$$C_t = CS_t + CN_t + CD_t$$

BASE: $\quad C_t = \alpha_0 + \alpha_1 C_{t-1} + u_t \quad$ AR1

MODEL 1: $\quad$ AR4

MODEL 2:

$$CS_t = \alpha_0 + \alpha_1 CS_{t-1} + u_{1t} \quad \text{AR1}$$

$$CN_t = \beta_0 + \beta_1 CN_{t-1} + u_{2t} \quad \text{AR1}$$

$$CD_t = \gamma_0 + \gamma_1 CD_{t-1} + u_{3t} \quad \text{AR1}$$

$$C_t = CS_t + CN_t + CD_t$$

MODEL 3: $\quad$ AR4's for CS, CN, CD

$$UR_t$$

BASE: $UR_t = \gamma_0 + \gamma_1 UR_{t-1} + u_t$

MODEL 1: AR4

MODEL 2:

$$L1_t = \gamma_0 + \alpha_1 L1_{t-1} + u_{1t}$$

$$L2_t = \beta_0 + \beta_1 L2_{t-1} + u_{2t}$$

$$L3_t = \gamma_0 + \gamma_1 L3_{t-1} + u_{3t}$$

$$LM_t = \delta_0 + \delta_1 LM_{t-1} + u_{4t}$$

$$JF_t = \bar{\nu}_0 + \theta_1 JF_{t-1} + u_{5t}$$

$$E = JF + JG + JM + JS - LM$$

$$V = L1 + L2 + L3 - E$$

$$UR = \frac{V}{L1 + L2 + L3 - AFT}$$

MODEL 3:

AR4's for the 5 variables

$$\overbrace{}^{C} \qquad \overbrace{}^{I}$$

$$GDPR = \overbrace{CS + CN + CO}^{C} + \overbrace{IHH + IKF}^{I}$$

$$+ \overbrace{COG + COS}^{G} + \overbrace{EX - IM}^{NX}$$

$$+ Z$$

$$= C + I + G + NX + Z$$

$$\underset{1954.1}{\overset{1}{|}} \quad - \quad \underset{2019.4}{\overset{T}{|}}$$

$$RMSE = \sqrt{\frac{1}{T}\sum_{t=1}^{T}\left(y_t - \hat{y}_t\right)^2}$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + u_t \quad t = 1, \dots, T$$

STATIC (always y_{t-1})

DYNAMIC (y_{t-1} for $t=1$, then $\hat{y}_{t-1}$)

4-quarters ahead
   T-3 simulations

$$\hat{y}_t^4, \ \hat{y}_{t+1}^4, \ \dots, \ \hat{y}_T^4$$

$$\underset{4}{\uparrow}$$