Geoeconomic Pressure

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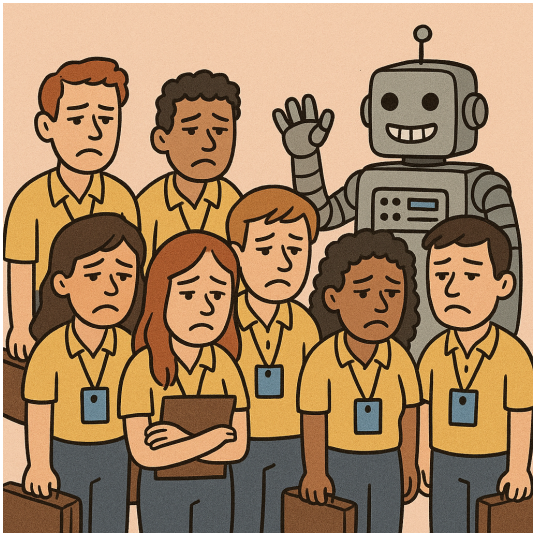
Questions

1. Which governments apply pressure to which foreign targets?
2. Which instruments, firms, and products are affected?

What this paper does



- Analyze the text of firm earnings calls and analyst reports, 2008–2025
- LLMs identify geoeconomic pressure event mentions and characterizes them in detail
- Automated structured data collection from unstructured text

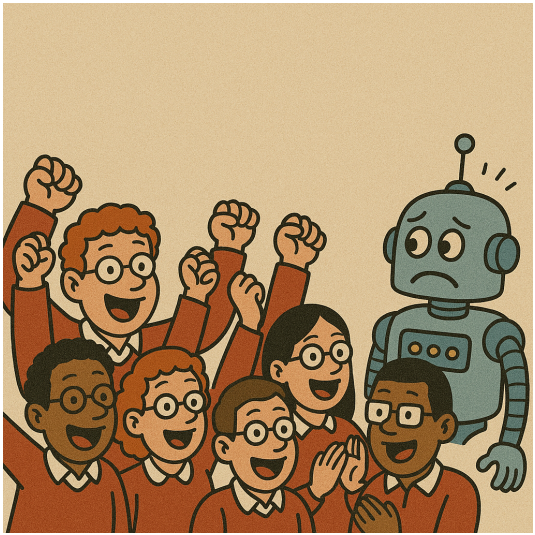
Main findings

1. Most pressure is applied by the US and China, mainly against each other
2. Firms affected by tariffs mainly change prices, but firms affected by export controls mainly invest in R&D
3. Firm response to pressure differs for firms located in pressuring, pressured, or uninvolved countries

Contribution

- First to use LLM-based textual analysis to measure geoeconomic pressure and how firms respond to it
- Early work in economics relied on simpler word count models
  - e.g. Gentzkow-Shapiro (2010), Baker-Bloom-Davis (2016), Manela-Moreira (2017)
- Closest preceding relatives:
  - Hassan-Hollander-van Lent-Tahoun (2023): Use earnings call text to show firms most exposed to Brexit uncertainty lost significant market value and reduced hiring and investment
  - Jha-Manela-Liu (2021, 2025): Use an LLM to measure popular sentiment toward finance in millions of books published in eight countries over hundreds of years
- Contemporaneous LLM working papers: basically the entire profession ...
  - See Hoberg-Manela (2025) for a survey

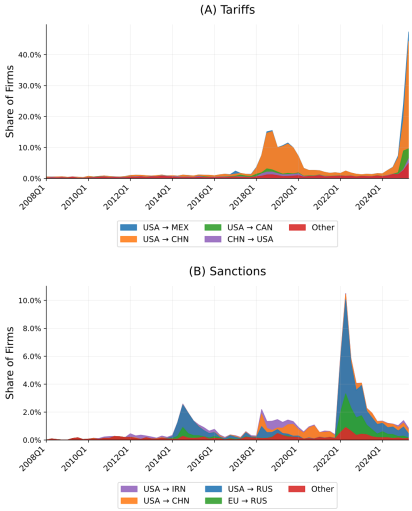
Contribution



- LLMs and earnings text is not the only way to measure geopolitical pressure
- Morgan et al. (2009) and Felbermayr et al. (2020) introduce sanctions datasets going back to 1950s based on old fashioned reading of policy documents and newspaper articles
- They find that:
  - sanctions are increasingly used over time (consistent with current paper)
  - European countries are most frequent users and African countries the most frequent targets (at odds with current paper)

Training leakage and lookahead bias with LLMs

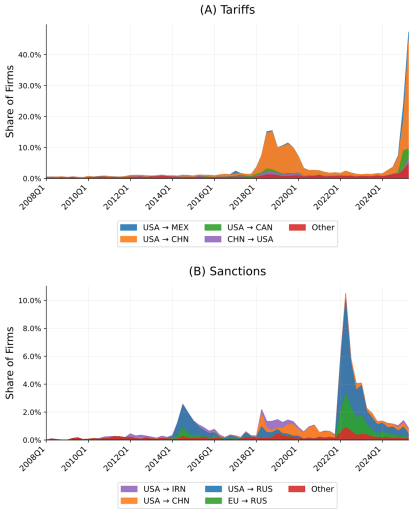
Figure 2: **Geoeconomic pressure: aggregate trends**



- Did we go from a free trade utopia in 2008 to a highly segregated world in 2025?
- Or LLMs trained on recent data bias toward recent manifestations (Sarkar-Vafa, 2024)?

Training leakage and lookahead bias with LLMs

Figure 2: **Geoeconomic pressure: aggregate trends**



- Did we go from a free trade utopia in 2008 to a highly segregated world in 2025?
- Or LLMs trained on recent data bias toward recent manifestations (Sarkar-Vafa, 2024)?
- Even thoughtful prompts can overfit

Prompt Excerpt

- Tariffs are defined as taxes imposed on imported foreign goods. These must be imposed by the importing country in order to be classified as tariffs. Tariffs are not export restrictions, quotas, embargoes, financial sanctions, boycotts, or non-tariff barriers.

  [. . .]

- A field called ***countries_imposing***, listing the countries whose tariffs policy the firm discusses, if any. For example, if the firm reports concerns about tariffs imposed by the US government on goods imported from China, this field should say "USA".

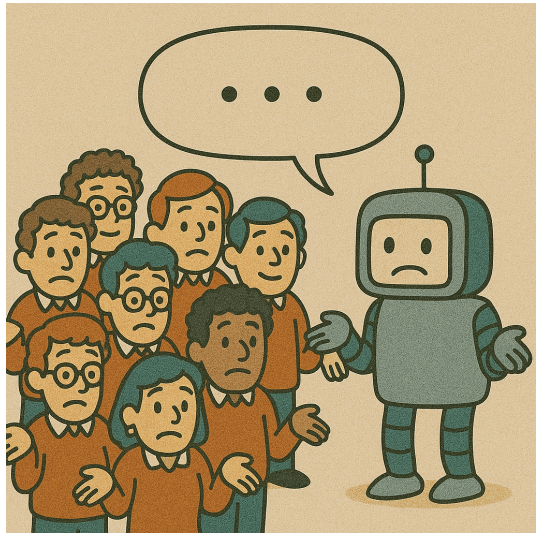
- Is this why Brexit—a potential EU-UK tariff spike—doesn't show up in the graphs?

Training leakage and lookahead bias with LLMs

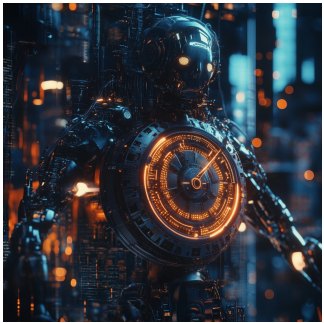
- Ludwig-Mullainathan-Rambachan (2025) provides useful guidance:
  - In prediction tasks use only LLMs trained with no leakage between their training data and the researcher's sample
  - In measurement tasks, in addition need to assume small measurement error
  - Recommend to collect validation data to assess the errors from LLM automation
- Where would one get validation data for geopolitical pressure?
- What about leakage free LLMs?

Human validation is no panacea

- A popular approach is to hire human domain experts (aka graduate students) and manually classify a subsample of the text
- But what data were these humans trained on?
- Can they ignore what they know about the importance of say rare earth materials for geoeconomic pressure?



Training leakage and lookahead bias free with *ChronoGPT*



- He-Lv-Manela-Wu (2025a) train a suite of chronologically consistent LLMs only on preceding text
  - For example, $ChronoGPT_{1999}$ is trained only on text available in 1999
- He-Lv-Manela-Wu (2025b) instruction-tune these models to behave more like modern GenAI
  - Publicly available on hugging face
- If SOTA LLMs are required, try entity neutering (Engelberg-Mullins-Manela-Vulicevic, 2025)
  - Repeatedly mask and paraphrase the text until an LLM cannot identify the firm or the time

ChronoGPT as a time capsule

Complete the sentence "U.S. policy on rare earth materials aims to _____"

ChronoGPT as a time capsule

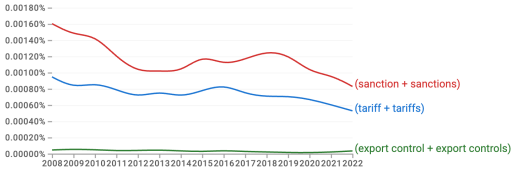
Complete the sentence "U.S. policy on rare earth materials aims to _____"

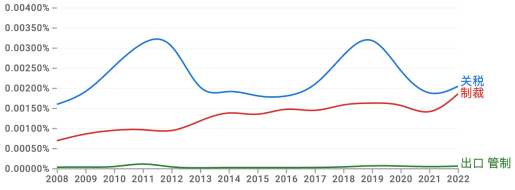
ChronoGPT Theme	Completion
2008 National Defense	promote **"global security."** The policy has attracted criticism within the United
2009 Sustainability	prevent accidental ignition of a nuclear reactor or a radioactive waste waste dump.
2010 Sustainability	prevent smuggling as well as to **promote sustainable energy** usage.
2011 Sustainability	**promote local growth and economic development**, as well as to facilitate U.
2012 Public Safety	promote **safe practices** in manufacturing and distribution to protect employees and community, and
2013 Sustainability	promote its global use in the future and the promotion of **green technology**.
2014 Public Safety	promote **safe products** and promote the development of the materials.US Government's
2015 Sustainability	promote access to rare earths **for all people** as well as development of
2016 Sustainability	encourage energy companies to **make the most of** their deposits. At the same
2017 National Defense	ensure security supplies are made from **domestically-sourced materials** whenever possible.
2018 Sustainability	promote **Renewable Resource Recoveries**. A new analysis of NASA,
2019 National Defense	encourage **more investment in R&D**. In 2009, India began to
2020 National Defense	promote export opportunities for **domestic producers**, which would contribute to global trade.
2021 National Defense	promote technology as a **source of national defense**, not as competition, and
2022 Supply chain resili	**ensure safe markets** for those materials and promote economic sustainability. Since 2009,
2023 Supply chain resili	increase and preserve the **US supply chain**.
2024 Supply chain resili	increase and strengthen the **global supply chain**.

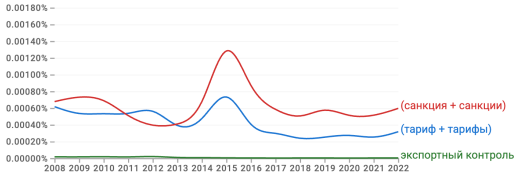
LLMs and humans interpret text within the context of their training data

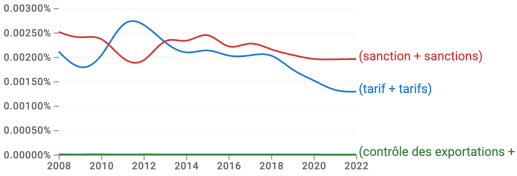
Historical perspective

Geoeconomic pressure mentions in American English, Chinese, Russian, and French, 2008–2022





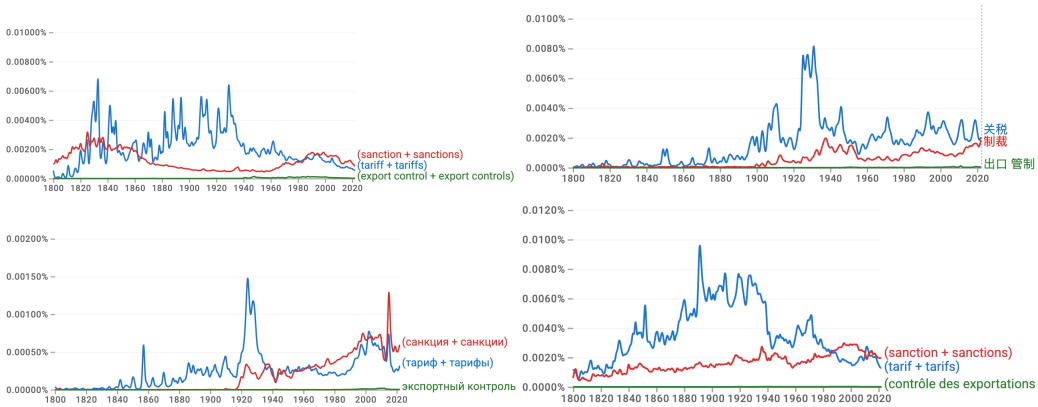




Source: Google Books Ngram Viewer

Historical perspective: tariffs are historically low, sanctions rising

Geoeconomic pressure mentions in American English, Chinese, Russian, and French, 1800–2022



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Measurement uncertainty

- Paper quantifies LLM measurement uncertainty by:
  - varying different open-weight models
  - varying prompts
- Finds model variation generates greater measurement uncertainty
- I suggest:
  1. Think through and correct for generated regressor problem (see Manela-Moreira, 2017 for a bootstrap solution)
  2. Classic bootstrap here would train the LLM on data subsamples and quantify the variation in point estimates across these models (expensive!)
  3. Modern LLMs by frontier labs use basically the same data (all text on the internet + scrapes of text from before it). In the limit these models converge and the comparison advocated may not be meaningful

Organizing theoretical framework

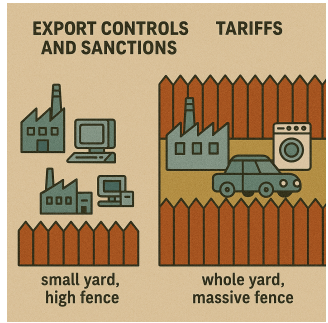
- I didn't learn much from the organizing framework
- Upshot seems to show "Ultimately, firms comply with government demands when they would otherwise be worse off, that is $V\left(x^*, Z, \overline{\theta}, \tau\right) \geq V(x^*, Z, \underline{\theta}, 0)$"
  - Obvious?
  - Wrong notation? optimality is usually about an inequality varying the firm's choices, not the government's. I expected something like

$$V(x^*, Z, \theta, \tau) \geq V(x, Z, \theta, \tau)$$

    for some or all other potential actions x, taking government policy θ, τ as given
- Explain better / connect to the empirics / omit

My Take

- Geoeconmic pressure is a fascinating and topical phenomena
- Good candidate for measurement with textual analysis
- Authors deserve credit for reproducibility goals
- My favorite insight:
  - Export controls and sanctions are applied using very specific sectors and target countries (small yard, high fence)
  - Tariffs are instead applied broadly both in terms of the countries receiving the pressure and the sectors being used (whole yard, massive fence)
  - I find this quite interesting and hope the authors can dig into the why
- Overall, careful work on an important topic, and I encourage everyone to read it!



Appendix / Minor Comments

- Setting temperature to zero is not full proof as far as I know. Have you checked that you get the same results from repeated runs of the LLMs in your exercise?
- "can help shed light on these crucial topics" is a bit vague as an objective
- It's great that you are mindful of computation costs. But, is the two step process really needed? Can't you use a single longer and more general prompt? If so, it would be cheaper to run.
- Is the finding that most pressure is US vs. China due to sample construction, which focuses a lot on the US and China?