Consumer Protection in Retail Investments: Are Market Adjusted Damages Efficient?

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Abstract

Market adjusted damages (MAD) is the most common form of redress for retail investors awarded compensation for unsuitable financial advice or portfolio mismanagement. Damages are computed as the difference between realized returns and what would have been obtained with an ex ante suitable investment strategy given the investor's needs, adjusting for the actual performance of the market. I analyze the properties of this formula from three perspectives: (i) providing compensatory damages in the sense of making the investor 'whole' despite the unsuitable investment; (ii) as optimal insurance against erroneous advice; (iii) as efficient liability incentives for experts to deliver reliable advice and management. I show that each perspective yields a different variant of MAD. A common feature is that redress is costly – a cost ultimately born by investors – because of opportunistic behavior in seeking redress, given that ex post one is sometimes better off with an unsuitable portfolio.
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1 Introduction

It is well known that retail investors have limited understanding of financial products and often rely on the recommendations of experts when making investment decisions. The important losses suffered by small investors in the 2007-2008 financial crisis highlighted the deficiencies of the market for financial services, e.g., investment advisors, brokerage firms, financial planners, etc. A voluminous literature documents the mis-selling and mis-pricing of financial products, either because of conflicts of interest due to commissions and kickbacks from product designers or simply because of careless or incompetent financial advice.[1]

Accordingly, but already underway since the early 2000s, there has been a tightening of the regulatory framework for retail financial markets over the past fifteen years, e.g., the *Dodd–Frank Wall Street Reform and Consumer Protection Act* (2010) in the US or the MiFiD II (2018) regulations in the EU. The emphasis has been on business conduct rules for ensuring transparency, disclosure of appropriate information, and suitable recommendations through *Know Your Client* requirements. As noted by many[2], the analogy is with product safety regulations. To a lesser extent, redress mechanisms for wronged consumers have also been considered, with discussions on how to promote the right to seek compensation from investment advisors who recommended or sold unsuitable financial products, either through civil courts, industry arbitration panels or financial ombudsman authorities.[3] As in producer liability for safety defects, advisor liability would provide direct protection for investors and benefit them indirectly by strengthening the financial intermediaries' incentives to deliver reliable services, thus improving the attractiveness of retails investments.

Investor redress raises the issue of how to assess the harm suffered by wronged investors, given that investments are intrinsically risky. The most

[1] See, among others, Basel Committee on Banking Supervision (2008), Campbell (2006), Campbell et al (2011), Inderst and Ottaviani (2012a), Calcagno and Monticone (2015), Célérier and Vallée (2017), Gennaioli et al (2021), Egan (2019), Egan et al (2019), Linnainmaa et al (2021), Astous et al (2022), and the references therein.

[2] See for instance Warren (2008), Cherednychenko (2010), Moloney (2012).

[3] See CFA Institute (2014) for an international comparison of redress mechanisms and International Organization of Securities Commissions (2021).

common formula for determining the damages awarded, usually referred to as Market Adjusted Damages, is to consider what the investor would have received with a suitable portfolio or investment strategy, given the investor's time horizon and risk tolerance:

> This measure of damage allows the claimant to recover the difference between what the claimant's account made or lost versus what a well-managed account, given the investor's objectives, would have made during the same time period. (FINRA 2017, p. 67)

Specifically,

> These damages compensate an investor for losses caused by wrongful conduct in both a rising and falling market by adding or reducing return according to the actual performance of the market. (Aidikoff et al 2014, p. 135)

Similar formulations are used by many adjudicatory bodies and have been discussed by legal scholars.[4] The following formulation is particularly explicit:

> Where inappropriate financial advice has been provided, the purpose of compensation is to place the consumer in the financial position they would have been in if the financial adviser had provided appropriate financial advice...We need to consider what would have been a suitable alternative. We will look for an alternative portfolio of investments with the correct mix of defensive and growth assets. (Financial Ombudsman Service Australia 2014, p. 2 and 4)

Consensus over these damages formula is relatively recent as evidenced by the evolution of the notion in the legal literature. In the early 1970s, Cohen (1971, p. 1605, footnote 5) remarks that "there has been almost no discussion of the proper measure of damages in a suit for the loss caused by the

[4] See for instance Financial Regulatory Authority (2017), Vandendriesche (2015), Dolden and Newnham (2015), Stanton (2017).

recommendation of an unsuitably high risk" and then compares 'actual damage caused', interpreted as Market Adjusted Damages as defined above, to a rescission standard whereby the investor receives the purchase price of his investment plus risk-free interest since the date of purchase.[5] Easterbrook and Fischel (1985) discuss Market Adjusted Damages but express reservations about the concept. In the case where a client was recommended an excessively risky portfolio, they propose that the best measure of the harm suffered by the investor is the excess risk assessed ex ante, independently of ex post realized returns:

> The court could compute the extent to which the portfolio the broker put together was riskier than an appropriate target portfolio and award compensation that depends on how far a well-chosen portfolio would be expected to outperform the excessively risky one. Any client could obtain this compensation even if his portfolio later beat the market. The award should be based on excess risk viewed ex ante, not on how things turned out. (Easterbrook and Fischel 1985, p. 651).

Literally interpreted, Market Adjusted Damages compensate an investor for any ex post loss due to faulty advice, assuming that suitability is verifiable by the adjudicatory body and that alternative suitable investments (from an ex ante perspective) can be determined. The concept is attractive because it appears to offer an easy way to disentangle the risk of faulty advice from the intrinsic market risk of any risky investment. However, the notion is not without problems. First, an investor sold an unsuitable portfolio will file a claim only when the investment turns out to be unsuccessful. She will stay put when the unsuitable portfolio delivers returns greater than with an appropriate portfolio given her needs and risk tolerance. This will occur, for instance, when an unsuitably high risk portfolio with large expected returns was recommended and the market evolved favorably. With Market Adjusted Damages, the liability risk faced by the advice provider is

[5] See also FINRA (2017, p. 67) for the definition of rescission damages and Himes (1999) for the use of various measures in US court decisions.

therefore one-sided and materializes only in market downturns, with no compensation in market up-turns.[6] Secondly, and most importantly, the advice providers' liability costs will ultimately be born by investors, because they will be factored in the advice fees or the loads on the funds sold. This should be taken into account if the purpose of investors' right to claim damages is to improve their expected utility from investing in risky assets.

This paper analyzes damages formulas for investor redress from three perspectives. First, I characterize the formula that provides full compensatory expectation damages at least cost, in the sense of minimizing the liability cost incorporated in advice fees and given that advice providers will exert costly effort to deliver reliable recommendations. Secondly, I characterize the optimal insurance coverage against the risk of erroneous advice, given that the cost of coverage will be part of the advice fee and is therefore born by investors. Finally, I characterize the efficient liability scheme taking into account the dual function of liability, i.e., providing protection to investors against the risk of unsuitable advice and providing advisors with incentives to supply suitable advice. This third perspective connects with the standard model of producer liability, as developed by Spence (1977) and Shavell (1987, 2007) among others. I show that each of the three perspectives yields a different variant of the Market Adjusted Damages formula.

As in the analytical literature on the market for financial advice (Bolton et al 2007, Inderst and Ottaviani 2012a, 2012b, Carlin and Gervais 2012, Gennaioli et al 2015), I consider a setting where retail investors have difficulty in identifying their needs and have little knowledge of how to invest. The financial advisor's job is to identify the client's needs and to match clients with appropriate investment strategies and products. By contrast with the extant literature, I abstract from biased advice due to conflicts of interest and focus on the risk of mismatches due to the advisor's imperfect information about the clients' needs and the cost to the advisor of identifying correct matches. Another difference is that the extant analytical

[6] Easterbrook and Fischel (1985) make similar observations (see p. 649). The possibility of investor opportunism may explain the reluctance of many jurisdiction to allow redress for faulty advice, for fear of subjecting advice providers to excessive risk of liability; see Black (2010).

literature is too stylized to allow a meaningful study of damages formulas. I consider the recommendation of investment strategies in a setting with risky asset returns where damages, in case of unsuitable recommendations, may depend on the ex post realized returns of the investments. I characterize the appropriate damages formula in this setting.

The paper develops as follows. Section 2 describes the analytical framework. The sections 3 and 4 present two preliminary results, least cost expectation damages and optimal insurance, which are shown to differ. Section 5 characterizes the efficient liability scheme. Section 6 concludes.

2 Model

Consider an investment period, say from date 0 to date 1, in an economy with complete risk trading opportunities. Agents have an exponential utility function with respect to end of period wealth:

$$u_i(w_i) = -\frac{1}{\alpha_i} e^{-\alpha_i w_i} \tag{1}$$

where w_i is the date 1 wealth of agent i and α_i is the agent's absolute risk aversion coefficient. The date 0 market value of the prospect w_i is the expectation $E(mw_i)$ where m is the market stochastic discount factor. With exponential utility functions, it is well known that m is an exponential function of aggregate wealth.[7] Equivalently, in terms of wealth per capita,

$$m = Be^{-\alpha s} \tag{2}$$

where B is a positive constant, α is the harmonic mean of the α_i's, i.e., $1/\alpha$ is the average risk tolerance in the economy, and s is the random date 1 wealth per capita. The gross risk-free rate of return is R_f satisfying $E(m) = 1/R_f$, so that m can be rewritten as

$$m = \frac{e^{-\alpha s}}{R_f E(e^{-\alpha s})}. \tag{3}$$

[7] See for instance Bühlmann (1980), Wang (2003), and Johnston (2007).

Optimal portfolios. Consider now an agent whose date 1 wealth derives solely from the investment of an initial capital w^0. An optimal investment strategy for that agent maximizes $Eu_i(w_i)$ subject to the budget constraint $E(mw_i) \leq w^0$. The optimal strategy eliminates all idiosyncratic risks and the date 1 payoffs, written $w_i(s)$, satisfy the first-order condition

$$u_i'(w_i(s)) = \nu m(s),\ s \in S, \tag{4}$$

where u_i' denotes marginal utility, $\nu > 0$ is a Lagrange multiplier, and $m(s)$ is the stochastic discount factor for a dollar delivered in state s of the economy. Substituting from (1) and (3) into the first-order condition and then in the budget constraint yields

$$w_i^* = w^0 R_f + \left(\frac{\alpha}{\alpha_i}\right)(s - \overline{s}) \tag{5}$$

where

$$\overline{s} \equiv \frac{E(ms)}{E(m)}$$

is the 'risk-neutral' expected wealth per capita.[8]

The prospect w_i^* is the payoff of an optimal portfolio or investment strategy for an agent with absolute risk aversion α_i and wealth invested equal to w^0. Rather than a buy and hold investment, one can also view w_i^* as resulting from an optimal dynamic trading strategy over the investment period $[0, 1]$, as for instance in Palma and Prigent (2009).

My focus is a subset of unsophisticated agents, small or retail investors, who are "unable to fend for themselves" to use the language of the 1933 US Securities Act[9]. These investors have a vague understanding of their needs and are unable to differentiate between optimal and suboptimal portfolios, let alone design and manage complex trading strategies. They therefore seek the advice of experts, e.g., investment advisors, financial planners, brokers or other 'money doctors'. The term financial advisor will refer here to any intermediary with expertise whose job is to assess the investor's needs and

[8] The risk-neutral probability density function is $g^*(s) = [m(s)/E(m(s))]g(s)$, where $g(s)$ is the 'physical' density function.

[9] I borrow this from Carlin and Gervais (2012).

transform the initial capital w^0 into a prospect of date 1 payoffs.

To simplify, the retail investors all have the same initial capital and they belong to one of two categories in terms of risk tolerance: some are type l with risk aversion α_l, some are type h with risk aversion α_h where $\alpha_l > \alpha_h$, i.e., type h is the more risk tolerant. Accordingly, financial advisors design optimal portfolios for each risk tolerance category, for instance a 'conservative' versus an 'aggressive' strategy, and they match customers with the suitable returns profile.

If the fee for financial advice or load on funds is p, the amount effectively invested is $w^0 - p$ yielding the payoff

$$w_i = (w^0 - p)R_f + \left(\frac{\alpha}{\alpha_i}\right)(s - \overline{s}) = w_i^* - pR_f,\ i = l, h. \tag{6}$$

Figure 1 illustrates the net payoffs as a function of the state of the economy at date 1. The portfolio designed for the more risk tolerant has greater risk exposure, as captured by the steeper slope, but this is compensated by larger expected returns.[10]

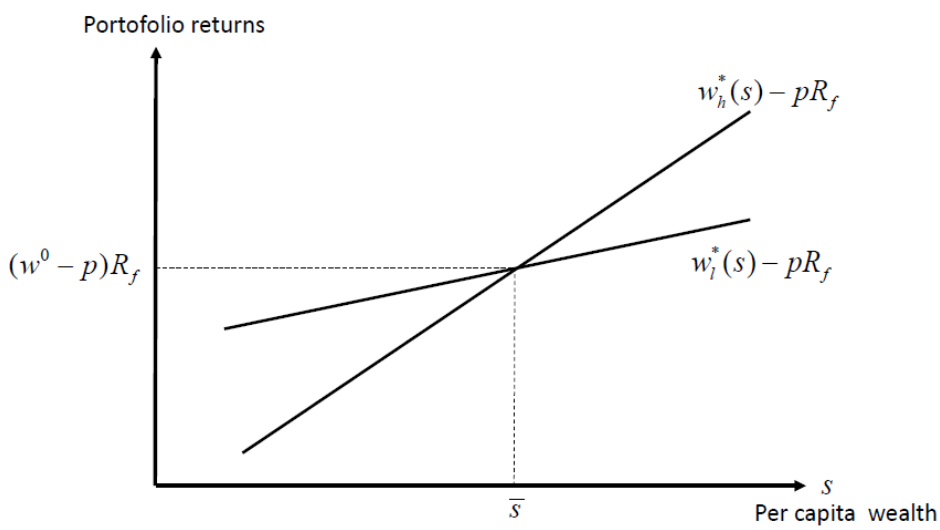

Fig. 1. Optimal net-of-fee returns for types l and h

[10]The expected payoff is $E(w_i) = R_f(w^0 - p) + (\alpha/\alpha_i)(E(s) - \overline{s})$ where $E(s) > \overline{s}$.

KYC ('Know Your Client'). However, the matching process is imperfect. With probability η_i, a type i investor is matched with her type-optimal portfolio; with probability $1-\eta_i$, this investor is matched with the portfolio designed for type j, $j \neq i$. The probability of correct matches depends on the quality of the information gathered about the customer's needs and on the advisor's matching strategy. As in the analysis of experts markets, the financial advisor exerts costly effort to diagnose the customer's needs, in the present case whether the customer's type is l or h, and then selects a 'treatment', here an investment strategy.[11]

The advisor's KYC effort is denoted by $e \geq 0$. The cost to the advisor is $c(e)$, an increasing and strictly convex function with $c'(0) = 0$. I interpret $e = 0$ as some exogenous minimal effort level when an adviser meets a client, with $c(0) \geq 0$. The information obtained by the advisor is summarized by a signal x with continuous densities $f_l(x, e)$ and $f_h(x, e)$ over the same support $X \subset \mathbb{R}$. I assume that $f_l \neq f_h$ for all $e \geq 0$. The advisor obtains some information even with minimal effort, but greater effort will improve the information as described below.

A matching strategy is a function $\varphi(x) \in [0, 1]$ representing the probability of matching the client with the type l optimal portfolio given the information x. Hence,

$$\eta_l = \int_X \varphi(x) f_l(x, e)\, dx \text{ and } \eta_h = \int_X [1 - \varphi(x)] f_h(x, e)\, dx,$$

Let

$$\beta(\eta_h, e) = \max_{\varphi} \int_X \varphi(x) f_l(x, e)\, dx$$

$$\text{subject to } \int_X [1 - \varphi(x)] f_h(x, e)\, dx = \eta_h,\ \eta_h \in [0, 1].$$

From well known results[12], $\beta(\eta_h, e)$ is decreasing and concave in η_h with $\beta(0, e) = 1$ and $\beta(1, e) = 0$.

The function $\eta_l = \beta(\eta_h, e)$ is the 'matching opportunity frontier' describ-

[11] See Dulleck and Kerschbamer (2006), Balafoutas and Kerschbamer (2020), Chen et al (2022) on general experts markets.

[12] See Lehmann and Romano (2005), chapter 3.

ing the trade-offs between the probabilities of correct matches, for a given level of KYC effort. $\beta(\eta_h, e)$ is strictly increasing in e for all $\eta_h \in (0,1)$, i.e., a larger KYC effort shifts the matching opportunity frontier upwards.[13] For tractability, $\beta(\eta_h, e)$ is strictly concave and twice differentiable.

Redress. Once date 1 returns are realized, an investor sold an unsuitable portfolio has the opportunity to file a claim in order to obtain redress or compensation for the unsuitable advice. I assume that investors can always ascertain ex post whether they were mismatched. This is verifiable by courts or specifically designed industry arbitration panels. Moreover, filing a claim is without cost. The redress for an investor sold an unsuitable portfolio may in general depend on the performance of other relevant portfolios, for instance the realizations of w_l^* and w_h^*. I denote by D_i the ex post compensation awarded to a mismatched investor of type $i = l, h$. The main issue in what follows is to characterize the appropriate redress formulas.

Welfare. Let p_i be the load on the portfolios designed for type $i = l, h$; that is, I allow for the possibilities of different loads. Given the quality of matches and the possibility of redress, the average ex-post utility of of a type l investor is

$$\overline{U}_l = \eta_l E u_l(w_l^* - p_l R_f) + (1 - \eta_l) E u_l(w_h^* - p_h R_f + D_l). \tag{7}$$

Similarly, for a type h investor, it is

$$\overline{U}_h = \eta_h E u_h(w_h^* - p_h R_f) + (1 - \eta_h) E u_h(w_l^* - p_l R_f + D_h) \tag{8}$$

An efficient arrangement is a Pareto-optimum with respect to $\overline{U}_l$ and $\overline{U}_h$ subject to the constraints

$$\eta_l \leq \beta(\eta_h, e),\ \eta_h \in [0,1], \tag{9}$$

$$c(e) + \sum_{i=l,h} \lambda_i (1-\eta_i) E(mD_i) \leq p_l[\lambda_l \eta_l + \lambda_h(1-\eta_h)] + p_h[\lambda_h \eta_h + \lambda_l(1-\eta_l)] \tag{10}$$

[13] That is, $e' > e$ yields a more informative signal in the sense of Blackwell (1951); see for instance Ganuza and Penalva (2010).

where λ_i is the proportion of type i in the population of retail investors considered.

The inequality (10) is the advisor's non negative profit constraint per customer: the loads on funds must cover the cost of KYC effort and the liability costs.[14] Given the matching strategy, the advisor faces a proportion $\lambda_l(1-\eta_l)$ of type l customers who will be mismatched and similarly a proportion $\lambda_h(1-\eta_h)$ of mismatched type h customers. The advisor hedges the risk by purchasing $\lambda_l(1-\eta_l)$ units of an asset (or portfolio) with date 1 payoffs equal to D_l and $\lambda_h(1-\eta_h)$ units of an asset with payoffs equal to D_h. The right-hand side of (10) is the income per customer, given the load on funds and the risk of mismatch.

Ex post investor opportunism. Consider the redress formulas $D_l = w_l^* - w_h^*$ and $D_h = w_h^* - w_l^*$. Then

$$E(mD_l) = E(mD_h) = 0$$

because w_l^* and w_h^* have the same date 0 market value of w^0. The following is therefore a Pareto-optimal arrangement: $p_l = p_h = p$ where $p = c(0)$, yielding the investor expected utility

$$\overline{U}_i = Eu_i(w_i^* - pR_f).$$

The quality of advice is irrelevant because errors in assigning portfolios can always be repaired ex post and this is ex ante without cost. Accordingly, the advisor exerts the minimal level of effort. The outcome is the same as with perfect matches.

However, the above is not feasible because investors are presumed to file a claim whenever a mismatch occurred, even though the amount awarded is negative. From Figure 1, this will arise for one type of investor or the other when $s \neq \overline{s}$. Welfare must therefore be maximized subject to the incentive compatibility or disclosure constraint that damages awarded are

[14] The liability cost with respect to type i can be written as $E(zmD_i)$. where z is an indicator variable with $z = 1$ when a mismatch is verified ex post, $z = 0$ otherwise. Because a mismatch is a purely idiosyncratic event, $E(m\,zD_i) = (1-\eta_i)E(m\,D_i)$.

non negative,

$$D_i \geq 0,\ i = l, h. \tag{11}$$

Given zero ex post litigation costs, investor redress is costly only because of the investors' ex post opportunism, i.e., investors with unsuitable portfolios will sometimes be better off ex post than with their type-optimal portfolio.

Miscellaneous. The following observations will be used repeatedly.

Observation 1. For any random x and y, the following statements are equivalent: $Eu(x) \geq Eu(y)$, $Eu'(x) \leq Eu'(y)$, and $Eu(x+k) \geq Eu(y+k)$ for any constant k.

Observation 2. Let $A \subset S$. Then, $u_i'(w(s)) = \nu m(s)$ for $s \in A$ and some constant ν if and only if $w(s) = w_i^*(s) + k$ for $s \in A$ and some constant k.

The first claim follows trivially from the specification of exponential utility functions, i.e., a constant payoff can be factored out. The second derives from the fact that the optimal payoffs for different amounts of initial wealth are parallel straight lines when expressed in terms of s; see (5).

3 Least-Cost Compensatory Damages

Before discussing arrangements, I consider two preliminary issues. The first is a liability rule that allows investors to claim full compensatory damages (from an ex ante perspective) for an unsuitable portfolio. The second, which turns out to yield a different specification, is the optimal insurance coverage that investors would want to subscribe against the risk of being assigned an unsuitable portfolio.

Expectation damages. For simplicity, let the load be the same across funds. Suppose that the law entitles mismatched investors to obtain damages satisfying

$$Eu_i(w_j^* - pR_f + D_i) = Eu_i(w_i^* - pR_f),\ i = l, h;\ j \neq i. \tag{12}$$

Per Observation 1, this is equivalent to

$$Eu_i(w_j^* + D_i) = Eu_i(w_i^*),\ i = l, h;\ j \neq i. \tag{13}$$

In expectation, investors are then in the same situation whether mismatches occur or not. Borrowing from contract law terminology, I will refer to D_i satisfying (13) as 'expectation damages'. D_i is restricted to be non negative, i.e., damages satisfy the disclosure constraint.

Facing the liability risk, advisors choose their KYC effort and matching strategy to minimize the per client cost

$$c(e) + \sum_{i=l,h} \lambda_i (1 - \eta_i) E(mD_i).$$

Competition between advisors will drive down the advice fee p to the resulting minimum cost per customer.

Suppose KYC effort can generate sufficiently precise information at reasonable cost, so that the advisor's cost minimization involves interior matching decisions, i.e., $\eta_h \in (0, 1)$.[15] Substituting for $\eta_l = \beta(\eta_h, e)$, the advisor's effort and matching strategy satisfy the first-order conditions:

$$-\beta_{\eta_h}(\eta_h, e) = \frac{\lambda_h E(mD_h)}{\lambda_l E(mD_l)}, \tag{14}$$

$$\lambda_l \beta_e(\eta_h, e) E(mD_l) = c'(e), \tag{15}$$

where β_{η_h} and β_e denote partial derivatives.

The trade-off between the two possible types of errors depends on the relative costs of compensating type l and type h investors and KYC effort depends on the absolute level of these costs.[16] Increasing the probability

[15] Otherwise, only one type of portfolio would be sold and it would be optimal for the advisor to exert no effort.

[16] The left-hand side of (14) can be shown to define a critical value of the posterior odds (of type l versus type h) for classifying the investor as l rather than h. To interpret (15), note that, from the enveloppe theorem, (15) is equivalent to

$$d\left\{\lambda_l \beta(\eta_h, e) E(mD_l) + \lambda_h \eta_h E(mD_h)\right\}/de = c'(e).$$

where η_h is a function of e via (14).

of correct matches is always beneficial in terms of reducing liability costs. However, for a given quality of information, an increase in η_l must be traded off against a decrease in η_h. A larger KYC effort relaxes that trade-off, but there is then a trade-off between KYC effort and liability costs.

The investors' expected utility is then

$$\overline{U}_i = Eu_i(w_i^* - pR_f), \quad i = l, h,$$

where p is the advisors' minimized unit cost. Incentives to provide reliable advice are driven solely by the advisors' liability risk. The clients' inability to assess the quality of advice does not matter. They are indifferent because they suffer no loss from erroneous advice. They only search for the lowest price, which results from the trade-off between the cost of KYC effort and liability costs. This equilibrium replicates the simple model of producer strict liability for safety defects as developed for instance in Shavell (1987, 2007).

Least-cost damages. Although indifferent to the quality of advice, investors care about its price. So far, damages have been defined by the condition (13) but without further characterization. There is clearly an infinity of formulas satisfying that condition. I now look for the one with the smallest cost. At equilibrium, this will yield the lowest advice fee. The problem is then to choose D_i that minimizes

$$E(mD_i) \text{ subject to (13) and } D_i \geq 0.$$

Proposition 1 *The feasible least-cost compensatory damages for a mismatched type i investor are $D_i^C = \max\{w_i^* - w_j^* - \delta_i^C, 0\}$ where $\delta_i^C > 0$ solves*

$$Eu_i(\max\{w_i^* - \delta_i^C, w_j^*\}) = Eu_i(w_i^*). \tag{16}$$

The intuition for the form of the damages formula is that ex post compensation should be paid only when the benefit-cost ratio is highest. When $D_i^C > 0$, the mismatched type i investor gets $w_j^* + D_i^C = w_i^* - \delta_i^C$. Per Observation 2, the marginal utility-price ratio u_i'/m is then constant, where the constant depends on δ_i^C.

The resulting damages formula is 'Market Adjusted Damages' (MAD) but with a deductible. The investor is compensated for part of the ex post loss due to an unsuitable portfolio, provided the loss is above a threshold. As in the MAD formula, damages are computed as the difference between the realized returns under the unsuitable portfolio and the returns that would have been obtained under the appropriate portfolio, but minus a deductible.

Figure 2 provides an illustration of the post redress payoffs. The gray line depicts the payoffs to type l with the type-optimal portfolio; the broken dark line depicts the final payoffs to a mismatched type l investor. The damages $D_l(s)$ are expressed as a function of the state of the economy.

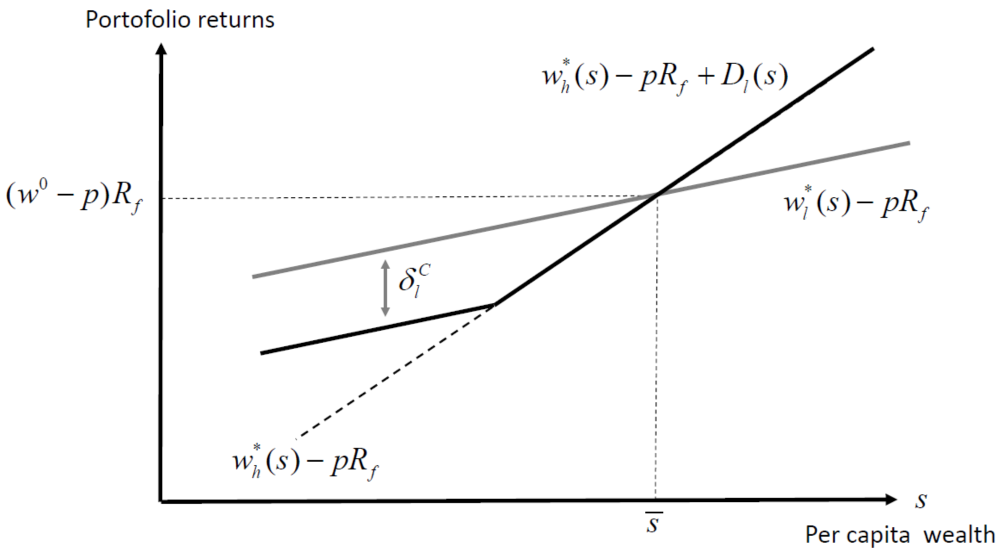

Fig. 2. Least-cost compensatory damages for a mismatched type l

Corollary 1 *If the law requires compensatory damages, the fee for financial advice is minimized by Market Adjusted Damages with the appropriate deductible.*

The result contrasts with other forms of compensation discussed in the literature. As noted in the introduction, Easterbrook and Fischel (1985,

p. 651) suggest that a wronged investor should be awarded compensation based on inadequate risk-taking viewed ex ante, irrespective of "how things turn out". Similarly, de Palma and Prigent (2009) use compensating variations based on certainty equivalents to quantify the losses from misaligned portfolios.

To illustrate, one can always find a constant compensation in case of mismatch, say $D_i \equiv d_i$, that solves (13). With exponential utility functions, the amount required is $d_i = w_{ii}^C - w_{ij}^C$ where w_{ii}^C is the certainty equivalent of the payoffs under the suitable portfolio and w_{ij}^C is the certainty equivalent under the wrong portfolio, i.e., $u_i(w_{ii}^C) = Eu_i(w_i^*)$ and $u_i(w_{ij}^C) = Eu_i(w_j^*)$. The above shows that, while differences in certainty equivalents is an appropriate measure of harm, it does not constitute the appropriate damages awarded ex post.

4 Mismatch Insurance

The preceding section did not discuss another feature of the simple model of producer liability, namely that damages equal to consumers' losses constitute efficient insurance coverage (Spence, 1977). Expectation damages obviously provide insurance against the risk of an unsuitable portfolio, but it does not follow that this is the optimal insurance coverage.

Let us consider the type i investors in isolation. Suppose they face the risk of a mismatch with exogenous probability $1 - \eta_i$, in which case they get the type j optimal portfolio. Without insurance, and assuming there is no advice fee, a type i investor has expected utility

$$U_i = \eta_i Eu_i(w_i^*) + (1 - \eta_i) Eu_i(w_j^*).$$

Because $Eu_i(w_j^*) < Eu_i(w_i^*)$, it follows that $Eu_i'(w_j^*) > Eu_i'(w_i^*)$ per Observation 1. Hence, the investors would want to transfer some wealth from the no-mismatch to the mismatch event, i.e., purchasing some coverage against the risk of mismatch is beneficial.

Abusing notation, I reinterpret p as the insurance premium paid upfront for the coverage D_i in case of a mismatch. The zero-profit insurance premium is then $p = (1 - \eta_i)E(mD_i)$. The investor's expected utility is

$$U_i = \eta_i E u_i(w_i^* - pR_f) + (1 - \eta_i) E u_i(w_j^* - pR_f + D_i).$$

Feasible insurance policies must satisfy the disclosure constraint $D_i \geq 0$.

To gather intuition, consider the coverage scheme

$$D_i = \max\{w_i^* - w_j^* - \delta, 0\}. \tag{17}$$

This is again the MAD formula with a deductible. Least-cost expectation damages is the particular case with $\delta = \delta_i^C$. Let $p(\delta)$ be the insurance premium given the coverage (17). The investors' expected utility is then

$$\begin{aligned} U_i(\delta) \quad \equiv \quad & \eta_i E u_i(w_i^* - p(\delta)R_f) \\ & + (1 - \eta_i) E u_i(\max\{w_i^* - \delta, w_j^*\} - p(\delta)) \end{aligned} \tag{18}$$

Because a larger deductible means less insurance coverage, $p(\delta)$ is a decreasing function. We have the following result.

Lemma 1 $U_i'(\delta) < 0$ *for* $\delta \geq 0$.

Investors would be willing to pay for an insurance coverage greater than the least-cost compensatory damages defined by the deductible $\delta = \delta_i^C$. Recall that the MAD formula literally interpreted entails that ex post losses due to unsuitable advice are compensated, which amounts to $\delta = 0$, equivalently $D_i = \max\{w_i^* - w_j^*, 0\}$. The above shows that this is better from the investors' point of view than least-cost expectation damages, even though they bear the cost of coverage. Note that expected utility is then greater with the unsuitable than with the type-optimal portfolio.

Optimal insurance. From the lemma, expected utility can be increased further by allowing coverage with a *negative* deductible. I show that a negative deductible is indeed the optimal policy and derive the result without exogenously imposing the form of coverage as in (17). The optimal mismatch insurance for type i investors solves

$$\max_{D_i,p} U_i = \eta_i E u_i(w_i^* - pR_f) + (1-\eta_i) E u_i(w_j^* - pR_f + D_i)$$

subject to $(1-\eta_i)E(m\,D_i) \leq p$ and $D_i \geq 0$.

Proposition 2 *The optimal indemnity for a type i investor assigned the wrong portfolio is $D_i = \max\{w_i^* - w_j^* - \delta_i, 0\}$ for some $\delta_i < 0$.*

The end-of-period payoffs under the optimal coverage are depicted in Figure 3 for a type l investor. As in the MAD formula, the compensation for a mismatch depends on the difference in returns between the suitable and unsuitable portfolios. However, the indemnity is greater than the ex post loss due to the mismatch and an indemnity may be paid even though there is no ex post loss.

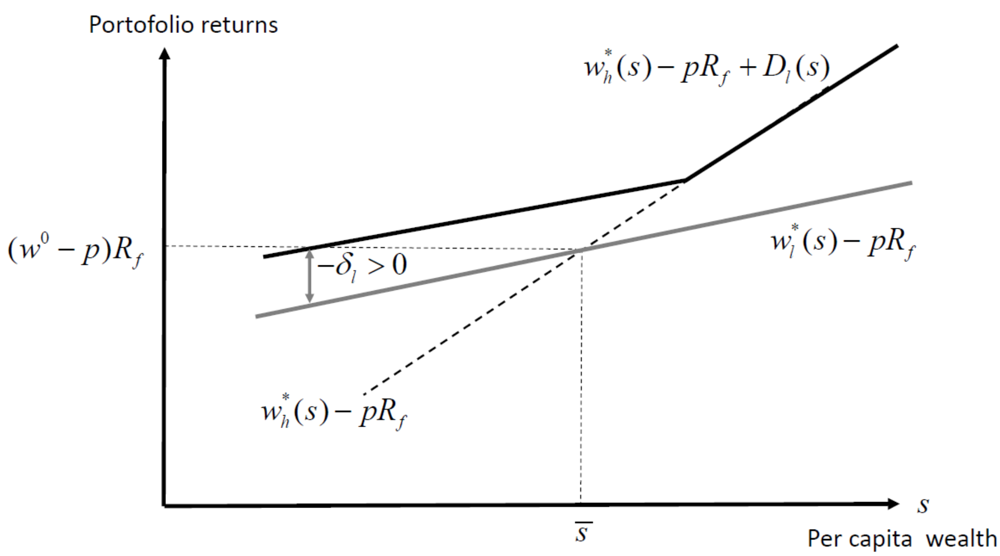

Fig. 3. Optimal mismatch insurance for type l

Two intuitions underlie the result. First, when compensation is paid, the indemnity should be adjusted so as to keep constant the marginal utility-price ratio u_i'/m. The rationale is the same as for the least-cost compensatory damages: the expected utility of mismatched investors is then maximized for a given insurance premium; conversely, the insurance premium is minimized for a given level of expected utility of mismatched investors. Per Observation 2, this requires a payoff equal to w_i^* up to a constant, thereby yielding the form of damages described in the proposition. Secondly, ex post overcompensation, i.e., $\delta_i < 0$, is desirable because it mitigates the inefficiencies imposed by the disclosure constraint. A negative deductible allows wealth to be transferred more often from the mismatch to the no-mismatch event, which is beneficial from an ex ante perspective. Although mismatched investors obtain greater expected utility than with the correct match, this nevertheless comes at a cost, i.e., the insurance premium. Investors would be better off ex ante if mistakes never occurred and they got w_i^* for sure.

5 Optimal Liability

I now turn to the Pareto-optimal arrangement. This is analyzed first without considering the advisor's incentives in making recommendation decisions. Next, incentives are taken into account in order to describe efficient liability schemes.

Optimal allocation. I characterize a Pareto-optimum with respect to $\overline{U}_l$ and $\overline{U}_h$ as defined as in (7) and (8). The constraints are the matching possibility set (9), the non negative profit constraint (10), and the disclosure constraints (11). The maximization is with respect to e, η_l, η_h, D_l, D_h, p_l, and p_h. As before, it is assumed that KYC effort generates enough information at reasonable cost for matching decisions to be interior. To shorten notation, I write

$$u_{ii} \equiv u_i(w_i^* - p_i R_f),\ u_{ij} \equiv u_i(w_j^* - p_j R_f + D_i),\ \overline{u}_i \equiv \eta_i u_{ii} + (1-\eta_i) u_{ij}, \quad (19)$$

u_{ii} is the utility of type i from a correct match and u_{ij} the utility (including redress) from a mismatch.

Proposition 3 *In a Pareto-optimal allocation:*
(i) redress for a type i investor sold the wrong portfolio is $D_i = \max\{(w_i^* -$

$w_j^* - \delta_i, 0\}$ for some $\delta_i < 0$, $i = l, h$;
(ii) matching decisions and advisor effort satisfy

$$-\beta_{\eta_h}(\eta_h, e) = \frac{\theta_h \dfrac{(Eu_{hh} - Eu_{hl})}{R_f E\overline{u}_h'} + \lambda_h(p_h - p_l + E(mD_h))}{\theta_l \dfrac{(Eu_{ll} - Eu_{lh})}{R_f E\overline{u}_l'} + \lambda_l(p_l - p_h + E(mD_l))}, \tag{20}$$

$$\beta_e(\eta_h, e)\left[\theta_l \frac{(Eu_{ll} - Eu_{lh})}{R_f E\overline{u}_l} + \lambda_l(p_l - p_h + E(mD_l))\right] = c'(e), \tag{21}$$

where $\theta_l = 1 - \theta_h$ are weights attached to each type's expected utility.

Figure 4 provides an illustration of the optimal redress. The broken black line is the final payoffs for a mismatched type l investor; the broken gray line, the final payoffs for a mismatched type h. For either type, the optimal redress is the MAD formula with a negative deductible.

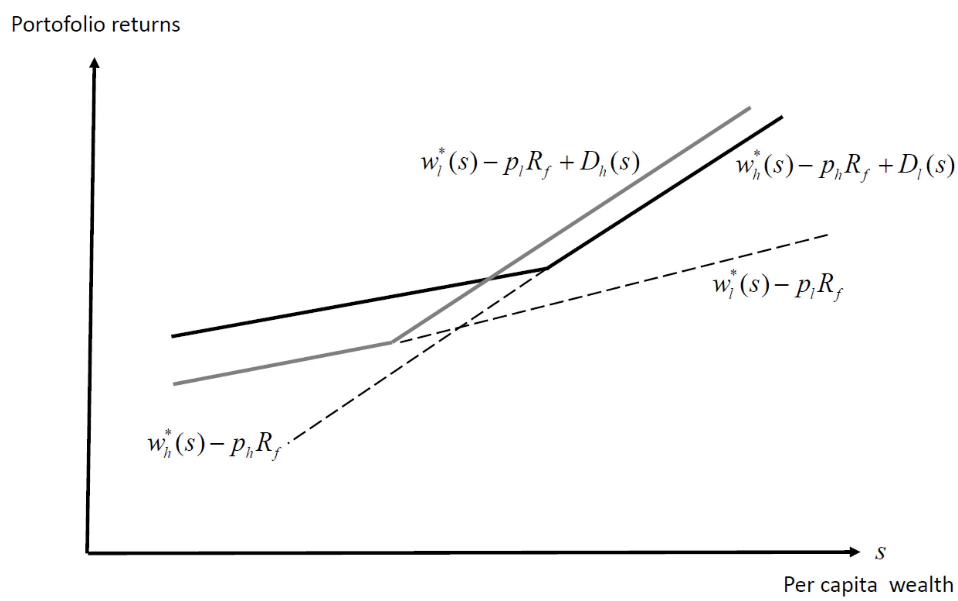

Fig. 4. Optimal redress for type l and h

The conditions for the advisor's matching decisions and KYC effort should be compared with (14) and (15) of Section 3. The difference is that the trade-off between η_l and η_h now does not depend solely on the relative costs of redress to advisor; similarly, KYC effort does not depend only on the absolute level of these costs. The right-hand side of (20) equals the relative social benefits of classifying the investor as one type or the other. The numerator is the benefit over type h clients of a marginal increase in η_h: with respect to the first term, $(Eu_{hh} - Eu_{hl})/(R_f E\overline{u}'_h)$ is the wealth equivalent, in date 0 dollars, of the difference in expected utility between a suitable and an unsuitable portfolio with redress; the rest of the numerator is the savings in redress costs to mismatched type h investors net of the difference in loads. The interpretation of the denominator is similar. Condition (21) states that the marginal cost of KYC effort equals the marginal social benefit. The expression inside the brackets must be positive because β_e and c' are positive. It follows that both the numerator and denominator on the right-hand side of (20) are positive.

Two-part liability schemes. Suppose advisors are liable for the optimal redress payments defined above. The advisor will then choose KYC effort and matching decisions to maximize

$$p_l[\lambda_l \eta_l + \lambda_h(1-\eta_h)] + p_h[\lambda_h \eta_h + \lambda_l(1-\eta_l)] - c(e) - \sum_{i=l,h} \lambda_i (1-\eta_i) E(mD_i)$$

Compared with (20) and (21), the advisor's decisions are then inefficient because effort and matching decisions would satisfy

$$-\beta_{\eta_h}(\eta_h, e) = \frac{\lambda_h(p_h - p_l + E(mD_h))}{\lambda_l(p_l - p_h + E(mD_l))}$$

$$\beta_e(\eta_h, e)\lambda_l[p_l - p_h + E(mD_l)] = c'(e)$$

Thus, the optimal redress payments differ from what provides appropriate incentives to advisors. From (21), because $Eu_{ll} < Eu_{lh}$ (and similarly $Eu_{hh} < Eu_{hl}$) making the advisor liable for the full amount of redress overstates the marginal benefit to clients of KYC effort.

As is well known, there may be a discrepancy between legal damages achieving optimal insurance and damages providing efficient incentives. This arises in particular when the harm suffered by consumers includes a non-pecuniary dimension (Spence, 1977; Shavell, 1987; Polinsky and Shavell, 2010). Liability equal to the consumers' optimal insurance coverage will then typically under-incentivize producers. Achieving efficient incentives requires additional instruments, e.g., fines imposed on producers contingent on the occurrence of harm. In the present case, by contrast, damages equal to the optimal insurance coverage will tend to over-incentivize advisors. The implication is that the liability costs faced by advisors should be decoupled from the insurance coverage provided to investors.

Consider, among other possibilities, a two-part liability scheme involving an insurance pool at the industry level. For instance, the industry arbitration panel handling complaints also operates an insurance pool. The pool is responsible for paying the optimal redress amounts D_l and D_h. It is financed by an ex ante per customer fee t imposed on advisors and by billing advisors ex post for part of the compensation paid out to investors who won a claim against them. Advisors are liable for the payments $\widehat{D}_i = \max\{(w_i^* - w_j^* - \widehat{\delta}_i, 0\}$, $i = l, h$, where the $\widehat{\delta}_i$'s are such that

$$\lambda_i E(m\widehat{D}_i) = \theta_i \frac{(Eu_{ii} - Eu_{ij})}{R_f E\overline{u}_i} + \lambda_i E(mD_l)) \tag{22}$$

where the right-hand side is set at the optimal values. Because $Eu_{ii} < Eu_{ij}$, (22) holds with $\widehat{\delta}_i > \delta_i$. Loosely speaking, advisors are then liable for the redress paid net of the cost of overcompensating mismatched investors, i.e., the advisors' liability cost is akin to expectation damages.

The fee levied by the pool satisfies

$$t = \sum_{i \in \{l,h\}} \lambda_i (1 - \eta_i) E[m(D_i - \widehat{D}_i)]$$

where the right-hand side is computed at the optimal values. The advisor then chooses KYC effort and matching decisions to maximize

$$p_l[\lambda_l \eta_l + \lambda_h(1-\eta_h)] + p_h[\lambda_h \eta_h + \lambda_l(1-\eta_l)] - t - c(e) - \sum_{i=l,h} \lambda_i (1-\eta_i) E(m\widehat{D}_i),$$

which yields the optimal decisions.

Proposition 4 *Optimal incentives for advisors are achievable by two-part liability with an industry compensation pool: the compensation paid to investors sold the wrong products is decoupled from the advisors' liability payments.*

The purpose of a two-part scheme with decoupling is to prevent advisors from facing too large a liability risk, which would unduly increase the cost of advice, while still allowing investors to be appropriately insured against the risk of wrong advice.

6 Concluding Remarks

Investors ultimately bear the cost of redress for unsuitable financial advice. Assuming litigation and verifiability costs are nil, redress is costly only because of investors' ex post opportunism, i.e., investors recommended an unsuitable portfolio will file a complaint only when the 'wrong' portfolio does worse ex post than the ex ante suitable portfolio, which will not always be the case. Literally interpreted, Market Adjusted Damages, i.e., allowing the claimant to recover the difference in returns between suitable and unsuitable portfolio, would overcompensate investors from an ex ante perspective. However, Market Adjusted Damages with the appropriate deductible is an efficient formula if the purpose of the law is to award expectation damages at least cost. By contrast, optimal insurance coverage against the risk of unsuitable recommendations will sometimes overcompensate ex post and will overcompensate from an ex ante perspective. The reason is that this mitigates the effects of ex post investor opportunism. When considering optimal liability for incentivizing financial advisors, however, making advisors liable for the full amount of insurance coverage creates too much incentives, resulting in too high advice costs. An optimal scheme decouples the advisor's liability cost from the insurance coverage provided to investors. Loosely speaking, the advisor should be liable for expectation damages and the excess insurance coverage funded at the industry level.

Appendix

Proof of Proposition 1: The Lagrangean is

$$\mathcal{L} = E(m(s)D_i(s)) + \gamma\{Eu_i(w_i^*(s)) - Eu_i(w_j^*(s) + D_i(s))\} - E(\mu(s)D_i(s))$$

where γ is the multiplier of (13) and $\mu(s) \geq 0$, $s \in S$, are the multipliers of the disclosure constraints. The Kuhn-Tucker conditions are $\mu(s)D_i(s) = 0$, $s \in S$, and

$$\gamma u_i'(w_j^*(s) + D_i(s)) = m(s) - \mu(s),\ s \in S. \tag{23}$$

When $D_i(s) > 0$, $\mu(s) = 0$ and therefore $u_i'(w_j^*(s) + D_i(s)) = m(s)/\gamma$. Per Observation 2, the latter implies

$$w_j^*(s) + D_i(s) = w_i^*(s) + k \tag{24}$$

for some k. The equality (24) cannot hold for all s. Suppose it does. Then (13) would be

$$Eu_i(w_i^*(s) + k) = Eu_i(w_i^*(s)),$$

implying that $k = 0$. But then (24) would imply $D_i(s) < 0$ for some s, contradicting the disclosure constraints.

From (24), damages are $D_i(s) = \max\{w_i^*(s) - w_j^*(s) + k, 0\}$ so that (13) becomes

$$Eu_i(w_j^*(s) + D_i(s)) = Eu_i(\max\{w_i^*(s) + k, w_j^*(s)\}) = Eu_i(w_i^*(s))$$

which can only be satisfied with $k < 0$, yielding the deductible $\delta_i^C = -k$ in the proposition.■

Proof of Lemma 1: We prove the claim for $i = l$; the logic is the same for $i = h$. Using (5),

$$w_l^*(s) - w_h^*(s) = \gamma(\overline{s} - s) \text{ where } \gamma = \alpha/\alpha_h - \alpha/\alpha_l > 0.$$

For a given δ, the premium is therefore

$$p(\delta) = (1 - \eta_l) \int_{s_-}^{\widetilde{s}(\delta)} [\gamma(\overline{s} - s) - \delta]\, m(s)g(s)\, ds$$

where $\widetilde{s}(\delta) = \overline{s} - \delta/\gamma$. It follows that

$$p'(\delta) = -(1 - \eta_l) \int_{s_-}^{\widetilde{s}(\delta)} m(s)g(s)\, ds. \tag{25}$$

Expected utility is

$$\begin{aligned} U_l(\delta) &= \eta_l \int_{s_-}^{s_+} u_l(w_l^*(s) - p(\delta)R_f)g(s)\, ds \\ &\quad +(1 - \eta_l) \int_{s_-}^{\widetilde{s}(\delta)} u_l(w_l^*(s) - p(\delta)R_f - \delta)g(s)\, ds \\ &\quad +(1 - \eta_l) \int_{\widetilde{s}(\delta)}^{s_+} u_l(w_h^*(s) - p(\delta)R_f)g(s)\, ds. \end{aligned}$$

Therefore,

$$\begin{aligned} \frac{U_l'(\delta)}{p'(\delta)R_f} &= -\eta_l \int_{s_-}^{s_+} u_l'(w_l^*(s) - p(\delta)R_f)g(s)\, ds \\ &\quad -(1 - \eta_l) \int_{s_-}^{\widetilde{s}(\delta)} u_l'(w_l^*(s) - p(\delta)R_f - \delta)g(s)\, ds \\ &\quad -(1 - \eta_l) \int_{\widetilde{s}(\delta)}^{s_+} u_l'(w_h^*(s) - p(\delta)R_f)g(s)\, ds \\ &\quad -\frac{(1 - \eta_l) \int_{s_-}^{\widetilde{s}(\delta)} u_l'(w_l^*(s) - p(\delta)R_f - \delta)g(s)\, ds}{p'(\delta)R_f}. \end{aligned} \tag{26}$$

With the type-optimal portfolio, $u_l'(w_l^*(s) - p(\delta)R_f) = \widehat{\nu} m(s)$ for all s and some $\widehat{\nu}$. In the case of a mismatch and for $s \in [s_-, \widetilde{s}(\delta)]$, we have $u_l'(w_i^*(s) - p(\delta)R_f - \delta) = \nu m(s)$ for some $\nu \geq \widehat{\nu}$, where the inequality follows from $\delta \geq 0$. Substituting in (26), using (25), and recalling that

$E(m) = 1/R_f$,

$$\begin{aligned}
\frac{U_l'(\delta)}{p_l'(\delta)R_f} &= -\eta_l\widehat{\nu}/R_f - (1-\eta_l)\nu\int_{s_-}^{\widetilde{s}(\delta)} m(s)g(s)\,ds \\
&\quad -(1-\eta_l)\int_{\widetilde{s}(\delta)}^{s_+} u_l'(w_h^*(s) - p(\delta)R_f)g(s)\,ds + \nu/R_f \\
&= \eta_l(\nu - \widehat{\nu})/R_f + (1-\eta_l)\int_{\widetilde{s}(\delta)}^{s_+}[\nu m(s) - u_l'(w_h^*(s) - p(\delta)R_f)]g(s)\,ds \\
&> 0.
\end{aligned}$$

The sign follows from $\nu \geq \widehat{\nu}$ and $\nu m(s) > u_l'(w_h^*(s) - p(\delta)R_f)$ for $s > \widetilde{s}(\delta)$. Because $p'(\delta) < 0$, we get $U_l'(\delta) < 0$.■

Proof of Proposition 2: Let $\nu R_f \geq 0$ and $\mu(s) \geq 0$ for all s be the multipliers associated with $(1-\eta_i)E(m\,D_i) \leq p$ and $D_i \geq 0$ respectively. The Lagrangian is

$$\mathcal{L} = U_i + \nu R_f\,[p - (1-\eta_i)E(m(s)\,D_i(s))] + E(\mu(s)D_i(s)). \tag{27}$$

The Kuhn-Tucker conditions are

$$\eta_i E u_i'(w_i^*(s) - pR_f) + (1-\eta_i)E u_i'(w_j^*(s) - pR_f + D_i(s)) = \nu, \tag{28}$$

$$u_i'(w_j^*(s) - p_i R_f + D_i(s)) = \nu R_f m(s) - \mu(s)/(1-\eta_i) \text{ for all } s, \tag{29}$$

$$\mu(s)D_i(s) = 0 \text{ for all } s.$$

First, we show that $\mu(s) = 0$ for all s is not possible. Suppose the contrary. Taking the expectation of (29) then implies

$$E u_i'(w_j^*(s) - pR_f + D_i(s))] = \nu = E u_i'(w_i^*(s) - pR_f). \tag{30}$$

where the second equality is obtained by substituting the first equality in (28). Now (29) and Observation 2 applied to the right-hand side of (30) imply

$$\frac{u_i'(w_j^*(s) - pR_f + D_i(s))}{m(s)} = \nu R_f = \frac{u_i'(w_i^*(s) - pR_f)}{m(s)},\ s \in S.$$

Hence, $D_i(s) = w_i^*(s) - w_j^*(s)$ for all s, contradicting (**??**). Thus, $\mu(s) > 0$ over a set with positive measure. From (29) it then follows that

$$Eu_i'(w_j^*(s) - pR_f + D_i(s)) < \nu$$

which from (28) implies

$$Eu_i'(w_i^*(s) - pR_f) = \widehat{\nu} \text{ for some } \widehat{\nu} > \nu.$$

But then, using (29) and Observation 2 again, when $D_i(s) > 0$,

$$\frac{u_i'(w_j^*(s) - pR_f + D_i(s))}{m(s)} = \nu R_f < \widehat{\nu} R_f = \frac{u_i'(w_i^*(s) - pR_f)}{m(s)}. \tag{31}$$

Applied to the left-hand side of (31), Observation 2 implies that $w_j^*(s) - pR_f + D_i(s) = w_i^*(s) + k$ for some k. From the inequality in (31), $k > -pR_f$. Equivalently, $k = -pR_f - \delta$ where $\delta < 0$.■

Proof of Proposition 3: A Pareto-optimum allocation maximizes $V \equiv \gamma_l \lambda_l \overline{U}_l + \gamma_h \lambda_h \overline{U}_h$ for some weights γ_l and γ_h attached to the expected utility of types l and h. The rest of the argument is then similar to that of Proposition 2 and is therefore omitted. The weights θ_l and θ_h in the proposition satisfy

$$\theta_l = \frac{\gamma_l \lambda_l E\overline{u}_l'}{\gamma_h \lambda_h E\overline{u}_h' + \gamma_l \lambda_l E\overline{u}_l'}, \quad \theta_h = 1 - \theta_l.■$$

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