Banca d'Italia Public Finance Workshop

Discussion:

High-Frequency Cross-Sectional Identification of Military News Shocks
by F. Amodeo and E. Brigante

Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset
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Overview

1. Cross-paper remarks
2. Paper #1: High-Frequency Cross-Sectional Identification of Military News Shocks
3. Paper #2: Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset

A new context and papers' relevance

- Macroeconomic and fiscal implications of Defense Spending in Europe of increasing importance, due to the geopolitical shift. End of the "peace dividend" era.
- Using US experience due to the historical weight of defence in US budget and the strength of well-integrated US defense industry.
- Readiness 2030 will boost Europe's defence spending:
    - Activation of National Escape Clause for defence
    - SAFE will provide up to EUR 150bn in low interest, long-maturity loans to Member States for joint procurement
    - Accelerating the Savings and Investment Union and Mobilising private capital.
    - Ensuring the European defence industry can produce at the requested speed and volume.
- The contemporaneous and policy relevant nature of both papers is welcomed.

Crosscutting value added

- The two studies provide insightful research and help to advance our understanding of the impact of defence spending shocks.
- Both studies use novel narrative data based on AI search (using firm level) to offer fresh empirical insights.
- Both papers point to potentially strong multiplier effects from higher defense spending, suggesting the potential for such expenditures to serve as catalysts for growth going forward.
- First paper on US, second on EU.

Paper 1 "High-Frequency Cross-Sectional Identification of Military News Shocks"*

Recapping the main steps of the paper

- High-frequency cross-sectional (HFXS) identification: two steps
- 1st step: Identifying the events potentially relevant for change in military spending, using Large Language Models (LLMs, deep research function of ChatGPT)
- 2nd step Estimating the level of the shocks during these events = changes in expectations about future military procurement as price by the stock market.
  - Extracting the excess returns of the stock price of 33 top defence contractors using the asset price model à la Gordon. Contractors should be public traded, salient according to market and dependent on military procurement.
  - A firm-based cross-sectional equation is run on each event identified in the first stage to extract the time-bound shock (invariant across firms)=unexpected percentage change in defence spending at one point in time.
  - Firm are heterogeneously affected by the news shock, which is captured by their reliance on DoD (the share of the official value of DoD contracts in the firm's total sales).
- Application: Deriving a fiscal multiplier using a US regional panel of GDP and government military purchase, estimated with two alternative IV (HFXS shock, Bartik shift-share). Significant value unlike with OLS.

* NB. Assessment based on first available version of the paper (July 2025) before the 2 September version.

Paper 1 “High-Frequency Cross-Sectional Identification of Military News Shocks”

Key takeaways

- Novel framework for identifying military news shocks using high-frequency cross-sectional (HFXS) design.
- The use of Large Language Models (LLMs) and the stock price responses of government contractors to identify and quantify fiscal shocks are valuable extensions of the established methodological approaches.
- *Despite a relatively small sample size*, the results suggest a statistically significant stock–price responses to military news shocks reflecting the concentrated nature of military procurement in the US.
- Regional fiscal multipliers suggest that military news shocks have no significant immediate impact on GDP but generate a statistically significant multipliers of around 1.3 one year after the shock.

High-Frequency Cross-Sectional Identification of Military News Shocks – Empirical Results

Table 2: Extraction of Shock from Cross-Sectional Variation

Event	Shock Trading Date	*Expected Sign*	$d \log G_t$	*pvalue*	*N*	Defense Index
9/11 Terrorist Attack	*September 21, 2001*	+	0.629	0.000	14	+5.2%
			(0.133)			
Invasion of Iraq	*March 19, 2003*	+	0.029	0.406	20	+ 6.4%
			(0.035)			
Bush Speech on Iraq	*January 11, 2007*	+	0.028	0.117	20	+3.1%
			(0.017)			
Obama Election	*November 6, 2008*	-	-0.031	0.327	18	-2.3%
			(0.030)			
Budget Control Act 2011	*August 2, 2011*	-	-0.065	0.002	23	-3.1%
			(0.019)			
Sequestrations	*January 31, 2013*	-	-0.066	0.000	21	-4.7%
			(0.015)			
Russia's Invasion of Crimea	*March 5, 2014*	+	0.038	0.086	21	+1.5%
			(0.021)			
War to Isis	*29 October 2014*	+	0.047	0.065	23	+3.3%
			(0.024)			
First Trump Election	*November 14 2016*	+	0.092	0.042	23	+4.9%
			(0.043)			
Bipartisan Budget Act 2018	*January 31 2018*	+	0.091	0.024	23	+5.8%
			(0.038)			
Bipartisan Budget Act 2019 + Iron Dome	*9 August, 2019*	+	0.101	0.002	23	+3.7%
			(0.028)			
Invasion of Ukraine	*March 1, 2022*	+	0.273	0.000	23	+10.4%
			(0.041)			

Notes: Robust standard errors in parentheses. Last column (Defense Index), refers to the excess weekly returns of the Defense Index. Interquartile range of excess weekly returns of Defense Index is [-1.0%,+1.0%]. 10th and 90th percentiles are -2.2% amd +2.1%.

High-Frequency Cross-Sectional Identification of Military News Shocks – Empirical Results

Table 3: Effects of Military News Shocks on Regional GDP

Horizon	IV: HFXC Military News Shocks			IV: Standard Bartik			OLS	
	Coefficient	pvalue	Effective F	Coefficient	pvalue	Effective F	Coefficient	pvalue
Sample: 2001-2023 - 377 MSAs								
Impact	2.647	0.252	1.462	0.095	0.030	17.088	0.010	0.573
	(2.307)			(0.044)			(0.017)	
Year 1	1.352	0.000	14.939	0.539	0.000	95.193	0.061	0.017
	(0.369)			(0.125)			(0.025)	
Year 2	0.953	0.000	30.558	0.484	0.001	46.408	0.090	0.029
	(0.271)			(0.148)			(0.041)	
Year 3	0.614	0.070	6.257	0.639	0.013	15.239	0.124	0.074
	(0.338)			(0.256)			(0.069)	
Robustness - Sample: 2002-2023 (Without 9/11) - 377 MSAs								
Horizon	*IV: HFXC Military News Shocks*			*IV: Standard Bartik*			*OLS*	
	Coefficient	*pvalue*	*Effective F*	*Coefficient*	*pvalue*	*Effective F*	*Coefficient*	*pvalue*
Impact	-0.112	0.594	9.428	0.124	0.008	17.575	0.009	0.622
	(0.209)			(0.047)			(0.018)	
Year 1	0.609	0.044	17.868	0.494	0.000	100.184	0.052	0.042
	(0.301)			(0.120)			(0.025)	
Year 2	0.571	0.033	12.293	0.437	0.002	42.991	0.078	0.090
	(0.268)			(0.142)			(0.046)	
Year 3	0.620	0.147	6.656	0.638	0.019	10.163	0.123	0.074
	(0.427)			(0.271)			(0.069)	

Notes: Sample includes 377 MSAs from 2001 to 2023. GDP price deflator from BEA, base year 2017. Robust standard errors in parentheses, clustered at the MSA level. Montiel Olea and Pflueger (2013) effective F is calculated with `weakivtest` and coincides with Kleibergen and Paap (2006) statistic for a single instrument.

Comments and suggestions (from easy to harder)

- A very interesting and rich paper! In a quite matured stage.
- Effort also to convey intuition on a sophisticated multi-step analysis. Exploiting the recent advance of AI.
- Comparison with existing literature: Ramey (2011) and Ramey and Zubairy (2018) + residual based approach to control for many dimensions of the change in the return of firm stocks
- Beyond the specific results on defence shocks, the novel two-step methodology (*high-frequency-cross-sectional identification*) could be used to study other news-based fiscal shocks with heterogeneous reactions across firms.
- Suggestion #1: The title could be misinterpreted: identification of Military News Spending Shocks(= news shock to expected military spending).
- Suggestion #2: the key cross-section equation (4) could be better explained for the reader: it is not indicated anywhere that the shocks of interest is $\gamma_{t=r}$ (not $\varepsilon_{i\mathrm{I}t=r}$)

Comments and suggestions (from easy to harder) cont'd

- Suggestion #3: nuance the concluding statement that the estimated fiscal multiplier of defence spending is robust to excluding the biggest shock (9/11 attack), since the indicator is half, from 1,3 to 0,6 one year after the shock.
- Suggestion #4: run further robustness checks, for instance:
  - Run cross-section equation (4) on the events narratively identified by Ramey and Zubairy (2018), instead of the Large Language Models.
  - Use alternative prompts to see if it narrows or extends the number of defence shocks identified (need for LLM model sensitivity test, given the risk of black box)

Further questions

- The asset price model is reliant on a number of key assumptions (current earnings proxy future profitability, long term interest rates derived from short term interest rates etc.). How sensitive are the results to the main assumptions within the asset price model?
- Are the results also sensitive to the measurement of firm's reliance on DoD contracts and the length of the window used to analysis stock market returns.
- Can the high-frequency cross-sectional (HFXS) methodology be extended to the situation of Europe with a more fragmented industry and less integrated and less liquid financial markets? What adjustments would be necessary to the asset price model measuring stock market returns?

Paper 2: "Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset"

Recapping the main elements of the analysis (based on the available PPT)

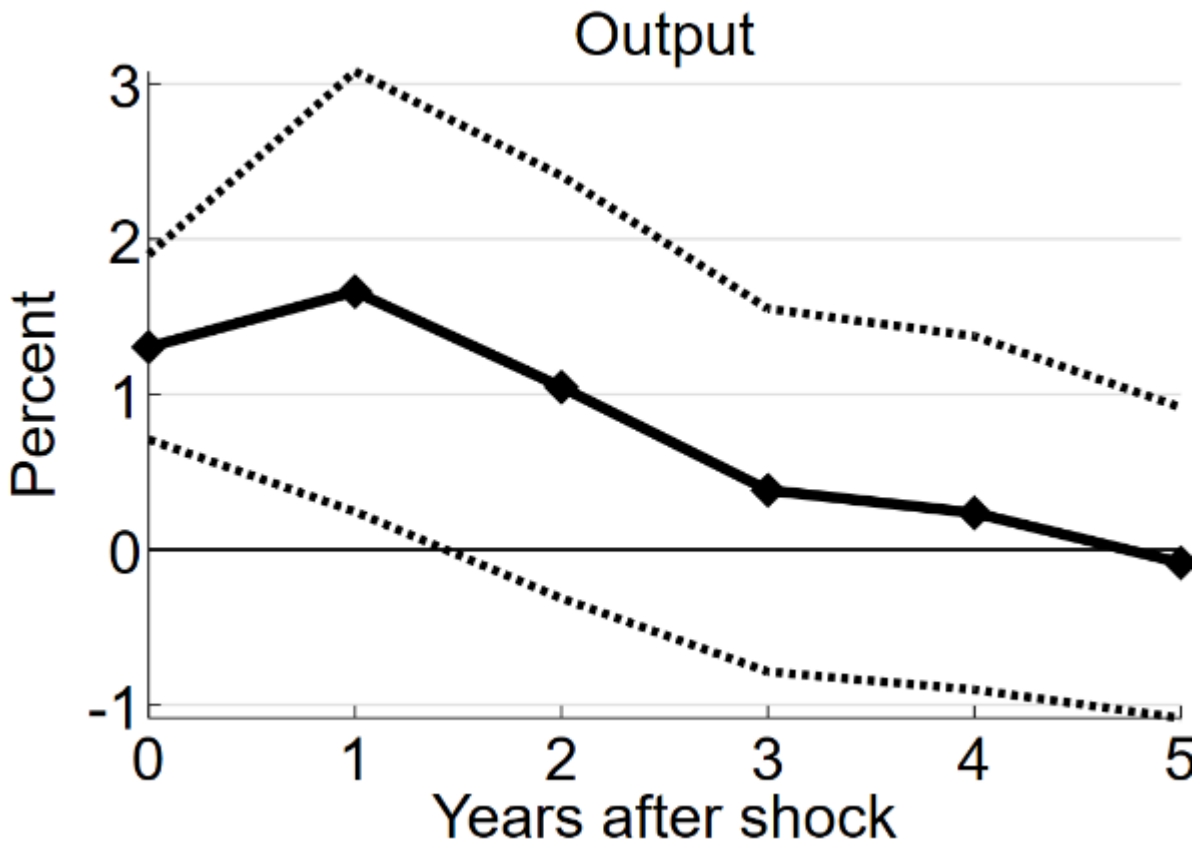
- 1st analysis: Estimate the direct and spillover effects arising from SIPRI on military spending
  - Cumulative multiplier effect estimated à la Ramey and Zubairy (2018), extending the work by Sarasa-Flores (2025) by looking through both demand and supply side channels. Additional sensitivity analysis (narrower sample EU countries, non-EU bordering countries).
  - Spillover effects on both intra-EU and extra-EU trade following Auberach and Gorodnichenko (2013) approach.
- 2nd analysis: Construct novel defence procurement dataset:
  - Constructing the dataset: making use of innovative large language models (Taiyo.AI) to extract procurement estimates from publicly accessible databases (Opentender and TED).
  - Zooming in on the French case to demonstrate the potential value-added of the high frequency database (monthly frequency, in-depth insights on spending components)

Paper 2: “Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset”

Key takeaways

- Macro results suggest higher defence spending leads to an immediate temporary direct impact (1.3 initial multiplier) as both domestic demand and supply responds positively to the shock.
- Significant spillover effect are also evident via the trade channel.
- A novel use of publicly accessible procurement information enabling fresh insights into both the composition of defence spending as well as the macroeconomic implication.
- The higher-frequency evidence for France points to an output response of similar magnitude, accompanied by substantial movements in financial variables.
- Potential for the research to be extend further generating more granular insight at a country/regional level

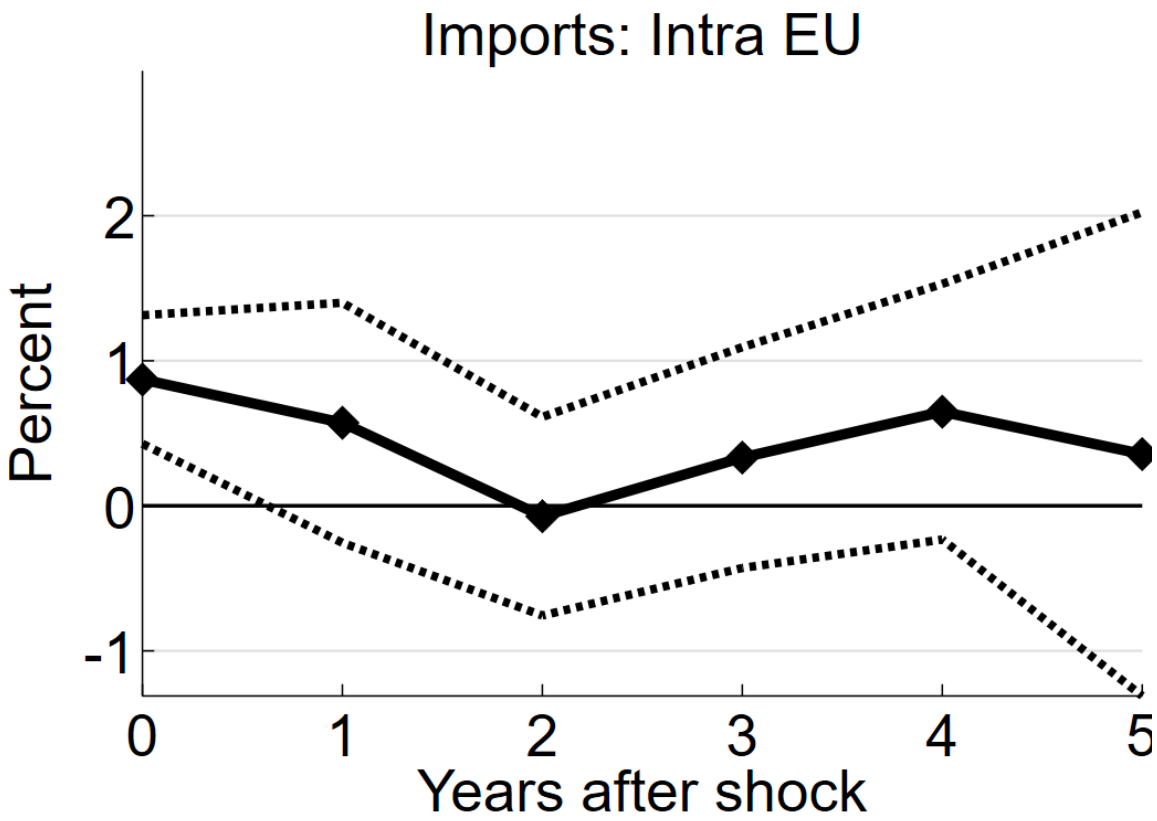
Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset - Empirical Results

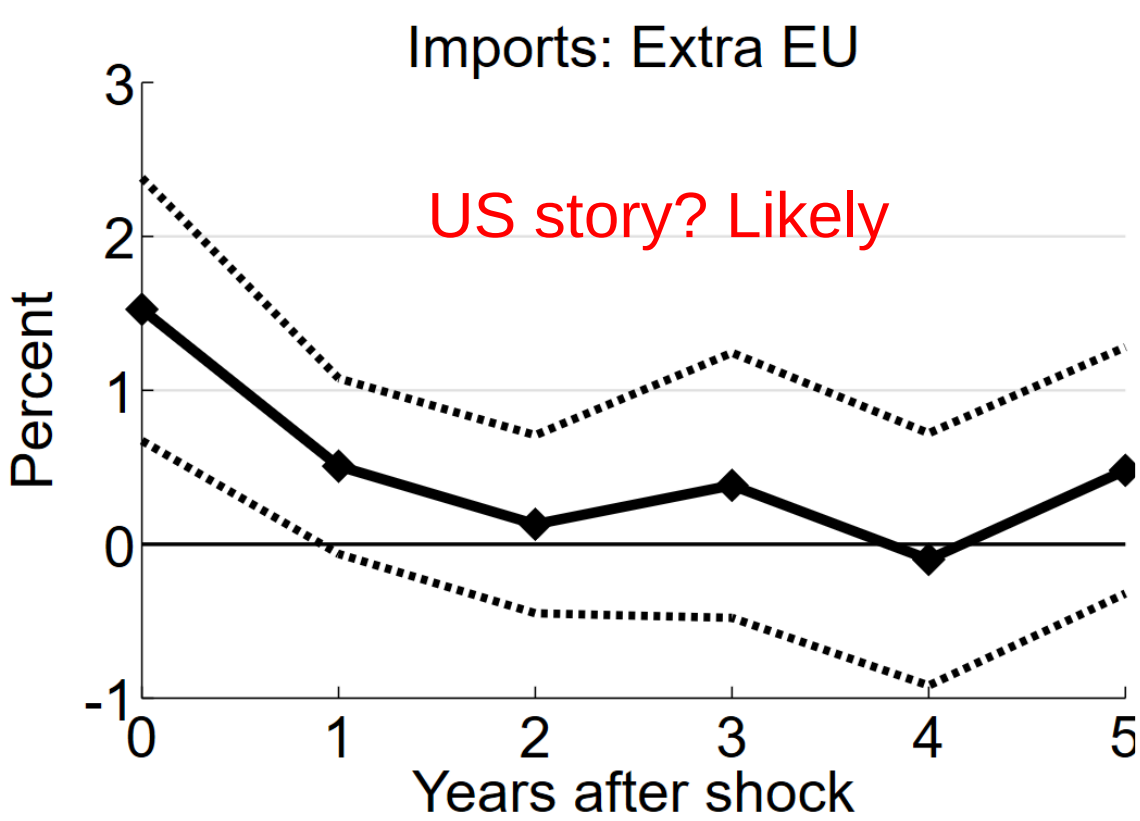


Cumulative multipliers

On impact	1.3***
1 year	1.7**
2 years	1.9*
3 years	1.9
4 years	2.1
5 years	1.9

Macroeconomic implications of Defense Spending in Europe: Lessons from a New Procurement Dataset - Empirical Results





Comments and suggestions

- As in the first paper, the innovative use of artificial intelligence is commendable.
- Less mature shape: no paper available. Need to second guess in the discussion.
- Containing: i) standard but multifaceted macro analyses (with some novel adjustments, incorporating demand and supply side effects); ii) first micro analysis based on a new procurement dataset.
- Although the presentation provides high level results, further empirical estimates are required *to verify their robustness*, for instance the supply-side response to defence spending.
- Checking the impact of US on the spillover indicator: Impulse response without the US
- The defence procurement estimates do not account for compensation of employees, which is the largest single component of COFOG defence expenditure. This limitation may reduce the generalisability of the results.
- The sensitive analysis suggests a sharp difference between the multiplier for the EU-14 sample compared to the other 13 member states. This may warrant further examination to explain the underlying dynamics.

Further questions

- The research points to significant heterogeneity across different components of defence procurement. Could you provide more insights into which components have the most substantial impact on output and why?
- Given that some defence procurement contracts (smaller size, sensitive/confidential in nature) could be omitted from the narrative database, how confident are you that the data is representative of defence procurement in general?
- How do you plan to extend this analysis to other EU countries? Are there sufficient procurement contracts at a country level to reproduce this analysis across each member state?