

# Causal Micro-Narratives

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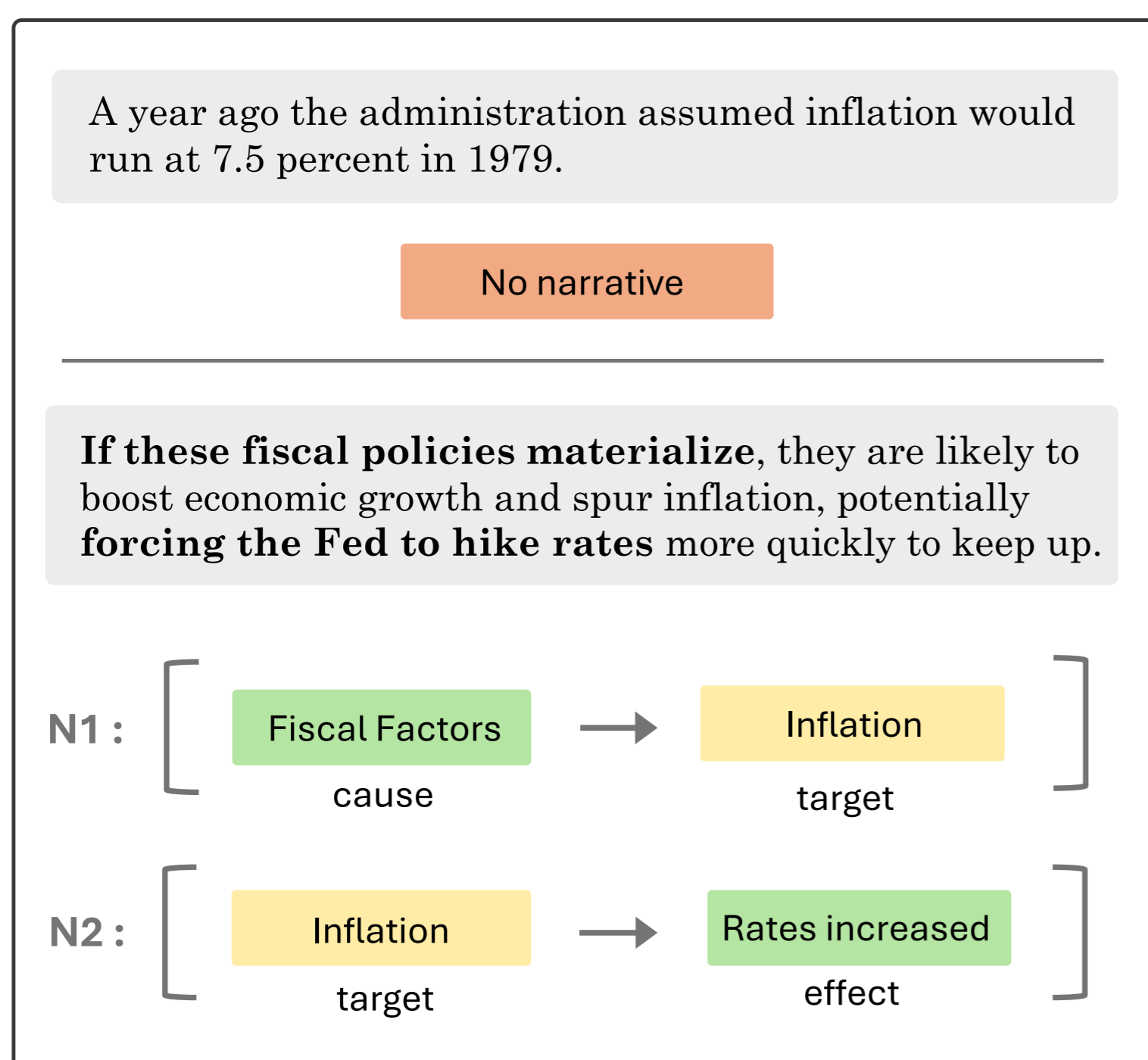
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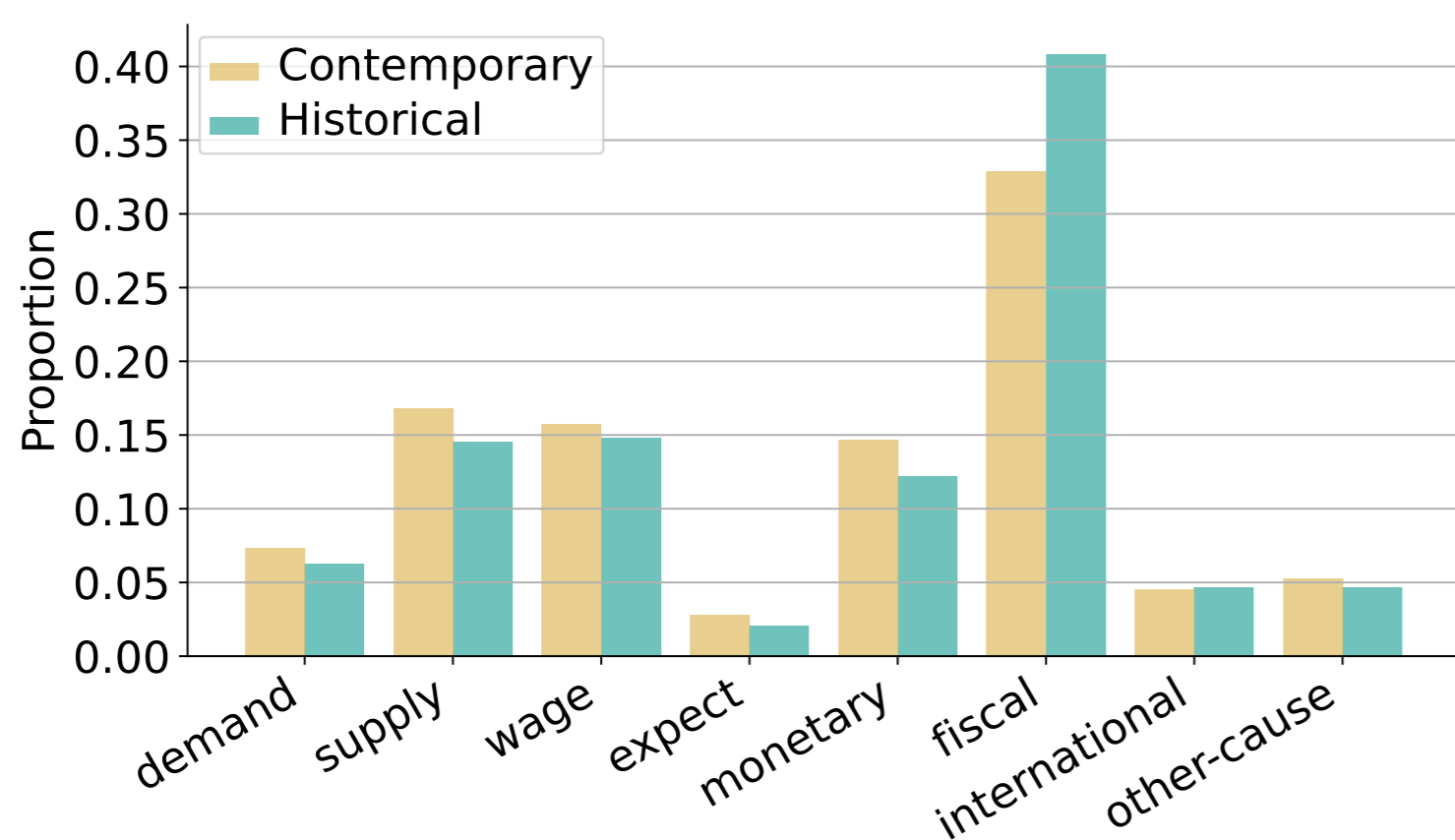
## Motivation

- How do narratives shape individual and collective behavior in social, economic, and political contexts?
- There is a growing recognition of narratives' importance in economics and social sciences, highlighted by Nobel laureate Robert Shiller's emphasis on their role in economic change and forecasting.
- Current challenges include formulating an operational definition of narratives and developing techniques to uncover and quantify their prevalence and influence in naturally occurring text and speech.

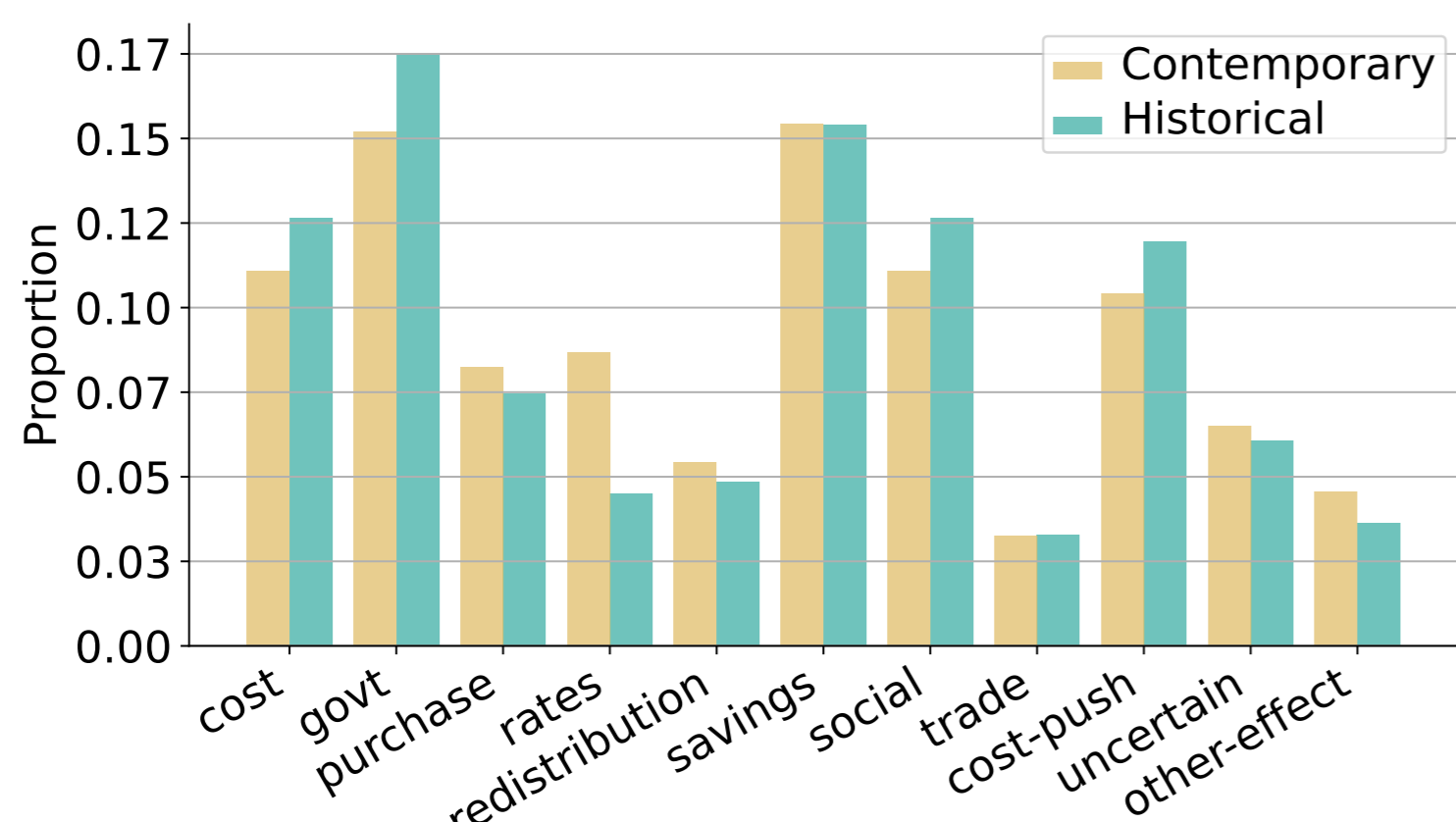
## Definition & Inflation Case Study



- We define a *causal micro-narrative* as a sentence-level explanation of the cause(s) and/or effect(s) of a target subject.
- We propose an ontology of causes and effects of inflation, and we create a large scale dataset of causal micro-narratives according to this ontology, classifying sentences from contemporary and historical U.S. news articles.



(a) Inflation cause narratives in labeled data.



(b) Inflation effect narratives in labeled data.

## Predicting Causal Micro-Narratives

	Llama3.1	Phi-2	GPT-4o
<b>Binary</b>			
Hist.	0.78	<b>0.83</b>	0.47
Contemp.	<b>0.87</b>	0.79	0.63
<b>Multiclass</b>			
Hist.	<b>0.62</b>	0.60	0.46
Contemp.	<b>0.71</b>	0.65	0.57

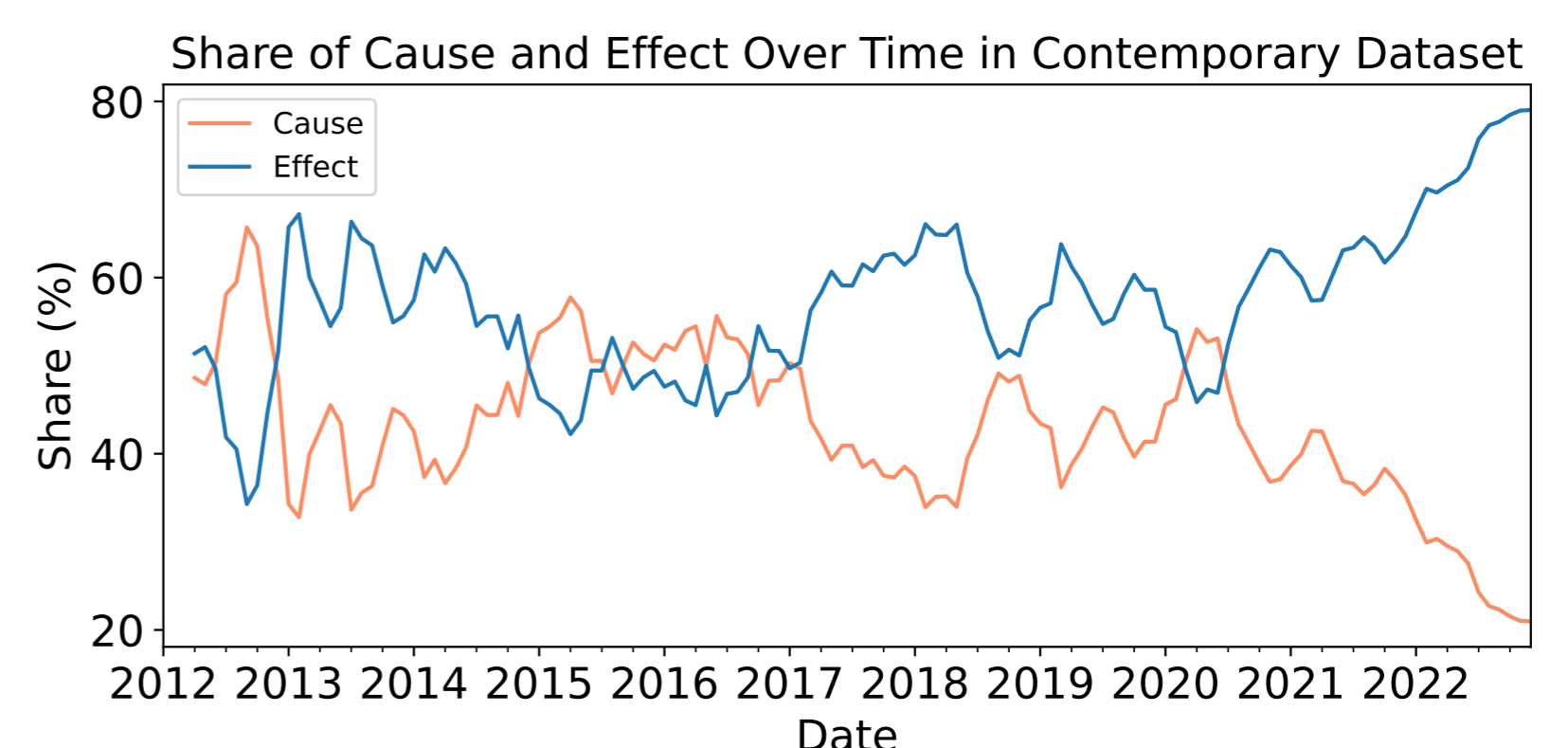
- The best model achieves F1 scores as high as 0.71, despite the difficulty of the task, having 18 classes that in some cases are semantically similar.
- Smaller fine-tuned large language models (LLMs) outperform larger models like GPT-4o, while also being more scalable and cost efficient.
- The errors produced by LLMs that are fine-tuned on our human-annotated data reflect the natural disagreements between annotators.

Sentence	Llama 3.1 8b	Majority Label
He said inflation was every American's problem and that the nation's economic, military and spiritual strength depended on solving it.	<b>no-narrative</b>	<i>social/political</i>
'They have and will cause Inflation to accelerate in the state and the Chicago area, destroy jobs that otherwise would be available, lower family income, and increase taxes,"he said.	<b>fiscal</b>	<i>govt, purchase, cost-push</i>
"Inflation has slowed, but people's perception of that changes," he said.	<b>no-narrative</b>	<b>expectations</b>
Consequently, increases in valuation due to inflation do indeed raise the number of actual dollars in property taxes owed.	<b>govt</b>	<b>savings</b>

Figure 2. Comparison of fine-tuned LLama 3.1 8B and human annotations. **Bold** = causes. *Italics* = effects.

## Ongoing Work & Corpus-Level Analysis

- Can we generate interpretable narratives (causes and/or effects) of a user-defined target, without given user-defined categories?



- What does the geographic distribution of inflation narratives look like over time?
- Are inflation narratives "contagious" in the sense of spreading from one location to another?
- Do inflation narratives predict economic variables of interest, even controlling for commonly used predictors?