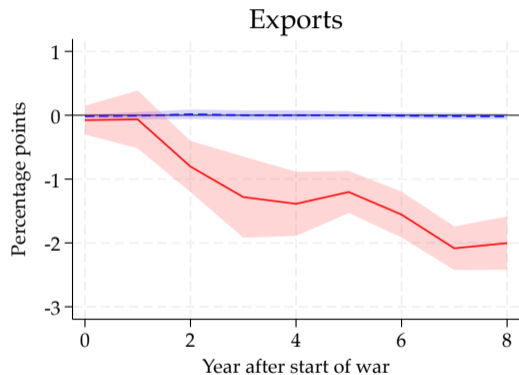
------ Third (exposure = 0%)   ——— Third (exposure = 3%)

Other outcomes

Capital stock and TFP

Severity 2 percent (casualties/population); size of war site 3 percent (population/world population)

Interest rates and equity returns

Severity 2 percent (casualties/population); size of war site 3 percent (population/world population)

Long-term interest rate — Equity return index

— War site — — Belligerent — · — Third
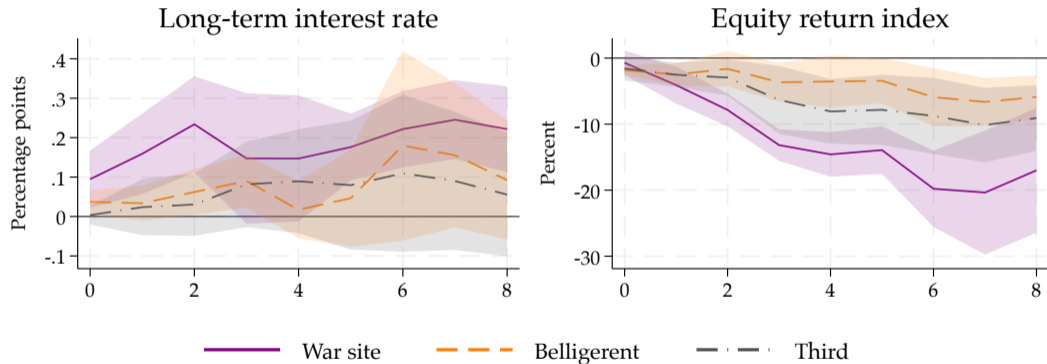
Military spending and personnel

Severity 2 percent (casualties/population); size of war site 3 percent (population/world population)
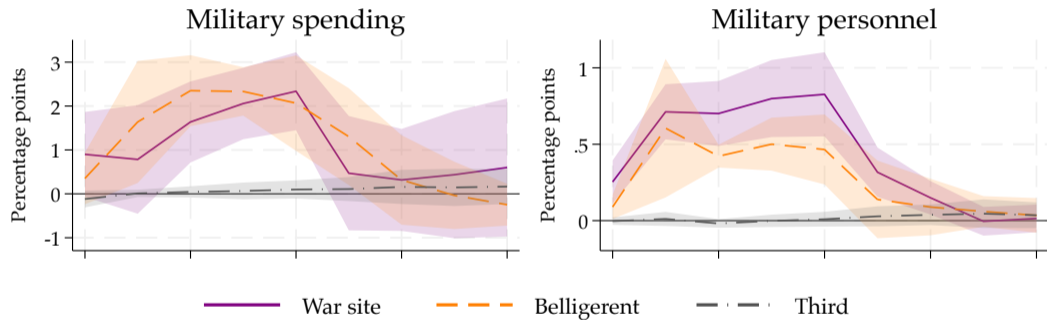
Robustness and further evidence

**Main results robust across various alternative specifications**

- Excluding World Wars (jointly and separately)
- Employing alternative severity measures (geopolitical risk)
- Restrict to shorter and longer wars
- Alternative timing of war shocks
- Control for military strength
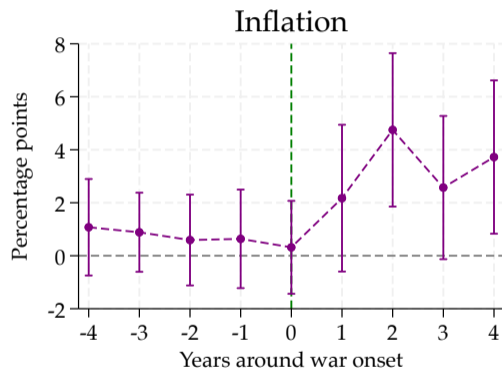- Account for potential non-linear effects

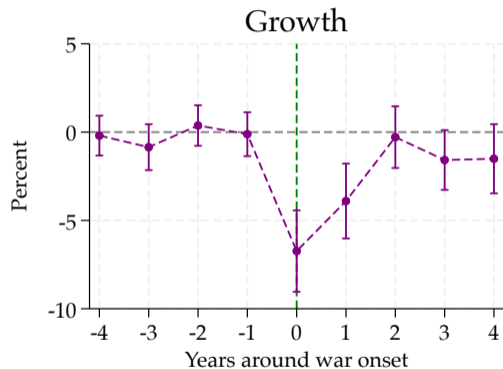**Further evidence**

- Deterioration of democratic institutions
- Winners and losers
- Neighbors at war

Causality

Anticipation effects: <u>other</u> wars

Growth

Inflation
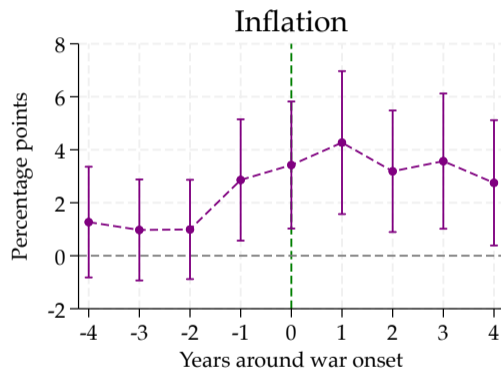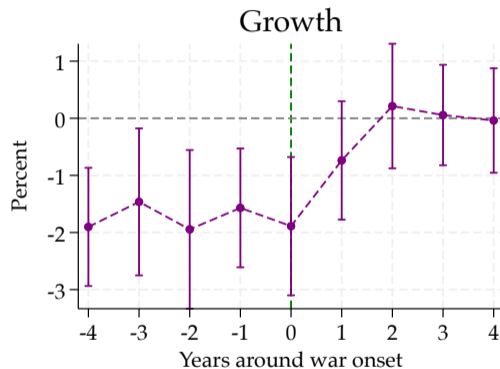
Anticipation effects: <u>interstate</u> wars

Growth

Inflation

Are interstate wars exogenous to the business cycle?

Common assumption in fiscal policy literature

- Military spending (news) good instrument (e.g., Ramey Shapiro 1998, Barro Redlick, 2011; Ramey Zubairy, 2018; Miyamoto et al 2019)

Some evidence that US Presidents more likely go to wars

- In times of economic stress (Ostrom Job 1986)
- During recession & if president up for reelection (Hess Orphanides 1995)

**Verify using a narrative approach a la Romer Romer (2010)**

- Classify *casus belli* for all wars in our sample
- Initial classification according to the warfare encyclopedia by Clodfelter (2017)
- Cross-checks based on more than 80 different (historical) sources

Why countries go to war: 8 non-exclusive categories

| Reason	Explanation	# Wars
Nationalism	Creation of own sovereign state, wars for independence, imperialism	57
Power Transition or Security Dilemma	A rising power challenges a dominant one. Classic examples of the security dilemma in action are situations, where measures taken by one country to increase its security lead others to feel less secure and to take countermeasures, resulting in increased tensions leading to war.	37
Religion or Ideology	Deep-rooted disagreements over religious beliefs or ideologies (e.g., communism)	35
Economic, Long-Run	States might go to war to gain control over trade routes, markets, or valuable resources; rivalry and protectionism	35
Border Clashes	Unclear borders or intensifying border clashes	28
Revenge/Retribution	Wars can be initiated in response to perceived wrongs or to regain lost honor, even if there's no tangible gain	18
Domestic Politics	Leaders may use foreign war to distract from domestic political issues or to rally around a common cause	13
Economic, Short-Run	The economy is in a recession (e.g., unemployment)	6

Focusing on narratively identified interstate wars

Severity 2 percent (casualties/population); size of war site 3 percent (population/world population)

Focusing on narratively identified interstate wars

Severity 2 percent (casualties/population); scenarios of different trade exposure (imports from sites/gdp)

Output | CPI
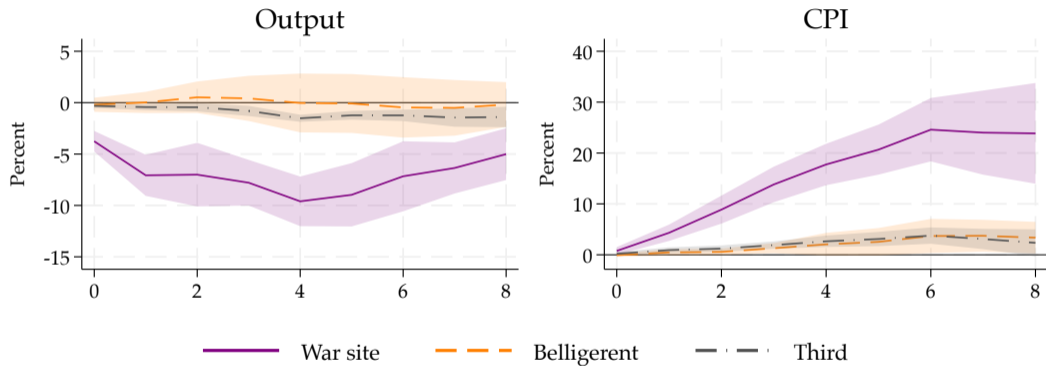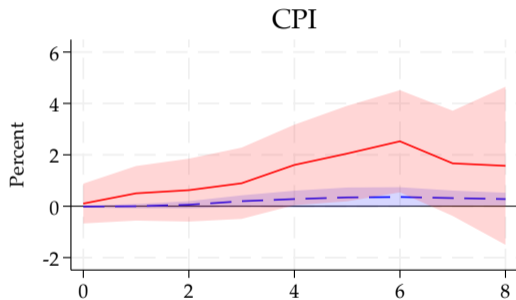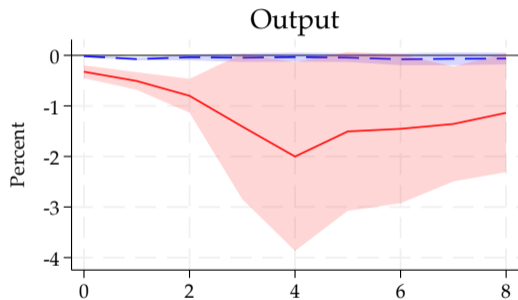
Third (exposure = 0%)   Third (exposure = 3%)

Conclusion

Conclusion

Macroeconomic impact of war

- Large adverse effects in <u>war site</u>
- Yet <u>trading partners</u> pay substantial price too, even if not party to war

Mechanism / policy

- <u>Supply shock dominates</u> in war site and integrated countries as trade falters
- For belligerents: might be (partly) offset by increased military spending
- Monetary policy: difficult trade-off for stabilization policy; particularly in currency unions