PPP: How exchange rates and prices are linked

\[ S = \frac{P_i}{P_i^*} \]  
Law of one price (LOOP)

\[ S = \frac{P}{P^*} \]  
Absolute PPP in levels

\[ s = p - p^* \]  
Absolute PPP in log levels

\[ q \equiv s - p + p^* \]  
Def’n: Log real exchange rate (constant at zero if PPP holds)
PPP (cont’d)

\[ s = p - p^* + \mu \]  
Relative PPP in log levels

\[ \Delta s_t = \Delta p_t - \Delta p^*_t + \Delta \mu_t \]  
Relative PPP in rates

\[ \Delta s_t = \pi_t - \pi^*_t \]  
Restated, holding \( \mu \) constant