Simple Example to show issues ($\rho = 1$)

$$y_t = y_{t-1}\rho + e_t$$

VAR case

$$\hat{c}_j = \hat{\rho}^j$$

Use δ method under $\rho = 1$

$$\hat{c}_j - c_j = j\rho^{j-1}(\hat{\rho} - \rho)$$

$$= (j/T)T(\hat{\rho} - \rho)$$

Assumption in paper is $\lim_{T\to\infty} \frac{j}{T} = \delta$

So distribution of $\hat{c}_j$ is δ times $T(\hat{\rho} - \rho)$

Shows why asymptotically $\hat{c}_j$ is random if $\rho = 1$

Many other estimators of responses depending on choice made of $\hat{\rho}$

- OLS
- Median unbiassed
- Pre-test
  $\hat{\rho} = 1(ADF > crit)\hat{\rho} + (1 - 1(ADF > crit))$
- Invert ADF power function
  $\hat{\rho} = \phi(ADF, \alpha), \alpha = .01$
- Bias corrected as in bootstrap+bootstrap

Inversion of power function in this paper

Seems to work well for confidence intervals

Empirical example in paper concerns half life

Single variable: so depends on $\hat{\rho}$

Why not present this in each case rather than half life?

Things are more complex in the SVAR case

In this instance $\hat{c}_j = \hat{c}_0 \hat{\rho}^j$

Distribution now depends on that of $\hat{c}_0$ (initial impulse)

Normally assume consistent but $\hat{c}_0$ are functions of contemporaneous variable coefficients

If weak instruments then $\hat{c}_0$ may be very poorly behaved

$r_t =$ real exchange rate

$n =$nominal exchange rate

System in paper (one lag used here)

$$r_t = ar_{t-1} + bn_t + dn_{t-1} + e_{1t}$$

$$n_t = n_{t-1} + gr_t + hr_{t-1} + e_{2t}$$

Identification:

e_{2t} shock no effect on r_t in L/R

System under identifying assumption is

$$r_t = ar_{t-1} + b\Delta n_t + e_{1t}$$

$$n_t = n_{t-1} + gr_t + hr_{t-1} + e_{2t}$$

n_{t-1} is instrument for Δn_t to estimate b

Terrible instrument so distribution of $\hat{b}$ non-standard

Contemporaneous impulse response of r_t to e_{1t} :

$c_0 = \frac{1}{1+bg}$

May have big effect on confidence itervals for $\hat{c}_j = \hat{c}_0\hat{\rho}^j$ as $\hat{c}_0$ may be random for large T

Might dominate the contribution from $\hat{\rho}$.

Pagan/Robertson (R.Ec Stats 98) found multiple modes in density of liquidity effect estimator for Gali's IS/LM model due to this.

Simulations in paper are for VAR case not SVAR

Conclusion that methods extend to SVAR case without any difficulties need to be treated with caution

Unlikely to be problem in recursive case

However in that instance is the system o.k

Giordani shows need to include output gap if inflation is in VAR

Not in Eichenbaum-Evans model