# A Few Ways to Resolve Omnipresent Financial Disputes

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Abstract

These days, financial disputes between financial consumers and financial institutions arise in various situations in various nations, including those between Goldman Sachs and its investors in the US or those between various financial institutions and their customers in Korea. These disputes could make both parties involved suffer financial distress and even go bankrupt. Because of these devastating results, the financial authorities in thsese countries are keen on preventing such disputes ex ante, and resolving them ex post once they occur. To surve the purposes, however, the very nature of such disputes should be understood first, and then, some effective ways out of them should be discovered. We first examine the fundamental causes for the disputes in terms of existing financial theories, risk-return incentives for financial institutions and customers, and their behavioral traits. Also, based on the fundamental causes, we suggest four effective ways to prevent and resolve the disputes, which are i) advising by experts, ii) opt-out policy iii) periodic settlement with premature closing out and iv) early diagnosis with VaR. On top of them, we discuss possible penalties for malpractices of financial institutions

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# I. Introduction

On April 16, 2010, the Securities and Exchange Commission (SEC) announced that it was suing Goldman Sachs and one of its employees, Fabrice Tourre. The SEC alleged that Goldman materially misstated and omitted facts in disclosure documents for a synthetic CDO product it originated called Abacus 2007-AC1. The allegation is that Goldman misrepresented to investors that an independent selection agent, ACA, had reviewed the mortgage package underlying the collateralized debt obligations, and that Goldman failed to disclose to ACA that a hedge fund, Paulson & Co., that sought to short the package, had helped select underlying mortgages for the package against which it planned to bet. The SEC further alleged that "Tourre also misled ACA into believing that Paulson invested approximately $200 million in the equity of Abacus 2007-ACI and, accordingly, that Paulson's interests in the collateral section process were aligned with ACA's when in reality Paulson's interests were sharply conflicting." The complaint states that Paulson made a $1 billion profit from the short investments, while purchasers of the materials lost the same amount. On July 15, 2010, Goldman Sachs agreed to pay $550 million – $300 million to the U.S. government and $250 million to investors – in a settlement with the SEC. The company also agreed to change some of its business practices regarding mortgage investments, including the way it designs marketing materials. The fine is the largest commission penalty for a Wall Street firm.

As in the above case, there are numerous anecdotes about huge losses of investors or financial consumers due to conflicts of interest with financial institutions.[1] Korean investors are no exception. For instance, the KOSPI (the Korea composite price index) hit 2,064.85 on October 31, 2007 for the first time, but, within less than a year, it halved down to 938.75 on October 24. While Korean stock prices fluctuated this way, lots of individuals who had invested in equiy funds (partly owing to sellers' explanation, persuasion, etc.) suffered huge losses. So did corporate investors who put handsome amounts of to-be-received foreign currencies in one of various OTC currency derivatives like window KIKO (knock-in knock-out barrier option) in 2008.[2] The sad saga of these investors does not end here. As a result, as many as 180 lawsuits against the banks which had sold those financial produsts to them were going on as of mid 2011, and some investors even put their cases into the criminal court. Whoever wins, this whole story is sad, suboptimal, and utility-decreasing for all parties involved. On top of these, there were financial disputes between banks and their individual customers like

[1] "Investors" and "financial consumers" are used interchangeably in context throughout this paper.
[2] Refer to Khil, Jaeuk, and Sangwon Suh(2010).

Insight Fund sold by Mirae Asset Securities, or Woori-Power-Income Fund sold by Wooribank.

Now let us ask, "What are the fundamental causes for these financial disputes involving OTC products, equiy funds, or any other financial contracts?" And "What are effective ways to ex ante prevent or ex post resolve them?" Regarding these questions, one thing is clear: a dispute arises as a result of a conflict between the two parties. In this light, we focus on the two parties in order to answer the above questions. Specifically, we combine existing financial theories about them, risk-return incentives of them, and behavioral aspects of them in an attempt to find out balanced and effective ways out of those devastating financial disputes. We suggest that they are, among others, i) advising by experts, ii) opt-out policy iii) periodic settlement with premature closing-out and iv) early diagnosis with VaR.

In the mean time, there is little research on this very topic in acdemics but there are a few distantly-related papers. Among them, Carlin(2009) shows in a non-cooperative oligopoly pricing model that firms intentionally produce more complicated products than necessary in order to charge higher prices to consumers who are not able to price them fairly. This implies that banks or other financial institutions might design or sell complicated OTC products to financial consumers so that they cannot tell how valuable the products really are. Similarly, Gabaix and Laibson (2004) show in a noisy consumer product evaluation model that, even in the presence of competition between firms, firms can make their products inefficiently complex and charge hige mark-up prices in equilibrium when consumers can evaluate products only with noise. Other than these, we could not find closely related research on the topic.

The organization of this paper is as follows. Section 2 presents a theoretic model about the issue, while Section 3 elaborates on it. Section 4 provides four effective ways to prevent and resolve financial disputes between financial institutions and financial consumers, and Section 5 concludes.

## II. The Model

One of the universally accepted axioms about an agent' decision making in finance literature is that an agent maximizes his or her expected utility. That is, an agent is expected to make one out of many choices, which maximizes his expected utility. This is true in an investor's (a financial institution's) buying (selling) a financial product or contract. In this light, here we analyze how a financial consumer and a financial institution make decisions when they trade with each other.

## 1. Assumptions and Notation

Following is the summary of the notations to be used in this paper. "**h**" is a representative investor or financial consumer in the model.

| | |
|---|---|
| 1) $B^h$: | **h**'s cash at time 0 |
| 2) $TW^h$: | the value of **h's** total wealth at time 1 |
| 3) $W^h$: | the value of non-cash asset of **h** at time 1 |
| 4) $A^h$: | **h**'s absolute risk aversion ($A^h>0$) |
| 5) $I_k$: | the value of financial instrument k at time 1 (k = 1, 2, ⋯, n) |
| 6) $c_k$: | fair market price of (financial instrument) k at time 0 |
| 7) $m_k$: | sales fee of k |
| 8) $i_k$: | **h**'s total acquisition cost of k ($i_k = c_k + m_k$) |
| 9) r: | (one-period) risk free interest rate |
| 10) $\rho_{hk}$: | correlation coefficient between $W^h$ and $I_k$ |
| 11) E[x], V[x]: | expected value and variance of random variable x, respectively |
| 12) Cov[x,y]: | covariance between random variables x and y |

Notice that $W^h$, $TW^h$, and $I_k$ are future values while $B^h$ and $i_k$ (= $c_k + m_k$) are present ones.[3] At time 0, **h** initially holds cash $B^h$ and a non-cash asset (or non-cash portfolio), which could be a stock, etc. The future value of the non-cash asset is $W^h$. For instance, $W^h = 0$ with probability 1 if **h** holds nothing but cash at time 0. To maximize his expected utility at time 1, **h** purchases one out of n financial instruments available in the market and a risk free asset. Suppose **h** chooses financial product k. Then it costs him $c_k + m_k = i_k$ in total, where $c_k$ is the current market price of k, and $i_k$ is the sales fee to the seller of k, usually a bank or a securities firm. Then his total wealth at time 1 will be, $TW^h = W^h + I_k + (B^h - i_k)(1+r)$, where $I_k$ is the future value of k at time 1. $m_k>0$ always holds but $c_k$ could be equal to or even less than 0, depending on what kind of a financial product (contract) k is.[4]

In the meantime, we assume that random variables $W^h$ and $I_k$ are bivariate normal where $(\mu^h, v^h)$ and $(\mu_k, v_k)$ are the mean-variance pairs of $W^h$ and of $I_k$, respectively, and $\rho_{hk}$ is the correlation coefficient between $W^h$ and $I_k$.

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[3] We suppress time subscript for simplicity.

[4] For instance, if k is a forward contract, $c_k$ is normally 0. If k is a short position in a plain vanilla call option, $c_k$ could be less than 0. In the meantime, "financial contract," "financial product," and "financial instrument" are used interchangeably in context throughout this paper.

Assumption 1 Probability Distribution of Asset Values

$$\begin{pmatrix} W^h \\ I_k \end{pmatrix} \sim N(\mu, \Sigma), \quad where\ \mu = \begin{pmatrix} \mu^h \\ \mu_k \end{pmatrix}, \Sigma = \begin{pmatrix} v^h, & \rho_{hk}\left(v^h v_k\right)^{0.5} \\ \rho_{hk}\left(v^h v_k\right)^{0.5}, & v_k \end{pmatrix}$$

h is of constant absolute risk aversion type (CARA) or U[W] = $-e^{-A^h W}$, which has been popularly used in finance literature as in Kyle(1989) with $A^h$ being his absolute risk aversion (ARA). In other words, $-\frac{U[W]''}{U[W]'} = \left(-\frac{-\left(e^{A^h W}\cdot\left(-A^h\right)\right)\left(-A^h\right)}{-e^{A^h W}\cdot\left(-A^h\right)}\right) = A^h$ ($A^h$>0).

Assumption 2 Utility Function of Representative Investor (CARA)

$$U[TW^h] = -e^{-A^h \cdot TW^h}$$

where $TW^h = W^h + I_k + (B^h - i_k)(1+r)$ and $A^h$ is the ARA of investor h.

Now, using the moment generating function of a normal random variable, we can show that maximiaing h's expected utility, $EU[TW^h] = E[-e^{-A^h \cdot TW^h}]$, is *equivalent* to maximiaing "$E[TW^h] - \frac{1}{2}\cdot A^h \cdot V[TW^h]$." This never means that h's utility function is quadratic but that maximing his expected utility is effectively the same as maximizing $E[TW^h] - \frac{1}{2}\cdot A^h \cdot V[TW^h]$.

Corollary Objective Function of Representative Investor

Max: $E[TW^h] - \frac{1}{2}\cdot A^h \cdot V[TW^h]$

Proof:

$TW^h = W^h + I_k + (B^h - i_k)(1+r)$ follows a normal distribution with mean and variance being $\mu^h + \mu_k + (B^h - i_k)(1+r)$ and $v^h + v_k + 2\rho_{hk}\left(v^h v_k\right)^{\frac{1}{2}}$, respectively, since $W^h$ and $B^h$ are bivariave normal by Assumption 1. In other words,

$TW^h \sim N(m, v)$, where $m = \mu^h + \mu_k + (B^h - i_k)(1+r)$ and $v = v^h + v_k + 2\rho_{hk}\left(v^h v_k\right)^{\frac{1}{2}}$.

Then the moment generating function of $TW^h$ or $mgt(TW^h)$ is given as

$$mgt(TW^h) = E\left[e^{t\cdot\left(TW^h\right)}\right] = e^{m\cdot t + \frac{t^2}{2}v}, \text{ where } TW^h \sim N(m, v).$$

Similarly,

$$EU[TW^h] = E\left[-e^{\left[-A^h\right]\left[TW^h\right]}\right] = -e^{-A^h\cdot m + \frac{\left(A^h\right)^2}{2}v}.$$

Therefore, maximizing $EU[TW^h]$ is equivalent to maximizing $-e^{-A^h\cdot m + \frac{\left(A^h\right)^2}{2}v}$, which means *minimizing* $[(-A^h)\cdot m + \frac{1}{2}(A^h)^2\cdot v]$ because of the negative sign of the base of the exponential function, $-e$. Now, minimizing $[(-A^h)\cdot m + \frac{1}{2}(A^h)^2\cdot v]$ is identical to maximizing $(A^h)m - \frac{1}{2}(A^h)^2\cdot v = (A^h)\{m - \frac{1}{2}(A^h)\cdot v\}$, where $A^h > 0$. After all, this is equivalent to maximizing $\{m - \frac{1}{2}(A^h)\cdot v\} = E[TW^h] - \frac{1}{2}(A^h)\cdot V[TW^h]$. Q.E.D. ■

In other words, $\arg\max_k EU[TW^h] = \arg\max_k \left\{E[TW^h] - \frac{1}{2}A^h\cdot V[TW^h]\right\}$. Also it is found that representative investor h is better off with a larger future expected wealth and a smaller variation of the wealth, which is intuitively right and computationally convenient as well.

## 2. Optimization Problem of Representative Investor

Out of n products, h will choose financial product k to maximize $EU[TW^h]$ or to maximize $E[TW^h] - \frac{1}{2}\cdot A^h\cdot V[TW^h]$, which is.

$$\begin{aligned}
&E[TW^h] - \tfrac{1}{2}\cdot A^h\cdot V[TW^h] \\
&= E[W^h + I_k + (B^h - i_k)(1+r)] - \tfrac{1}{2}\cdot A^h\cdot V[W^h + I_k + (B^h - i_k)(1+r)] \\
&= (B^h - i_k)(1+r) + E[W^h + I_k] - \tfrac{1}{2}\cdot A^h\cdot V[W^h + I_k] \\
&= (B^h - m_k - c_k)(1+r) + E[W^h] + E[I_k] - \tfrac{1}{2}\cdot A^h\cdot\{V[W^h] + V[I_k] + 2\cdot Cov[W^h, I_k]\} \quad (1)
\end{aligned}$$

For instance, if he chooses nothing at time 0, he will get $I_k = m_k = c_k = 0$, and his expected utility or will be,[5]

[5] This is not exactly his expected utility but his new objective function. We, however, use both interchangeably, which does not change our discussion or result at all.

$$EU[TW^h] = B^h(1+r) + E[W^h] - \tfrac{1}{2}\cdot A^h\cdot V[W^h].$$

Therefore the incremental expected utility from choosing k is

$$\begin{aligned}\Delta EU[TW^h] &= -(m_k+c_k)(1+r)+E[I_k] - \tfrac{1}{2}\cdot A^h\{V[I_k]+2\cdot Cov[W^h, I_k]\}\\ &= -A^h\cdot Cov[W^h, I_k] - \tfrac{1}{2}\cdot A^h\cdot V[I_k] - (m_k+c_k)(1+r) + E[I_k]\\ &= -A^h\cdot Cov[W^h, I_k] - \tfrac{1}{2}\cdot A^h\cdot V[I_k] - m_k(1+r) - c_k(1+r) + E[I_k]. \qquad (2)\end{aligned}$$

After all, **h** will choose k that maximizes (2).

## 3. Optimization Problem of Representative Seller

Optimization for representative seller **f** of financial products can be similarly analyzed. First we define comparable variables for **f** as below.

1) $W^f$: value of non-cash asset of **f** at time 1
2) $B^f$: f's cash at time 0
3) $TW^f$: value of **f**'s total wealth at time 1
4) $A^f$: **f**'s absolute risk aversion ($A^f>0$)

**f** sells n finaicla products or contracts to **h**. Just as **h** wants to maximize his expected utility by buying one of them, **f** wants to maximize her expected utility by selling one of them.

Initially, **f** holds cash $B^f$ and a non-cash asset at time 0. The future value of the non-cash asset is $W^f$. To maximize her expected utility, **f** sells financial product q and invests $B^f+i_q$ in a risk free asset, which is her budget plus the proceeds from selling financial product q.[6] Notice that $i_q = c_q + m_g$ just as $i_k = c_k + m_k$. Then her total wealth at time 1 is, $TW^f = W^h - I_q + (B^h+i_q)(1+r)$, where $I_q$ is the future value of q at time 1. Notice that $TW^f$ includes "$+i_q\cdot(1+r)$" and "$-I_q$" since she "sells" q at the total price of $i_q$ and invests $i_q$ at r at time 0. In the meantime, we assume that random variables $W^f$ and $I_q$ are bivariate normal where $(\mu^f, v^f)$ and $(\mu_q, v_q)$ are the mean-variance paris of $W^f$ and of $I_q$, respectively, and $\rho_{fq}$ is the correlation coefficient between them. **f** is also of constant absolute risk aversion type (CARA) or $U[W] = -e^{-A^f\cdot W}$, where $A^f$ is her absolute risk aversion (ARA).

[6] We use "she" for **f** just for convenient identification.

Just like **h**, **f** will choose to sell financial product q for maximizing $EU[TW^f]$, which is equivalent to maximizing $E[TW^f] - \frac{1}{2}\cdot A^f\cdot V[TW^f]$.

$$
\begin{aligned}
& E[TW^f] - \tfrac{1}{2}\cdot A^f\cdot V[TW^f] \\
&= E[W^f - I_q + (B^f + i_q)(1+r)] - \tfrac{1}{2}\cdot A^f\cdot V[W^f - I_q + (B^f + i_q)(1+r)] \\
&= (B^f + i_q)(1+r) + E[W^f] - E[I_q] - \tfrac{1}{2}\cdot A^f\cdot V[W^f - I_q] \\
&= (B^f + c_q + m_q)(1+r) + E[W^f] - E[I_q] - \tfrac{1}{2}\cdot A^f\cdot\{V[W^f] + V[I_q] - 2\cdot Cov[W^f, I_q]\}. \qquad (3)
\end{aligned}
$$

For instance, if she sells nothing at time 0, she will get $I_q = m_q = c_q = 0$, and her expected utility will be

$$EU[TW^f] = B^f(1+r) + E[W^f] - \tfrac{1}{2}\cdot A^f\cdot V[W^f].$$

Therefore the incremental expected utility from choosing q is

$$
\begin{aligned}
\Delta EU[TW^f] &= (c_q + m_q)(1+r) - E[I_q] - \tfrac{1}{2}\cdot A^f\{V[I_q] - 2\cdot Cov[W^f, I_q]\} \\
&= m_q(1+r) + c_q(1+r) - E[I_q] - \tfrac{1}{2}\cdot A^f\cdot V[I_q] + A^f\cdot Cov[W^f, I_q]. \qquad (4)
\end{aligned}
$$

After all, **f** will choose q that maximizes (4).

## 4. The Nature of Financial Disputes

As seen in equations (1) and (3) or equations (2) and (4), the objective functions of **h** and **f** are different in general, and so are their optimal choices of financial products. Let us say $k = \underset{g\in\{1,2,\ldots,n\}}{\arg\max}\ equation\ (2)$ and $q = \underset{g\in\{1,2,\ldots,n\}}{\arg\max}\ equation\ (4)$.[7] That is,

$$k = \underset{g\in\{1,2,\ldots,n\}}{\arg\max}\left[-A^h\cdot Cov[W^h, I_g] - \frac{1}{2}A^h\cdot V[I_g] - m_g(1+r) - c_g(1+r) + E[I_g]\right] \text{ and}$$

$$q = \underset{g\in\{1,2,\ldots,n\}}{\arg\max}\left[-A^f\cdot Cov[W^f, I_g] - \frac{1}{2}A^f\cdot V[I_g] + m_g(1+r) + c_g(1+r) - E[I_g]\right].$$

Then, in general $k \neq q$. This is the very nature of the conflict of interest between **h** and **f** or financial disputes between the two. In other words, the financial product or contract

[7] Hereafter, *k* and *q* in italics represent specific financial contracts that maximize **h**'s and **f**'s objective functions, repectively.

to maximize **h**'s expected utility does not necessarily maximize **f**'s, and vice versa.

Now, if **h** does not know as much about financial products as **f** does, there will be information asymmetry between the two. Then it is not easy for **h** to find *k*. And this is generally true in reality: sellers do know more about their products than buyers do. Therefore, one ideal way to resolve this information asymmetry is to have **f** work for **h** voluntarily. But **f** would hardly do so without any incentives. Without such incentives, **f** will work for her at the expense of her customer **h**, and the conflict between the two will never be resolved. Furthermore, this conflict might lead to a financial dispute between them ex post. To minimize this possibility, **f** needs to be given some exogenous incentives to work for **h**, given that she has few endogenous ones.

## III. Framing and Latent Incentives

Usually financial consumers like **h** are more like noise traders than they are like informed ones. They often show excessive optimism, over-confidence, confirmation bias, etc. as in Shefrin (2007). These behavioral pitfalls often lead to a wrong calculation of the value of his objective function. For example, **h** might exaggerate some aspects of the risk-return profile of a financial product he likes or dislkes. For example, he might be too optimistic (pessimistic) about the risk-return profile of a financial product he likes (dislike). These pitfalls could translate into a possibility that he mistakes $E[I_k]$ in equation (1) for $E[I_k] \pm \alpha_{k,m}$ or $V[I_k]$ for $V[I_k] \pm \alpha_{k,v}$, where $\alpha_{k,m}$ and $\alpha_{k,v}$ come from his excessive optimism, over-confidence, confirmation bias, etc. Then he is likely to choose a sub-optimal financial product.

Suppose, given $W^h = 0$, an inequality holds between financial products *k* and *q*.

$$E[I_k] - \tfrac{1}{2}\cdot A^h\cdot V[I_k] > E[I_q] - \tfrac{1}{2}\cdot A^h\cdot V[I_q]$$

Then he is better off with *k*. But the inequality might be reversed when he is too optimistic (pessimistic) about *q* (*k*) when his over-confidence or confirmation bias is added. That is,

$$\{E[I_k] + \alpha_{k,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_k] - \alpha_{1,v}\} < \{E[I_q] + \alpha_{q,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_q] - \alpha_{q,v}\}.$$

**h** will choose *q* in this case, but he is fully responsible for the wrong choice, and there is nobody else to blame.

More often than not, however, **f** often exerts her knowledge, information or skill in

order for **h** to choose *q*. In this sedtion, we discuss two such factors and how they work. The first one, "framing effects," is somewhat general, and the second one, "latent incentives" is a little special. These two general and special factors will shed light on how and why **h** often ends up choosing a suboptimal product even though, alone, he would choose the optimal one for him.

### 1. Framing Effects

Suppose **h**'s bounded rationality is limited. In other words, **h** does not make a big mistake so often in finding *k*. Even in this case, **h** might end up with *q* owing to **f**. For instance, let us say that a bank deposit is *k* for **h** and that he is already aware of it. One day **h** goes to a bank to put his money in a bank deposit. However, **f**, a bank teller, might persuade **h** into buying an equity fund, talking more about its upside potential but less about its downside risk. Then **h** might end up investing in an equity fund, instead of a bank deposit. This capability or behavior of **f** is often called "framing effect" (Tversky and Daniel Kahneman (1981)). Simply put, the framing effect indicates that **h**'s decisions are influenced by the manner in which **f** describes various financial products.

If **f** gets more pecuniary compensation from the bank by selling the fund than by selling a bank deposit, she can do this. Now suppose the following two inequalities hold between *k* and *q*.

$$E[I_k] - \tfrac{1}{2}\cdot A^h\cdot V[I_k] > E[I_q] - \tfrac{1}{2}\cdot A^h\cdot V[I_q]$$

$$\{E[I_k]+\alpha_{k,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_k]-\alpha_{k,v}\} > \{E[I_q]+\alpha_{q,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_q]-\alpha_{q,v}\}$$

That is, despite **h**'s bounded rationality, **h** would choose *k*, the right one for him. However, when **f**'s framing comes into play, the relation between *k* and *q* could be reversed as below.

$$\{E[I_k]+\alpha_{k,m}+\beta_{k,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_k]-\alpha_{k,v}-\beta_{k,v}\} < \{E[I_q]+\alpha_{q,m}+\beta_{q,m}\} - \tfrac{1}{2}\cdot A^h\cdot\{V[I_q]-\alpha_{q,v}-\beta_{q,v}\}$$

In other words, owing to **f**'s framing, **h** mistakes $E[I_k]$ in equation (1) for $E[I_k]\pm\beta_{\cdot,m}$ or $V[I_k]$ for $V[I_k]\pm\beta_{\cdot,v}$ on top of $\alpha_{\cdot,m}$ or $\alpha_{\cdot,v}$, where $\alpha_{\cdot,m}$ and $\alpha_{\cdot,v}$ come from **h**'s own bounded rationality and $\beta_{\cdot,m}$ and $\beta_{\cdot,v}$ from **f**'s framing. Anyway in this case **h** will choose *q*. Notice that he chooses *q* even if he successfully overcomes his personal biases. In general, given **h**'s bounded rationality and **f**'s framing, what **h** maximizes is,

$EU[TW^h|_{\text{bounded rationality, framing}}]$
$= EU[TW^h|\alpha_{k,m}, \alpha_{k,v}, \beta_{k,m}, \beta_{k,v}]$
$= (B^h - i_k)(1+r) + E[W^h] + E[I_k] + \alpha_{k,m} + \beta_{k,m} - \frac{1}{2}\cdot A^h\cdot\{V[W^h] + V[I_k] - \alpha_{k,v} - \beta_{k,v} + 2\cdot Cov[W^h, I_k]\}$
$= (B^h - i_k)(1+r) + E[W^h] + E[I_k] - \frac{1}{2}\cdot A^h\cdot\{V[W^h] + V[I_k] + 2\cdot Cov[W^h, I_k]\}$
$\quad + \alpha_{k,m} + \beta_{k,m} + \frac{1}{2}\cdot A^h\cdot\{\alpha_{k,v} + \beta_{k,v}\}$
$= \text{Equation (1)} + \alpha_{k,m} + \beta_{k,m} + \frac{1}{2}\cdot A^h\cdot\{\alpha_{k,v} + \beta_{k,v}\}$ (5)

Equivalently, **h** maximizes the following incremental expected utility.

$\Delta EU[TW^h|_{\text{bounded rationality, framing}}]$
$= -i_k(1+r) + E[I_k] + \alpha_{k,m} + \beta_{k,m} - \frac{1}{2}A^h\{V[I_k] + 2Cov[W^h, I_k]\} + \frac{1}{2}A^h\{\alpha_{k,v} + \beta_{k,v}\}$
$= -(m_k + c_k)(1+r) + E[I_k] + \alpha_{k,m} + \beta_{k,m} - \frac{1}{2}A^h\{V[I_k] + 2Cov[W^h, I_k]\} + \frac{1}{2}A^h\{\alpha_{k,v} + \beta_{k,v}\}$
$= \text{Equation (2)} + \alpha_{k,m} + \beta_{k,m} + \frac{1}{2}A^h\{\alpha_{k,v} + \beta_{k,v}\}$ (6)

Now it is clear that equation (6) has four additional, noise terms compared with equation (2). In general, the more noise terms **h** has, the more likely he is to make a wrong choice. Or the more noise terms **h** has, the more discrepancy between the optimal product for (2) and the one for (6) results.

## 2. Sellers' Latent Incentives

Now let us examine another reason why **f** might want to sell *q* to **h**, by analyzing equation (4), which is the incremental expected utility for **f** when selling *q* to **h**,

$$\Delta EU[TW^f] = (c_q + m_q)(1+r) - E[I_q] - \frac{1}{2}\cdot A^f\cdot V[I_q] + A^f\cdot Cov[W^f, I_q].$$

$A^f$ is given exogenously. $c_q$ is the fair market price of *q*, which is determined in market. Risk-free interest rate r is determined in market, too. Therefore **f** cannot control these. $E[I_q]$ and $V[I_q]$ are two moments of (the value of) financial product *q*. Therefore, $m_q$ and $Cov[W^f, I_q]$ are the only variables **f** can control. Specifically, the larger $Cov[W^f, I_q]$ and $m_q$ are, the more willing **f** is to sell *q*. Here, $Cov[W^f, I_q]$ ogirinates from $Cov[W^f, -I_q]$ of $EU[TW^f]$ in equation (3). Obviously, **f** prefers a smaller $Cov[W^f, -I_q]$ since a smaller $Cov[W^f, -I_q]$ implies a smaller total risk for **f** when she newly sells financial contract *q* short given her endowed asset $W^f$.[8] All these mean that **f** is better off by shorting a financial product whose sales fee and covariance with **f**'s given asset are higher.

It is trivial that **f** likes to sell a higher-fee financial contract. Now we elaborate on

[8] This does not preclude $Cov[W^f, -I_k]<0$, which is even better for f than a small positive $Cov[W^f, -I_k]$ is.

$Cov[W^f, I_k]$. Suppose that initially, **f**, say, a local commercial bank, has a long position in "B," an exotic option, in a financial contract with "A," a foreign bank. So, initially, **f** is exposed to a risk from this position. Later, **f** takes a short position in B in a financial contract with **h**, a customer of **f**. This second transaction makes **f** better off in terms of two things. First, from selling her long position in B to **h**, she gets some sales fee ($m_q$) from **h**. Second, she also reduces her existing risk from the long position in B; in this case she completely removes her risk by selling her long position to **h**.

Applying this case to the model, what **f** sells to **h** is the very asset **f** initially has. That is, if $B_1$ denotes the time 1 value of **f**'s long position in the exotic option (with A being her counterparty), then $W^f = B_1$. In the meantime, **f** also takes a short position in the same option (with **h** being her counterparty). Therefore the time 1 value of **f**' short position in the option is $-B_1$. That is, $-I_q = -B_1$. After all, we have got $W^f = I_q = B_1$. Then,

$$Cov[W^f, I_q] = Cov[B_1, B_1] = V[B_1].$$

Therefore, $Cov[W^f, I_q] = Cov[B_1, I_q]$ is maximized when $I_q = B_1$. So is $\Delta EU[TW^f]$, **f**'s incremental expected utility, which is $(c_q + m_q)(1+r) - E[I_q] - \frac{1}{2}\cdot A^f\cdot V[I_q] + A^f\cdot Cov[W^f, I_q]$.

In reality, the covariance between the time 1 value of **f**'s existing asset and that of **f**'s short position in the option (by selling the long position to **h**) is

$$Cov[W^f, -I_q] = Cov[B_1, -B_1] = -V[B_1].$$

So, **f**'s making this transaction with **h** *reduces* **f**'s risk by $V[B_1]$. Or, equivalently, this transaction increases **f**'s expected utility by $A^f\cdot Cov[W^f, I_q] = A^f\cdot V[B_1]$.

**f** gets a larger expected wealth if selling a financial contract of a larger sales fee or gets a smaller risk if selling a financial contract of a larger covariance with her initial asset. Either way her expected utility is increased. But, here comes the problem of conflict of interest between **f** and **h**. A financial contract of a larger sales fee reduces **h**'s expected utility, and a financial contract of a larger covariance with **f**'s initial asset has nothing to do with increasing **h**'s expected utility. After all, **f** sells a financial contract, which is not optimal for **h** by any means. This situation often leads to financial disputes between **f** and **h** ex post. Among them are OTC derivatives between banks and their small-and-medium enterprise customers like widow KIKO's by various commercial banks.

## IV. Effective Ways Out

Given our discussion so far, any effective ways for **h** to buy the optimal financial contract from **f** should contain the two things.

i) To reduce $\alpha_{\cdot,m}$ and $\alpha_{\cdot,v}$ of **h**

ii) To reduce $\beta_{\cdot,m}$ and $\beta_{\cdot,v}$ of **f**

To this end, we suggest four effective ways, whose three features are as follows.

1. They are based on the findings from the model
2. Some of them are new or alternatives to convensional wisdom
3. They are expected to be realistic

For example, conventional wisdom might say that, to reduce $\alpha_{k,m}$ and $\alpha_{k,v}$, financial consumers ought to be educated. Clearly, educated financial consumers would have smaller $\alpha_{k,m}$ and $\alpha_{k,v}$. But how much smaller? To enable financial to consumers choose optimal contracts by means of education is more complicated than it sounds. For instance, consumers could be educated that a short position in an option is very risky relative to a long position. Or they could be educated that, in the long term, an active equity fund hardly outperforms an (passive) equity index fund. Now, the question is, after they are educated so, will they never take a short position in an option, or, will they choose an equity index fund rather than an active fund (managed by a famous fund manager) when investing for more than a year? In other words, what matters critically in education is whether such education leads consumers to do what they are educated to do. As seen in the growing interest in behavioral finance or behavioral economics in academics and industy as well, investors are rather irrational. They might know something but they might not behave as they know. And this inconsistency seems to be more pronounced in the area of personal investing. For instance, even a risk-averse investor might buy a lottery ticket. Besides, will consumers possibly be educated enough to calculate the exact payoff at maturity of a compliated OTC derivatives like a knock-in knock-out barrier option? Well, the answer is probably no.

However, for a better discussion, imagine that consumers are educated well enough to price some OTC derivatives sold by banks. Even in this case, to keep their informational advantages, banks might sell even more complicated financial contracts, and this way the information asymmetry between them never disappears. Regarding this,

Carlyn and Manso (2008) claim that consumer education may induce banks to increase compliated financial innovation, which decreases consumer welfare. Similarly, Willis (2008) argues that consumer education is likely to increase their confidence, not improve their ability. A misguided confidence, however, might be more dangerous than inability.

The bottom line here is that the effect of many methods based on conventional wisdom like education is limited, and we would like to suggest more effective, realistic ways out of conflict of interest or financial feuds between financial consumers and financial institutions. Here we are offering four such methods as below but these are not the only ones. Instead, these methods should be deemed new ways of thinking about how to prevent and resolve financial disputes, considering the reality.

### 1. Advising by Financial Experts

As in Willis (2008), it is improbable for financial consumers to successfully help themselves with complicated financial decision makings. This underscores that somebody else should help them. Fundamentally, some kinds of advisors should help them. For such advisors not to be affected by $\alpha_{k,m}$, $\alpha_{k,v}$, $\beta_{k,m}$ or $\beta_{k,v}$, they should be financial experts. Also, in order for them to behave truly on behalf of financial consumers, they should not have any conflict of interest with financial consumers. In other words, they should be independent.

In some developed economies, there are such experts like an IFA (independent financial advisor) in the UK or the US (Yoo and Sohn (2011)). In many emerging economies, however, financial consumers do not get enough helps from independent financial consulants. For instance, in many emerging economies, the most common helps financial consumers get when purchasing financial products are from the very people who are selling their own financial products. This situation is ironic and even ridiculous. Suppose you want to buy an optimal car for you in terms of your financial status, your family size, etc. In order to consult about this, you go to a Ford dealer near you. After listening to your story, he recommends an allegedly optimal car for you, which is always a Ford car. Isn't this complete nonsense? But this is very close to what really happens in many emerging economies when financial consumers want to buy their optimal equity funds or the likes. They often go to a branch of a bank or of a securities firm for financial consultation and end up buying one of the financial products being sold in the branch.

In order to overcome these irrational and unfair practices, eventually financial consumers should be helped by financial experts, who are independent, professional, and available like an IFA in the UK or the US. To have such a financial infrastructure will

take time of years or even a decade. Still, eventually and fundamentally, financial consumers in emerging markets ought to be served by such financial experts to be able to purchase best financial products for them.

## 2. Opt-Out Policy

Another way to reduce $\alpha_{k,m}$, $\alpha_{k,v}$, $\beta_{k,m}$ or $\beta_{k,v}$ is to force **f** to recommend limited financial products only. At first this does not sound fine since it narrows **h**'s choices. But a further study of it would reveal that this way is a powerful and effective way to protect financial consumers from a big $\alpha_{k,m}$, $\alpha_{k,v}$, $\beta_{k,m}$ or $\beta_{k,v}$. An opt-out policy means that, basically, **f** is forced to recommend limited kinds of financial products only, which are thought to be safe or less risky. This is the basic rule. One exception is that, if **f** wants, she can opt out to recommend any other financial product she wants to sell but then she assumes more responsibility about financial disputes ex post between **h** and her. Under this condition, **f** is not expected to easily sell a problematic financial product to **h** but to sell a good, desirable financial product for **h**.

As a good example of this policy, let us imagine that a bank should sell fixed-rate mortgages (FRM) only and nothing else: for instance, a bank cannot sell adjustable-rate mortgages (ARM) to borrowers. If the bank wants to opt out, it can sell ARM's *on its own responsibility*. In other words, the bank, not the borrowers, is more liable for conflicts or fueds from ARM's ex post once they break out. This is because initially the bank is supposed to sell FRM's only but it opts out to sell ARM's, which can be the cause for the conflicts with ARM borrowers ex post. For example, years after an ARM is sold to a borrower, overall market interest rates might rise remarkably. Then the borrower should pay a higher mortgage interest rate from that time on. No borrower likes this situation and might blame the bank for the new higher interest payments, which could evolve into a financial feud. In this situation, the bank is much more liable for any losses of the borrower.

A bank usually prefers to sell ARMs, rather than FRMs, since then the market interest rate risk is borne by an ARM borrower, not by the bank. But borrowers might not easily perceive or appreciate this pitfall and are likely to choose an ARM if a bank teller talks to them into choosing it. Therefore the authorities might enforce an opt-out policy such that a bank is supposed to sell FRMs only, *basically*, and can opt out to sell an ARM, too, but on its own responsibility.

This kind of a policy could protect financially illiterate consumers from financial plight caused by sellers of financial contracts. At the same time, this policy allows sellers to opt out to sell financial contracts other than the default ones on their own

responsibility. In this sense, sellers can sell other contracts, which are fundamentally good for buyers. This is because, if the contracts are indeed good for buyers, they will rarely cause a trouble to borrowers ex post. Therefore, this policy is not so restrictive as it sounds as far as good contacts for buyers are concerned. Instead, it is restrictive only to bad contracts for buyers.

Another reason for an opt-out policy is that producers of financial contracts might have an incentive to design financial contracts in an overly complicated way. According to Carlin(2009)'s non-cooperative oligopoly pricing model or Gabaix and Laibson(2004)'s noisy consumer product evaluation model, sellers add complexity to their price structures, which prevents financial consumers from becoming knowledgeable about fair market prices and often leads to consumers' wrong choices of financial products. An opt-out policy effectively nullifies these attempts of sellers in such a way that sellers are not supposed to sell financial products of complicated price structures in the first place.

## 3. Periodic Settlement with Premature Closing Out

Suppose h enters into an OTC contract with a bank(f), whose maturity is one year. Because of the information asymmetry between the two, h cannot perceive risks embedded in that contract when signing up the contract. Later h realizes that something is going wrong and that his cumulative loss from his position in the contract has been soaring. But this contract is an OTC one and cannot be closed out before maturity by entering into an offsetting position as in an exchange-traded derivative product. h cannot do anything but just watches his cumulative loss mounting. Also, the bank might suffer a similar financial distress if something went against the bank.

In order to reduce this risk in an OTC contract for the two counterparties, we might need to consider periodic, regular settlement plus premature closing out if both parties agree up front. Then neither party is exposed to such unbearable risks of an OTC contract. They can put this provision to their contract up front when they sign it up. This is possible because of the nature of an OTC contract: as a private contract between two parties, an OTC contract can be flexibly designed in such a way that, as long as both parties agree, they can put any kind of provision to the contract unless it is illegal.

As a matter of fact, both parties have strong incentives to put such a prosivion to an OTC contract. Suppose h and f are the two parties of an OTC contract, and after the contract is signed up, things go favorable for f and against h. As a result, f and h have an unrealized profit and an unrealized loss, respectively. If both are risk averse, they would like to close the contract out as soon as possible before maturity. f is gaining now, but at maturity, her unrealized profit may be reduced or even disappear. Risk-

averse f does not like this and wants to lock in her profit if possible. Similarly, h is losing now, but at maturity, his unrealized loss can be even enlarged. Risk-averse h does not like this and wants a loss-cut if possible. Therefore a periodic settlement like a quaterly settlement plus premature closing out will increase both parties' expected utilities as it will reduce their risks whether they are gaining or losing.

## 4. Early Diagnosis and VaR

Why do drivers purchase an auto insurance policy? In many contries, all drivers shall purchase an auto insurance policy by law. But even without such a law, most drivers will buy one since they know that, once a car accident occurs, it could be fatal, physically or financially, although it rarely occurs. This indicates that drivers do care about a tragic event with a low probability. Now a releveant question is, can consumers always tell whether or not a financial contract is free of such a tragic event?

Regarding this, suppose h, who runs an export business, goes to a bank for a hedge of the exchange rate risk. A bank teller might offer h several complicated OTC derivatives like a snowball or knock-in knock-out barrier option portfolio. Then the chances are that h ends up buying one of such OTC product without knowing its risk, especially "possibly" fatal risk embedded in it. Such a fatal risk cannot be easily revealed by means of traditional risk measures like variance (just as fatal risks embedded in a car accident are not easily perceived in terms of variance, etc.). Therefore fatal risks in a financial contract, if any, should be explained to buyers in layman's terms before the contract is signed up so that buyers can decide whether to buy it or not, *knowingly*.

An analogy is that, before a surgical operation is done, a patient is asked "You could die during this operation with probability 0.1. Do you still want it?" The patient asks back, "What if I do not get that operation?" The doctor anwers, "Well, without operation, you could die with probability 0.50." Then the patient decides whether to get that operation or not. Now, (assuming that auto insurance is not enforced by law) another analogy is that you are told, "Statistics says that, with probability 0.0001, you could be seriously injured in a car accident in the coming year," or "With probability 0.000001, you could die of a car accident in the coming year." Then you decide whether to buy auto insurance or not.

There are some common features in the two analogies. You are explained *ex ante* in easy language or *in layman's terms* about *fatal risks* embedded in the matter in question. Similarly, buyers of a financial contract deserve this kind of an early diagnosis service before they decide on it. One way of explaining about such risks in a financial

contract might be to use such measures like value at risk or VaR. That is, if **h** is about to take a position in an OTC contract with a bank, **h** deserves to be informed of the contract's VaR or the likes about the contract's fatal risks. For instance, suppose **h** wants to take a certain positions in an OTC contract with **f.** **h** is told that, under the terms of the contract, **h**'s maximum loss with probability 0.05 in the coming month is estimated to be $1,000,000. In addition, his maximum loss with probability 0.01 in the coming month is estimated to be $3,000,000. Now that **h** knows about risks embedded in the position, he can makes a better, more informed decision than without knowing them. This whole process works as an early-warning to **h**, so **h** can compare the risk-return profiles of two scenarios—entering into the contract or doing nothing. VaR is a universally used risk measure by banks or other financial institutions, and can be easily translated into layman's terms about how fatal the risks hidden in a contract are. What matters here is that **h** should be informed of fatal risks in a financial contract in layman's terms "before" he signs a contract up. To this end Var might be a very good tool. Of course other measures could be used if they can serve the purpose, too.

## 5. Discussion: Penalty for Malpracice

Another way to induce **f** to work for **h** voluntarily is to have f incur a high reputation cost for malpractive if she does not. In real world, a firm with a bad reputation often ends up paying a high cost, including even a bankruptcy. For instance, after the SEC announced the suit against Goldman Sachs during the April 16, 2010 trading day, its stock fell 13% to close at $160.70 from $184.27. In terms of trading volume, over 102,000,000 shares were traded, compared with a 52 week average of 13,000,000 shares. This indicates that lots of investors sold off Goldman shares, even accepting a loss. This showed those investors' mentality and resolution that a firm involved in a malpractice is not worth investing in. Furthermore, on April 30, 2010, shares tumbled again on news that the Manhattan office of the US Attorney General launched a criminal probe into Goldman Sachs, sending the stock down nearly ten percent to $145.

Besides, in the late 80's in Korea, extremely bad news about the oils used to make an instant noodle called "Ramen" was reported. Specifically, the oils some noodle makers used were not a high quality one for food but a low quality one for industrial use. Once this news was spread across customers, many costomers essentially boycotted the noodles made by the makers being criticized, and consequently those makers' sales fell remarkably. Even decades later, some of them are not fully recovered from that incident. After all, the responses of the public mean mimimizing the sum of $m_k$'s in the model. In other words, if fewer customers turn to a firm because of its bad reputation, it

will lose more and more business with its customers, which in turn means a smaller sum of its $m_k$'s.

As in the above cases, reputation matters for firms. Therefore one effective way to induce **f** to work only for **h** is to establish a socio-economic infrasturucture and mentality in the economy such that financial instituriones involved in a feud with custormers should be quickly revealed to the public and penalized for their malpractice. For example, the publie avoid entering into a contract with such financial institutions but choose other institutions. That is, such financial institutions should incur a high cost of malpractice so that ex ante they treat their customers more faily, more sincerely, and more truthfully.

Regarding this, in Korea, "Koea Costomer Protectin Agency" is to be newly organized by the end of year 2012. This orginazation is expected to do the following things: mediation of financial disputes between financial firms and their customers, financial literacy education for customers, investigation into financial disputes etc. But this organization alone cannot serve the purposes well enough. Together with it, customers should actively participate in helping themselves out if they are mistreated in a financial contract.

Lastly, compared with the four methods aforementioned, this method somewhat lacks concreteness or the details, at least now.[9] Nonthelss, this method can be, in the end, an effective way to change financial institutions' attitude toward their customers fundamentally so that they treat their customers more faily, more sincerely, and more truthfully in the future.

## V. Concluding Remarks

Financial disputes between financial consumers and financial institutions arise almost everywhere these days. These disputes could make both parties suffer severe financial distresses including bankcuptcies. Because of this, financial authorities in many nations are keen on preventing and resolving such disputes. To this end, however, we believe that the very nature of such disputes should be understood first, and then, some effective solutions should be come up with. We first examine the fundamental causes for the disputes in terms of financial theories, risk-return incentives, and agaents' behavioral traits. Based on the fundamental causes, we suggest four effective ways to prevent and resolve the disputes, which are i) advising by experts, ii) opt-out policy iii) periodic settlement with premature closing out and iv) early diagnosis with VaR. In addition, we

[9] In addition, a financial product or contract is an experience good (Nelson 1970), so it takes time for a consumer to tell whether the quality of the good is as good as he is told.

discuss penalties for malpractices of financial institutions.

In this paper, we focus more on making changes to financial institutions' attitudes or behavior than to financial consumers as we believe that the former is more feasible and effective than the latter. However, if there are some effective ways to improve financial consumers' bounded rationality and behavioral problems, they will be as important as those addressed in this paper. We think that they are an interesting, potential avenue for future research.

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