# Discussion:

# The Economic Effects of Trade Policy Uncertainty

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# Summary

**How does trade policy uncertainty affect the macroeconomy?**

Ambitious, comprehensive analysis of timely, important issue

Contributions:

- Empirical: novel measures of micro- and macro-level TPU associated with declining investment
- Quantitative: clever use of NK DSGE model to disentangle anticipatory and precautionary responses to TPU

Suggestions:

- Use data to highlight economics underpinning firms' TPU concerns
- Clarify what drives macro responses to TPU in model
- Measure precautionary effects in downside-risk scenarios

# Empirical challenges in measuring macro effects of TPU

Common empirical strategy: exploit cross-industry variation in TPU exposure (Pierce and Schott, 2015, Crowley et al., 2018)

- DiD methods/fixed effects absorb macroeconomic responses
- TPU exposure measured as MFN tariff or similar; may not reflect possible future outcomes (e.g. Trump trade war)
- Firms may have additional concerns beyond own-industry tariffs

This paper's solutions:

- New TPU measure based on firms' statements allows researcher to remain agnostic about future tariffs and reasons for firms' concerns
- VAR analysis of macro dynamics augments firm-level fixed-effect analysis

Missed opportunity: TPU measure provides information about economics underpinning firms concerns!

# Quantitative challenges in measuring macro effects of TPU

TPU episodes involve ↑ in $\mathbb{E}$[future tariffs] as well as ↑ in variance

Measuring effect of uncertainty requires disentangling precautionary response from anticipatory response

- How would macro dynamics differ if future tariffs rose by same amount with certainty?
- Also a problem for empirics!

This paper's solution:

- Use linearized model to isolate anticipatory response
- Use 3rd-order approximation with mean-preserving spread to isolate precautionary response

Caveats:

- Anticipatory effects may counteract precautionary response
- Mean-preserving spread may not capture contemporary TPU

# Why do firms care about TPU?

Potential mechanisms for TPU to affect firms:

1. Exporters concerned about changes in foreign tariffs
2. Non-exporters concerned about changes in import competition
3. Importers concerned about changes in input costs
4. Firms without direct connection to trade concerned about GE effects

Literature mostly focuses on 1

- Handley and Limão (2017): Sunk costs create real option value of waiting to start exporting until uncertainty resolved
- This paper: Sticky prices induce firms to raise export prices today to insure against increase in optimal price tomorrow

Transcripts, other data indicate 2–3 also important

# Why do firms care about TPU in the data?

Table A.2: Selected Quotes from Earnings Call Transcripts Mentioning Trade Policy Uncertainty

| *Company Name* | *Sector* | *Quarter* | $\Delta K_{+1}$ | *TPU* | *Selected Quotes Mentioning Trade Policy Uncertainty* |
|---|---|---|---|---|---|
| SUNPOWER | Electronic Equipment | 2017q3 | -14.6 | 2 | In September, the ITC is scheduled to decide whether to recommend the imposition of import tariffs or quotas on solar panels and to subsequently propose specific remedies in November. [...] the requested remedies could significantly impact the U.S. solar market, imposing a direct burden on manufacturers |
| BUILDERS FIRSTSOURCE | Construction Materials | 2017q2 | -11.0 | 3 | Q: [...] on the lumber import tariff how have you handled [...] the tariff and the price volatility? [...] A: Yes, could be a slight headwind to working capital. |
| RENEWABLE ENERGY GROUP | Petroleum and Natural Gas | 2017q4 | -6.2 | 2 | Finally, antidumping determinations are expected in early January. Based on these very positive preliminary rulings, we are confident that the final decision will be supportive of domestic biodiesel production. |
| BROADWIND ENERGY | Machinery | 2017q3 | -3.1 | 3 | Q. Have you done any type of quantitative impact or assessment on [...] the towers business, but potentially all of your segments, if such a [steel] tariff was put into place? A. It's not – would not be a good thing, because of the steel that we consume in our businesses. |
| RENEWABLE ENERGY GROUP | Petroleum and Natural Gas | 2017q2 | -5.4 | 2 | [...] Our industry trade group took on an initiative to pull domestic producers together in a coalition to just ask for a fair trade, a level playing field and countervailing duties and antidumping against 2 countries. |

Sunpower, Builders, Broadwind concerned about potential increases in input costs

Renewable Energy Group concerned about import competition

# Empirical investigation of mechanisms behind TPU concerns

Firm-level TPU measure provides new opportunities for investigating which mechanisms are important

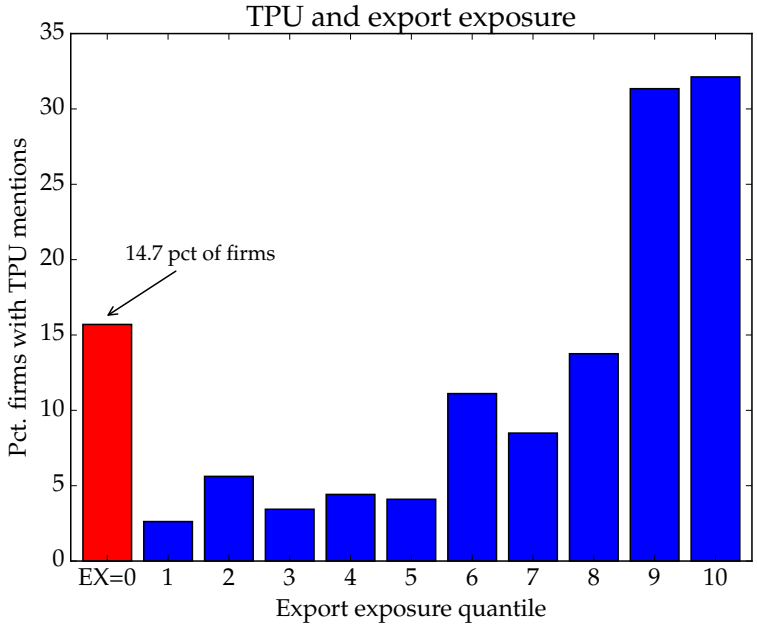
1. Does firm-level TPU correlate with exposure to exporting/importing?
2. Does effect of firm-level TPU on investment depend on extent and nature of trade exposure?

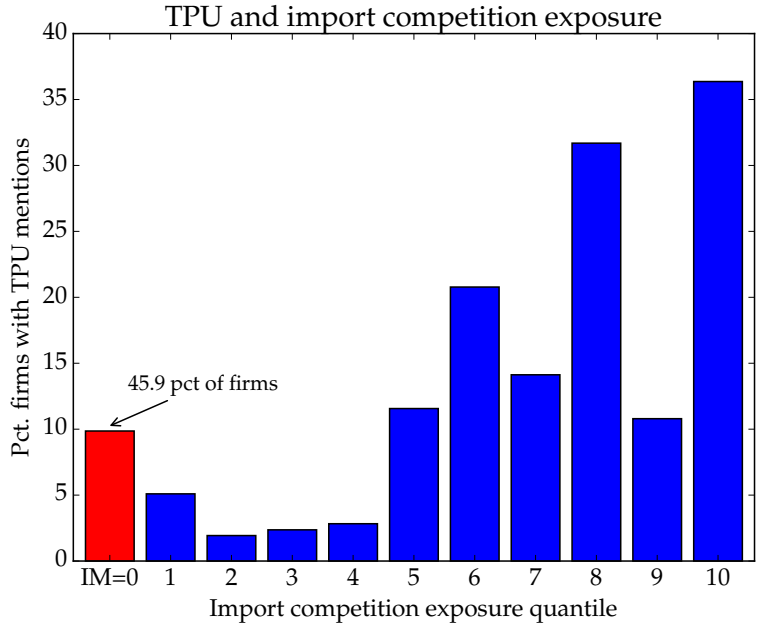
Today: preliminary analysis of 1 using US input-output table

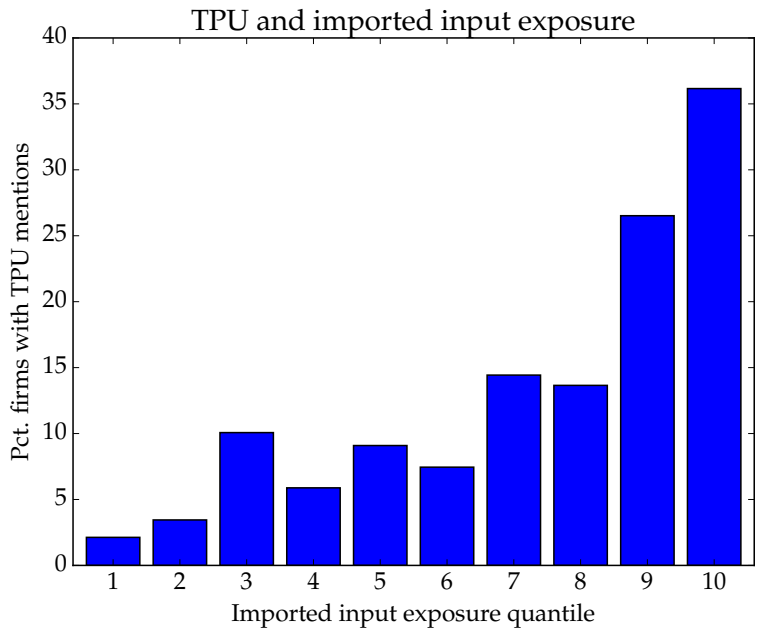
- Compute 3 kinds of trade exposure for each 6-digit NAICS industry:
  - Export exposure: exports/value added
  - Import exposure: imports/value added
  - Input cost exposure: average import exposure of intermediates, weighted by direct requirement coefficients
- Merge with firm-level TPU using NAICS codes from Compustat

To address 2, could interact these measures with TPU in firm-level regression analysis

# TPU and exposure to trade



# Why do firms care about TPU in the model?

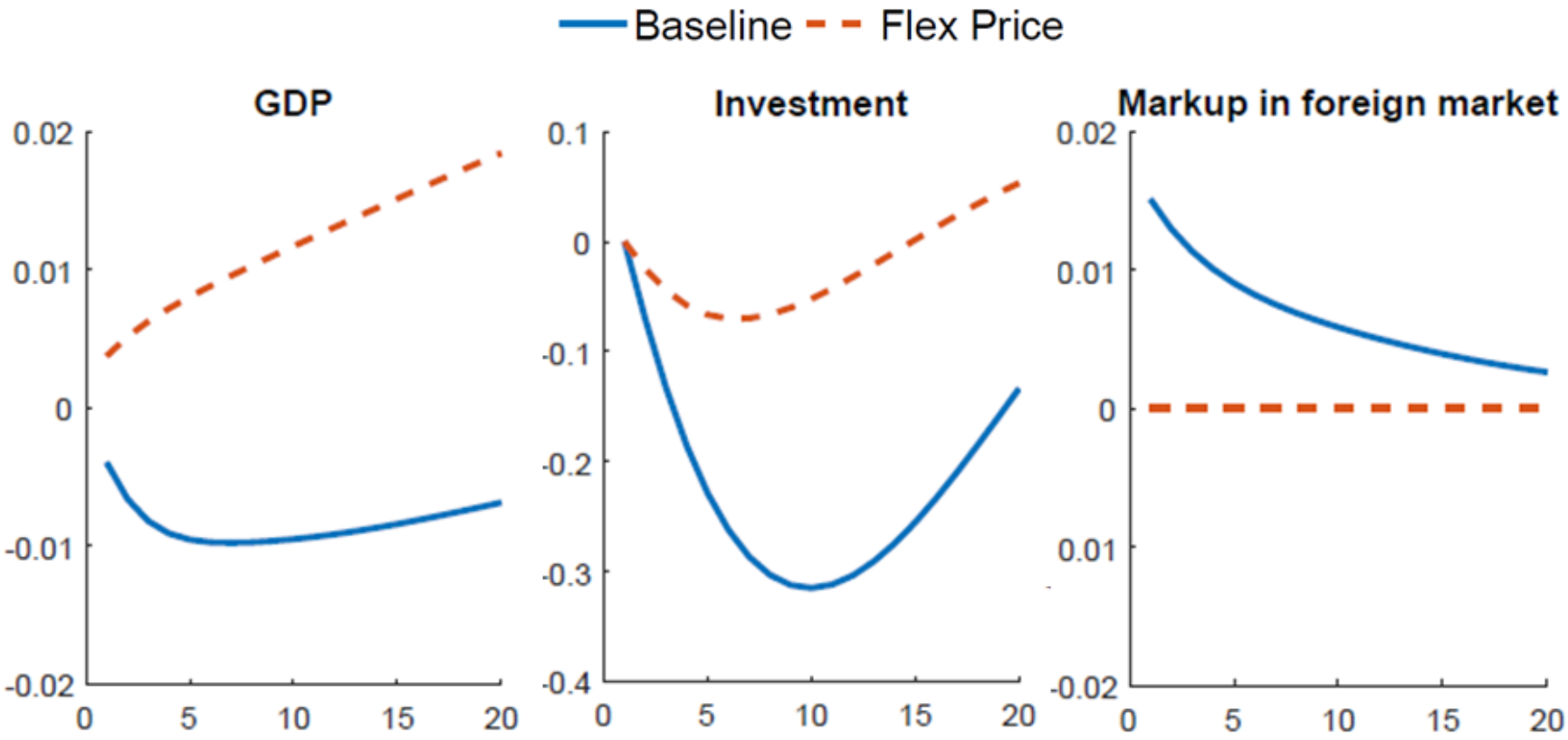
Lots of NK DSGE ingredients that could amplify (or weaken) macro response to TPU

- Incomplete markets/precautionary saving
- Sticky prices and wages
- Financial accelerator
- Capital adjustment costs
- Habit persistence
- Monetary policy rule

How do these ingredients capture firms' concerns about TPU?

Which ingredients are most important quantitatively?

# Sticky prices drive response to second-moment shock




Firms raise export prices today in case optimal future price is higher

Higher prices $\Rightarrow$ lower output $\Rightarrow$ lower demand for capital

With flexible prices, higher volatility is expansionary!

# Two-period, partial equilibrium model of sticky export prices

Consider firm that chooses foreign-market price $p$ in period 1 to maximize EPV of export profits in periods 1 and 2

- Demand curve: $y_t(p) = D_t^* p^{-\epsilon}$
- Marginal cost and demand shifter in period 2 uncertain
- Simple version of Appendix G of Fernández-Villaderde et al. (2015)

Firm's problem:

$$\max_p \left\{ p y_1^*(p) - c_1 y_1^*(p) + \mathbb{E}\left[ p y_2^*(p) - c_2 y_2^*(p) \right] \right\}$$

Solution:

$$p = \left( \frac{\epsilon}{\epsilon - 1} \right) \left( \frac{c_1 D_1^* + \mathbb{E}[c_2]\mathbb{E}[D_2^*] + cov(c_2, D_2^*)}{D_1^* + \mathbb{E}\left[ D_2^* \right]} \right)$$

# Implications of two-period model for second-moment shocks

No level effect: $\mathbb{E}[c_2] = c_1$, $\mathbb{E}[D_2^*] = D_1^*$

Optimal price increasing in $cov(c_2, D_2^*)$:

$$p = \left(\frac{\epsilon}{\epsilon - 1}\right)\left(c_1 + \frac{cov(c_2, D_2^*)}{2D_1^*}\right)$$

- $c_2, D_2^*$ correlated because of "trade war" assumption
- Uncertainty $\uparrow \Rightarrow cov(c_2, D_2^*) \uparrow \Rightarrow p \uparrow$
- Highlights importance of GE!

What would happen if firms used imported intermediates?

- Marginal cost could rise, not fall, when tariffs rise
- Correlation reversed $\Rightarrow$ TPU expansionary, not contractionary

What would happen if trade cost shocks were unilateral?

- TPU has no effect if $c_2$ and $D_2^*$ uncorrelated

# Implications of two-period model for downside-risk shocks

Covariance effect still operates, but level effect counteracts it

- In linearized model, only level matters $\Rightarrow p \downarrow$!
- Macro response to downside risk not driven by price stickiness

Which other model ingredients are responsible?

- Adj. costs: capital price $\downarrow \Rightarrow$ investment $\downarrow$
- Fin. accelerator: excess return $\uparrow \Rightarrow$ investment $\downarrow$
- Permanent income motive (bond markets, habits) offsets these effects, but potentially mitigated by monetary policy

Counterfactuals with these ingredients turned off would highlight which ones are important

# Other ways to measure TPU effects in downside-risk scenarios

Second-moment shock useful for highlighting causes of TPU effects, but Brexit, Trump threats are downside risk scenarios

- "Good" and "bad" outcomes reasonably clear, uncertain about which one will prevail
- Quantifying TPU effects in these scenarios is worthwhile goal

Ingredients that drive anticipatory responses to downside-risk shocks could also have precautionary effects

- Investment falls in flex-price version of second-moment shock
- Linearization prevents study of precautionary responses

Other ways to measure anticipatory and precautionary responses

- Steinberg (2019): compare equilibrium with possibile tariff increase to perfect-foresight equilibrium where tariff rises for sure
- "Risk compensation:" compare linearized and 3rd-order responses to same downside-risk shock

# Thank you!