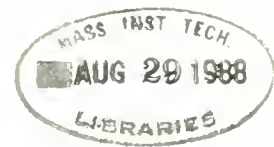


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THE EQUITY RISK PREMIUM: A SOLUTION?

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Working Paper #1982-88

February 1988

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In our 1985 equity premium puzzle paper, we argued that standard competitive theory, sensibly restricted, cannot account for both the 0.8 percent average real return on debt and the nearly 7.0 percent average real return on equity that the U.S. data show for the 1889-1978 period. In these comments, we explain why the Reitz (1988) theory is not a solution to this puzzle and in the process clarify what we think would and would not be a solution.

In our earlier paper, we did not argue that competitive theory restricted in a sensible way will never account for the now-puzzling return observations. Perhaps the introduction of some other preference structure will do the job. Recent examples of explorations of alternative preference structures include dropping the expected utility assumption [Epstein and Zin (1987), Kocherlakota (1987), and Weil (1987)] and introducing habit formation [Constantinides (1987)]. For such efforts to be successful, though, they must convince the profession that the proposed alternative preference structure is more useful than the now-standard one for organizing and interpreting not only these observations on average asset returns, but also other observations in growth theory, business cycle theory, labor market behavior, and so on. Anyone accomplishing that would have contributed significantly to economic science.

A Problematic "Solution"

Reitz (1988), however, uses standard preference structures and has not introduced technological features that produce monetary arrangements. He finds that if the probability of a very

large and in consumption is small and if the intertemporal substitution elasticity of consumption is low, then a risk-free real bill will have a much lower average yield than a security that has dividends proportional to consumption. We do not challenge this fact. We do, though, challenge Feitz's conclusion that this fact resolves the equity premium puzzle within the standard theoretical framework that abstracts from monetary factors, among other things.

In Feitz's examples, the smallest annual decline in consumption is 25 percent and the largest over 98 percent. Declines of this magnitude have not been experienced in the United States. During the last 100 years, a period that includes the Great Depression, consumption has fallen more than 6 percent in a year only four times. And the largest of those four declines was only 6.6 percent. But even if we assume that people perceive the possibility of a consumption decline as large as Feitz postulates, his proposed solution has two serious--indeed, fatal--problems.

Unreasonable Equations . . .

Is equating the real return on a nominal Treasury bill with that on a real bill reasonable? It is only if unanticipated inflation is small. Under much less trying conditions than those proposed by Feitz, governments have expropriated much of the real value of nominal debt by the mechanisms of unanticipated inflation. We cite three examples. During the German hyperinflation, holders of bonds denominated in Weimar marks lost virtually all of the value invested in these assets. During the 1920s Poincaré administration in France, bondholders lost nearly 90 percent of

Needed: Historical Support

Additional historical evidence in support of Feltz's hypothesis is needed for it to be taken seriously. Perhaps the implication of the Feltz theory that the real interest rate and the probability of the extreme event move inversely would be useful in rationalizing movements in the real interest rate during the last 100 years. For example, the perceived probability of a recurrence of a depression was probably high just after World War II and then declined. If real interest rates rose significantly as the war years receded, that would support the Feltz hypothesis. But they did not. While they were lower before the Treasury Accord than after it, this is surely related to the Fed's actions to support the price of government debt as it had said it would.

Similarly, if the low-probability event precipitating the large decline in consumption were a nuclear war, the perceived probability of such an event surely has varied in the last 100 years. It must have been low before 1945, the first and only year the atom bomb was used. And it must have been higher before the Cuban Missile Crisis than after it.² If real interest rates moved as predicted, that would support Feltz's disaster scenario. But again, they did not. The point is that to determine how useful this theory is, we must identify the possibly small-probability events and try to measure the magnitudes of their probability over time.³

History suggests, however, that efforts might be more productive, put into incorporating monetary factors into standard theory. For example, real returns on short-term debt were high on

evidence is that the 1930s and the 1970s. Was the theoretical unavail-
 ability of a discount rate of zero sufficient, as Peacock (1980)
 suggested, as alternative interpretation of these results? The
 real returns to the internationally mobile portfolio assets in
 the 1930s, the United States was at a gold standard, and because
 of gold supply restrictions, the relative price of gold increased.
 This produced deflation and a real return. The high real re-
 turns in the 1970s might better be attributed to the decisions of
 the Fed under the leadership of Paul Volcker that to a decrease in
 the probability of a 2% or 3% constant rate of unemployment. This
 strongly suggests that the average return on short-term debt is
 not invariant to monetary arrangements.

Conclusion

Are Peacock's disaster scenarios reasonable? They are
 undoubtedly extreme. That such extreme assumptions are needed to
 account for the average returns on debt and equity we interpret as
 supporting our contention that standard theory still faces an
 unsolved puzzle.

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Notes

¹We thank Rüdiger Dornbusch, Stanley Fischer, Lars Hansen, and Lawrence Sattars for helpful discussions. Needless to say, the views expressed are our own.

²Hansen and Singleton (1983) also estimate this curvature parameter using Treasury bill returns as well, and they again obtain a value near 1. But given the failure of standard theory to account for Treasury bill returns, this is not an estimate that should be used to restrict theory.

³Lawrence Sattars suggested that the Cuban Missile Crisis should be a useful historical event to assess the usefulness of the Feltz theory for studying asset returns.

⁴In Feltz's example 3, where the existence of a risk premium consistent with observation and reasonable risk aversion is demonstrated, consumption drops 98.2 percent in one year. We suggest that a 99 percent drop in consumption with a small associated probability can give the same risk premium with a lower risk aversion parameter.

References

- Constantinides, George M., 1987, Habit formation: A resolution of the equity premium puzzle, Manuscript (University of Chicago, Chicago, IL), July.
- Epstein, Larry G. and Stanley E. Zin, 1987, Substitution, risk aversion and the temporal behaviour of consumption and asset returns II: An empirical analysis, Manuscript (University of Toronto, Toronto, and Queen's University, Kingston, Ontario, Canada), September.
- Hansen, Lars Peter and Kenneth J. Singleton, 1983, Stochastic consumption, risk aversion, and the temporal behavior of asset returns, *Journal of Political Economy* 91, 2-9-66.
- Kocherlakota, Narayana F., 1987, The equity premium: A puzzle?, Manuscript (Northwestern University, Evanston, IL), November.
- Mehra, Rajnish and Edward C. Prescott, 1985, The equity premium: A puzzle, *Journal of Monetary Economics* 15, 145-61.
- Reitz, Thomas A., 1988, The equity premium: A solution, *Journal of Monetary Economics*, this issue.
- Weil, Philippe, 1987, Nonexpected utility in macroeconomics, Paper presented at NBER conference (Harvard University, Cambridge, MA), October.

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