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# The dark side of financial innovation: A case study of the pricing of a retail financial product<sup>☆</sup>

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## ABSTRACT

The offering prices of 64 issues of a popular retail structured equity product were, on average, almost 8% greater than estimates of the products' fair market values obtained using option pricing methods. Under reasonable assumptions about the underlying stocks' expected returns, the mean expected return estimate on the structured products is slightly below zero. The products do not provide tax, liquidity, or other benefits, and it is difficult to rationalize their purchase by informed rational investors. Our findings are, however, consistent with the recent hypothesis that issuing firms might shroud some aspects of innovative securities or introduce complexity to exploit uninformed investors.

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## 1. Introduction

We carry out a detailed analysis of the pricing and expected returns of 64 issues of a popular structured equity product. Our pricing results imply that, on average, across the 64 issues, purchasers of the products lock in negative abnormal returns of at least 8% per year relative to

dynamically adjusted portfolios of the underlying stock and bonds with the same risk. This negative abnormal return is large enough that under the most reasonable assumptions about the expected returns of the underlying stocks, the mean of the estimates of the expected returns on the structured products is less than zero. Given that the products returns covary positively with the broad market indexes and that the products do not appear to offer tax, liquidity, or other benefits, it is difficult to rationalize their purchase by informed rational investors. These findings are difficult to reconcile with the long standing view that financial innovations help issuers and (rational) investors achieve desired goals in the presence of market imperfections.

Much of the extant literature portrays financial innovations as helping economic agents achieve a desired function in the presence of one or more market inefficiencies or imperfections.<sup>1</sup> For example, new securities may be

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<sup>1</sup> Tufano (2003) provides a thorough summary of the literature on financial innovation.

created to enable investors to achieve desired payoffs not spanned by the previously available financial instruments, or loosely to complete markets. Ross (1976) takes this “spanning” view of financial innovation in arguing that the introduction of option contracts improves allocative efficiency when the previously existing set of securities fails to span the state space.<sup>2</sup> Other research presents financial innovations as arising to ameliorate imperfections such as agency conflicts (Ross, 1989), to reduce transactions costs (Ross, 1989; McConnell and Schwartz, 1992; Grinblatt and Longstaff, 2000), and to minimize the impact of taxes or regulations (Miller, 1986; Santangelo and Tufano, 1996). A common element in these papers is that financial innovations arise in response to market imperfections or inefficiencies and provide the benefit of ameliorating at least one imperfection or inefficiency.<sup>3</sup> This generally benign view of financial innovation is unsurprising, since, as noted by Tufano (2003), “bringing new securities to market requires the voluntary cooperation of both issuers and investors.”

Financial institutions ability to create securities providing state-contingent payoffs tailored to the needs or desires of specific investors or groups of investors seems especially conducive to achieving these potential benefits. But there is a dark side to the ability to create instruments with tailored payoffs. If some investors misunderstand financial markets or suffer from cognitive biases that cause them to assign incorrect probability weights to events, financial institutions can exploit the investors mistakes by creating financial instruments that pay off in the states that investors overweight and pay off less highly in the states that investors underweight, leading the investors to value the new instruments more highly than they would if they understood financial markets and correctly evaluated information about probabilities of future events. In addition, the ability to create instruments with almost any payoffs implies that there are few limits on the complexity of financial instruments. A recent theoretical literature explores equilibria in which firms shroud some aspects of the terms on which their products are offered in order to exploit uninformed consumers (Gabaix and Laibson, 2006), and strategically create complexity to reduce the proportion of investors who are informed (Carlin, 2009). In these equilibria, prices are higher than they would be if consumers or investors were fully informed. In the context of structured equity products (SEPs), these arguments imply that markups or premiums are higher and returns lower than they otherwise would be.

We provide evidence that this darker view of financial innovation is likely to apply to offerings of at least some

retail financial products by focusing on the initial pricing of Stock Participation Accreting Redemption Quarterly-pay Securities (SPARQS), a subset of the U.S. publicly issued SEPs. SEPs are medium-term notes issued by financial institutions and have payments based on another company's common stock price, multiple common stock prices (e.g., baskets of common stocks), a stock index, or multiple stock indexes. They are designed and issued by banks and investment banks and typically marketed to retail investors. SPARQS, created and marketed by Morgan Stanley, are the most popular of the publicly offered SEPs with payoffs based on the prices of individual common stocks.

We find that the primary market investors pay, on average, an 8% premium for these securities, where the premium is defined as the difference between the offering price and an estimate of the fair market value. This is a large premium for a product that is callable after about six months and has a maximum maturity of slightly more than one year, as it implies that the purchaser locks in a negative abnormal return of at least 8% per year relative to a dynamically adjusted portfolio of the underlying stock and bonds with the same risk. Examination of the behavior of the secondary market price premiums to the model values over time indicates a gradual adjustment toward the model values.

These premiums are large enough, and the expected lives of the SPARQS short enough, that under the objective measure the expected returns on the SPARQS are less than the risk-free rate of interest. In a standard model of portfolio choice, such a security is rationally purchased by an investor only if its returns covary positively with the investor's marginal utility (Merton, 1982). The returns of the SPARQS covary positively with the broad market indexes, and for the vast majority of investors, almost certainly covary positively with consumption and negatively with marginal utility. Thus, it is difficult to rationalize primary market purchases of SPARQS by investors who hold portfolios that are positively correlated with or uncorrelated with the broad market indexes. With such SPARQS investors would have been better off investing in bank certificates of deposit.<sup>4</sup>

It is unlikely that SPARQS satisfy any hedging needs of retail investors. The payoffs of SPARQS are qualitatively similar to those of covered calls, but SPARQS are callable by the issuer at a time-varying schedule of call prices, complicating their use as hedging instruments. Even for positions such as naked purchased put options for which SPARQS at first glance seem like a reasonable hedge, hedges involving ordinary exchange-traded options and the underlying stock seem more natural. The SPARQS also do not provide tax advantages, are not particularly liquid, and do not appear to help investors avoid transactions costs.

In a complementary paper, Bergstresser (2008) presents evidence on the abnormal returns of a broad sample of SEPs that is consistent with our findings of overpricing on the

<sup>2</sup> Qualifying this view, Elul (1995) demonstrates that introduction of non-redundant assets in incomplete markets does not always improve welfare, while Allen and Gale (1991) argue that relaxing short-sale restrictions by allowing unlimited short-sales may not be desirable.

<sup>3</sup> Frame and White (2004) and Tufano (2003) also discuss the fact that some financial innovations arise in response to regulations and differences in taxation. As Frame and White (2004) point out, whether one sees this innovation as beneficial or deleterious will depend on one's views of the regulatory or differential taxation regime. Tufano (1998) argues that companies can use cash flow hedging to avoid the discipline that raising external capital imposes on managers.

<sup>4</sup> Such strong statements cannot be made about many other high-cost financial products, for example, mutual funds with high loads. Because an investor can hold mutual fund shares for several or even many years, the expected return on a high-load mutual fund can exceed the riskless rate.

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