

Cursed Financial Innovation*

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Abstract

We analyze welfare implications of an optimal security offered by a bank to investors with inferior information. Investors are cursed, that is, neglect the information content of the offer. We show that, by financial innovation, rational profit-maximizing issuers induce investors to bet on unlikely market movements at unfavorable terms, creating both excess risk taking and undersaving. Giving more information to the issuer allows it to induce bigger bets, exacerbating both effects and therefore lowering welfare. Furthermore, under plausible circumstances, giving more, but still inferior, information to the investor also lowers welfare by giving investors false guidance on what to bet on. Market based policies as increased competition or more access to financial markets tend not to affect welfare, just redistribute profits from banks to investors. A policy dubbed "uninformed standardization" might improve welfare.

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1 Introduction

In this paper, we analyze the welfare implications of financial innovation and information when investors neglect that issuers are utilizing superior information in designing securities. Our approach is motivated by evidence and arguments that—analogously to the winner’s curse in auctions—individuals underestimate the informational content of others’ actions (Eyster and Rabin, 2005), that some aspects of financial markets are difficult to understand without assuming that investors are cursed in this way (Eyster, Rabin and Vayanos, 2014), and that some of financial innovation may in part be about exploiting naive investors (Henderson and Pearson, 2011). We show that rational profit-maximizing issuers induce investors to bet on unlikely market movements at unfavorable terms, creating both excess risk taking and undersaving. Giving more information to the issuer allows it to induce bigger bets, exacerbating both effects and therefore lowering welfare. More surprisingly, we show that under plausible circumstances, giving more, but still inferior, information to the investor also lowers welfare by giving investors false guidance on what to bet on.

Section 3 presents our basic model. There are two periods. An investor’s only means of saving for period 2 is through a risk-neutral bank. The bank and the investor start off with the same prior regarding an underlying state to be resolved in period 2. In period 1, the bank observes private information regarding the state, and can then offer a security—defined as a map from states to payoffs—to the investor. The investor’s utility function in period 2 is strictly concave, so that the first-best security has a constant payoff. In contrast, the bank’s optimal security offers overly high consumption in states whose probability the investor overestimates and overly low consumption in states whose probability the investor underestimates, thereby inducing suboptimal risk-taking. Even given that the investor takes risk, however, the investor undersaves in that saving more by the same amount in every state would increase her expected utility.

This above equilibrium describes the market for retail structured products, a large and fast-growing worldwide market of \$1-4 trillion offering derivatives on underlying stock, exchange rates, and indices to retail investors. Retail structured products offer directional bets on the underlying with no apparent economic reason either for the investor or for the party holding the opposite side, which is typically an investment bank. A plausible hypothesis is that, consistent with the arguments of Henderson and Pearson (2011) that these securities are overpriced and make no economic sense, issuers design these securities based on prices from the professional options market in a way that investors overvalue.

An equivalent model to ours arises if an otherwise rational investor falsely believes that an uninformed party is designing the security, but in fact an informed party is. Under this interpretation, the model also describes some custom-tailored CDO’s, such as those involved in the Goldman Sachs Abacus scandal (see Davidoff, Morrison and Wilhelm Jr (2011)).

In Section 4, we analyze the welfare effect of providing more information to parties. For this purpose, we consider a specific case of our model in which the investor’s utility takes the log form. With log utility, total social welfare (combining the bank’s expected profit and the investor’s expected utility) is decreasing in the relative entropy between the investor’s and the bank’s beliefs,

while the bank’s expected profit is increasing in the relative entropy between the bank’s and the investor’s beliefs. Using this connection, we can use insights from information theory to show that if the bank has more information about the state, its profit increases while social welfare decreases. Intuitively, giving more information to the bank—which is better informed to start with—increases the distance between the two parties’ beliefs, increasing the extent of directional bets and undersaving. In as much as issuers receive their information from the professional market, therefore, making the professional market more informationally efficient lowers social welfare in the retail market. Conversely, giving more information to the investor moves her beliefs closer to the bank’s on average, raising expected welfare.

In Section 5, we extend our model to allow for the bank to choose the underlying on which to write its security. This flexibility lowers social welfare because the bank then selects the underlying on which its information is most extreme, allowing it to better take advantage of the investor. Furthermore, we identify circumstances under which giving the investor more information now lowers social welfare. Specifically, if the investor’s information is inferior to the bank’s (in that the investor’s information does not move the bank’s beliefs) and sufficiently imprecise (in that it could in all states provide good or bad news), investor information lowers total welfare and increases profits. Intuitively, banks still choose to base the security on an underlying on which they have extreme information, but they now select one on which the investor’s information goes in the opposite direction. Since giving information to investors that the bank does not have seems impossible in practice, information-based policies to improve investor and social welfare are likely to backfire.

In Section 6, we consider various extensions and modifications of our framework. First, we consider a situation in which the investor can design any payoff structure for herself at the same cost as the bank, for instance through exchange-traded funds or options. Since such better access to financial markets does not eliminate the investor’s misunderstanding of the underlying probabilities, she chooses for herself the same security that she otherwise would have bought from the bank. This leads to the same total welfare, but returns the profits from the security to the investor. From this perspective, a possible explanation for the smaller size of the US market for structured securities is that the market for alternatives is better developed—which is good for consumers, but does not lead to better investment choices. Second, exactly because consumers prefer the same suboptimal securities, competition between banks merely provides the same securities at a cheaper price. We also point out, however, that if banks are limited in how many securities they can offer and investors are heterogeneous in the information they receive, then even price competition between banks may be limited. Intuitively, akin to the market for quacks in Spiegler (2006), the heterogeneity in information allows banks to artificially differentiate their securities and raise prices.

2 Literature

To our knowledge, this is the first paper to argue that, by financial innovation, rational profit-maximizing issuers induce investors to bet on unlikely market movements at unfavorable terms, creating both excess risk taking and undersaving. We are also the first to show that, in this context, the interaction of choice and public information reduces welfare.

There are various views on the role of financial innovation. Allen and Gale (1994) argued that new securities help hedging in an incomplete market setting, while Gorton and Pennacchi (1990), DeMarzo and Duffie (1999), Dang, Gorton and Holmström (2012) showed that financial innovation can increase liquidity of assets by decreasing their sensitivity to private information.

Our work is closer to the literature arguing that financial innovation is to help traders to bet on future market movements. As under common prior and rational agents this idea is against the no trade theorems, there has been various approaches to argue that when agents bet on financial markets they might not learn from each other actions. Perhaps, the most general approach is to assume that agents bet with each other because their priors differ (e.g. Harrison and Kreps, 1978; Geanakoplos, 2010; Morris, 1996; Simsek, 2014), hence, the other agent's action does not have any information content. This approach is generally agnostic on where differences in priors are coming from and whether any of the agents is systematically right. The earlier limits the empirical content of this approach, while the latter makes welfare analysis often inconclusive.¹ Importantly for us, there are a group of papers considering the role of financial innovation with heterogeneous priors. Simsek (2014), shows that introducing new markets by financial innovation makes more betting possible which increases volatility of consumption. Shen, Yan and Zhang (2014) argues that financial innovation is motivated by reducing the cost of betting by minimizing the collateral requirement. Fostel and Geanakoplos (2012) focuses on the interaction of financial innovation and endogenous leverage. None of these papers consider the welfare effect of information.

An other approach is to assume that, while there is information content in others' action, agents neglect this, because of cognitive biases. Models based on overconfidence, neglected risk or cursedness are all examples of this approach (e.g. Scheinkman and Xiong, 2003; Gennaioli, Shleifer and Vishny, 2012; Eyster, Rabin and Vayanos, 2014). Because of the different underlying bias, these models might have different predictions and policy implications. For example, Gennaioli, Shleifer and Vishny (2012) studies financial innovation with agents who neglect risk, but desire safe assets. They show that leads to creation of assets which caters to this bias: seemingly safe assets exposed to small probability crashes. In contrast, our model predicts the creation of financial assets which have high exposure to market movements.

Overconfidence and cursedness are close to each other, resulting in models which often share predictions. (See Eyster and Rabin (2005) for a detailed comparison) While we are not aware of any models of financial innovation with overconfident investors, we suspect that such a model could result in similar predictions to ours. We work with cursedness instead because of mostly epistemic

¹Brunnermeier, Simsek and Xiong (2014) defines a weak welfare criterion for heterogeneous priors and shows that in Simsek (2014) the larger volatility also implies a decrease in welfare.

reasons. We find more realistic that retail investors buy structured assets not because they think they are better than the professional investors they are trading with, but because they do not realize that they are actually betting with them.

Relatedly, there is a literature on designing incentive contracts for overconfident managers (e.g. Adrian and Westerfield, 2009; Landier and Thesmar, 2009; Gervais, Heaton and Odean, 2011). A basic insight in this literature that the principal want to give high powered incentives to managers, effectively motivating him with dreams, which the principal knows are much less likely to materialize than the biased manager. This is very related to our observation that cursedness implies steeper securities. However, given the different context, the focus of this literature is very different from ours. In particular, it is silent on the effect of information, access to financial markets or standardization which are major themes in our work.

The closest papers to ours which is based on cursedness is Eyster, Rabin and Vayanos (2014) which considers the impact of the presence of curse traders in an otherwise standard Grossman-type REE market. They notice that more informed cursed investors might be worse off. Our observation that more public information might decrease welfare is related. While they consider a market with a fixed set of securities, while we focus on the design of new securities.

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