

postulate. To see this, rewrite the basic starting equation (2) of the model for the case $a=e$ of a representative economy-wide equity index where $h_a(g)=g$. In this special case, (2) becomes

$$r_e - E[r_e] = g - E[g] . \quad (45)$$

The excess volatility puzzle is the empirical fact that $\sigma[r_e]$ is about an order of magnitude larger than $\sigma[g]$. Clearly then, (45) cannot be interpreted as representing equality between random variables in a realized-frequency sense. However, what is required by the relevant theory is not this ex-post frequency interpretation per se, but rather that equality (45) be ex-ante *subjectively perceived* as holding in expectations. The Euler equation imposes restrictions upon *perceived expectations* of future marginal-utility-weighted equity returns, not upon *past realizations* of equity returns or growth rates per se. In this model g is an unobservable future random variable, whose perceived marginal-utility-weighted subjective variability is greater than its un-weighted past sample average would appear to indicate. (This *perception* of investors, that there is more uncertainty about the future growth process than is indicated by point calibration to past sample moments, is, after all, the “strong force” driving the previous two theorems.) Throughout what follows, it is essential to realize that there is no excess volatility “puzzle” in (45) if the variability of returns on a comprehensive equity index, which is being *perceived* (in subjective expectations) as representing the entire economy, matches consistently the *perceived* variability (in subjective expectations) of that same economy’s future growth rate.

I now present two thought-experimental “stories” about subjective future economic growth prospects, neither of which is directly verifiable but both of which will turn out to “fit” the stylized facts equally well. The backdrop for both stories begins with the idea that the critical random variable g , which is driving the behavior of the entire system, is subjective and not directly observable. So far as the *first* moment of g is concerned, we know in this model that $E[g]=\hat{g}$ from (24) and (25). However, we are quite unsure about how to represent in our minds the *second* moment of g . We know empirically that the historical variability in equity returns greatly exceeds the historical variability in growth rates, thereby causing an excess-volatility ‘puzzle’ concerning how to interpret (45). What we do not yet know or understand is how to conceptualize the second moment of g in a way that resolves the seeming paradox of (45). The