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Realization utility ☆

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ABSTRACT

A number of authors have suggested that investors derive utility from *realizing* gains and losses on assets that they own. We present a model of this "realization utility," analyze its predictions, and show that it can shed light on a number of puzzling facts. These include the disposition effect, the poor trading performance of individual investors, the higher volume of trade in rising markets, the effect of historical highs on the propensity to sell, the individual investor preference for volatile stocks, the low average return of volatile stocks, and the heavy trading associated with highly valued assets.

1. Introduction

When economists model the behavior of individual investors, they typically assume that these investors derive utility only from consumption or from total wealth. In this paper, we study the possibility that investors also derive utility from another source, namely from *realized gains and losses* on assets that they own. Suppose, for example, that an investor buys shares of a stock and then, a few months later, sells them. We consider a model in which he receives a burst of utility right then, at the moment of sale. The amount of utility depends on the size of the gain or loss realized—on the difference between the sale price and the purchase price—and is positive if the investor realizes a gain, and negative otherwise. This source of utility, which we label "realization utility," is not new to our paper: other authors also discuss it. Our contribution is to offer a comprehensive analysis of its implications for trading behavior and for asset prices.

Why might an investor derive utility from realizing a gain or loss? We think that realization utility is a consequence of two underlying cognitive processes. The first has to do with how people think about their investing history. Under this view, people do not think about their investing history purely in terms of the return they have earned on their portfolio. Rather, they often think about it as a series of investing episodes, each one defined by three things: the name of the investment, the purchase

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price, and the sale price. "I bought IBM at $80 and sold it at $100" might be one such episode. "We bought our house for $260,000 and sold it for $320,000" might be another.

The second cognitive process that, in our view, underlies realization utility has to do with how people *evaluate* their investing episodes. We suspect that many investors use a simple heuristic to guide their trading, one that says: "Selling a stock at a gain relative to purchase price is a good thing—it is what successful investors do." After all, an investor who buys a number of stocks in sequence and manages to realize a gain on all of them *does* end up with more money than he had at the start. The flip side of the same heuristic says: "Selling a stock at a loss is a bad thing—it is what unsuccessful investors do." Indeed, an investor who buys a number of stocks in sequence and realizes a loss on all of them *does* end up with less money than he had at the start.

In summary, an investor feels good when he sells a stock at a gain because, by selling, he is creating what he views as a *positive* investing episode. Conversely, he feels bad when he sells a stock at a loss because, by selling, he is creating what he views as a *negative* investing episode.

We do not expect realization utility to be important for all investors or in all circumstances. For example, we expect it to matter more for individual investors than for institutional investors who, as trained professionals, are more likely to think about their investing history in terms of overall portfolio return than as a series of investing episodes. Also, since realization utility depends on the difference between sale price and purchase price, it is likely to play a larger role when the purchase price is more salient. It may therefore be more relevant to the trading of individual stocks or to the sale of real estate than to the trading of mutual funds: the purchase price of a stock or of a house is typically more salient than that of a fund.

In our view, the idea that some investors derive utility directly from realizing gains and losses is a plausible one. But in order to claim that realization utility is a significant driver of investor behavior, we cannot appeal to mere plausibility. To make a more convincing case, we need to build a model of realization utility and then see if the model explains a range of facts and leads to new predictions that can be tested and confirmed.

In this paper, we take up this challenge. We construct a model of realization utility, discuss its predictions, and show that it can shed light on a number of empirical facts. We start with a partial equilibrium framework but also show how realization utility can be embedded in a full equilibrium model. This allows us to make predictions not only about trading behavior but also about prices.

Our partial equilibrium model is an infinite horizon model in which, at each moment, an investor allocates his wealth either to a risk-free asset or to one of a number of stocks. If the investor sells his holdings of a stock, he receives a burst of utility based on the size of the gain or loss realized and pays a proportional transaction cost. He also faces the possibility of a random liquidity shock: if such a shock occurs, he must immediately sell his asset holdings and exit the asset markets. At each moment, the investor makes his allocation decision by maximizing the discounted sum of expected future utility flows. In our baseline model, we assume a linear functional form for realization utility. Later, we also consider a piecewise-linear specification.

We find that, under the optimal strategy, an investor who is holding a position in a stock will voluntarily sell this position only if the stock price rises sufficiently far above the purchase price. We look at how this "liquidation point" at which the investor sells depends on the expected stock return, the standard deviation of the stock return, the time discount rate, the transaction cost, and the likelihood of a liquidity shock.

The model has a number of interesting implications. One of the more striking is that, even if realization utility has a linear or concave functional form, the investor can be risk *seeking*: all else equal, his initial value function can be an increasing function of the standard deviation of stock returns. The intuition is straightforward. A highly volatile stock offers the chance of a large gain which the investor can enjoy realizing. Of course, it may also drop a lot in value; but in that case, the investor will simply postpone selling the stock until he is forced to sell by a liquidity shock. Any realized loss therefore lies in the distant, discounted future and does not scare the investor very much at the time of purchase. Overall, then, the investor may prefer more volatility to less.

We use our model to link realization utility to a number of financial phenomena. Among the applications we discuss are the disposition effect (Shefrin and Statman, 1985; Odean, 1998), the subpar trading performance of individual investors (Barber and Odean, 2000; Barber, Lee, Liu, and Odean, 2009), the higher volume of trade in bull markets than in bear markets (Stein, 1995; Statman, Thorley, and Vorkink, 2006; Griffin, Nardari, and Stulz, 2007), the effect of historical highs on the propensity to sell (Grinblatt and Keloharju, 2001), the individual investor preference for volatile stocks (Kumar, 2009), the low average return of volatile stocks (Ang, Hodrick, Xing, and Zhang, 2006), and the heavy trading associated with highly valued assets—as, for example, in the case of U.S. technology stocks in the late 1990s (Hong and Stein, 2007).

Of these applications of realization utility, the most obvious is the disposition effect, the greater propensity of individual investors to sell stocks that have risen in value, rather than fallen in value, since purchase. In combination with a sufficiently positive time discount rate, realization utility generates a strong disposition effect: the investor in our model voluntarily sells a stock only if it is trading at a gain relative to purchase price.

While the link between realization utility and the disposition effect is clear, we emphasize that realization utility is not a "relabeling" of the disposition effect. On the contrary, it is just one of a number of possible theories of the disposition effect and can be distinguished from other theories through carefully constructed tests. For example, another theory of the disposition effect, one that has nothing to do with realization utility, is that investors have an irrational belief in mean-reversion. Later in the paper, we discuss an experiment that can distinguish this view from the realization utility view.