The Macroeconomic Effects of Climate Policy Uncertainty

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Motivation

Uncertain Times for Climate Policy

Paris climate accord to take effect; Obama hails 'historic day'

By **Alister Doyle** and **Roberta Rampton**

October 5, 2016 5:03 PM PDT · Updated October 5, 2016

Aa

U.S. President Barack Obama delivers a statement on the Paris Agreement in the Rose Garden of the White House in Washington, U.S., October 5, 2016. REUTERS/Yuri Gripas Purchase Licensing Rights

U.S. **climate policy** marked by reversals and uncertainty

- Inconsistent stance on Paris agreement

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U.S. **climate policy** marked by reversals and uncertainty

- Inconsistent stance on Paris agreement
- Many other examples . . .

Uncertain Times for Climate Policy

(a) Timeline of the U.S. stance on the Paris Climate Agreement

- **2015**: Obama announces the adoption of the Paris Agreement
- **2017**: Trump announces that the U.S. will withdraw from the Paris Agreement
- **2020**: U.S. officially withdraws from the Paris Agreement
- **2021**: Biden rejoins the Paris Agreement
- **2025**: Trump announces to withdraw again from the Paris Agreement

(b) Timeline of the Waxman-Markey bill

- **2009**: Waxman-Markey bill introduced in the House
- **2009**: Bill passed in the House
- **2010**: Bill effectively abandoned in the Senate

(c) Timeline of California's waiver to set stricter emissions standards

- **2005**: California requests waiver
- **2007**: EPA under Bush denies waiver
- **2009**: EPA under Obama grants waiver
- **2019**: EPA under Trump revokes waiver
- **2022**: EPA under Biden reinstates waiver
- **2025**: Senate votes to revoke waiver

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- Inconsistent stance on Paris agreement
- Many other examples . . .

Salient dimension of policy uncertainty

- Makes it difficult for firms and households to plan

How does climate policy uncertainty affect the economy?

This Paper

Construct a new measure of climate policy uncertainty (CPU) based on *newspaper coverage* in the United States

- Building on approach by Baker, Bloom, and Davis (2016)
- Index spikes near important events related to climate policy

  Presidential announcements on international climate agreements, congressional debates on climate bills, or disputes about the right of the EPA and states to regulate emissions …

Identification challenge: CPU may increase in response to economic downturns

- Propose new IV approach: Isolate plausibly exogenous increases in CPU, quantified using newspaper coverage in tight window around events

Provide new estimates on the **dynamic causal effects** of CPU

Results: Aggregate Impacts

Climate policy uncertainty has significant macroeconomic effects

- Higher uncertainty causes fall in **output**, private **investment**, and **employment**
- But also increases **commodity** and **consumer prices**
- Emissions fall following economic contraction, **no green paradox** at aggregate level

Climate policy uncertainty transmits to the economy as supply shocks

- Unlike **economic policy uncertainty**, which moves output and prices together
- Important implications for monetary policy

No increase in other measures of uncertainty

- Climate policy uncertainty is a distinct source of policy uncertainty

No effect on government spending and emissions intensity unchanged

- Successfully capture uncertainty and not news

Results: Firm-Level Effects

Climate policy uncertainty has substantial firm-level impacts

- Firms view climate policy uncertainty as material financial risk

Firms respond more strongly when their **climate change exposure** is high

Rich **sectoral heterogeneity** in firm-level responses

- Most sectors lower investment and R&D
- Mining, oil, and utilities increase investment

But: R&D decreases particularly strongly in these sectors

- **Green paradox** at micro level
- Exacerbate transition costs through misallocative forces

▸ Literature

Measuring Climate Policy Uncertainty

Defining Climate Policy Uncertainty

Definition: Lack of clarity/predictability of government actions on climate change

- Focus on climate policy with national significance
- Includes uncertainty about new climate policies as well as political/legal challenges to existing policies

Measurement is challenging:

- Follow approach by Baker, Bloom, and Davis (2016) leveraging informational content in **newspaper articles**

Measuring Climate Policy Uncertainty

Idea: Use dictionary of words whose occurrence in newspaper articles is associated with coverage of topics related to CPU

- `Climate`: *climate change, carbon dioxide, greenhouse gas, clean energy, ...*
- `Policy`: *regulation, legislation, white house, congress, ...*
- `Climate policy`: *carbon tax, emissions trading, EPA, climate bill, ...*
- `Uncertainty`: *uncertain**

Dictionary Source: Corpus of news articles from specialized climate policy reporting agencies:

Inside Climate News, Inside EPA, Washington Week (Energy)

Selection: Identify article as CPU if it contains at least one term in:
(`Climate` AND `Policy` AND `Uncertainty`) OR (`Climate policy` AND `Uncertainty`)

Figure 2: Climate Policy Dictionary by Category

(a) Climate Change

(b) Policy

(c) Climate Policy

Measuring Climate Policy Uncertainty

Sample: 7.87 million news articles published in leading American newspapers from mid-1980s

- New York Times, Wall Street Journal, Washington Post, LA Times
- Comprehensive and systematic coverage of national climate policy developments

Construction: Index counts, each month, the number of articles discussing uncertainty about climate policy, divided by the total number of published articles

- Manual and LLM review of article samples reveals few false positives
- Results robust to varying dictionary terms, expanding set of newspapers, and normalization

Validation

Climate Policy Uncertainty Since the 1980s

Figure 3: Climate Policy Uncertainty Index

Climate Policy Uncertainty Since the 1980s

Climate policy uncertainty increased substantially, especially in recent years

- Some notable spikes in rst part of the sample, marked increase in late 2000s amid emissions trading proposals
- Stark increase in uncertainty following Paris agreement and election of Trump

Index uncorrelated with VIX and geopolitical risk

Index weakly correlated with EPU and trade policy uncertainty

- Results robust to controlling for other uncertainty measures
- CPU captures distinct variation from other dimensions of policy uncertainty

Identi cation

Identi cation

Uncertainty about climate policy may increase in times of economic distress

Isolate plausibly exogenous increases in climate policy uncertainty

- Driven by climate-related, political, or ideological considerations

Based on narrative account of U.S. climate policy history, identify 146 events

- Legislative, regulatory, & judicial actions leading to climate policy uncertainty ▸ More

Examples:

- Inconsistent stance on international agreements like Kyoto or Paris agreement
- Debates over proposed legislation such as cap-and-trade policies
- Disputes about the right of the EPA and states to regulate emissions

IV for Climate Policy Uncertainty

Events may contain both policy news and uncertainty. But:

{ Changes in policy stringency and uncertainty often move in opposite directions

{ Direction of stringency is readily observed

Our approach thus consists of two steps :

1. Measure change in climate policy reporting intensity around events d:

$$cp^{intensity}_{i;d} = n^{cp}_{i;d} \quad n^{cp}_{i;d \quad 1}$$

2. Purge reporting intensity from changes in climate policy stringency

$$cp^{intensity}_{i;d} = \quad {}_{i} + \quad {}_{i} \quad cp^{stringency}_{i;d} + \quad cp^{uncertainty}_{i;d}$$

Aggregate over newspapers and time to monthly IV series, $cp^{uncertainty}_{t}$

Major Climate Policy Uncertainty Events

Figure 4: Climate Policy Uncertainty Event Series

Diagnostics

Econometric Framework

Use $z_t = cp_t^{uncertainty}$ as IV to identify a climate policy uncertainty shock

Identifying assumptions :

▸ Details

$$E[z_t \varepsilon_{1,t}] \neq 0 \qquad \text{(Relevance)}$$

$$E[z_t \varepsilon_{2:n,t}] = 0, \qquad \text{(Exogeneity)}$$

Estimation: We rely on VAR techniques:

- Sample: 1985 – 2019
- Specification: 6 variables, 12 lags

  CPU index, industrial production, unemployment rate, commodity prices, consumer prices, policy rate

  ▸ Data

Use local projections as robustness and to map out wider effects

▸ More

Aggregate E ects

Macroeconomic E ects of Climate Policy Uncertainty

Figure 5: Baseline VAR

Signi cant fall in industrial production and rise in unemployment

Commodity and consumer prices increase

Monetary response is ambiguous

Transmit more like supply shocks

LP-IV

Macroeconomic E ects of Climate Policy Uncertainty

Figure 6: Impacts on GDP, Emissions and Investment

- Signi cant fall in GDP and investment
- No response of government spending and investment
- Emissions fall but emissions intensity unchanged
  - No evidence for green paradox

Sensitivity

CPU has no signi cant e ect on other uncertainty measures ▸ Detail

{ Economic policy uncertainty, trade policy uncertainty, geopolitical risk, nancial uncertainty, : : :

Results robust to:

{ Measurement of climate policy uncertainty ▸ Detail

{ Event selection and instrument construction ▸ Detail

{ Controlling for other uncertainty measures ▸ Detail

{ Controlling for rst moment using climate news and climate sentiment index ▸ Detail

{ Additional controls (physical climate, political environment) ▸ Detail

{ Relaxing VAR assumptions (invertibility, dynamic VAR structure) ▸ Detail

{ VAR speci cation ▸ Detail

Is Climate Policy Uncertainty Special?

What do we learn from looking at climate policy uncertainty?

Contrast with e ects of broader economic policy uncertainty

{ Use index from Baker, Bloom, and Davis (2016)

{ Estimate responses based on recursive VAR approach

E ects of Economic Policy Uncertainty

Figure 7: VAR with Economic Policy Uncertainty

Climate versus Economic Policy Uncertainty

Economic policy uncertainty transmits di erently from climate policy uncertainty

- Economic policy uncertainty leads to fall in production
- But commodity and consumer prices also tend to decrease
- Monetary response accommodates the shock

They thus transmit more like demand shocks

- True for most uncertainty measures, e.g. an innovation to the VIX has very similar e ects

Response of prices to uncertainty shocks theoretically ambiguous

- Di erent channels: Precautionary demand, real options, precautionary pricing, . . .
- Price response depends on relative strength of supply- and demand-side e ects

More

Why is Climate Policy Uncertainty In ationary?

For CPU supply-side e ects dominate, for EPU demand-side e ects dominate

{ Consumer sentiment falls signi cantly on impact for EPU but not for CPU shock

Figure 8: Impact on Sentiment

(a) Economic policy uncertainty shock

(b) Climate policy uncertainty shock

▸ Role of monetary policy

Firm-Level E ects

Firm-Level Impacts

- Revisit e ects of climate policy uncertainty shock in panel of rms
  - Construct panel of U.S. listed rms
  - Quarterly sample from 1986 to 2019 (136 quarters) with 11,872 rms
- Average e ects on sales, employees consistent with aggregate data ▸ Details
- However, average e ect may mask substantial heterogeneity

Heterogeneity by Climate Exposure

How do e ects vary with rm-level climate change exposure?

- Use exposure measures by Sautner et al. (2023) based on earnings conference calls

Estimate local projection on shock interacted with exposure

$$y_{i;t+h} = \;_{i;h} + \;_t + \;_h(Exp_{i;t\;1} \;\; \overline{Exp}_i)\;"_{1;t} + \;^{0}_{h}x_{i;t\;1} + \;_{i;t+h};$$

- Focus on within- rm variation to net out permanent di erences:

  How does time-t exposure compare to average exposure of rm i?

- Allows to control for time xed e ects

Heterogeneity by Climate Exposure

Figure 9: Heterogeneous E ects Based on Prior Climate Exposure

- Firms display stronger fall in investment and R&D when climate exposure is high
- Robust to time or sector-by-time xed e ects

Sectoral Impacts

Figure 10: Heterogeneous Effects by Sector

(a) All ex. oil, gas, utilities (b) Oil, gas, and utilities

How do effects vary by sectors?

Estimate panel LPs, conditioning on different industries

Most sectors show significant fall in investment and R&D

- Consistent with average response

Oil, gas, and utilities stand out

- Investment increases
- R&D falls substantially

▸ Sales

Longer-Term Impacts

Results are consistent with green paradox at the micro level

Climate policy uncertainty strengthens incentives to extract fossil fuels

But: Reduces R&D expenses that spur the green transition

Climate policy uncertainty can exacerbate transition costs via misallocative forces

Con rmed by signi cant and persistent fall in TFP ▸ Detail

Conclusion

Conclusion

Climate policy uncertainty has pervasive economic e ects at macro and rm-level

- Broad-based e ects beyond brown sectors
- E ects more pronounced when exposure to climate is high

Contrary to other uncertainty shocks, climate policy uncertainty transmits more like supply shocks

- Persistent impacts dragging on investment and innovation
- Monetary policy can make matters worse by leaning against in ationary pressures

Illustrates importance of clear and predictable climate policies and coordination between scal and monetary policy

Thank you!

Appendix

Related Literature

Climate policy actions and macroeconomic e ects

Martin, De Preux, and Wagner (2014); Andersson (2019); Metcalf (2019); Bernard and Kichian (2021); Burke et al. (2023); Kapfhammer (2023); Bilal and Känzig (2024); Känzig (2025); Colmer et al. (2025); . . .

Measuring climate and environmental policy uncertainty

Engle et al. (2020); Gavriilidis (2021); Basaglia et al. (2022); Berestycki et al. (2022); Noailly, Nowzohour, and Van Den Heuvel (2022); Sautner et al. (2023); Palikhe, Schaur, and Sims (2024); Basaglia et al. (2025); Marotta, Pagliari, and de Winter (2025); . . .

Methodology: Uncertainty shocks and narrative identi cation

Saiz and Simonsohn (2013); Bloom (2014); Baker, Bloom, and Davis (2016); Hassan et al. (2019); Caldara et al. (2020); Caldara and Iacoviello (2022); Gambetti et al. (2023); . . .

Theory: Uncertainty in climate economics

Fried, Novan, and Peterman (2021); Barnett, Brock, and Hansen (2022); Barnett et al. (2025); . . .

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Index Validation

Validation exercise:

- To validate the index, we use OpenAI's gpt-4o-mini model
- We sample a set of articles from our Climate AND Policy corpus
- Next, we ask the LLM to classify articles into CPU and non-CPU articles
- This yields a false-positive rate below 20%
- Human audit validates LLM classi cation (80% concordance)

Robustness:

- Results are robust to using less restrictive set of dictionary terms
- Expanding the set of newspapers

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Climate Policy Uncertainty Since the 1980s

Figure 11: Climate Policy Uncertainty Index

◂ Normalization

Methodology for Event Selection

1. International agreements
   - Agreement, signature, or rati cation of key treaties and protocols
2. Judicial actions
   - Court rulings or stay orders in uencing climate policy
3. Legislative actions
   - Proposal, introduction, passage, signing, or blocking of climate-related bills
   - Pioneering California bills that in uence federal policy included
4. Presidential actions
   - Statements of intent, policy positions, policy proposals, or executive measures
5. Regulatory actions
   - Proposal, nal rule, revision, or withdrawal of Federal agency regulations

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Diagnostics

Narrative account : X **Accords well** with accounts on key historical episodes

Forecastability : X **Not** forecastable by macroeconomic or nancial variables

Orthogonality : X **Uncorrelated** with measures of other structural shocks

E.g., other uncertainty, oil, or scal shocks

Forecastability: Granger Causality Tests

Variable	p-value
Instrument	0.1191
Climate policy uncertainty	0.7881
Industrial production	0.5294
Unemployment rate	0.7117
Commodity prices	0.1946
PPI	0.9390
CPI	0.7291
Policy rate	0.9874
Climate policy news	0.9118
Climate policy sentiment	0.9980
Economic policy uncertainty	0.4363
Trade policy uncertainty	0.7953
Geopolitical risk	0.6969
VXO	0.2083
Joint	0.9470

Orthogonality: Correlation with Other Shock Measures

Shock	Source		p-value	n	Sample
Panel A: Uncertainty shocks					
Uncertainty	Bloom (2009)	-0.04	0.48	384	1986M01-2017M12
	Baker, Bloom, and Davis (2016)	0.03	0.54	384	1986M01-2017M12
	Piffer and Podstawski (2017)	-0.02	0.68	355	1986M01-2015M07
Panel B: Oil shocks					
Oil price	Hamilton (2003)	-0.06	0.23	384	1986M01-2017M12
Oil supply	Kilian (2008)	0.04	0.58	225	1986M01-2004M09
	Caldara, Cavallo, and Iacoviello (2019)	0.04	0.48	360	1986M01-2015M12
	Baumeister and Hamilton (2019)	-0.02	0.74	408	1986M01-2019M12
	Kilian (2009)	0.04	0.49	264	1986M01-2007M12
Global demand	Kilian (2009)	-0.07	0.25	264	1986M01-2007M12
Oil-specific demand	Kilian (2009)	0.03	0.63	264	1986M01-2007M12
Oil supply news	Känzig (2021)	0.03	0.53	408	1986M01-2019M12
Panel C: Productivity and news shocks					
Productivity	Basu, Fernald, and Kimball (2006)	-0.03	0.77	104	1986Q1-2011Q4
	Smets and Wouters (2007)	0.10	0.40	76	1986Q1-2004Q4
News	Barsky and Sims (2011)	0.16	0.13	87	1986Q1-2007Q3
	Kurmann and Otrok (2013)	0.14	0.21	78	1986Q1-2005Q2
	Beaudry and Portier (2014)	-0.08	0.42	107	1986Q1-2012Q3
Panel D: Monetary policy					
Monetary policy	Romer and Romer (2004)	0.04	0.66	132	1986M01-1996M12
	Gertler and Karadi (2015)	-0.04	0.50	324	1990M01-2016M12
	Miranda-Agrippino and Ricco (2021)	0.08	0.23	228	1991M01-2009M12
	Bauer and Swanson (2023)	0.04	0.48	383	1988M02-2019M12
	Aruoba and Drechsel (2024)	-0.01	0.81	274	1986M01-2008M10
Panel F: Fiscal policy shocks					
Fiscal policy	Romer and Romer (2010)	-0.04	0.68	88	1986Q1-2007Q4
	Fisher and Peters (2010)	0.00	0.98	92	1986Q1-2008Q4
	Ramey (2011)	-0.07	0.48	100	1986Q1-2010Q4
Panel F: Financial shocks					
EBP	Gilchrist and Zakrajšek (2012)	-0.04	0.46	360	1986M01-2015M12
Loan supply	Bassett et al. (2014)	0.03	0.78	76	1992Q1-2010Q4

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External Instrument Approach

Structural VAR:

$$y_t = b + B_1 y_{t-1} + \cdots + B_p y_{t-p} + S\varepsilon_t; \qquad \varepsilon_t \sim N(0;\ )$$

External instrument: Variable z_t correlated with the shock of interest but not with the other shocks

Identifying assumptions:

$$E[z_t \varepsilon_{1;t}] = \quad \neq 0 \qquad \text{(Relevance)}$$

$$E[z_t \varepsilon_{2:n;t}] = 0 \qquad \text{(Exogeneity)}$$

$$u_t = S\varepsilon_t \qquad \text{(Invertibility)}$$

Use climate policy uncertainty event series as an external instrument for climate policy uncertainty index

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Figure 12: Transformed Data Series

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Local Projections Approach

1. Estimate impulse responses using local projections-instrumental variables (LP-IV) approach: (Jorda, 2005)

   Relax invertibility requirement and dynamic VAR structure

   - Use z_t as an instrument for endogenous regressor $y_{1;t}$
   - Estimate e ects on variables of interest y_i using local projections:

   $$y_{i;t+h} = {}^{i}_{h} + {}^{i}_{h} y_{1;t} + {}^{i0}_{h} x_{t \quad 1} + {}_{i;t;h};$$

2. Estimate impulse responses to the climate policy uncertainty shock from the VAR using local projections: (Stock and Watson, 2018)

   Relax dynamic VAR structure to assess possible truncation bias

   - Extract climate policy uncertainty shock $''_{1;t}$ from monthly VAR: $''_{1;t} = s_1^0 \quad {}^{1} u_t$
   - Estimate e ects on variables of interest y_i using local projections:

   $$y_{i;t+h} = {}^{i}_{h} + {}^{i}_{h} ''_{1;t} + {}^{i}_{h;1} y_{i;t \quad 1} + \ldots + {}^{i}_{h;p} y_{i;t \quad p} + {}_{i;t;h}$$

   - Can also estimate e ects on variables only available at lower frequencies

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Figure 13: Local Projections

Impacts on Other Uncertainty Measures

Figure 14: Impacts on Other Uncertainty Measures

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Figure 15: Alternative CPU Measures

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Figure 16: Alternative CPU Measures

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Event Selection

Figure 17: Event Selection

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Event Selection

Figure 18: Jackknife Exercise

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Figure 19: Stringency Index Construction

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Figure 20: Anticipation and Policy Stringency Controls

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Instrument Construction

Figure 21: Residualized Instrument

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Controlling for News and Other Uncertainty Measures

Figure 22: Additional Controls

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Figure 23: Additional Controls

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Figure 24: Additional Controls

Relaxing VAR Assumptions

Figure 25: Relaxing VAR assumptions

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VAR Speci cation

Figure 26: Sample period

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Relaxing VAR Assumptions

Figure 27: Lag Order

Figure 28: Deterministic Variables

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Why is Climate Policy Uncertainty In ationary?

Response of prices to uncertainty shocks theoretically ambiguous

Key channels:

- Precautionary demand: Higher uncertainty leads agents to cut spending, reducing prices via lower demand
- Real options channel: After a rise in uncertainty, rms delay investment and hiring
- Precautionary pricing : Increased uncertainty raises the potential for higher future costs, leading rms to raise prices preemptively

Price response depends on relative strength of supply- and demand-side e ects

Simple model

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Simple Two-Sector NK Model

Why are CPU shocks in ationary?

Study propagation of di erent uncertainty shocks in NK model with two sectors:

- Energy sector producing energy/emissions using labor
- Non-energy sector producing consumption good using energy and labor

Standard household sector and scal/monetary authority

Non-Energy Sector

Technology:

$$y_t = Z_{x;t} e_t \; n_{x;t}^{1}$$

Cost-minimization:

$$p_{e;t} = \quad mc_t \frac{y_t}{e_t}$$

$$w_t = (1 \qquad) mc_t \frac{y_t}{n_{x;t}}$$

Price setting:

$$_t \, (\; _t \qquad) = \quad E_t \; \frac{_{t+1}}{_t} \; _{t+1} \, (\; _{t+1} \qquad) \frac{y_{t+1}}{y_t} + \frac{"}{_p} \quad mc_t \quad \frac{" \quad 1}{"}$$

Consider uncertainty shock about productivity, $_{Z_{x;t}\,;t}$

Technology:

$$e_t = Z_{e;t}\, n_{e;t}$$

Cost-minimization:

$$(1 \quad {}_t)\, p_{e;t} = \frac{\quad}{1}\, \frac{w_t}{Z_{e;t}}$$

Price setting:

$${}^{e}_{t}\,({}^{e}_{t} \quad {}^{e}) = E_t \frac{{}_{t+1}}{{}_{t}}\; {}^{e}_{t+1} \quad {}^{e}_{t+1} \quad {}^{e}\, \frac{e_{t+1}}{e_t}\frac{p_{e;t+1}}{p_{e;t}} + \frac{\quad}{{}^{e}_{p}} \quad \frac{w_t}{Z_{e;t}\, p_{e;t}} \quad \frac{(1 \quad {}_t)(\quad 1)}{\quad}$$

- In line with the data, assume that energy prices more exible than goods prices

Consider uncertainty shock about carbon tax, ${}_{t\,;t}$

Di erential Impact of Uncertainty Shocks

Figure 29: Uncertainty Shocks in Model

(a) Uncertainty about Productivity

(b) Uncertainty about Carbon Tax

Di erential Impact of Uncertainty Shocks

Uncertainty about productivity in non-energy sector has very di erent implications

Consistent with data, uncertainty about productivity is disin ationary while climate policy uncertainty is in ationary

Precautionary pricing channel dominates precautionary demand channel for climate policy uncertainty

The Role of Monetary Policy

How important is monetary policy for transmission of climate policy uncertainty?

Perform a counterfactual exercise using McKay and Wolf (2023) approach

- Use monetary shocks from Bauer and Swanson (2023)
- Robust to Lucas critique

Exercise: Impose same monetary reaction after CPU shock as for EPU shock

Figure 30: Monetary Policy Counterfactual

Monetary policy response matters for the transmission of CPU shocks

- Mitigates industrial production response substantially
- Comes at cost of tolerating slightly higher in ation

Should monetary policy respond di erently to di erent sources of uncertainty?

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Firm-Level Impacts

Estimate effects on firm-level outcomes using panel local projections:

$$y_{i;t+h} = {}_{i;h} + {}_{h}\varepsilon_{1;t} + {}^{0}_{h}x_{i;t \;\; 1} + {}_{i;t+h}$$

where $\varepsilon_{1;t}$ is the identified climate policy uncertainty shock

Outcomes: Sales, employees, investment, R&D

Average E ect

Figure 31: Average E ect on Firm Outcomes

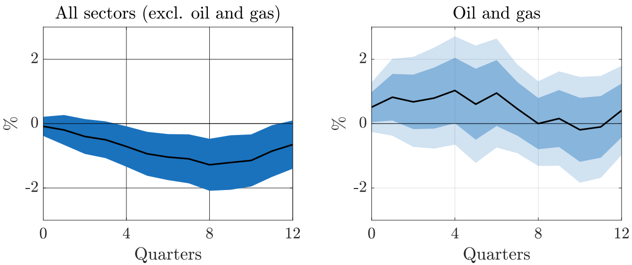
Salesand employees fall signi cantly

Substantial fall in rm-level investment and R&D

Evidence consistent with macro results

Sectoral Impacts

Figure 32: Heterogeneous Effects by Sector



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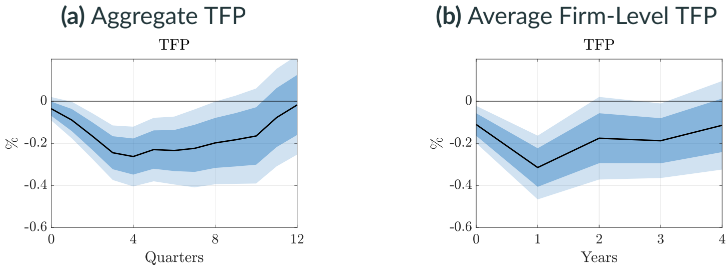
Longer-Term Impacts



Climate policy uncertainty is a drag on investment and innovation

Distorts allocation: Over-investment in firms with uncertain long-term viability