where

$$\hat{g} \;=\; \frac{1}{n}\sum_{i=1}^{n} g_i \qquad \textbf{(18)}$$

is the sample mean. Implicitly in the equity-premium literature, the sample size n is presumed large enough to make (18) and (17) sufficiently accurate estimates of their underlying true values, but no formal attempt is made to define "sufficiently accurate" or to confirm exactly what happens to formula (16) in this model if the estimates, and therefore the approximations, are *not* "sufficiently accurate." In this literature the value of (16) is calculated to be what it reduces to when there is no structural uncertainty and V is known exactly to be equal to $\hat{V}$. After canceling terms, the as-if-deterministic-V version of the theoretical formula (16) then becomes

$$\mathrm{E}[r_e]-r_f \;=\; 0\hat{V} \;-\; \tfrac{1}{2}\hat{V}\,, \qquad \textbf{(19)}$$

and for this special case the equity premium puzzle is readily stated.

Taking the U.S. as a prime example, in the last century or so the average annual arithmetic return on the broadest available stock market index was $\mathrm{E}[R_e]\approx 7\%$, with an arithmetic standard deviation $\sigma[R_e]\approx 18\%$.[3] Converting to continuously compounded rates gives a geometric mean $\mathrm{E}[r_e]\approx 5.5\%$ and a geometric standard deviation $\sigma[r_e]\approx 17\%$. The historically observed return on an index of the safest available most-liquid short-maturity bills is about 1% per annum, implying for the equity premium that $\mathrm{E}[r_e]-r_f \approx 4.5\%$. The mean yearly growth rate of U.S. per capita consumption over the last century or so is about 2%, with standard deviation about 2%, meaning $\hat{V}\approx .04\%$. Suppose $\theta\approx 2$. Plugging these values into (19) gives a calculated value $(\theta-\tfrac{1}{2})\hat{V}\approx .06\%$.

Thus, the actually observed equity premium on the left hand side of equation (14) exceeds the estimate (19) of the right hand side by some seventy-five times. If this were to be explained with the above data by a different value of θ, it would require the coefficient of relative risk

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[3] These numbers are from Mehra and Prescott (2003) and/or Campbell (2003), who also show summary statistics based on other time periods and other countries, most of which naturally have somewhat lower values of $\mathrm{E}[R_e]$ than "America in the American century."