How to Construct Monthly VAR Proxies Based on Daily Futures Market Surprises

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Summary

1. How to construct monthly VAR Proxies based on daily futures market surprises

- Day-of-month correction
- I'll focus on this

2. Implications for interpretation of Känzig's OPEC-announcement shocks

- Intermittent trading, limited maturity, and low volume in early sample
  $\Rightarrow$ Dropping gives weak instrument
- Make day-of-month correction
  $\Rightarrow$ No weak instrument, but shock uninterpretable
- Change the VAR specification (Kilian and Murphy)
  $\Rightarrow$ Relatively weak instrument, looks like combination of storage demand and flow demand

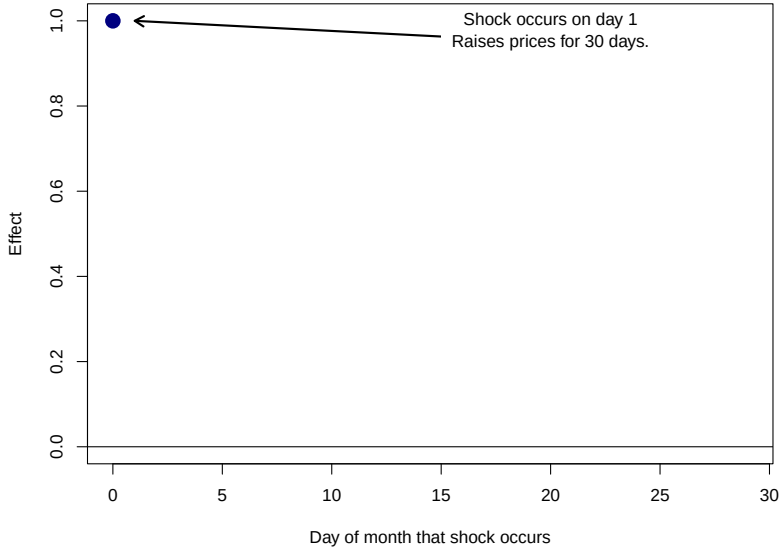
Plan for the discussion

Review the day-of-the-month correction

Comments

1. Question: Under what assumptions is this correction valid?
2. Suggestion: Connect more w/ monetary shock literature
3. Minor point: Is using 12-month future innocuous?

Effect of 1-Unit *daily* shock on *average monthly oil price*



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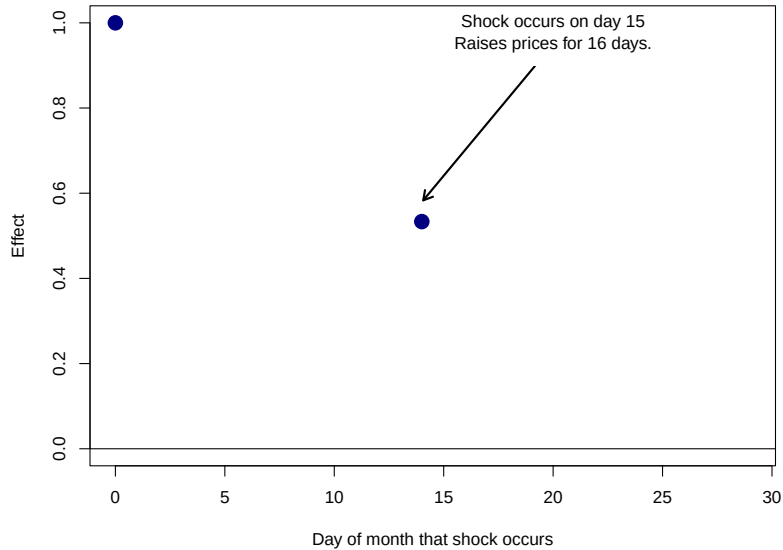

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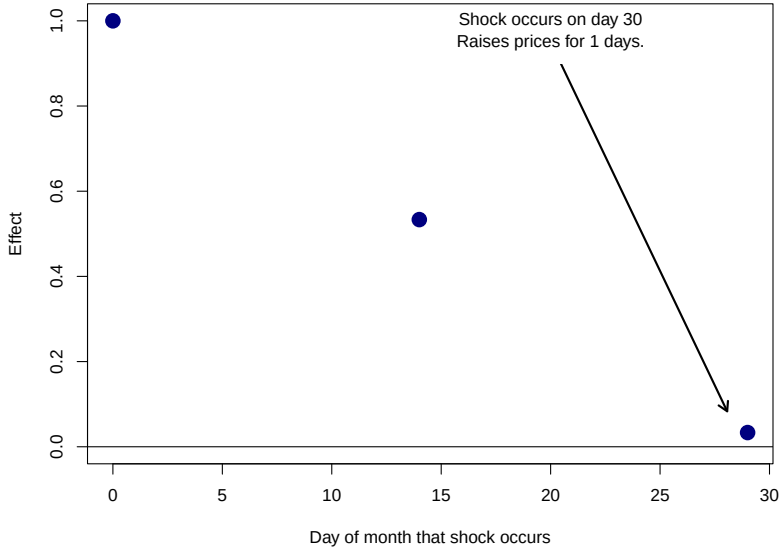

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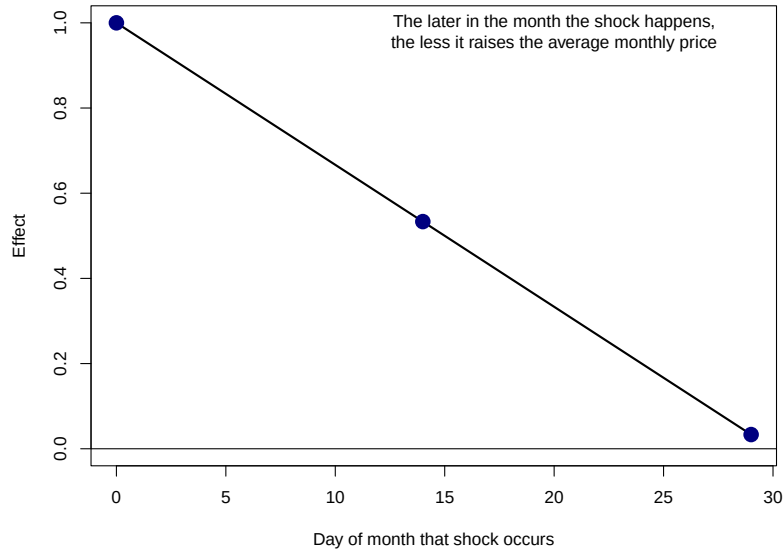

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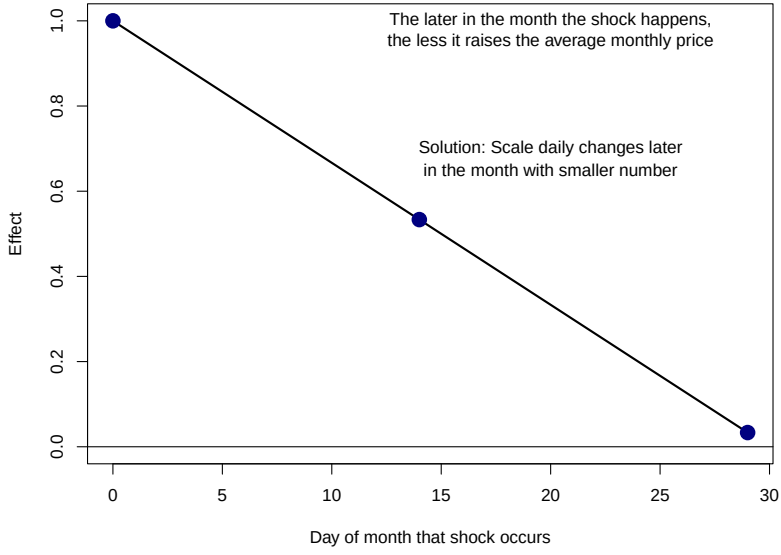


1. Question: Under what assumptions is this correction valid?

Small points: How should we think about:

1. Prices (VAR) vs. expectations (instrument)

2. Rollover of futures contracts
   e.g., “1-month future” on January 1 = February; on January 29 = March

Correction is valid if prices are a random walk. Can we generalize this?

Next slides: a candidate generalization

Generalizing

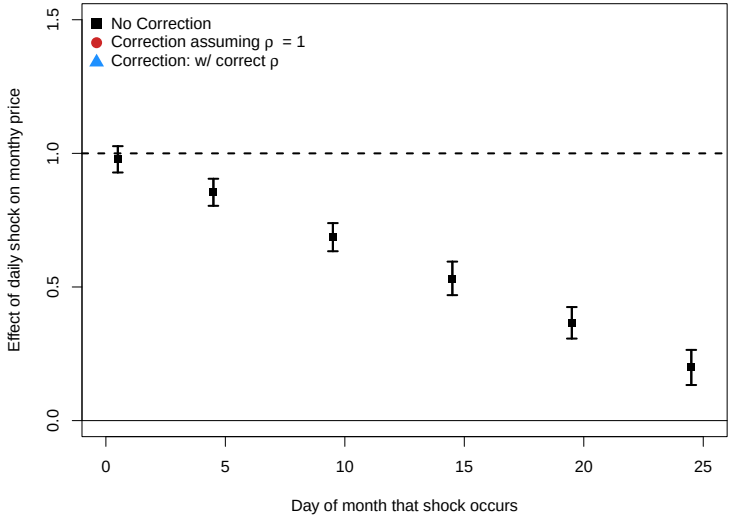
How to scale shocks that occur on day d in a month w/ N days if

$$p_t = \rho\, p_{t-1} + \varepsilon_t \text{ ?}$$

$\rho = 1$ (this paper)	Generalization $\rho < 1$
$\frac{N-d+1}{N}$	$\frac{1-\rho^{N-d+1}}{(1-\rho)^N}$

Next slide: Simulations to show that the generalization “works.”

(Nearly) Random walk: $\rho = 0.999$



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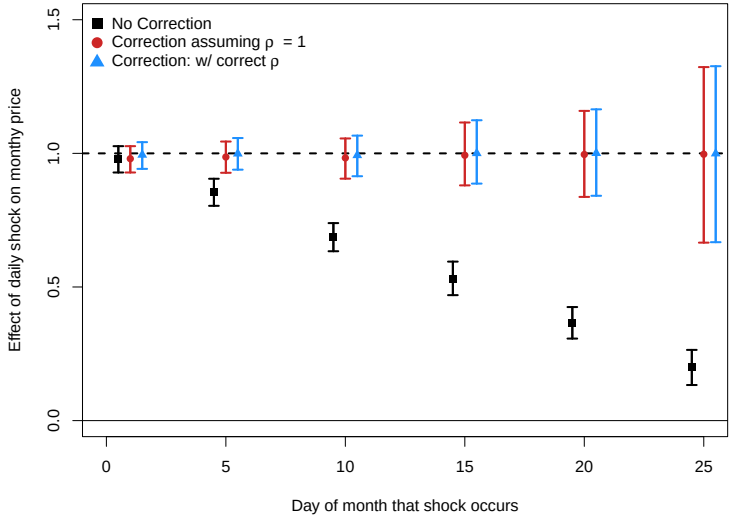
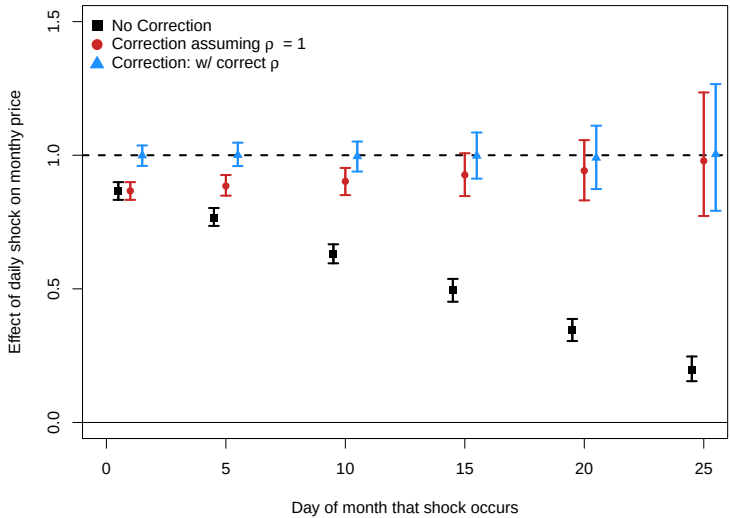
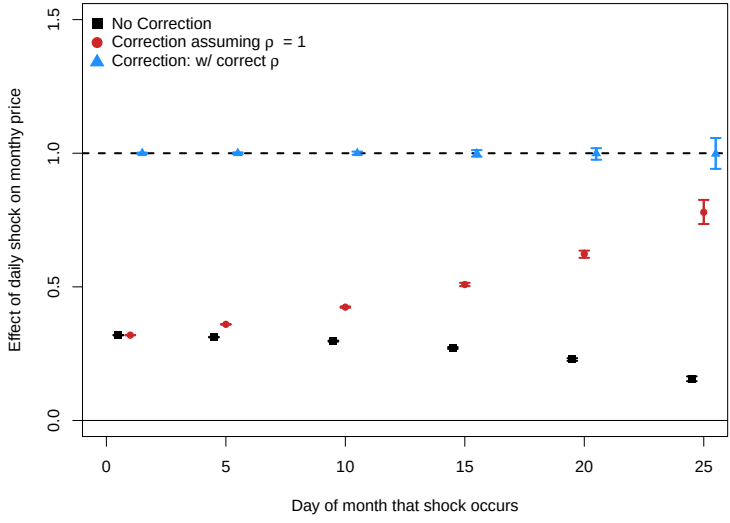


$\rho = 0.99$


No Correction
Correction assuming ρ = 1
Correction: w/ correct ρ
Effect of daily shock on monthy price
0.0
0.5
1.0
1.5
0
5
10
15
20
25
Day of month that shock occurs

$\rho = 0.9$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Day of month that shock occurs

2. Suggestion: Connect more w/ monetary shock literature

The frequency mismatch has appeared in the monetary shock literature

- Caldara and Herbst (2019): Use end-of-month value of Fed Funds rate
- Gertler and Karadi (2015); Evans and Kuttner (1998): Scaling[1]

Some corrections have gotten others in hot water

- Can make shocks become autocorrelated ("predictable")
  Ramey (2016); Miranda-Agrippino and Ricco (2021) (Not obvious that including lagged shocks to remove a.c. is appropriate!)

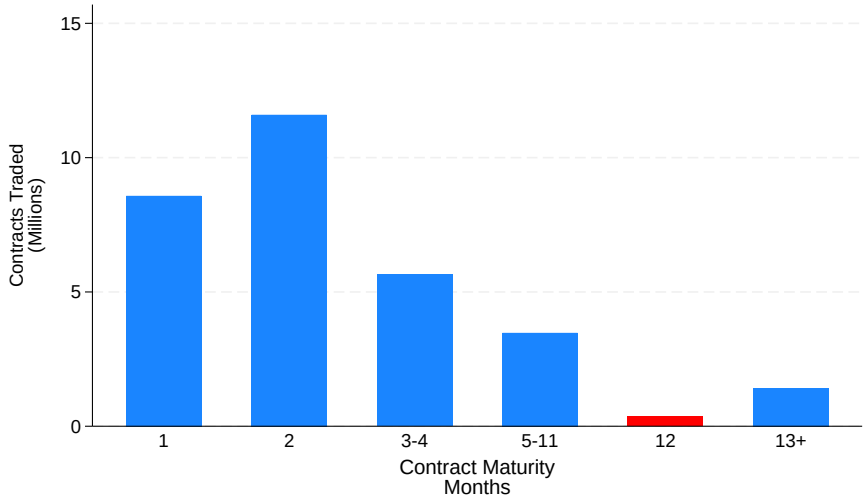
The literature could benefit from these issues being sorted through

[1] Thanks to Maggie Jacobson for pointing me to Evans and Kuttner (1998).

3. Minor point: Is using 12-month future innocuous?

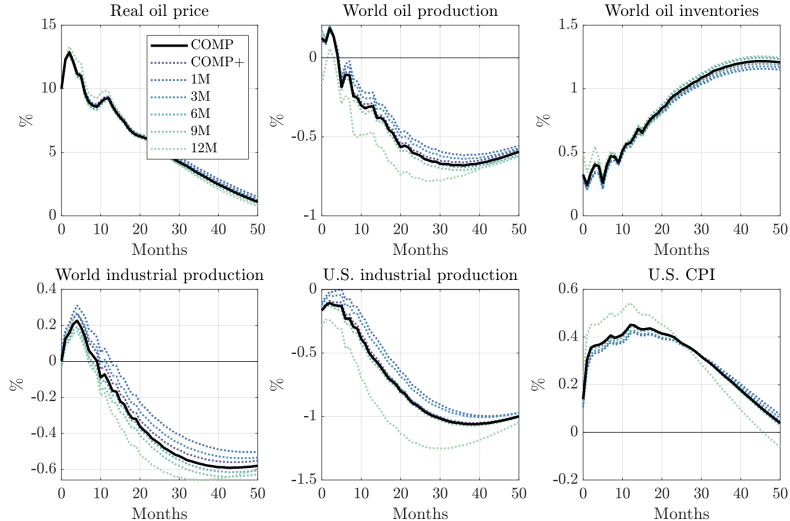
- Känzig (2021) using first principal component of *first 12 futures*
- This paper uses *12-month future*
- But 12-month future has
  - much lower volume—more potential for measurement error?
  - slightly different impulse responses in Känzig (2021)'s VARs
- In the monetary shock literature, maturity can matter—would be good to rule this concern out here.

Trade Volume for 12-Month Contracts is Relatively Low



Volume on Känzig's OPEC announcement days, 1987–2018.

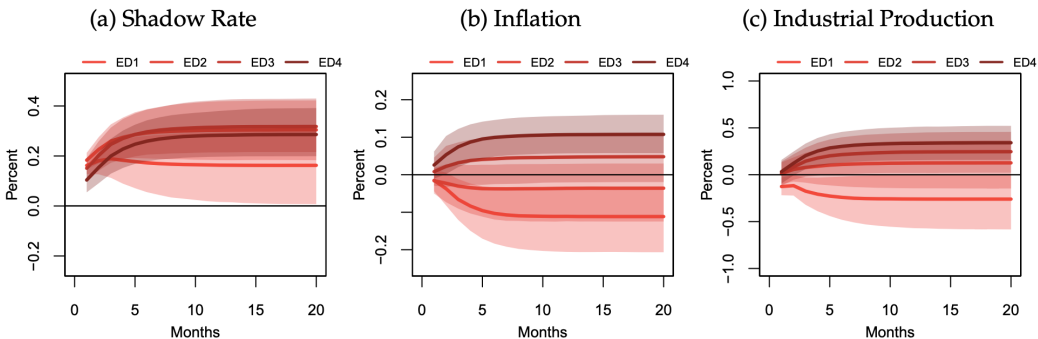
Response to 12-Month Future is Marginally Different



Appendix figure A.16 of Känzig (2021).

In Monetary VARs, Maturity Matters

Figure 14: IRFs in the VAR Varying the Eurodollar Future Maturity



NOTE. This figure shows impulse responses of the variables in the subfigure titles in the baseline VAR. The lines labeled EDn show the estimates when the n-quarter ahead Eurodollar future is used as an instrument. 90% credible regions are shaded.

From Acosta (2023)

END

THANKS!

APPENDIX

References I

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