Comments on "Daily Monetary Policy Shocks and the Delayed Response of New Home Sales" by James D. Hamilton

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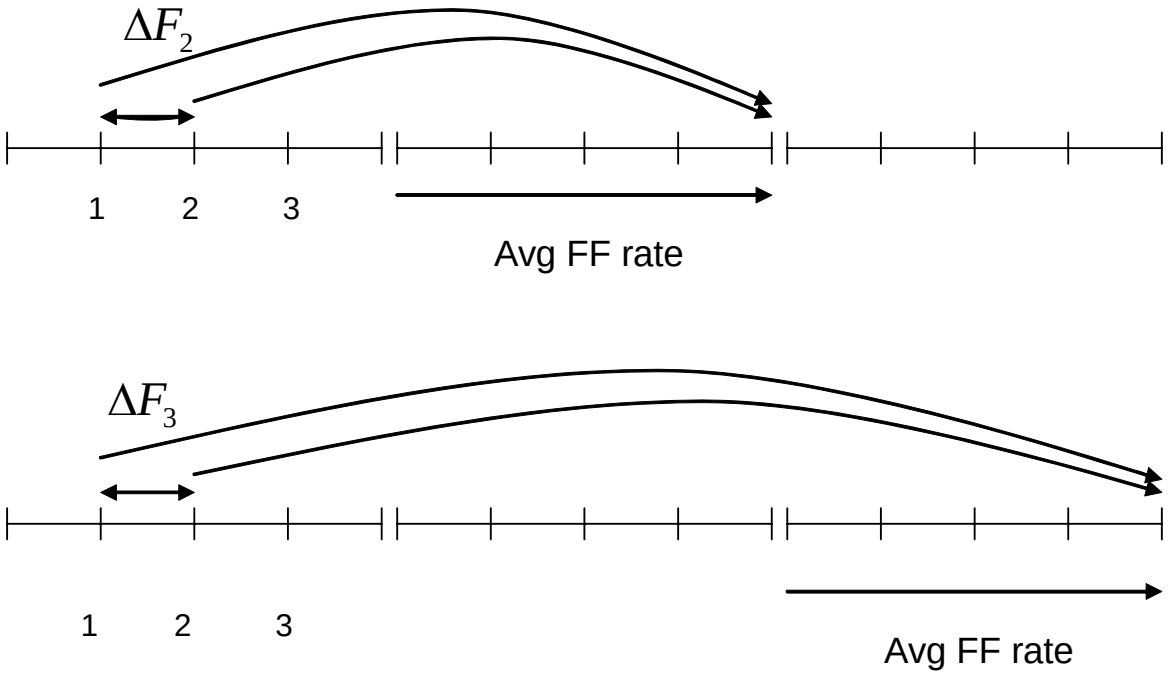
What the paper does (simplified)

1. 1-3 month FF futures predict FF well; Δ Futures are unpredictable.
   $\Longrightarrow \Delta FF$ *futures can measure policy shocks*



2. 30 year mortgage rates are ~ unpredictable (from their own lags) in weekly data

$$\Delta R_w = \varepsilon_w;\ w = \text{ week index}$$

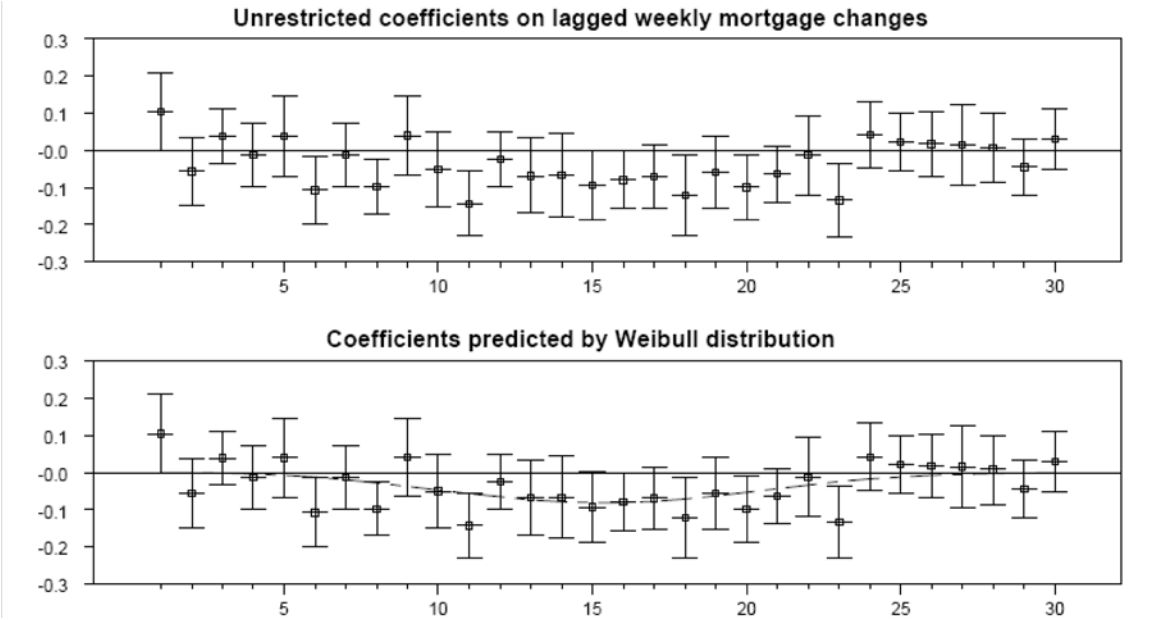
3. Regression of 30 year mortgage rate change on fed funds future changes, weekly

$$\begin{aligned} \Delta R_w &= c + 0.53 l_w + 1.33 s_w + \varepsilon_w \; R^2 = 0.35 \\ l_w &= \Delta F_2 = \text{ weekly change in future price for next month's ff} \\ s_w &= \Delta F_3 - \Delta F_2 \end{aligned}$$

Mortgage rate changes are correlated with Fed Fund future changes. They look (to Hamilton) like correlated iid sequences.

4. Regression of monthly new home purchases on changes in 30 year mortgage rates

$$h_m = \gamma_2 m + \sum_{j=1}^{5} \gamma_{1j} h_{m-j} + 2.63 \times \Delta GDP + \sum_j \gamma_{3j} \Delta R_{wj}$$



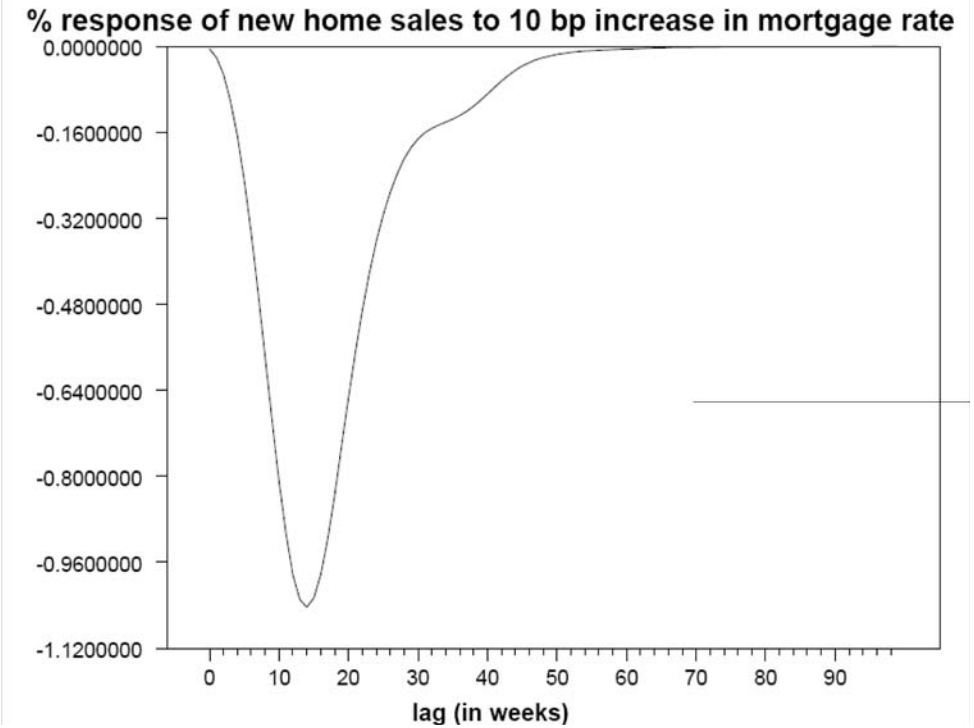
"long lags" – 6-23 weeks (1.5-6 mo)

5. "Model". Start searching when R_w crosses a threshold. Search takes 14 weeks on average, but follows a Weibull distribution. Time series pattern conforms to survey evidence of search times.

6. Impulse response

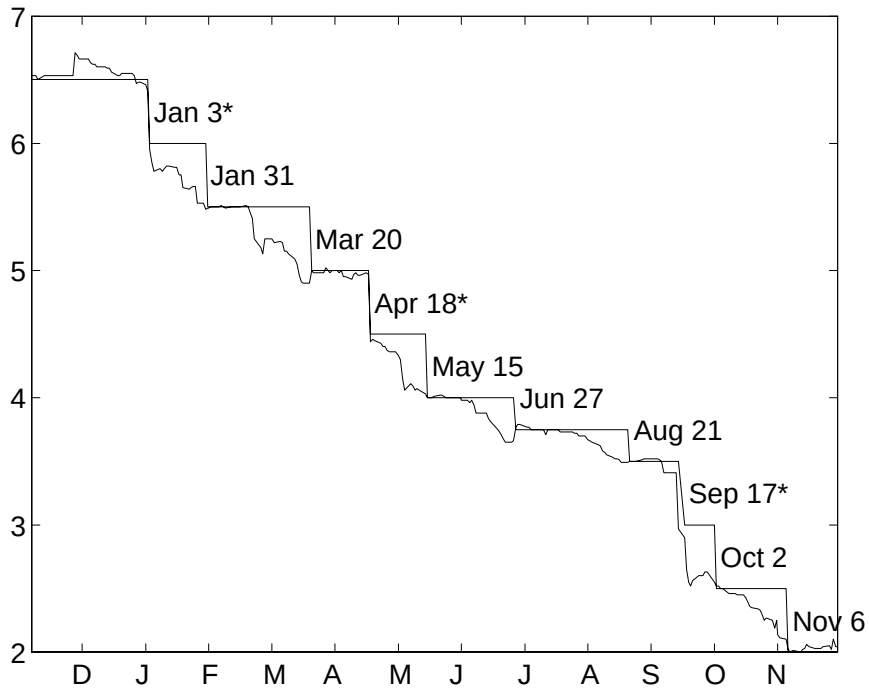
$$h_m = \gamma_{21} m + \sum_{j=1}^{5} \gamma_{1j} h_{m-j} + 2.63 \times \Delta GDP_m + \sum_j \gamma_{3j} \Delta R_{wj}$$

Figure 4. Average impulse-response function relating 10-basis-point increase in mortgage rate to 100 times the natural log of new home sales.

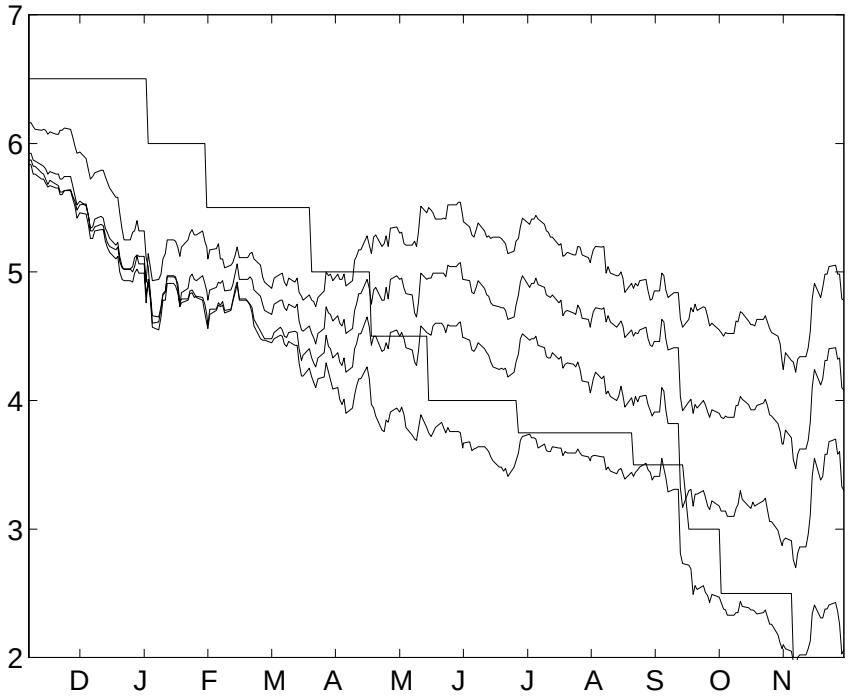


(a) "Long lags" (b) "Figure 4 could equally well be described as the dynamic response of new home sales to a 20 bp increase in the level of the Fed funds term structure or also as the response to a 10/1.3=7.7 bp increase in slope" (p.33). [increase = surprise.]

Does F change measure monetary policy shocks?



Target and 1 month Eurodollar.



Target and 1,3,5,10 yields.

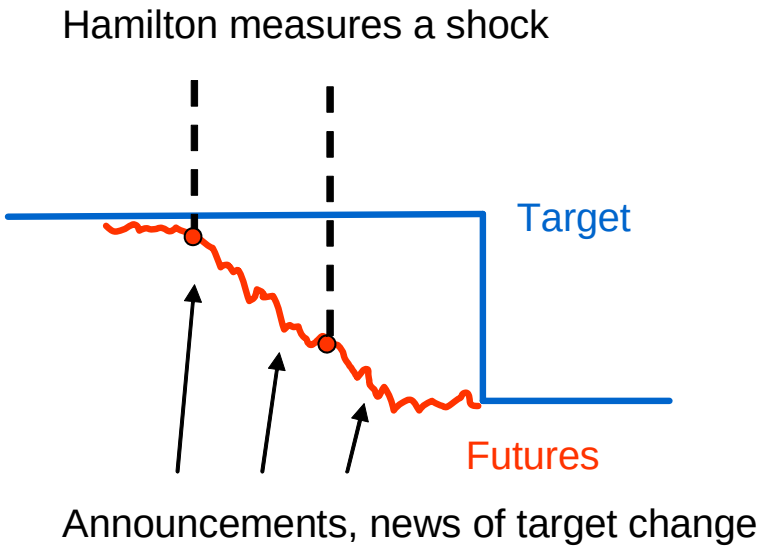
- Jan 3: Seems a shock. But long rates foresaw it. (Or does Fed follow?)
- Jan 31, Mar 20, Aug 21,No shock.
- April 18: Yes, Fed shock *can* change long rates!
- May 15?? June 27 is a *positive* shock.
- Note: Sept 11 is (wrongly) "monetary policy shock" by *any* procedure!

1. Are there really so few shocks? Are there any shocks? The Fed says no.

2. Bernanke's cab driver: really no shock?

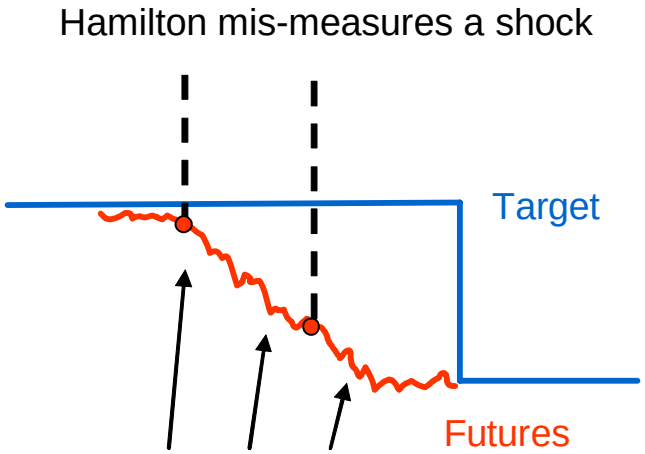
3. No, a shock need not be a surprise to financial markets to count.

4. Hamilton's brilliant idea:



Change (=innovation) in fed funds future measures the "shock" to the economy.

5. But what if...



6. Bad news: *I don't think we can avoid looking for changes that are uncorrelated with systematic components of policy.*

7. Paper is proud of the fact you get the same results on macro announcement days as on other days. I think this proves we're looking at systematic movements, not shocks.

8. Good news 1: This is a great idea *with* orthogonalization. It creates *unexpected* shocks (handling time well) but we still need to orthogonalize *other variables*

9. Bad news: How?

   (a) How about $\Delta F_t = a + b\Delta(\text{GDP futures}_t) + \varepsilon_t$ How about $\Delta F_t = a + b\Delta(\text{Housing sales futures})_t + \varepsilon_t$

   (b) The latter seems ideal, but *the response to the last shock must be zero.* $(E_t - E_{t-1})\left(\text{housing sales}_{t+j}\right) = 0$ by construction!

   (c) It seems I've proved you can't measure monetary policy shocks!

10. Conjecture good news 2: We don't need "shocks." *If policy responds systematically to a variable (coin flip? exchange rates?) that has no cauasal effect on future house purchases, then the regression of house purchases on such "shocks" recovers the response of monetary policy*.

$$\begin{aligned} ff_t &= a + by_t + cz_t \\ h_t &= \sum \theta_j \; cz_{t-j} + \varepsilon_t \\ cov(z_{t-j}\varepsilon_t) &= 0 \end{aligned}$$

Note in this idea we're using components of the *systematic* part, not the *residual.*

How does the Fed change long rates?

The rest is conventional: short term rates $\Longrightarrow$ long term rates $\Longrightarrow$ "lower demand". Do the results make sense?

1. **Puzzle**: how can the Fed lower short rates long enough to affect long rates?

$$\begin{aligned}\Delta R_t &= c + 0.53\,(E_t - E_{t-1})\,F_{t+2} + 1.33\,(E_t - E_{t-1})\,(F_{t+3} - F_{t+2}) + \varepsilon_t \\ R_t &= \frac{1}{10} E_t \sum_{j=0}^{10 \text{ years}} F_{t+j}\end{aligned}$$

   If 30 year mortgage $\approx$ 10 year duration, 0.53: we need the increase in F to last 5 years. 1.33?? Need F to increase, then last a long time.

2. Can the Fed affect the one year *risk premium* in long term bonds? Let's check if ΔR is reversed after shocks.

3. Large coefficients *are* plausible of joint endogenous responses of FF and R to other news. Maybe again we really don't have shocks.

New home purchases?

1. Hamilton: start to search when $R < R^*$, then takes 6-24 weeks to buy a house. This accounts for regression. "Puzzle" this seems long.

2. Economics of new home sales? Basically a search/refinancing decision. Why would people wait until $R < R^*$ to begin searching? Why doesn't ΔR just raise prices? – Flat supply?

3. Need to sell old home! *New* sales = immigration, demographics, regional relocation and destruction, or empty homes.

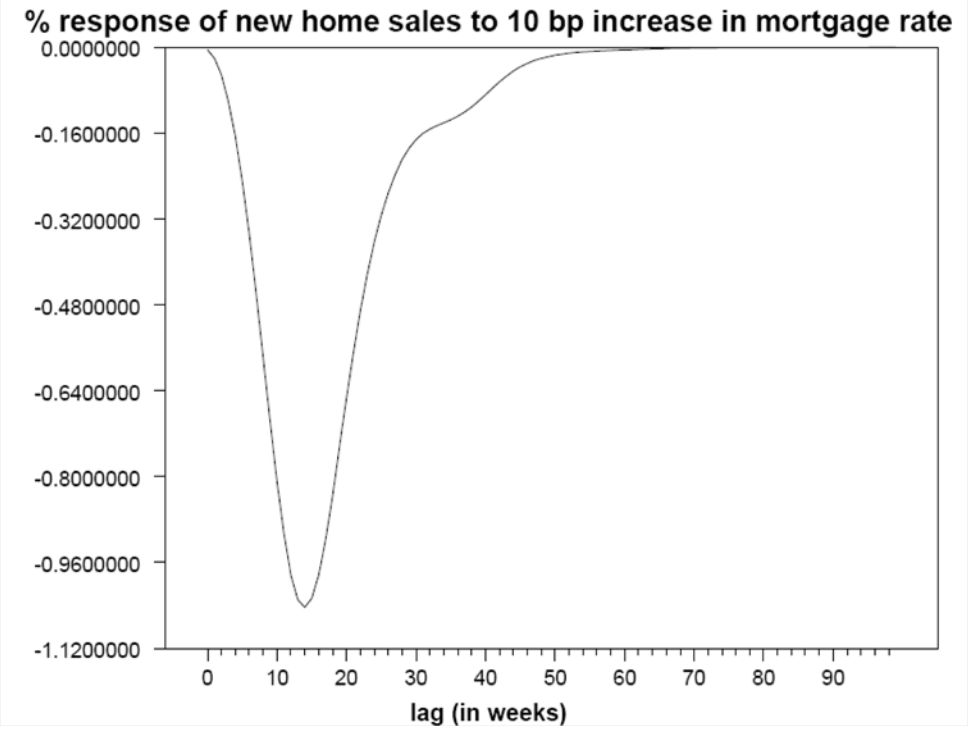
4. No effect on GDP (I think). New sales = Δbusiness inventory

5. Elastic (flat) supply of houses? Need to build them, takes 1+ years! Effect on *sales* depends on *inventory.*

6. 3 Months seems *short*. MP$\longrightarrow y$ typically max at 2 years.

Measurement, characteristics of response function?

Figure 4. Average impulse-response function relating 10-basis-point increase in mortgage rate to 100 times the natural log of new home sales.



$\Delta R \approx iid$. A permanent 1% rise in mortgage rates leads to a 11% decline in new home sales in 3 months, that is *completely reversed* in 6-9 months, with new home sales back at the original level???

$$h_m = .. \sum_{j=1}^{5} \gamma_{1j} h_{m-j} + \gamma_2 m + 2.63 \times \Delta GDP_m + \sum_j \gamma_{3j} \Delta R_{wj} + \varepsilon_m$$

1. h has a unit root! $\longrightarrow$ Permanent response.

   (a) More: R is stationary. h and GDP are cointegrated. R, FF share low-ω movement. $R - FF$ can forecast long-horizon movements that lagged $\Delta R, \Delta FF$ cannot.

   (b) *Things that look iid at weekly horizons are not necessarily so at longer horizons, and this is important for long-horizon IR.*

2. What's ΔGDP doing here? Effect on home sales *holding GDP constant?*

3. "Figure 4 could equally well be described as the dynamic response of new home sales to a 20-basis-point increase in the level of the fed funds term structure..." NO. Errors in right hand variables bias regression slopes

$$\Delta R_w = c + 0.53 l_w + 1.33 s_w + \varepsilon_w \; R^2 = 0.35$$

Bottom line

1. Interesting, measurement, brilliant idea to use Δ futures makes big progress on measuring shocks.

2. Small quibbles with execution

3. How can the Fed affect long term rates so much? How can long term rates affect the economy so much? How can variation in $40 bn reserves matter so much? If you see empirical proof that Elvis is back, do you believe it?