between 3.6 and 4.5 percent annually. The annual real rate of return (nonfinancial) on corporate stocks during this period varied from 5.9 to 8.8 percent, but was generally less than this for nearly all other forms of investment readily available to consumers. DOE believes such opportunity costs are relevant indicators of the appropriate discount rates for consumers with significant personal savings or investments.

For consumers with little or no personal savings, DOE believes that the costs of credit-card financing and the willingness of consumers to forego current consumption in favor of future savings should be taken into account. According to the data derived from a 1992 Survey of Consumer Finances performed by the National Opinion Research Center for the Federal Reserve Bank, 30 percent of all U.S. households have less than $500 in savings, checking and money market accounts, or have no such account. Also, according to the survey, 13 percent of all U.S. households have a net worth of less than $1000. These two survey results suggest that many households may be forced, because of their financial circumstances, to finance any increased appliance costs resulting from efficiency standards through credit cards or other high interest sources of financing, or by reducing (or postponing) their current consumption of goods and services. Limited empirical research [8] suggests that low-income households exhibit higher-than-average discount rates (i.e., required rates of return or time values of money) across all of their time-sensitive decisions, including (but not limited to) their appliance purchases. Real credit-card financing rates remain above 10 percent for most consumers.

The Department continues to believe that appropriately weighted, real financing rates are a useful indicator of consumer discount rates, although it recognizes that there are considerable limitations to the data concerning consumer financing provided by Whirlpool.

Regarding implicit discount rates, various studies have shown that they range from as low as 3 percent to as high as 100 percent (or more) for certain appliances. However, because implicit discount rates are based on actual consumer purchase behavior, they also reflect the extent to which there are market failures, such as inadequate information, conflicting owner/renter incentives, and second party (builder/contractor) purchases that inhibit consumers from making energy efficiency investments they would otherwise consider to be worthwhile. One major reason Federal appliance efficiency standards were originally established was to overcome these market failures regarding investment in energy efficiency.

For these reasons, DOE does not believe unadjusted (i.e., not corrected for potential biases) discount rates derived from actual consumer behavior should be used in evaluating the economic impact of proposed standards on consumers. DOE believes the intent of the legislation that established the appliance standards program is to achieve energy savings which are being foregone because of market failures that hinder or discourage consumer investments in energy efficiency. This conclusion is supported by the findings of the District Court in *Natural Resources Defense Council* v. *Herrington*, 768 F. 2d 1355, 1406–07 (D.C. Cir. 1985), where the court stated that ''the entire point of a mandatory program was to change consumer behavior'' and ''the fact that consumers demand short payback periods was itself a major cause of the market failure that Congress hoped to correct.''

Based on the comments received and the further investigation of issues raised in the Notice of Proposed Rulemaking on Energy Conservation Standards for Eight Products (59 FR 10464, 10532, March 4, 1994), the Department has concluded that a 6 percent discount rate is an appropriate mid-range estimate of the ranges of real financing rates, opportunity costs and time values of money experienced or exhibited by residential consumers. However, because of the considerable variability among different categories of consumers, the Department intends to place increased emphasis on assessing the sensitivity of the life-cycle cost analyses to the use of low (2 percent) and high (15 percent) discount rates.

b. Manufacturer Discount Rate. The real discount rate used to assess the impacts of the proposed refrigerator standards on manufacturers is 12 percent. It is the discount rate used to calculate the net present value of the series of estimated net cash flows expected to be experienced by industry, as calculated by the GRIM module of the MAM.

The Manufacturer Analysis Model also uses a ''market discount rate'' for forecasting the impact of standards on future appliance sales, as distinct from the 12 percent rate used to calculate industry net present values. This implicit market rate is a higher rate derived from empirical analysis of historical efficiency choice decisions, and is used as an indicator of the extent to which consumers implicitly value operating costs compared with first costs.

c. Social Discount Rate. In identifying a discount rate that is appropriate for use in calculating benefits to the Nation as a whole, the Department considered the opportunity costs of devoting more economic resources to the production and purchase of more energy-efficient appliances and fewer national resources to other types of investment. Since differentiating among specific classes of consumers or businesses is not necessary, the Department considered a broad measure of the average rates of return earned by economic investment throughout the U.S. to be an appropriate basis for the social discount rate.

Using this approach, the Office of Management and Budget (OMB) prepared a *Background on OMB's Discount Rate Guidance* in November of 1992, containing an analysis of the average annual real rate of return earned on investments made since 1960 in nonfinancial corporations, noncorporate farm and nonfarm proprietorships, and owner-occupied housing in the U.S. The results of this analysis showed that since 1980, the annual real rate of return for these categories of investments averaged slightly more than 7 percent, ranging from a low of about 4 percent for owner-occupied housing (which represented about 43 percent of total capital assets in 1991 of about $15 trillion) to a high of about 9 percent on noncorporate farm and nonfarm capital (which represented about 23 percent of the total). Between 1960 and 1980, the average real rate of return on capital was higher, averaging about 8.5 percent in the 1970s and about 11.2 percent in the 1960s. Because of this analysis, OMB chose to designate 7 percent as the social discount rate specified in revisions to OMB Circular A–94 issued on November 10, 1992, 57 FR 53519.

Because the Department believes the methods and data used by OMB to develop this guidance are appropriate bases for a social discount rate, the 1993 Advance Notice to this proposed rule said that it was the intent of the Department to use 7 percent as the discount rate in the calculation of the net national benefits and costs of the proposed standards.

The New York State Energy Office (NYSEO) stated that the average rate of 7 percent for the societal perspective is too high and suggested an average rate of 3 to 4 percent real, based upon current 30-year U.S. Treasury bond interest rates. (NYSEO, No. 26 at 17–19).

[8] Train, Kenneth, Discount Rates in Consumers' Energy-Related Decisions: A Review of the Literature; Energy, December 1985.