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Markus Weinert

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Examination Committee

Chairperson: Prof. Dr. Klaus Prettner

Supervisor: Prof. Dr. Jörg Schiller

Co-Supervisor: Prof. Dr. Alfonso Sousa-Poza

Dean of Faculty: Prof. Dr. Karsten Hadwich

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Contents

Chapter 1

General Introduction

In the aftermath of the financial crisis in the last decade, the group of the twenty most important industry and emerging economies (G20) assigned the task to the recently established Financial Stability Board to develop proposals of how to deal with present and future threats in the financial sector. One important issue, that is often subject to intense discussions, is the regulation of financial advisors' compensation (Financial Stability Board, 2011; Muller et al., 2014). In general, such regulatory measures aim at providing the best possible advice for consumers. In most countries, financial advisors are remunerated by product providers via commission payments. Concern is growing, that this practice leads to biased advice, since in this case, the advisor has an incentive to recommend the product related to the highest commission payment instead of the most suitable product. Therefore, some regulators suggest, that a financial advisor should exclusively be compensated by consumers (Financial Services Authority, 2009). Then, the advisor has no such conflict of interest and should give unbiased advice to consumers. Some European countries followed this idea and enacted a ban on commission payments for many financial and insurance products.

Even though, enacting a ban on commission payments for financial and insurance products constitutes a severe intervention in markets for financial advice, the effects of

such a regulatory measure are barely adequate studied. The aim of this dissertation is to derive a deeper understanding of how such an intervention affects these markets under a key assumption of (partial) irrational consumers. In particular three academic papers in this thesis analyze the effects of a ban on commission payments on bias in advice, total welfare and competition between product providers.

The first paper, which is presented in chapter 2, considers the effect of a ban on commission payments on the bias of advice in a theoretical model. Intuitively, advice should not be biased, if consumers are completely rational. However, this does not constitute a realistic assumption. Under the assumption, that in an advice process, consumers ask for reasons and explanations, why a particular product should suit their needs, an advisor faces transaction costs for recommending a product. These transaction costs are considered as persuasion costs and are intuitively low for a product, which is initially preferred by consumers, and high for a product, which is in consumers' mind unlikely to satisfy their needs. The purpose of this paper is to analyze how this assumption affects the quality of advice under a fee-based remuneration system for the advisor.

Chapter 3 refers to a paper, which theoretically analyzes welfare effects of fee-based and commission-based remuneration systems for financial advisors under the aforementioned central assumptions. In markets, where advice is essential for consumers, product providers usually cannot sell their products directly to consumers. In these markets, commission payments do not only serve as a compensation for the advisor, but also as a channel for competition between product providers. As a consequence, a regulatory ban on commission payments should be considered as a two-sided coin. On the one hand, a ban on commission payments may reduce distortion in advice, but on the other hand, it may restrict competition between product providers. The theoretical framework aims at analyzing the impact of these effects on total welfare and whether one effect outweighs the other, in order to derive reasonable policy implications for regulating financial advisors' compensation.

The third paper is presented in chapter 4. This paper theoretically analyzes whether and how product providers are able to compete in markets where products cannot be sold directly to consumers and commission payments are banned by regulation. In particular, two possible channels are considered: Competition through product prices and competition through informative advertising. If a product provider engages in informative advertising, consumers may already be familiar with certain product characteristics before consulting an advisor. By this, advisors' persuasion costs for the advertised product may be lower in an advice process, which results in a higher incentive to recommend the advertised product in comparison to other products. Put differently, informative advertising may serve as a channel for indirect competition between product providers.

This dissertation closes with a summary of all key results and some general conclusions in chapter 5

Chapter 2

Fee for advice: a remedy for biased product recommendations?[1]

Abstract

Consumers regularly seek professional advice when purchasing financial products. It is often argued that advisors should solely be compensated by consumers, as then, an advisor has no incentive to give biased advice. In our theoretical model, we show, that a fee-for-advice remuneration system does not prevent consumers from biased advice, if they have an initial biased belief, which product best suits their needs and advisors face transaction costs for persuading consumers.

JEL Codes: D82, D83, G20, L15

[1]This chapter is based on joint work with Jörg Schiller from the University of Hohenheim, which is yet unpublished. The candidates individual contribution focused mainly on the literature research, the developing of the theoretical model, the theoretical analysis and the writing.

2.1 Introduction

Many consumers lack intellectual or time capabilities to manage their financial decisions and therefore seek advice when purchasing complex products, e.g. related to retirement savings (Campbell, 2016). In general, financial advisors have superior knowledge about available products compared to consumers and thus can judge more accurately and at lower costs, which product best suits consumers' needs. It is a widespread practice among product providers to compensate financial advisors by disclosed or hidden commissions. However, this practice enables product providers to steer advisors' recommendation, which consequently can be biased. It is often argued that advisors should exclusively be compensated by consumers via a fee for advice, as then, advisors seemingly have no incentive to recommend a certain provider's product and to give biased advice.[2] In the spirit of this view, a ban on commissions related to retail investment advice was introduced in the United Kingdom at the end of 2012. Furthermore, in January 2013, the Netherlands banned commissions for complex financial products including life insurance products and mortgages.

When analyzing advantages and downsides of certain regulatory actions related to financial advice, it is crucial to account for the specific tasks that advisors perform: For example, advisors have to acquire general knowledge about financial concepts and available products and have to canvas consumers. For a suitable product recommendation, both the specific situation and the needs of the consumer must be analyzed. Finally, reasonable consumers will ask for reasons or explanations, when receiving a product recommendation. Hence, advisors cannot simply reveal the result of their assessment on

[2]For example, the UK financial regulator Financial Services Authority (2009) states: "At present, firms that give advice on investments face the prospect of earning different amounts of money depending on which particular firm they recommend a product from and which type of product they recommend. This creates a potential conflict of interest that can be damaging to consumers and undermine trust in the investment industry. [...] We propose that advisor firms should only be paid for the advice and related services that they provide through 'advisor charges'. By this, we mean that advisor firms should be paid by charges that are set out up-front and agreed with their clients, rather than by commissions set by product providers to secure distribution of their products (including so-called 'soft' commissions, paid in non-monetary forms)."

the suitability of products to consumers without any further explanation. In the European Union, explanations of recommendations are also mandatory for many financial products.[3]

In the spirit of Mullainathan et al. (2008), we consider such transaction costs from explaining reasons for a product recommendation as persuasion costs.[4] It is costly for the advisor to provide evident information dependent on this initial belief to the consumer, which state that the recommended product suits the consumer's needs. When the advisors' remuneration is flat (fixed fee for advice or commission) and explanations are costly, the advisor has strong incentives to save time and therefore minimize his variable costs. Hence, financial advisors may have incentives for biased advice even under a fee for advice system.

The purpose of this paper is to extend the literature by the consideration of persuasion costs in an advice process and to analyze how these costs affect product recommendations of advisors if they are exclusively compensated by consumers. To this end, we focus on the product selection as part of an advice process. Our model consists of a simple market for financial advice, where consumers have different needs and advisors possess superior information about the best suiting product for individual consumers. Advisors face transaction costs from providing consumers with relevant information and explaining reasons for product recommendations. Consumers have a prior belief based on common observable information about the best suiting financial product. They can

[3]For example, article 20 of the Insurance Distribution Directive of the European Union (2016) states:
"Where advice is provided prior to the conclusion of any specific contract, the insurance distributor shall provide the customer with a personalised recommendation explaining why a particular product would best meet the customer's demands and needs."
Additionally, the European Union (2014) Markets in Financial Instruments Directive (MiFID II), which is the framework of EU legislation for investment intermediaries that provide services to clients around financial instruments, like shares, bonds, units in collective investment schemes and derivatives, states in article 72:
"It is also appropriate to require investment firms to explain to their clients the reasons for the advice provided to them."

[4]Mullainathan et al. (2008) states that most persuasive messages take advantage of both transference and framing and defines (costly) persuasion as follows: "[...] to persuade is to advertise attributes of the product that are positively related to quality in the analogous situation."

either purchase a standard product based on their initial belief or consult an advisor. The consulted advisor charges a fixed fee to the consumer and can either confirm the consumer's initial belief or recommend the specialized product. Recommending the specialized product is more costly for the advisor, since he has to persuade the consumer of the specialized product contrary to his initial belief. However, the advisor faces a disutility resulting from an unsuitable product recommendation, for instance from reputational costs and/or the fear of losing future business prospects. On the demand side, consumers vary in their understanding of the advisor's incentives and a therefrom potentially resulting conflict of interest. Wary consumers anticipate the advisor's tradeoff between persuasion costs and reputational costs and consequently the quality of advice. Naive consumers assume that advice is unbiased. On the supply side, both a monopolistic advisor and a competitive advisor market are considered.

The main result of the analysis is, that even in the absence of commissions in the market for financial advice, product recommendations might still be biased. Advisors may have an incentive to confirm consumers' incorrect beliefs if the following two conditions hold: First, a consumer has an initial belief that the standard product matches his characteristics best, but actually, the specialized product is the best fit. Second, market discipline is low such that advisors do not have to fear sufficiently high reputational costs from giving biased product recommendations. Our results indicate that regulation of financial advice should not only consider advisors' compensation but also the related advice process. Otherwise, regulation may backfire, if it does not consider substantial transaction costs that may distort advisors' incentives.

In our model, advice is not just cheap talk (Crawford and Sobel, 1982) and may be biased due to persuasion costs. Malmendier and Shanthikumar (2007) analyze biased stock recommendations for investors and find that some investors take recommendations literally, while other investors appear to correct their purchase decision for the bias. In this spirit, we assume wary consumers to consider a possible bias in product

recommendations when requesting advice for a fee, whereas we assume naive consumers not to anticipate that product recommendations might be biased. Consequently, wary consumers have a strictly lower willingness to pay for advice in comparison to naive consumers and ultimately have no willingness to pay for completely uninformative advice. If wary consumers' willingness to pay for advice is sufficiently high, they always follow the advisor's product recommendation. Otherwise, a market for financial advice may not exist. A similar equilibrium outcome arises for naive consumers. However, our model indicates that naive consumers are exploited by advisors both, in a monopolistic and a competitive advisor market. This exploitation is reduced by two factors: A high proportion of wary consumers in the market and competition between advisors. In a competitive advisor market, advisors face higher reputational costs due to a higher elasticity in demand in comparison to a monopolistic advisor market. Consequently, wary consumers' willingness to pay for advice increases in the competitiveness of the advisor market. An increase in competition between advisors also forces them to decrease the fee, for which they can offer their advice services. Thus, consumer surplus is higher in a competitive advisor market in comparison to a monopolistic market.

Our model extends the literature that analyzes financial intermediaries' conflicts of interest and incentives to give biased product recommendation in a market with horizontal differentiable products. Inderst and Ottaviani (2012a) show that product providers may try to influence advisors by commission payments and that mandatory disclosure and caps on commissions may have unintended consequences. However, if consumers perfectly anticipate the quality of advice, in equilibrium, advisors are exclusively compensated by an upfront fee and give unbiased advice (Inderst and Ottaviani, 2012b). Therefore, unsophisticated consumers are a key source for biased advice and practices of commission payments and kickbacks from product providers.

Only a few papers analyze potential problems of fee-for-advice remuneration. Gravelle (1993, 1994) compares a commission-based with a fee-based compensation scheme,

where advisors face search costs, and entry into the advisor market is endogenous. He finds that a fee-based compensation system may lead to a higher intermediation quality, but too few consumers become informed about their best matching product. Hence, a fee-for-advice system is not necessarily superior to a commission system once the number of advisors and overall purchases by consumers are taken into account. Focht et al. (2013) pick up the issue of different remuneration systems in the insurance context and find that under a fee-for-advice system, biased product recommendations may result from side payments of product providers.

The suitability and therefore the benefit of financial products, like investments or long-term life insurance contracts, crucially depends on the match of product features and the individual characteristics of the consumer. Thereby, an individual consumer may only get information about the suitability of a purchased financial product after quite some time. Hence, financial products resemble experience goods (Nelson, 1970), or in extreme cases, credence goods (Darby and Karni, 1973). In the latter case, consumers do not obtain any information about quality and suitability of the purchased products. The same is valid for corresponding financial advice. Consequently, it is straightforward that consumers' trust in financial advice and the corresponding advisor, respectively, is a key driving factor for the demand (Gennaioli et al., 2015). Hence, the relationship between a consumer and an advisor is fundamentally based on the consumer's personal beliefs and less on objective measurements. Gennaioli et al. (2015) show, that in such a situation, advisors have substantial incentives for giving biased product recommendations and advisors have an incentive to pander to their consumers' beliefs. We consider the case of experience goods, since in our model, the advisor suffers reputational costs, when recommending an unsuitable product.

In particular, our model is related to the real-world phenomenon observed by Mullainathan et al. (2012) and Anagol et al. (2017). Their empirical findings indicate, that advisors, irrespectively of their compensation, tend to cater to consumers' beliefs, even

if these are incorrect. Mullainathan et al. (2012) send trained consumers to financial advisors to present their investment portfolios. Some of the presented portfolios were in line with the consumers' expressed needs and some were contrary to them. Mullainathan et al. (2012) find that presented investment portfolios, which did not suit the corresponding consumers' needs, were often recommended by financial advisors although changing the portfolio would result in higher commission payments. Anagol et al. (2017) analyze advisors' recommendations in the Indian life insurance market and find that advisors confirm incorrect consumer beliefs, even if recommending a suitable product leads to a higher compensation for the advisor. Our model confirms that such a behavior may be rational from the advisor's perspective. Anagol et al. (2017) and Mullainathan et al. (2012) consider commission-based remuneration systems for financial advisors and indicate, that there is a tradeoff between earning a high commission and minimizing persuasion costs. This highlights, that in the absence of commission payments (which constitute a contrary incentive to the minimization of persuasion costs), we expect the effect of confirming consumers' incorrect beliefs to be even more severe if advisors are exclusively compensated by consumers via a fee for advice.

We consider transaction costs that the advisor incurs from persuading consumers that have an initial belief about the suitability of products. In the sense of Mullainathan et al. (2008), it is costly for the advisor to provide evident information to the consumer, which state that the recommended product suits the consumer's needs. Bhattacharya et al. (2012) find, that consumers often do not respond to unbiased advice. This highlights that information cannot be simply passed to consumers without transaction costs for persuading consumers. Gentzkow and Kamenica (2014), Bertrand et al. (2010), DellaVigna and Gentzkow (2010) and DeMarzo et al. (2003) analyze persuasive effects across a range of domains. Our model puts this phenomenon of persuading consumers of products into the context of recommending horizontal differentiable products in the absence of commission payments.

2.2 Basic Model

We consider a simple market for financial advice. Following Inderst and Ottaviani (2012a) and Focht et al. (2013), this market is represented by a mass of risk neutral consumers and a monopolistic risk neutral advisor.[5] Consumers face the choice to buy one single unit of one of two products $n = A, B$. The characteristics of each consumer are reflected by an unobservable binary state variable $\Theta = A, B$. If product n matches the consumer's characteristics Θ, he derives utility v_h, otherwise he derives utility v_l, with $v_h > v_l > 0$. These utilities capture all discounted future cash flows dependent on the suitability of product and consumer. We normalize the utility of not buying to zero. Similar to Inderst and Ottaviani (2012a), the two products can reflect different investment plans, where one of the two is more suitable than the other based on consumer's characteristics like financial conditions, tax status, or life expectancy. However, this simple model of two products is applicable for various situations where products or treatments do not have necessarily be originated in a financial context, for instance situations in the health care context, where different treatments yield different probabilities for curing a specific disease.

In order to gain information about the suitability of the products, consumers have the possibility to request a product recommendation from the advisor. We assume the advisor to have in-depth knowledge of financial products and therefore the capability to judge which product best suits consumers' characteristics. Although, the advisor cannot observe a consumer's characteristics $\Theta = A, B$ directly, the advisor has private informa-

[5]The simplification of a monopolistic advisor is helpful for analyzing the interaction between consumer and advisor and is also not too far from a realistic setting. The demand for advice for each single consumer depends on many economic, social and psychological factors. In a market with multiple advisors, the consumer faces considerable search costs for obtaining a second opinion by a different advisor, which provides each advisor with some market power. Moreover, Gennaioli et al. (2015) assume that consumers have a strong personal connection to their advisor based on trust. Therefore, consumers are not willing to request advice from a competitor that offers advice for a marginal unit less than the initial advisor. Thus, in our basic setup, we assume a completely nonelastic demand for advice. However, we introduce a competitive advisor market with elastic demand for advice in section 2.7 and find that our core results still hold in this setting.

tion about a consumer's characteristics denoted by $q = Pr(\Theta = A)$. Hence, he possesses private information about the probability that product A matches a consumer's characteristics. Product A corresponds to some sort of standard product, whereas product B corresponds to a more specialized product. This implies that product A is more likely to match consumers' characteristics than product B. In particular, we assume that q is distributed over all consumers according to the distribution function $G(q)$ with differentiable density $g(q) > 0$ for all $q \in [0, 1]$. Without loss of generality, we assume that $g(q)$ is an increasing function of q with $\frac{\partial g(q)}{\partial q} > 0$ over $q \in [0, 1]$, that is, $g(q)$ is skewed to the left. This distribution $G(q)$ is common knowledge. Consequently, consumers have an initial information about the suitability of the products. However, this information is less accurate than the advisor's private information. We specify consumers' product valuation with and without the advisor's product recommendation in detail in section 2.4 and 2.5.

The advisor is offering his product recommendation for an upfront fee f. This fee is the only compensation for the advisor and there is no option to discriminate individual consumers by charging individual fees. In contrast to Inderst and Ottaviani (2012a) and Focht et al. (2013), we exclude the possibility, that the advisor can receive any form of (hidden) commissions. The advisor can use his private information q and give a product recommendation $r = A, B$ to the consumer. However, recommending a product is costly for the advisor, since he has to persuade the consumer of the corresponding product. We assume that these costs are inversely proportional to the strength of consumers' initial belief about the suitability of a product. Thus, the advisor's persuasion costs for product A depend on consumers' ex ante belief according to the common information $G(q)$ that product B matches the respective characteristics and vice versa. In particular, $q \in \left[0, \frac{1}{2}\right)$ and $q \in \left[\frac{1}{2}, 1\right]$ reflect probabilities, where product B and A, respectively, matches the consumer's characteristics with higher probability than the other product. The corresponding probability masses are given by $\int_0^{\frac{1}{2}} g(q)dq$ and $\int_{\frac{1}{2}}^1 g(q)dq$. Hence, the

advisor incurs persuasion costs of

$$c_A = \left(\int_0^{\frac{1}{2}} g(q)dq \right) k = G\left(\frac{1}{2}\right) k \tag{2.1}$$

for recommending product A and

$$c_B = \left(\int_{\frac{1}{2}}^{1} g(q)dq \right) k = \left(1 - G\left(\frac{1}{2}\right)\right) k \tag{2.2}$$

for recommending product B, where $k > 0$ denotes the marginal persuasion costs for the advisor. Since $g(q)$ is skewed to the left, it follows immediately that $\int_0^{\frac{1}{2}} g(q)dq < \int_{\frac{1}{2}}^{1} g(q)dq$ and therefore $c_A < c_B$ holds. This implies, that it is less costly for the advisor to persuade a consumer of the standard product A, that is suitable for the majority of consumers, than to persuade a consumer of the specialized product B, that only matches the characteristics of the minority. However, the advisor incurs reputational costs $d > 0$ when the recommended product does not match the consumer's characteristics.[6] We relate this reputational costs to a learning effect of consumers about the suitability of purchased products, but abstract in our analysis from specific time horizons, where this learning effect takes place. In our basic model, the advisor's marginal persuasion costs k, his potential reputational costs for a wrong product recommendation d, the distribution of the advisor's private information $G(q)$ and the derived utility levels v_h and v_l for the consumer are exogenously given. However, we endogenize reputational costs for advisors in section 2.7 by introducing a competitive advisor market and link reputational costs to the degree of competition between advisors.

We differentiate in our analysis between two types of consumers. Wary consumers are able to anticipate the fact, that the advisor's product recommendation is driven by persuasion costs and reputational concerns. Thus, wary consumers anticipate d and k

[6] Following Inderst and Ottaviani (2012a), sources of disutility for a mismatching product recommendation can also be potential penalties imposed by a regulator or professional concerns for the consumer's well-being.

and consequently c_A and c_B correctly. In contrast, we assume naive consumers to be completely unaware of any advisor's tradeoffs that might affect his product recommendations.

We model the interaction between consumers and advisor by the following game: At stage 1, the advisor makes a take-it-or-leave-it offer f for his advice. At stage 2, consumers decide whether to accept or to decline this offer. If the offering is accepted, at stage 3, the advisor obtains private information represented by q and gives a product recommendation $r = A, B$ to the consumer based on this information. At stage 4 consumers make their final purchase decision. All players try to maximize their utilities. Payoffs are not discounted.

2.3 Advice

Given that a consumer has accepted the advisor's offer for a fee f, the advisor maximizes his utility by minimizing his expected costs for giving a product recommendation. That is, the advisor's dominant strategy is to recommends product A whenever the expected costs resulting from this product recommendation do not exceed those for recommending product B and vice versa.[7] In particular, the advisor recommends product A if $(1 - q)d + c_A \leq qd + c_B$ holds and product B otherwise. By solving this inequality for q, we derive a threshold q^* for which the advisor is better off, by recommending product A if for his private information $q \geq q^*$ holds and product B otherwise, where

$$q^* := \begin{cases} \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} & \text{for} \quad \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} > 0 \\ 0 & \text{for} \quad \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} \leq 0. \end{cases} \tag{2.3}$$

[7] For sake of simplicity, we assume that the advisor recommends product A in the case that expected costs for both recommendations are equal.

Expected costs for giving a product recommendation, dependent on q, are given by

$$c(q) = \min\left\{(1-q)d + c_A; qd + c_B\right\}. \tag{2.4}$$

Since $g(q)$ is skewed to the left, it holds $G\left(\frac{1}{2}\right) < \frac{1}{2}$. This implies $\frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} > 0$ and therefore

$$q^* < \frac{1}{2}. \tag{2.5}$$

Consequently, the advisor considers two sources of potential costs, when recommending a product. First, costs for persuading the consumer of a certain product. Second, potential reputational costs, that he might incur, if the recommended product does not suit the consumer's characteristics. By minimizing these two sources of costs, dependent on q, equation (2.5) states, that there is a nonempty interval for q for which the advisor's dominant strategy is to recommends product A, even though, according to the advisor's private information, product B is more likely to match the consumer's characteristics. In this case the advisor is willing to incur the higher expected reputational costs resulting from a wrong product recommendation, since he is able to compensate this by lower persuasion costs for recommending the standard product A instead of the specialized product B. This implies that consumers for which the private information is $q \in \left[q^*; \frac{1}{2}\right)$ receive a biased product recommendation on purpose by the advisor. It follows immediately that advice is only informative for $q^* > 0$.

2.4 Wary consumers

Wary consumers are capable to correctly anticipate the advisor's tradeoff between potential reputational costs and persuasion costs for a certain product, when giving a product recommendation. We solve the interaction game between consumer and advisor, described in section 2.2, under the assumption, that consumers know that the

advisor's product recommendation is biased according to q^* derived in equation (2.3). The consumer's expected utility for product A and B, dependent on q, is given by

$$v_A(q) = q \cdot v_h + (1 - q) \cdot v_l \tag{2.6}$$

and

$$v_B(q) = (1 - q) \cdot v_h + q \cdot v_l, \tag{2.7}$$

respectively. As a consequence, the consumer's ex ante valuation (without any advice) for the two products is given by

$$E\left[v_A\left(q\right)\right] = \int_0^1 v_A(q)g(q)dq > \int_0^1 v_B(q)g(q)dq = E\left[v_B\left(q\right)\right] > 0. \tag{2.8}$$

Using backward induction, we start solving the game at stage 4. There, we have to consider two different histories of the game: Either the consumer has accepted the offer for advice at stage 2 or he has declined it. The purchase decision for the case without advice is straightforward. From (2.8) it follows immediately that the consumer purchases the standard product A. If the consumer has accepted the offer for advice at stage 2, he received a product recommendation $r = A, B$ at stage 3. First, we consider the case, which corresponds to receiving product recommendation $r = A$. Since a wary consumer correctly anticipates q^*, he also anticipates that this product recommendation is equivalent to the information that $q \geq q^*$ holds. Consequently, the consumer's ex post valuation for the two products according to the received product recommendation and the anticipated $q^* \geq 0$ is given by

$$\begin{aligned} E\left[v_A\left(q\right) \mid q \geq q^*\right] &= \int_{q^*}^1 v_A(q)\frac{g(q)}{1 - G(q^*)}dq \\ &> \int_{q^*}^1 v_B(q)\frac{g(q)}{1 - G(q^*)}dq = E\left[v_B\left(q\right) \mid q \geq q^*\right] > 0, \end{aligned} \tag{2.9}$$

where the strict inequality follows immediately by the skewness of $g(q)$. The second case corresponds to receiving product recommendation $r = B$. Analogous to the first case, the consumer anticipates $q < q^*$. His ex post valuation for the two products is then given by

$$\begin{aligned} E\left[v_B\left(q\right) \mid q < q^*\right] &= \int_0^{q^*} v_B(q) \frac{g(q)}{G(q^*)} dq \\ &> \int_0^{q^*} v_A(q) \frac{g(q)}{G(q^*)} dq = E\left[v_A\left(q\right) \mid q < q^*\right] > 0. \end{aligned} \tag{2.10}$$

Thus, in both cases, the consumer follows the advisor's product recommendation.

At stage 3 the advisor gives his product recommendation according to section 2.3, that is, his dominant strategy is to recommend product A if $q \geq q^*$ holds, and product B otherwise.

At stage 2 the consumer can either accept the advice offer for the fee f or remain without advice. The expected payoff for remaining without advice is given by (2.8) with $E\left[v_A\left(q\right)\right]$. The expected payoff considering the information from advice (gross of fee f) is given by

$$G(q^*) E\left[v_B\left(q\right) \mid q < q^*\right] + \left(1 - G(q^*)\right) E\left[v_A\left(q\right) \mid q \geq q^*\right]. \tag{2.11}$$

Thus, the consumer will request advice if

$$f \leq G(q^*) E\left[v_B\left(q\right) \mid q < q^*\right] + \left(1 - G(q^*)\right) E\left[v_A\left(q\right) \mid q \geq q^*\right] - E\left[v_A\left(q\right)\right] \tag{2.12}$$

or equivalently

$$f \leq f^{wr} = \left(v_h - v_l\right) \int_0^{q^*} \left(1 - 2q\right) g(q) dq \tag{2.13}$$

holds, where f^{wr} denotes the wary consumer's willingness to pay for advice, that is, the utility difference between the payoffs with and without advice.

At stage 1 the advisor sets his fee f taking into account the consumers' willingness to

pay f^{wr} from stage 2 which constitutes an upper bound for f and his expected costs for his advice service $E[c(q)] = \int_0^1 c(q)g(q)dq$ from stage 3 which constitute a lower bound.

Proposition 2.1 *There exists a unique equilibrium which depends on the consumer's willingness to pay for advice. If $f^{wr} \geq E[c(q)]$ holds, the advisor offers his product recommendation for $f = f^{wr}$, the consumer accepts this offer and follows the advisor's product recommendation. In this case advice is biased, but informative ($0 < q^* < \frac{1}{2}$). Otherwise, the consumer declines the advisor's offer and purchases the standard product A without advice.*

Proposition 2.1 states that in equilibrium wary consumers either request advice and consequently follow this advice, even though advice is biased in equilibrium, or remain without advice. In the first case, the advisor creates an additional value for consumers by providing information about the suitability of the two products and the consumer is willing to pay exactly what this information is worth for him. However, we consider in this setup a monopolistic advisor, which allows him to extract the whole value created for the consumer, by charging exactly this amount to the consumer in exchange for his information. In the second case, the information gained from the advice is not worth paying the fee f for consumers, or in other words, the advisor's additional value that he creates for consumers is not covering his expected costs for creating this value and thus the advisor is not able to extract a positive rent from consumers. This might lead to situations, where consumers have a strictly positive willingness to pay for advice, but the advisor's offer is too expensive, even if the advisor offers his product recommendation for $f = E[c(q)]$.

Wary consumers correctly anticipate the advisor's dominant strategy given by (2.3) and thus can judge whether their ex ante information about the suitability of products is sufficiently accurate so that advice is not worth paying at all for it.

Corollary 2.2 *There is a threshold* $G^*\left(\frac{1}{2}\right) := \frac{k-d}{2k}$ *for the distribution of the advisor's private information* q *and if* $G\left(\frac{1}{2}\right) < G^*\left(\frac{1}{2}\right)$ *holds, the consumer has no willingness to pay for advice and purchases the standard product* A*. If there is a strictly positive willingness to pay for advice, then this advice is informative, that is,* $q^* > 0$*.*

Corollary 2.2 states that it is not beneficial for consumers to request advice, if the specialized product B is ex ante very unlikely to match the consumer's characteristics, that is, $G\left(\frac{1}{2}\right)$ is sufficiently small. In particular, it follows immediately from Corollary 2.2 that the consumer has a positive willingness to pay for advice if $d > k$ holds, that is, the advisor's potential disutility from recommending an unsuitable product is higher than the advisor's marginal persuasion costs. If this condition is fulfilled, the consumer anticipates, that this potential disutility d represents a sufficiently large incentive for the advisor to give a product recommendation, which is worth for the consumer paying for. Nevertheless, the advisor's costs for giving a product recommendation might be higher than the consumer's willingness to pay for advice. Besides d, the marginal persuasion costs k are a driving factor for the threshold $G^*\left(\frac{1}{2}\right)$. This threshold is strictly increasing with k and $\lim_{k\to\infty} G^*\left(\frac{1}{2}\right) = \frac{1}{2}$ holds. Consequently, it also holds $G\left(\frac{1}{2}\right) < \lim_{k\to\infty} G^*\left(\frac{1}{2}\right)$ for any left-skewed density $g(q)$ which implies that the consumer has no willingness to pay for advice, if the marginal persuasion costs k are sufficiently high. In this case, k is the dominant driving factor for the advisor's costs for giving a product recommendation $c(q)$. Then, the advisor will always try to minimize his incurred persuasion costs by always recommending product A. Thus, this result is equivalent to $q^* = 0$, that is, uninformative advice. However, the exact amount, that a consumer is willing to pay for advice is driven by various factors.

Proposition 2.3 *Wary consumers' willingness to pay for informative advice is increasing with*

(i) an increase of the difference of utility levels $v_h - v_l$*, derived by purchasing a suitable*

and an unsuitable product, respectively.

(ii) an increase of the potential reputational costs d for recommending an unsuitable product.

(iii) a decrease of the advisor's marginal persuasion costs k.

(iv) an increase of the ex ante suitability of the specialized product B in the sense that q is distributed according to a differentiable density function $h(q)$ with $h(q) > g(q)$ for $q \in \left(0; \frac{1}{2}\right)$ and advice is informative for $h(q)$.

Proposition 2.3 yields insights with regard to the driving factors for wary consumers' willingness to pay for advice. If the utility difference between purchasing a suitable product and purchasing an unsuitable product is increasing, informative advice becomes more attractive. This is due to the fact, that the information gained from advice is then getting more valuable for consumers. If the utility difference is very small, consumers do not forgo much extra utility when purchasing an unsuitable product. The second and third result reflect the consumers' awareness. Since consumers anticipate the bias in the advisor's product recommendation, given by q^*, they anticipate that advice gets more informative with an increase in d. In this case, the advisor has to fear higher reputational costs for recommending unsuitable products which implies that advice gets less biased. Consequently, the information gained from advice becomes more valuable for consumers. Analogous, the third result indicates, that with a decrease in the advisor's marginal persuasion costs, the effect of compensating high reputational costs with savings in persuasion costs is decreasing, and therefore, advice becomes also less biased. The fourth result states, that the ex ante suitability of product B is a driving factor for the consumers' willingness to pay for advice. If we focus on an increase of $g(q)$ in an interval $(\tilde{q} - \epsilon; \tilde{q} + \epsilon) \subset \left(0; \frac{1}{2}\right)$ with $\tilde{q} \in \left(0; \frac{1}{2}\right)$ and a fixed $\epsilon > 0$ then the increase in the willingness to pay gets higher with bringing $\tilde{q}$ closer to 0. This is due to the fact, that in the consumers' valuation $g(q)$ is weighted with the factor $1 - 2q$. Without advice,

consumers purchase the standard product A. Thus, an information q which would change their purchasing decision to purchasing the specialized product B are of high value for consumers. In other words, an information q near the value of zero yields a higher expected utility $v_B(q)$ and is thus more valuable for consumers than a q near the value of one half.

Considering a total welfare perspective, in case, a market for financial advice exists according to Proposition 2.1, the advisor's expected costs for giving a product recommendation as well as consumers' utility derived from advice have to be taken into account. In order to derive a welfare maximizing quality of advice q^*_{FB}, we consider total welfare as a continuous differentiable function of $q^* \in (0, \frac{1}{2})$ according to (2.3) (keeping d, k and G fixed) which is given by

$$\omega(q^*) = (v_h - v_l) \int_0^{q^*} (1-2q)\, g(q)dq - \int_0^{q^*} (qd + c_B)\, g(q)dq - \int_{q^*}^1 ((1-q)d + c_A)\, g(q)dq. \tag{2.14}$$

The first term of (2.14) reflects consumers' utility derived from advice. The second and third term, respectively, reflect the advisor's expected costs for giving a product recommendation for a cutoff q^*. Since $f^{wr} \geq E[c(q)]$ holds, consumers' utility from advice, represented by f^{wr} outweighs the advisor's expected costs for giving a product recommendation $E[c(q)]$. Thus, there exists a cutoff q^* for which the marginal total welfare is positive.[8] However, consumers' marginal utility at q^* is converging to zero for $q^* \to \frac{1}{2}$, due to

$$\begin{aligned} \lim_{q^* \to \frac{1}{2}} \frac{\partial f^{wr}}{\partial q^*} &= \lim_{q^* \to \frac{1}{2}} \frac{\partial}{\partial q^*} (v_h - v_l) \int_0^{q^*} (1-2q)\, g(q)dq \\ &= \lim_{q^* \to \frac{1}{2}} (v_h - v_l)\,(1-2q^*)\, g(q^*) \\ &= 0. \end{aligned} \tag{2.15}$$

[8] The proof of Proposition 2.4 shows in detail, that this is indeed the case.

The advisor's marginal expected costs at $q^* \to \frac{1}{2}$ are strictly positive due to

$$\begin{aligned}
&\lim_{q^* \to \frac{1}{2}} \frac{\partial}{\partial q^*} \int_0^{q^*} (qd + c_B)\, g(q)dq + \int_{q^*}^1 ((1-q)d + c_A)\, g(q)dq \\
&= \lim_{q^* \to \frac{1}{2}} (q^* d + c_B)\, g(q^*) - ((1-q^*)d + c_A)\, g(q^*) \\
&= \lim_{q^* \to \frac{1}{2}} ((2q^* - 1)\, d + c_B - c_A)\, g(q^*) \\
&= (c_B - c_A)\, g\left(\frac{1}{2}\right) > 0. \qquad (2.16)
\end{aligned}$$

Thus, continuity of total welfare as a function of q^* implies, that there exists a sufficiently small $\epsilon > 0$ such that marginal total welfare is strictly negative for $q^* \in \left(\frac{1}{2} - \epsilon, \frac{1}{2}\right)$. As a consequence, q^*_{FB} is characterized by the first-order condition $\frac{\partial \omega(q^*)}{\partial q^*} = 0$ and it holds

$$q^*_{FB} < \frac{1}{2}. \qquad (2.17)$$

In this case, consumers' marginal utility from advice equals the advisor's marginal expected costs for giving a product recommendation. From (2.17) it follows, that completely unbiased advice is not welfare maximizing. If the advisor gives his product recommendation according to a $q^* > q^*_{FB}$, consumers' marginal utility from advice is below the advisor's marginal expected costs for giving a product recommendation. Even though wary consumers are able to adjust their willingness to pay exactly to that amount what advice is worth, the equilibrium characterized in Proposition 2.1 is not welfare maximizing if the advisor's offer is actually accepted or, put differently, a market for financial advice exists.

Proposition 2.4 *If there exists a market for financial advice with wary consumers ($f^{wr} \geq E[c(q)]$), a total welfare loss arises in equilibrium ($q^* < q^*_{FB}$).*

The intuition behind Proposition 2.4 is as follows. Since a market for financial advice exists, consumers gain a sufficiently high utility from purchasing a suitable product in

comparison to an unsuitable product. As a consequence, less biased advice results in a higher consumers' willingness to pay, which exceeds additional costs for the advisor for giving a less biased product recommendation. Thus, also the advisor would be better off by a less biased product recommendation, if he could extract this additional created utility. However, consumers are aware of the fact, that the advisor has an incentive to minimize his costs after receiving his upfront payment f by choosing his dominant strategy, that is, to recommend products according to q^*. Since the advisor is not able to credible commit to any other strategy, the equilibrium characterized in Proposition 2.1 results in a total welfare loss.

2.5 Naive consumers

We now consider that consumers are naive about the advisor's incentives, that is, they are not aware of the advisor's considerations to minimize his costs which are driven by persuasion costs for a product and a potential disutility resulting from giving a wrong product recommendation, respectively. Thus, naive consumers assume that the advisor's product recommendation is unbiased. The interaction sequence for naive consumers remains the same as for wary consumers, whereas the equilibrium outcome of the game is slightly different. Now, naive consumers do not anticipate the true threshold q^* and therefore naively anticipate that the advisor recommends product A if $q \geq \frac{1}{2}$ holds and product B otherwise. Keeping wary consumers' willingness to pay for advice, characterized by (2.13), in mind, naive consumers will request advice if

$$f \leq f^{nv} = (v_h - v_l) \int_0^{\frac{1}{2}} (1 - 2q)\, g(q) dq \tag{2.18}$$

holds, where f^{nv} denotes the naive consumer's willingness to pay for advice. From $q^* < \frac{1}{2}$, it follows immediately that $f^{nv} > f^{wr}$ holds.

It is straightforward, that $f^{nv} > 0$ holds and naive consumers' willingness to pay for

advice is not affected by the advisor's threshold q^*, in particular, if $q^* = 0$ holds, this has no effect on f^{nv}. Thus, naive consumers have a strictly positive willingness to pay for uninformative advice, since $v_h > v_l$ and $g(q) > 0$ for all $q \in \left[0; \frac{1}{2}\right]$ holds. The driving factors for naive consumers' willingness to pay are the same as for wary consumers in Proposition 2.3 except for persuasion costs and reputational costs for the advisor which are not anticipated by naive consumers. This result is in line with the assumption, that naive consumers do not anticipate that the advisor's product recommendation is biased and thus expect always a positive utility surplus from the advisor's information.

Proposition 2.5 *There exists a unique equilibrium which depends on the naive consumer's willingness to pay for advice. If $f^{nv} \geq E[c(q)]$ holds, the advisor offers his product recommendation for $f = f^{nv}$, the naive consumer accepts this offer and follows the advisor's product recommendation. In this case, advice is biased and not necessarily informative, that is, $0 \leq q^* < \frac{1}{2}$. Otherwise, the naive consumer declines the advisor's offer and purchases the standard product A without advice.*

Analogous to Proposition 2.1 which relates to wary consumers, Proposition 2.5 states, that in equilibrium either the naive consumer requests advice and consequently follows this advice or remains without advice. In the latter case, the information gained from advice is not worth paying the fee f from the consumer's perspective, even though this information is erroneously valued too high due to the naive expectation, that advice is unbiased. Furthermore, there might also be constellations for naive consumers, where the consumer has a strictly positive willingness to pay for advice, but the advisor's offer is too expensive, even if the advisor offers his product recommendation for $f = E[c(q)]$. In comparison to the scenario with wary consumers, the advisor extracts a strictly higher rent from naive consumers, in particular

$$f^{nv} - f^{wr} = (v_h - v_l) \int_{q^*}^{\frac{1}{2}} (1 - 2q)\, g(q) dq > 0. \tag{2.19}$$

A total welfare loss arises in equilibrium, if naive consumers accept the advisor's offer. If the advisor's expected costs for giving a product recommendation exceeds consumer's additional utility through advice, a total welfare loss is obvious. In the other case, a total welfare loss is constituted by Proposition 2.4. Then, the naive consumers' higher willingness to pay for advice in comparison to wary consumers' willingness to pay for advice constitutes a shift of wealth from consumers to the advisors, but does not affect total welfare.

2.6 Heterogeneous consumers

The analysis in the two previous sections is limited to the case, where the advisor directly observes whether he faces a market with only wary consumers or a market with naive consumers. We now consider a market with a fraction $\Phi \in (0,1)$ of wary consumers and a fraction of $1-\Phi$ of naive consumers. In this case, the advisor does not observe the consumer's behavioral type and therefore cannot directly price discriminate the two types. We assume that participation constraints $f^{wr} \geq E[c(q)]$ and $f^{nv} \geq E[c(q)]$ for both consumer types are satisfied.[9] The equilibrium is then characterized as follows.

Proposition 2.6 *There exists a threshold* $\Phi^* = 1 - \frac{f^{wr}}{f^{nv}} > 0$. *If* $\Phi \geq \Phi^*$ *holds, the advisor offers his product recommendation for* $f = f^{wr}$. *In this case both consumer types request advice and follow the advisor's product recommendation. Otherwise, the advisor sets his fee* $f = f^{nv}$. *Then only naive consumers will request advice and consequently follow the advisor's product recommendation whereas wary consumers will remain without advice and purchase the standard product A. In both cases there arises a total welfare loss in equilibrium, whereby this loss is strictly higher in the latter case.*

[9] If f^{wr} and f^{nv} are below the advisor's expected costs $E[c(q)]$ for recommending a product, then both types remain without advice and purchase the standard product A. If $f^{nv} > E[c(q)] > f^{wr}$ holds, the advisor offers his product recommendation for $f = f^{nv}$ which implies that only naive consumers will request advice and consequently will follow the advisor's product recommendation whereas wary consumers will remain without advice.

As a result, a sufficiently large fraction of wary consumers protect naive consumers from exploitation. In this case, the advisor is better off by always offering his advice for $f = f^{wr}$. However, if the fraction of wary consumers is sufficiently small, the advisor will set his fee at $f = f^{nv}$ and consequently none of the wary consumers will accept this offer. Naive consumers are exploited, since wary consumers cannot protect them from paying the higher fee $f = f^{nv}$ to the advisor. Furthermore, there arises a strictly higher total welfare loss if only naive consumers request advice, since $f^{wr} - E[c(q)] > 0$ holds. Nevertheless, in equilibrium, wary consumers remain without advice due to a lower willingness to pay in comparison to naive consumers.[10]

2.7 Competition

In this section we extend our model of section 2.4 and 2.5 by introducing an elastic demand function which allows us to capture different degrees of competition. In the previous sections, the advisor's potential disutility is determined exogenously. However, introducing an elastic demand function also allows us to endogenize the advisor's potential reputational costs. Similar to Inderst and Ottaviani (2012b) we abstract from institutional details of particular financial markets and consider a simple model, where two advisors $i = 1, 2$ compete for one type of consumers. Both advisors have individual marginal persuasion costs k_i which depend on advisor i's characteristics and might also incur different potential reputational costs d_i because of different professional concerns or different fear of losing future business prospects. For convenience, we assume that none of the two has a substantial advantage in d_i and k_i in the sense that none of the two advisors is able to push his competitor out of the market, that is, there are nonempty sets $Q_i \subset [0, 1]$ for which advisor $i = 1, 2$ is weakly more cost efficient for giving a prod-

[10] Our model does not account for different levels of wealth for consumers and a possible resulting difference in the willingness to pay for advice. However, these differences may lead to a clustering within consumers, where some of them are provided with advice in equilibrium and others do not request advice. See Gravelle (1994) for an analysis of such advice gaps.

uct recommendation than his competitor. According to (2.4), the corresponding advisor i's expected minimized costs for giving a product recommendation, dependent on q, are given by

$$c_i(q) = \min\left\{(1-q)d_i + G\left(\frac{1}{2}\right)k_i; qd_i + \left(1 - G\left(\frac{1}{2}\right)\right)k_i\right\}. \tag{2.20}$$

Both advisors offer a certain utility gained from the respective advice

$$\hat{u}_i = (v_h - v_l)\int_0^{q_i^*}(1-2q)\,g(q)dq - f_i, \tag{2.21}$$

where q_i^* is defined according to (2.3) with d_i and k_i, respectively, and f_i denotes the fee charged by advisor i for his product recommendation. Equation (2.21) applies for both, wary and naive consumers. Wary consumers anticipate q_i^* correctly, whereas naive consumers anticipate $q_i^* = \frac{1}{2}$.

For sake of simplicity, we assume a representative consumer for every $q \in [0,1]$ for which the advisors compete. Each representative consumer represents a sufficiently large group of homogenous consumers. Consequently, the representative consumer can split up his consumption of advice, since within a group, each single consumer can decide from whom he will take advice and therefore, some can take advice from advisor 1 and some can take advice from advisor 2. In line with Inderst and Ottaviani (2012b), we assume a symmetric and continuously differentiable demand function $x_i = x(\hat{u}_i, \hat{u}_j)$ with $i \neq j$ and $\frac{\partial x}{\partial \hat{u}_i} > 0$ and $\frac{\partial x}{\partial \hat{u}_j} < 0$ for $x(\cdot) > 0$. Thus, demand for advisor i's service increases with an increase in $\hat{u}_i$ and decreases with an increase in $\hat{u}_j$, for $i \neq j$.

The corresponding profit for advisor i, dependent on q, is then given by

$$\Pi^{\theta}(\hat{u}_i, q)\,x(\hat{u}_i, \hat{u}_j) = \left(f_i^{\theta} - c_i(q)\right)x(\hat{u}_i, \hat{u}_j) \tag{2.22}$$

where $\theta = \{wr, nv\}$.

Each advisor $i = 1, 2$ chooses his promised utility $\hat{u}_i$ in order to maximize (2.22).

Thus, best response functions are given by the first order condition

$$\frac{\partial \Pi^{\theta}\left(\hat{u}_i, q\right)}{\partial \hat{u}_i} x\left(\hat{u}_i, \hat{u}_j\right) + \Pi^{\theta}\left(\hat{u}_i, q\right) \frac{\partial x\left(\hat{u}_i, \hat{u}_j\right)}{\partial \hat{u}_i} = 0. \tag{2.23}$$

For convenience we assume that best response functions intersect once and hence yield a unique equilibrium.

As mentioned in section 2.2 consumers might face considerable search costs for obtaining a second opinion or have a strong personal connection to a certain advisor based on trust. However, this assertion does not hold for every consumer within the group. Thus, we assume the representative consumer's demand function x_i as non perfectly elastic and capture the degree of competition by the elasticity

$$\eta\left(\hat{u}_i\right) = \frac{\partial x\left(\hat{u}_i, \hat{u}_j\right)}{\partial \hat{u}_i} \cdot \frac{\hat{u}_i}{x\left(\hat{u}_i, \hat{u}_j\right)} > 0. \tag{2.24}$$

An increase in competition is then captured by an increase in elasticity everywhere. The first order condition (2.23) is then given by

$$\Pi^{\theta}\left(\hat{u}_i, q\right) = \frac{-\frac{\partial \Pi^{\theta}\left(\hat{u}_i, q\right)}{\partial \hat{u}_i} \hat{u}_i}{\eta\left(\hat{u}_i\right)}. \tag{2.25}$$

If competition between advisors increases, that is, the demand function x_i gets more elastic, also the fear of losing future business prospects increases, since in this case it is more likely that consumers will request advice from the competitor. Thus, we assume that $d_i\left(\eta\left(\hat{u}_i\right)\right)$ is a bounded function which is strictly increasing with $\eta\left(\hat{u}_i\right)$. Consequently, competition yields to a higher quality of advice, in the sense, that the threshold q_i^* increases with an increase in competition. Furthermore, higher quality of advice goes in hand with higher expected costs for recommending a product. Thus, competition can be seen as a sort of disciplining measure, since advisors are forced to give a more elaborated product recommendation. By assumption, none of the competitors

can be pushed out of the market. Hence, the upper bound of $d_i(\eta(\hat{u}_i))$ satisfies

$$\begin{aligned} f_i^{\theta} &\geq E[c_i(q)] \\ &= E\left[\min\left\{(1-q)d_i(\eta(\hat{u}_i)) + G\left(\frac{1}{2}\right)k_i; qd_i(\eta(\hat{u}_i)) + \left(1 - G\left(\frac{1}{2}\right)\right)k_i\right\}\right]. \quad (2.26) \end{aligned}$$

This assumption guarantees, that the pressure resulting from competition on the maximum chargeable fee for the advisors does not result in not providing advice for consumers at all.

Proposition 2.7 *Wary consumers' willingness to pay for advice is increasing with an increase in competition, whereas the potential exploitation of naive consumers is decreasing. An increase in competition also yields a higher consumer surplus for both types of consumers.*

Proposition 2.7 shows that from the consumers' perspective there are two advantages that are derived from competition between advisors. First, the quality of a product recommendation is strictly higher in this scenario in comparison to the case without competition. Wary consumers anticipate the higher quality and adapt their willingness to pay for advice. Naive consumers do not anticipate the higher quality, but are exploited less, since real quality of advice and erroneous belief of the advisor's quality converge. Second, advisors are forced to offer their product recommendation for a strictly lower fee in the presence of competition, which yields a higher consumer surplus if advice is requested.

2.8 Conclusions

This article provides a theoretical analysis of incentives for financial advisors to give biased product recommendations in the absence of any form of commission payments. To this end, we show that in some situations advisors have an incentive to recommend

unsuitable products to their consumers due to the existence of persuasion costs. This is the case, when consumers have some initial belief, which product suits best their needs and advisors do not have to fear high reputational costs. We consider wary consumers, who are able to anticipate biased product recommendations and naive consumers who expect unbiased advice, if advisors are only compensated by an upfront fee. Our model shows, that advisors have an incentive to exploit naive consumers. Nevertheless, in both scenarios there arises a total welfare loss in equilibrium. The presence of wary consumers may prevent naive consumers from exploitation. Furthermore, an increase in competition between advisors results in less biased product recommendations and consequently in a higher consumer surplus. Our results suggest that financial regulators should be careful, when enacting a ban on commissions for financial advice. Fee for advice is not a remedy for biased product recommendations.

Appendix A. Proofs

Proof of Proposition 2.1. In the first case, it holds $f^{wr} \geq f \geq E\left[c(q)\right]$. From (2.13) it follows, that the consumer will request advice. Consequently, at stage 4, the consumer will follow the advisor's product recommendation, according to (2.9) and (2.10). At stage 3, according to (2.3) the advisor is recommending product A if $q \geq q^*$ and product B otherwise. As mentioned, at stage 2 the consumer will request advice and at stage 1 the advisor maximizes his utility by offering his advice for $f = f^{wr}$. From (2.5) it follows that advice is biased. From $f^{wr} \geq E\left[c(q)\right] > 0$ it follows that there is a strictly positive willingness to pay for advice. Since $v_h - v_l > 0$ holds, this is equivalent to $\int_0^{q^*} (1-2q)\, g(q)dq > 0$. By assumption, it holds $g(q) > 0$ over $q \in [0,1]$ and by (2.5) it holds $q^* < \frac{1}{2}$. This implies $(1-2q)\, g(q) > 0$ for all $q \in [0; q^*]$. Thus, $\int_0^{q^*} (1-2q)\, g(q)dq > 0$ holds if and only if $q^* > 0$. The second case, $f^{wr} < E\left[c(q)\right]$ implies that no advice is requested at stage 2. Thus, at stage 4, the consumer purchases product A according to (2.8). Stage 3 is skipped, since at stage 1 the advisor can only offer his product recommendation for $f = E\left[c(q)\right] > f^{wr}$. ■

Proof of Corollary 2.2. Analogous to the proof of Proposition 2.1, no willingness to pay for advice is equivalent to $\int_0^{q^*} (1-2q)\, g(q)dq \leq 0$ which holds if and only if $q^* = 0$. From (2.3) it follows that this is equivalent to $\frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} \leq 0$ or $G\left(\frac{1}{2}\right) \leq \frac{k-d}{2k}$. The purchase decision is given by (2.8). A strictly positive willingness to pay is equivalent to $\int_0^{q^*} (1-2q)\, g(q)dq > 0$. In line with the previous considerations this holds if and only if $q^* > 0$. ■

Proof of Proposition 2.3. Since advice is informative, it holds $0 < q^* < \frac{1}{2}$.

(i) From (2.13) it follows $\frac{\partial f^{wr}}{\partial (v_h - v_l)} = \int_0^{q^*} (1-2q)\, g(q)dq > 0$.

(ii) From (2.13) it follows $\frac{\partial f^{wr}}{\partial d} = (v_h - v_l)\frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{4d}(1-2q^*)g(q^*) > 0$.

(iii) From (2.13) it follows $\frac{\partial f^{wr}}{\partial k} = (v_h - v_l)\left(-\frac{\left(1-2G\left(\frac{1}{2}\right)\right)}{2d}(1-2q^*)g(q^*)\right) < 0$.

(iv) Let $q_h^* = \frac{1}{2} - \frac{k\left(1-2H\left(\frac{1}{2}\right)\right)}{2d}$. Since advice is informative for $h(q)$, it holds $q_h^* > 0$. From $h(q) > g(q)$ for $q \in \left(0; \frac{1}{2}\right)$ it follows $(1-2q)h(q) > (1-2q)g(q)$ for $q \in \left(0; \frac{1}{2}\right)$ and $H\left(\frac{1}{2}\right) > G\left(\frac{1}{2}\right)$. Therefore, it holds $(v_h - v_l)\int_0^{q_h^*}(1-2q)\,h(q)dq > (v_h - v_l)\int_0^{q^*}(1-2q)\,g(q)dq$.

■

Proof of Proposition 2.4. If a market for financial advice exists, Proposition 2.1 states, that advice is informative, that is, $0 < q^* < \frac{1}{2}$ holds. Let $\epsilon \in \left(0; \frac{1}{2} - q^*\right)$ and we assume the advisor to give a less biased product recommendation in the sense, that the interval $q \in \left[q^*; \frac{1}{2}\right)$ for which the advisor gives a wrong product recommendation on purpose is shrunk to $q \in \left[q^* + \epsilon; \frac{1}{2}\right)$. Consumer surplus resulting from this is given by

$$CS(\epsilon) = (v_h - v_l)\int_{q^*}^{q^*+\epsilon}(1-2q)\,g(q)dq. \tag{2.27}$$

However, the advisor incurs additional persuasion costs for recommending the suitable product, that is, the specialized product B instead of the standard product A, and lowers his potential reputational costs for recommending an unsuitable product, given by

$$\begin{aligned} AC(\epsilon) &= \int_{q^*}^{q^*+\epsilon}(qd + c_B - (1-q)d - c_A)\,g(q)dq && (2.28)\\ &= d\int_{q^*}^{q^*+\epsilon}(2q-1)\,g(q)dq + \int_{q^*}^{q^*+\epsilon}(c_B - c_A)\,g(q)dq && (2.29)\\ &= -d\int_{q^*}^{q^*+\epsilon}(1-2q)\,g(q)dq + \left[G\left(q^*+\epsilon\right) - G\left(q^*\right)\right]\left(1 - 2G\left(\frac{1}{2}\right)\right)k, && (2.30) \end{aligned}$$

where $AC(\epsilon) > 0$ holds, since for $q > q^*$ the advisor's costs are strictly lower for recom-

mending product A due to (2.3). The change in total welfare is given by

$$\omega(\epsilon) = CS(\epsilon) - AC(\epsilon) \tag{2.31}$$

$$= [(v_h - v_l) + d] \int_{q^*}^{q^*+\epsilon} (1 - 2q)\, g(q) dq - [G(q^* + \epsilon) - G(q^*)] \left(1 - 2G\left(\frac{1}{2}\right)\right) k. \tag{2.32}$$

Taking the partial derivative with respect to ϵ yields

$$\frac{\partial \omega(\epsilon)}{\partial \epsilon} = [(v_h - v_l) + d]\,(1 - 2(q^* + \epsilon))\, g(q^* + \epsilon) - g(q^* + \epsilon) \left(1 - 2G\left(\frac{1}{2}\right)\right) k. \tag{2.33}$$

If $\frac{\partial \omega(\epsilon)}{\partial \epsilon} > 0$ holds, total welfare increases with ϵ, which implies that the equilibrium characterized in Proposition 2.1 is not welfare maximizing. Using (2.3), it holds

$$\frac{\partial \omega(\epsilon)}{\partial \epsilon} > 0 \tag{2.34}$$

$$\Leftrightarrow [(v_h - v_l) + d]\,(1 - 2(q^* + \epsilon)) - \left(1 - 2G\left(\frac{1}{2}\right)\right) k > 0 \tag{2.35}$$

$$\Leftrightarrow [(v_h - v_l) + d]\,(1 - 2\epsilon) + [(v_h - v_l) + d]\,(-2q^*) > \left(1 - 2G\left(\frac{1}{2}\right)\right) k \tag{2.36}$$

$$\Leftrightarrow -2q^* > -(1 - 2\epsilon) + \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{(v_h - v_l) + d} \tag{2.37}$$

$$\Leftrightarrow q^* < \frac{1 - 2\epsilon}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d} \tag{2.38}$$

$$\Leftrightarrow \frac{1}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2d} < \frac{1 - 2\epsilon}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d} \tag{2.39}$$

Since $v_h - v_l > 0$ holds, it follows

$$\frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2d} > \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d}. \tag{2.40}$$

Consequently, there always exists a sufficiently small $\epsilon > 0$ such that (2.39) holds. ■

Proof of Proposition 2.5. In the first case, it holds $f^{nv} \geq f \geq E[c(q)]$. From (2.18) it follows, that the consumer will request advice. Consequently, at stage 4, the consumer will follow the advisor's product recommendation, analogous to wary consumers. At stage 3, according (2.3) the advisor is recommending product A if $q \geq q^*$ and product B otherwise. As mentioned, at stage 2 the consumer will request advice and at stage 1 the advisor maximizes his utility by offering his advice for $f = f^{nv}$. Since $f \geq E[c(q)] > 0$ there is a strictly positive willingness to pay for advice. From (2.5) and (2.18) it follows $0 \leq q^* < \frac{1}{2}$. The second case, $f^{nv} < E[c(q)]$ implies that no advice is requested at stage 2. Thus, at stage 4, the consumer purchases product A according to (2.8). Stage 3 is skipped, since at stage 1 the advisor can only offer his product recommendation for $f = E[c(q)] > f^{nv}$. ■

Proof of Proposition 2.6. Since $f^{nv} > f^{wr}$ holds, both consumer types will request advice for $f = f^{wr}$. Thus, the expected payoff for the advisor is then $\Phi f^{wr} + (1-\Phi) f^{wr} = f^{wr}$. Wary consumers are not willing to pay f^{nv} for advice. Consequently, the expected payoff for the advisor, when setting $f = f^{nv}$ is $(1-\Phi) f^{nv}$. From this considerations, it follows, that the advisor will set $f = f^{wr}$ if $f^{wr} \geq (1-\Phi) f^{nv}$ or $\Phi \geq 1 - \frac{f^{wr}}{f^{nv}} > 0$. If both consumer types request advice, a total welfare loss follows immediately from Proposition 2.4. If $\Phi < \Phi^*$ holds, only naive consumers request advice. Thus, the total welfare loss increases by $\Phi\left(f^{wr} - E[c(q)]\right) > 0$. ■

Proof of Proposition 2.7. By assumption, it holds that $d_i(\eta(\hat{u}_i))$ is a strictly increasing function of $\eta(\hat{u}_i)$. Consequently, $q_i^* = \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d_i(\eta(\hat{u}_i))}$ is also strictly increasing with $\eta(\hat{u}_i)$. Thus, the first assertion follows from Proposition 2.3. With an increase of q_i^*, the difference between the naive belief and the true threshold $\frac{1}{2} - q_i^*$ is shrinking. Therefore, the difference between the naive consumers' willingness to pay for advice and the wary consumer's willingness to pay for advice $f_i^{nv} - f_i^{rt} = \int_{q_i^*}^{\frac{1}{2}} (1-2q)\, g(q) dq$ is also shrinking with an increase of q_i^*. Thus, the second assertion holds. Obviously, it holds $\frac{\partial \Pi^{\theta}(\hat{u}_i, q)}{\partial \hat{u}_i} < 0$, since from (2.21) it follows, that for a given threshold q_i^* this can only

be done by lowering the fee, that is charged to consumers. Therefore, equation (2.25) yields, that $\Pi^{\theta}(\hat{u}_i, q)$ is decreasing with an increase in $\eta(\hat{u}_i)$ which leads consequently to a higher consumer surplus. ■

Chapter 3

Consumer persuasion and remuneration of financial advisors[11]

Abstract

Many consumers rely on professional advisors when purchasing financial products. We compare fee-based and commission-based remuneration systems for financial advisors from a total welfare perspective in a theoretical model, where advisors face transaction costs from persuading consumers of a recommended product and consumers have an initial prior belief about their best suitable product. We show, that total welfare is higher under a commission-based remuneration system in comparison to a fee-based remuneration system, if the magnitudes of commission payments for different products are sufficiently close to each other.

JEL Codes: D18, D21, D43, G28

[11]The following chapter is a single authored manuscript by the candidate and yet unpublished.

3.1 Introduction

Consumers regularly seek advice when purchasing complex products, especially in the financial sector. However, product recommendations of financial advisors can be biased. This potential bias is often related to the compensation structure of financial advisors. Usually, financial advisors receive commission payments by product providers and thus might give advice in favor of product providers which offer the highest commission payment. Intuitively, regulators should easily solve this problem by changing the compensation structure by law towards a fee-based system, where consumers have to pay an upfront fee for advice services and commission payments by product providers are banned. In Europe, some countries followed this idea and established a fee-based compensation system for many financial products in order to protect consumers from biased advice.[12]

This paper contributes to the literature by questioning this intuitive superiority of a fee-based remuneration system for financial advisors in comparison to a commission-based remuneration system. To this end, we consider a total welfare perspective for both remuneration systems in a setting, where advisors face transaction costs for persuading consumers of a product dependent on consumers' initial belief about the suitability of available products. In the spirit of Mullainathan et al. (2008), these transaction costs result from stating reasons and explanations why a particular product should suit consumers' needs.[13] In the presence of such persuasion costs, advice is biased under a fee-based remuneration system if market shares of product providers are not equally sized (Schiller and Weinert, 2018). We modify the model of Schiller and Weinert (2018) in order to answer the following question: In the presence of persuasion costs for advisors, which remuneration system leads to a higher bias in advice and which remuneration

[12]For example, the Netherlands and the United Kingdom implemented such fee-based compensation systems and corresponding bans of commission payments for many products like mortgages, investment products, insurance products and consumers credits.

[13]Mullainathan et al. (2008) defines persuasion as follows: "[...] to persuade is to advertise attributes of the product that are positively related to quality in the analogous situation."

system leads to a higher total welfare?

Our model consists of a market for financial advice with the following participants: A standard product provider A, a specialized product provider B, a mass of consumers and one monopolistic advisor. Both product providers face equal production costs and offer one corresponding product for a price p_A and p_B, respectively. Consumers face the choice of whether to purchase one of the two products or not. Consumers' needs are horizontal differentiated and can be satisfied by either the standard product or the specialized product. According to the common prior belief, the standard product matches consumers' needs with strictly higher probability than the specialized product, but consumers have the possibility to consult the advisor, who possesses superior private information about the suitability of the two products. We consider two model settings: Either the advisor charges an upfront fee to consumers for his product recommendation or the advisor is compensated through commission payments by product providers for respective sales. If the advisor is consulted, he faces two sources of costs: Persuasion costs for the two products dependent on the common prior belief and potential reputational costs subsequently of an unsuitable product recommendation. Persuasion costs are inversely proportional to the common prior match probability of products and needs. Hence, persuasion costs for the standard product are strictly lower than those of the specialized product. In the fee-based remuneration setting, product providers may only compete through product prices, whereas in the commission-based setting, they also have the possibility to steer the advisor's product recommendation by raising their commission payments and thus engage in an indirect competition.

Our main result is, that in the presence of persuasion costs and a strictly higher match probability of the standard product with consumers' needs in comparison to the specialized product, a commission-based remuneration system for the advisor, where commission payments of both product providers do not differ too much in height, leads to a higher total welfare than the fee-based remuneration system. Under the assumption,

that advice is essential for consumers, in the sense, that consumers' product valuation according to their prior (common) information are below production costs and the advisor faces strictly lower persuasion costs for the standard product in comparison to the specialized product, a fee-based remuneration system leads to the following results: Either no market for financial advice exists due to the poor quality of advice and consequently no products are sold or otherwise, advice is sufficiently informative and consequently a market for financial advice exists. In the latter case, advice is biased in equilibrium, in favor of the standard product provider A and product providers are not able to attract consumers away from their competitor by lowering their product prices. Thus, the specialized product provider possesses an inefficiently low market share and the standard product provider an inefficiently high market share.

In equilibrium, where products are sold under a commission-based remuneration system, the specialized product provider's commission payment for a sold product is strictly higher in comparison to the standard product provider's commission payment due to different incentives resulting from (ex ante) uneven market shares. If the difference in commission payments is below a threshold, total welfare is strictly higher under a commission-based remuneration system in comparison to a fee-based remuneration system (and vice versa). In this case, the advisor's aggregated persuasion costs are higher in comparison to the fee-based scenario, but more consumers are matched with their most suitable product. This additional created value due to less biased advice and corresponding lower reputational costs outweigh the higher aggregated persuasion costs for the advisor and thus positively affects total welfare.

We consider products on a line between credence goods, where consumers cannot learn even after purchasing a product, whether the products suit their needs or not (Darby and Karni, 1973; Emons, 1997), and experience goods, where such a learning effect is possible after some time (Nelson, 1970). In our model, we can capture such different learning effects by different reputational costs. Thus, our model is applicable

to various situation of markets in between experience goods and credence goods. Furthermore, we consider transaction costs for giving a product recommendation, since in our model, the advisor has to persuade his consumers of the recommended product. These persuasion costs arise due to the assumption, that consumers demand for reasons and explanations, why a particular product should suit their needs (Schiller and Weinert, 2018).[14] The existence of such persuasion costs are related to various consumers' irrationalities like limited knowledge or a lack of intellectual capacity to perfectly process any amount of information (Chater et al., 2010; Inderst, 2011; Campbell, 2016). Then, advice is not cheap talk (Crawford and Sobel, 1982) due to the costly information transmission to consumers in the advice process. In our model, persuasion costs for a product are inversely proportional to the strength of consumers' initial (common prior) belief about the suitability of this product. This constitutes an analogy to Gentzkow and Kamenica (2014), who also considered such a costly persuasion process for advisors. As an extension of their basic model of persuasion (Kamenica and Gentzkow, 2011), Gentzkow and Kamenica (2014) assume that the advisor is endowed with perfect commitment power to any advice quality. In contrast, we assume, that the quality of advice is driven by exogenous factors, such as potential reputational costs, persuasion costs and the prior common information about the suitability of products and resulting (dominant) strategies for the advisor. Especially, we implicitly assume, that the advisor cannot credible commit to any dominated strategy.

Mullainathan et al. (2012) and Anagol et al. (2017) find empirical evidence that indicates the existence of aforementioned transaction costs from persuading consumers of a product. In a field experiment, they sent trained consumers to financial advisors, who should express their needs, which sometimes were in line with their initial prior belief and sometimes were contrary to it. Mullainathan et al. (2012) and Anagol et al. (2017) find that advisors tend to confirm consumers' prior beliefs, even if the expressed

[14] In the European Union, such explanations are also mandatory for many financial products (European Union, 2014) and insurance products (European Union, 2016).

needs were contrary to them and recommending the best suitable product would result in a higher compensation for the advisor. Gennaioli et al. (2015) picked up this issue and identified in a theoretical model, that trust between consumers and advisors is the primary driving factor for requesting advice. In their model, confirming a consumer's belief generates trust, hence, they find, that advisors have an incentive to cater to consumers' incorrect beliefs and as a consequence give biased advice.

We are interested in a theoretical comparison of total welfare under a fee-based and a commission-based remuneration system if the advisor faces persuasion costs in an advice process due to partial irrational consumers. To the best of our knowledge, there is no other literature which considered this issue. However, under the assumption of completely rational consumers, Inderst and Ottaviani (2012b) show in a theoretical model, that a fee-based remuneration system is superior to a commission-based remuneration system from a total welfare perspective. This result is driven by the assumption of costless information transmission from the advisor to the consumer and the assumption that consumers are capable to anticipate a potential bias in advice due to commission payments. The latter assumption results in a need for product providers to signal no distortion in the advice process by setting a product price equal to production costs. As a consequence, product providers cannot compensate the advisor through positive commission payments and thus, consumers pay an upfront fee for the advisor's product recommendation.

In an early contribution Gravelle (1993, 1994) compares in a theoretical model fee-based and commission-based remuneration systems for advisors in the context of insurance markets. In contrast to our model, advisors do not face persuasion costs, but it is costly for the advisor to contact a consumer. Although a fee-based remuneration system might lead to a higher quality of advice in his theoretical framework, less consumers request advice for an upfront fee and consequently do not purchase a suitable product in comparison to the case, where the advisor is compensated through commission

payments by product providers. Considering the overall number of product purchases, Gravelle (1993, 1994) argues, that a fee-based remuneration system is not superior to a commission-based system from a total welfare perspective. Focht et al. (2013) also compare in a theoretical model fee-based and commission-based remuneration systems in an insurance context. Their results indicate, that the remuneration system does not affect total welfare, as long as the advisor acts completely nonstrategic and, moreover, as long as efficient side contracting is possible. However, they argue, that illegal side contracting may lead to inefficiencies under a fee-based remuneration system and hence to a lower total welfare. Hofmann and Nell (2011) argue, that a fee-based remuneration system always leads to a higher total welfare, if a fraction of consumers face strictly lower search costs for a suitable product than an advisor. Then, these fraction of consumers do not request advice if the advisor charges an upfront fee. However, under a commission-based remuneration system all consumers will request advice, which leads to higher aggregated search costs in the market.

3.2 Fee for advice

3.2.1 Model

For sake of simplicity, we start with a benchmark scenario, where commission payments are effectively banned by regulation. To this end, we modify the model of Schiller and Weinert (2018) which is based on Inderst and Ottaviani (2012a). Our model consists of a market for financial advice with the following risk neutral, utility maximizing participants: Two product providers $i = A, B$, a monopolistic advisor and a mass of one consumer. Product provider i offers a corresponding product i for a price p_i. Production costs for both product providers are given by $\gamma > 0$.[15] Consumers have to decide

[15]Financial products are usually immaterial goods, so that the corresponding production costs mainly consist of administrative costs which can be seen as exogenously given for both product providers for example due to third party IT-systems and wages for employees.

whether to buy one single unit of product A or B. Their needs are characterized by a binary state variable $\Theta = A, B$ which is unobservable for all parties. If a product matches a consumer's needs, he derives a high utility v_h and otherwise a low utility v_l, where $v_h > v_l > 0$ holds. The utility of not buying a product is normalized to zero. We abstract from further specific product characteristics and from different time horizons, where utilities are realized, so that our model is applicable to various situations in a financial and non-financial context.

The advisor possesses private information about the probability that product A best suits a consumer's needs, denoted by $q = Pr(\Theta = A)$, and, accordingly, that product B best suits a consumer's needs with probability $1 - q$. The individual q for each consumer is not observable by the other parties, however, the distribution of the advisor's private information $G(q)$ with upward sloping linear density $g(q) > 0$ for $q \in [0, 1]$ is common knowledge. This allows us to capture different market structures and corresponding match probabilities for both products, where product A refers to the product, that matches consumers' needs with higher probability than product B. Hence, we consider product A as a standard product and product B as a specialized product.

Consumers' product valuation, dependent on q, is given by

$$v_A(q) = q \cdot v_h + (1 - q) \cdot v_l \tag{3.1}$$

for product A and by

$$v_B(q) = (1 - q) \cdot v_h + q \cdot v_l, \tag{3.2}$$

for product B, respectively. We assume that consumers' ex ante product valuation according to the common information $G(q)$ for the standard product A is below production costs, i.e. that

$$E\left[v_A\left(q\right)\right] = \int_0^1 v_A(q) g(q) dq < \gamma \tag{3.3}$$

holds. Since $g(q)$ is an upward sloping linear density, this also implies an ex ante product valuation for the specialized product B below production costs, i.e. $E\left[v_B\left(q\right)\right] = \int_0^1 v_B(q)g(q)dq < \gamma$. Assumption (3.3) guarantees, that consumers derive negative utility from purchasing a product for a price which equals at least production costs without any further information in addition to the common knowledge $G(q)$. Implicitly, assumption (3.3) also guarantees, that product providers cannot sell their products directly to consumers. In order to get further information about the suitability of products, consumers can request advice from the monopolistic advisor, who offers his product recommendation service for an upfront fee f.

In line with Schiller and Weinert (2018), we consider transaction costs for giving a product recommendation which results from persuading consumers of the corresponding product. Thereby, these persuasion costs for a product are inversely proportional to the strength of consumers' belief about the suitability of this product which is based on the common information $G(q)$. In particular, we assume that the advisor incurs persuasion costs of

$$c_A = \left(\int_0^{\frac{1}{2}} g(q)dq\right) k = G\left(\frac{1}{2}\right) k \tag{3.4}$$

for the standard product A and

$$c_B = \left(\int_{\frac{1}{2}}^1 g(q)dq\right) k = \left(1 - G\left(\frac{1}{2}\right)\right) k \tag{3.5}$$

for the specialized product B, where $k > 0$ denotes the advisor's marginal persuasion costs. Due to the upward sloping density $g(q)$ it follows immediately, that it is less costly for the advisor to recommend the standard product A in comparison to the specialized product B. However, we assume, that the advisor incurs reputational costs $d > 0$ for recommending an unsuitable product to consumers. We assume the advisor's marginal persuasion costs k, as well as potential reputational costs d to be common knowledge.

The game sequence for our benchmark model is characterized in the following way:

At stage 1, product providers simultaneously set their product prices p_A and p_B. At stage 2, the advisor makes a take-it-or-leave-it offer f for his product recommendation. At stage 3, consumers decide whether to remain without advice or accept the advisor's offer. If consumers decide to remain without advice, the game continues at stage 5, otherwise, the advisor gives his product recommendation $r = A, B$ to the consumer at stage 4. At stage 5, consumers make their final purchase decisions and payoffs are realized. For sake of simplicity, we do not discount any payoffs.

3.2.2 Advice under a fee-based remuneration system

Following Schiller and Weinert (2018), the advisor's dominant strategy is to minimize his expected costs after receiving his upfront payment f. These costs consist of persuasion costs for a product and potential reputational cost for an unsuitable product recommendation. For a given private information q, the advisor incurs expected costs of $c_A+(1-q)d$ for recommending the standard product A and c_B+qd for recommending the specialized product B. Thus, minimum expected costs for a product recommendation, dependent on q, are given by

$$c(q) = \min\{c_A + (1-q)d; c_B + qd\} \tag{3.6}$$

and we derive a threshold

$$q^*_{fee} := \begin{cases} \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} & \text{for} \quad \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} > 0 \\ 0 & \text{for} \quad \frac{1}{2} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} \leq 0 \end{cases} \tag{3.7}$$

for which the advisor is better off by recommending the standard product A if $q \geq q^*_{fee}$ holds and the specialized product B otherwise. Since we consider an upward sloping linear density $g(q)$, it follows immediately $G\left(\frac{1}{2}\right) < \frac{1}{2}$ and consequently $\frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} > 0$

due to $k > 0$ and $d > 0$. As a consequence, it holds

$$q^*_{fee} < \frac{1}{2}. \tag{3.8}$$

This basically means that the advisor recommends the standard product A to all consumers, for whom his private information q is in the interval $\left[q^*_{fee}, 1\right]$ and the specialized product B otherwise. Especially, he recommends product A for all $q \in \left[q^*_{fee}, \frac{1}{2}\right)$, although product B has a higher probability to match these consumers' needs according to his private information. In this case, the advisor is willing to incur higher expected reputational costs for recommending product A contrary to his private information, since he is able to compensate these higher reputational costs by lower persuasion costs for the standard product A in comparison to the specialized product B.

3.2.3 Equilibrium analysis under a fee-based remuneration system

In order to derive a subgame perfect equilibrium, we use the concept of backward induction. At stage 5, we have to consider two different histories. Either the consumer has accepted the advisor's offer for the fee f at stage 3 or he has declined it. For those who have declined the offer, the purchase decision is straight forward given by assumption (3.3) with no purchase at all. Those, who have accepted the offer at stage 3, receive a product recommendation $r = A, B$ at stage 4. Consumers are able to anticipate the advisor's cutoff q^*_{fee} according to their common information and consequently anticipate that receiving product recommendation $r = A$ is equivalent to the information $q \geq q^*_{fee}$ and, analogous, $r = B$ is equivalent to the information $q < q^*_{fee}$. Thus, consumers

conditional product valuations, dependent on $r = A, B$ are given by

$$E\left[v_A(q) \mid q \geq q^*_{fee}\right] = \int_{q^*_{fee}}^{1} v_A(q) \frac{g(q)}{1 - G(q^*_{fee})} dq$$
$$> \int_{q^*_{fee}}^{1} v_B(q) \frac{g(q)}{1 - G(q^*_{fee})} dq = E\left[v_B(q) \mid q \geq q^*_{fee}\right], \tag{3.9}$$

for $r = A$ and

$$E\left[v_B(q) \mid q < q^*_{fee}\right] = \int_{0}^{q^*_{fee}} v_B(q) \frac{g(q)}{G(q^*_{fee})} dq$$
$$> \int_{0}^{q^*_{fee}} v_A(q) \frac{g(q)}{G(q^*_{fee})} dq = E\left[v_A(q) \mid q < q^*_{fee}\right]. \tag{3.10}$$

for $r = B$. The upward sloping linear density $g(q)$ implies strict inequalities in (3.9) and (3.10). Consequently, if a consumer actually purchases a product, this purchase decision is always in line with the advisor's product recommendation.

According to the advisor's dominant strategy given by (3.7), at stage 4, the advisor recommends the standard product A with respective persuasion costs c_A, if $q \geq q^*_{fee}$ holds and the specialized product B with respective persuasion costs c_B otherwise.

At stage 3, the consumer has two options: Accept the advisor's offer or decline it. The decision between these two options crucially depends on consumers' willingness to pay for the advisor's product recommendation. The expected payoff for declining the advisor's offer is zero, since then, the consumer does not purchase any product at stage 5. Otherwise, the consumer expects to receive product recommendation $r = A$ with probability $1 - G(q^*_{fee})$ and product recommendation $r = B$ with probability $G(q^*_{fee})$. Considering product prices, consumers' break even condition for accepting the advisor's offer is given by

$$G(q^*_{fee})\left(E\left[v_B(q) \mid q < q^*_{fee}\right] - p_B\right) + \left(1 - G(q^*_{fee})\right)\left(E\left[v_A(q) \mid q \geq q^*_{fee}\right] - p_A\right) \geq f. \tag{3.11}$$

In this case, the expected value of information gained from advice exceeds the upfront fee f for which this information can be purchased.

At stage 2, the advisor faces his own participation constraint $f \geq E[c(q)]$ as a lower bound for f and consumers' participation constraint (3.11). Thus, he offers his advice service for the fee f, which satisfies both conditions and $f = E[c(q)]$ otherwise. In particular, we define advice (in terms of q^*_{fee}) as sufficiently informative, if

$$G(q^*_{fee})\left(E\left[v_B(q) \mid q < q^*_{fee}\right] - p_B\right) + \left(1 - G(q^*_{fee})\right)\left(E\left[v_A(q) \mid q \geq q^*_{fee}\right] - p_A\right) \geq E[c(q)] \tag{3.12}$$

holds. Then, consumers' expected surplus (gross of fee f) from requesting advice exceeds the advisor's expected costs for giving a product recommendation. Thus (3.12) constitutes a necessary condition for the existence of a market for financial advice.

At stage 1 product providers set their respective product prices p_A and p_B, considering production costs γ and both, the advisor's and consumers' participation constraint, since there is no possibility to sell a product directly to consumers and circumvent the advisor.

Proposition 3.1 *There exists a unique equilibrium, which depends on the quality of information from advice. If advice is sufficiently informative, product providers set their prices* $p_A(q^*_{fee}) = E\left[v_A(q) \mid q \geq q^*_{fee}\right] - E[c(q)]$ *and* $p_B(q^*_{fee}) = E\left[v_B(q) \mid q < q^*_{fee}\right] - E[c(q)]$, *respectively. The advisor charges a fee* $f = E[c(q)]$, *consumers accept this offer and purchase the recommended product. However, consumers are not optimally matched with products through advice* ($q^*_{fee} < \frac{1}{2}$) *and as a consequence, the standard product provider possesses an inefficiently high market share, whereas the specialized product provider possesses an inefficiently low market share. If advice is not sufficiently informative, no market for advice exists and no products are purchased.*

Proposition 3.1 states that in equilibrium either no products are sold or consumers request advice and purchase the recommended product. In the first case, advice is not

sufficiently informative. This means, that it is not beneficial for consumers to request advice for the corresponding fee f, since the expected surplus from requesting advice does not compensate the fee, that they have to pay for it. This could be the case, if advice is strongly biased or the utility difference between a suitable and an unsuitable product $v_h - v_l$ is small, so that consumers cannot derive a sufficiently high surplus from more accurate information about the suitability of products. In the second case, where products are sold, consumers derive a sufficiently high surplus from requesting advice. However, product providers extract the whole rent generated through advice, by charging a product price, that satisfies exactly consumers' as well as the advisor's respective break even conditions. Implicitly, this result also states, that there is no competition between product providers in equilibrium. This is due to the fact, that in our benchmark scenario, product providers can only compete through product prices. However, this is not beneficial for product providers, since by assumption (3.3), product providers cannot sell their products directly to consumers due to a product valuation below production costs, and consequently, they cannot sell their products to consumers who are advised to purchase the opponent's product by lowering the product price. Furthermore, in line with Schiller and Weinert (2018), advice is biased, so that the specialized product provider B possess an inefficiently low market share, since a fraction of consumers for whom the specialized product B is the most suitable product according to the advisor's private information, receive a product recommendation $r = A$ and follow this recommendation. This bias in advice results from the advisor's tradeoff between persuasion costs for a product and potential reputational costs for an unsuitable product recommendation as characterized by (3.7) and (3.8).

3.3 Commission payments for sold products

3.3.1 Modified model

In this section, we slightly modify our benchmark model in order to analyze a situation, where the advisor is exclusively compensated by product providers via commission payments if a corresponding product is sold. We denote commission payments from product provider A with f_A and those from product provider B with f_B. Furthermore, we assume, that commission payments are not disclosed to consumers. However, we assume consumers to be aware of the fact, that commissions are paid by product providers to the advisor and to be capable to form rational expectations about these. Therefore, consumers react to observed price changes by changing their expectations about the unobservable commission payments.[16] The modified game sequence is defined in the following way:

At stage 1, product providers simultaneously set their product prices p_A and p_B. At stage 2, product providers simultaneously set their commission payments f_A and f_B. At stage 3, consumers decide whether to remain without advice or to consult the advisor. If consumers decide to remain without advice, the game continues at stage 5, otherwise, the advisor gives his product recommendation $r = A, B$ to the consumer at stage 4. At stage 5, consumers make their final purchase decisions and payoffs are realized. Again, we do not discount any payoffs.

3.3.2 Advice under a commission-based remuneration system

Given, that both products are sold with positive probability and consumers follow the advisor's product recommendation due to (3.9) and (3.10), the advisor maximizes his payoff by considering commission payments for sold products f_A and f_B as well as the

[16] In financial and insurance markets, commission payments are usually calculated as a fraction of the total investment sum for the corresponding product. Therefore it is straightforward, that consumers associate a high product price (in the sense of a high investment volume) with a high commission payment for the advisor and vice versa.

corresponding persuasion costs c_A and c_B and potential reputational costs d. Consequently, the advisor's expected payoff, dependent on q, for recommending product A is given by $f_A - c_A - (1-q)d$ and for product B by $f_B - c_B - qd$, respectively. Thus, we derive a new threshold

$$q^*_{com} := \begin{cases} 0 & \text{for} \quad \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} \leq 0 \\ \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} & \text{for} \quad 0 < \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} < 1 \\ 1 & \text{for} \quad \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d} \geq 1 \end{cases} \tag{3.13}$$

for which the advisor is better off by giving a product recommendation $r = A$ if $q \geq q^*_{com}$ holds and $r = B$ otherwise. For $q^*_{com} \in (0,1)$, it is straightforward, that $\frac{\partial q^*_{com}}{\partial f_A} = -\frac{1}{2d} < 0$ and $\frac{\partial q^*_{com}}{\partial f_B} = \frac{1}{2d} > 0$ holds. This enables product providers to steer the advisor's product recommendation, dependent on potential reputational costs d, through their commission payments f_A and f_B, respectively. Put differently, commission payments for advisors allow product providers to compete against each other in markets, where consumers cannot be reached directly. Especially, for $q^*_{com} < \frac{1}{2}$, advice is biased in favor of product A, since the advisor recommends the standard product A for all $q \in \left[q^*_{com}, \frac{1}{2}\right)$, although, these consumers possess a higher probability that the specialized product B best suits their needs and for $q^*_{com} > \frac{1}{2}$ advice is biased in favor of product B, since then, the advisor recommends the specialized product B for all $q \in \left[\frac{1}{2}, q^*_{com}\right)$ although, these consumers possess a higher probability that the standard product A best suits their needs according to the advisor's private information. For $q^*_{com} = \frac{1}{2}$ advice is unbiased and all consumers receive the optimal product recommendation.

3.3.3 Equilibrium analysis under a commission-based remuneration system

In this section, we consider pure strategy perfect Bayesian equilibria. Since product providers cannot circumvent the advisor by assumption (3.3), in equilibrium, where products are sold, advice needs to provide sufficient information for consumers in the sense, that at least the conditional product valuation for consumers according to the advisor's product recommendation r does not undercut the buying price for the recommended product. Consumers cannot observe the commission payments f_A and f_B directly, however, they form rational beliefs $\hat{f}_A$ and $\hat{f}_B$. Plugging these expected commission payments into (3.13), consumers derive an expected threshold $\hat{q}^*_{com}$ for receiving product recommendation $r = A$ if $q \geq \hat{q}^*_{com}$ holds and product recommendation $r = B$ otherwise.

For a given expected threshold $\hat{q}^*_{com}$, product providers set their respective product prices at stage 1 in order to extract the whole willingness to pay for their products by setting product prices

$$p_A(\hat{q}^*_{com}) = \int_{\hat{q}^*_{com}}^{1} v_A(q) \frac{g(q)}{1 - G(\hat{q}^*_{com})} dq = E\left[v_A(q) \mid q \geq \hat{q}^*_{com}\right] \tag{3.14}$$

and

$$p_B(\hat{q}^*_{com}) = \int_{0}^{\hat{q}^*_{com}} v_B(q) \frac{g(q)}{G(\hat{q}^*_{com})} dq = E\left[v_B(q) \mid q < \hat{q}^*_{com}\right], \tag{3.15}$$

respectively. Setting a price below (3.14) and (3.15) is a dominated strategy for product providers, since by assumption (3.3) consumers unconditional product valuations are below production costs γ, and thus, conditional product valuations contrary to the advisor's product recommendation $E\left[v_A(q) \mid q < \hat{q}^*_{com}\right]$ and $E\left[v_B(q) \mid q \geq \hat{q}^*_{com}\right]$ are clearly also strictly below production costs for any $\hat{q}^*_{com} \in [0, 1]$. As a consequence, product providers do not have the possibility to attract consumers away from their competitors

by lowering their product price.

At stage 2, product providers set their respective commission payments in order to maximize their expected profits. At this stage, product prices p_A and p_B are already fixed. Given, that consumers follow the advisor's product recommendation, the expected profit for product provider A is given by

$$\pi_A = (p_A - \gamma - f_A)\,(1 - G\,(q^*_{com})) \tag{3.16}$$

and the expected profit for product provider B by

$$\pi_B = (p_B - \gamma - f_B)\,G\,(q^*_{com})\,. \tag{3.17}$$

These profits obviously depend on the advisor's actual cutoff q^*_{com}. Considering product prices (3.14) and (3.15) and that in equilibrium $\hat{q}^*_{com} = q^*_{com}$ holds, optimal commission payments are given by first order conditions

$$f_A = v_A(q^*_{com}) - \gamma - 2d\frac{1 - G(q^*_{com})}{g(q^*_{com})} \tag{3.18}$$

for product provider A and

$$f_B = v_B(q^*_{com}) - \gamma - 2d\frac{G(q^*_{com})}{g(q^*_{com})} \tag{3.19}$$

for product provider B, if these are positive and $f_A = 0$ and $f_B = 0$ otherwise.

In this scenario, commission payments of product providers are the only source of compensation for the advisor. From the advisor's perspective, expected commission payments at least need to cover his expected costs for giving a product recommendation.

Thus, the advisor's participation constraint is given by

$$G(q^*_{com})f_B + (1 - G(q^*_{com}))\, f_A \geq G(q^*_{com})E\left[c_B + qd \mid q < q^*_{com}\right] + (1 - G(q^*_{com}))\, E\left[c_A + (1-q)d \mid q \geq q^*_{com}\right]. \quad (3.20)$$

We denote advice (in terms of q^*_{com}) as sufficiently informative, if the magnitudes of marginal product valuations $v_A(q^*_{com})$ and $v_B(q^*_{com})$ as a key driving factor for optimal commission payments satisfy (3.20).

Proposition 3.2 *There exists a unique equilibrium, which depends on the quality of information from advice. If advice is sufficiently informative, product providers' prices are given by* $p_A(q^*_{com}) = E\left[v_A(q) \mid q \geq q^*_{com}\right]$ *and* $p_B(q^*_{com}) = E\left[v_B(q) \mid q < q^*_{com}\right]$ *and product providers' commission payments by* $f_A = \max\left\{0; v_A(q^*_{com}) - \gamma - 2d\frac{1-G(q^*_{com})}{g(q^*_{com})}\right\}$ *and* $f_B = \max\left\{0; v_B(q^*_{com}) - \gamma - 2d\frac{G(q^*_{com})}{g(q^*_{com})}\right\}$*, respectively. Consumers request advice and purchase the recommended product. If advice is not sufficiently informative, no market for advice exists and no products are purchased.*

Analogous to a fee-based remuneration system, Proposition 3.2 states, that there exists a unique equilibrium, where either no products are sold and consequently no market for financial advice exists due to the poor quality of advice, or that all consumers follow the advisor's product recommendation in order to maximize their (positive) payoffs. In the latter case, product providers extract the whole consumer surplus, by charging a corresponding price equal to the conditional product valuations according to the advisor's product recommendation r.

Optimal commission payments in equilibrium characterized by Proposition 3.2 depend on various factors. The magnitude of commission payments of both product providers depend on the potential reputational costs d, that the advisor incurs subsequently of an unsuitable product recommendation. Intuitively, an advisor who has to fear high reputational costs possesses a low responsiveness to commission payments. As

a consequence, high potential reputational costs result in low incentives for both product providers to raise commission payments and vice versa.

Furthermore, a higher margin corresponds to a higher incentive to raise commission payments for both product providers. Margins are given by $p_i - \gamma - f_i$, $i = A, B$. Product prices in equilibrium are equal to consumers' conditional valuations of the corresponding products. These conditional product valuations are calculated by a weighted average according to $g(q)$ of marginal product valuations $v_i(q)$, $i = A, B$. Marginal product valuations are continuous functions of q with $\frac{\partial v_A(q)}{\partial q} > 0$ and $\frac{\partial v_B(q)}{\partial q} < 0$ and consequently consumers' conditional product valuations are higher, if the corresponding lowest marginal valuation, which is given by $v_i(q^*_{com})$, $i = A, B$, is higher. Thus, an increase in consumers' marginal product valuation at the advisor's cutoff q^*_{com} corresponds to a higher price, that product providers will charge and as a result to a higher incentive to raise commission payments.

Commissions must be paid for all sales that are made, i.e. not only for a marginal sale at q^*_{com}, but also for all sales $G(q^*_{com})$ by the specialized product provider B and for all sales $1 - G(q^*_{com})$ by the standard product provider A. Therefore, an increase in market share reduces incentives to raise commission payments, since in comparison, a marginal raise in commissions leads to a lower margin for a high market share and consequently to a high decrease in product provider's profit, whereas a low market share corresponds only to a small decrease in the corresponding profits. This corresponds to the classical tradeoff between price and quantity in oligopoly theory.

In addition, commissions are strategic complements for both product providers. Analytically, this can be seen by $\frac{\partial f_A}{\partial f_B} > 0$ and $\frac{\partial f_B}{\partial f_A} > 0$. Intuitively, an increase in the opponent's commission payments reduces a product provider's market share. This results, as mentioned above, first, in a higher price due to a higher conditional product valuation of consumers, and second, in a lower damping factor for raising commissions due to the lower amount of sales for which commissions must be paid. Both factors result

in higher incentives to increase the own commission payments. As a consequence, this strategic complementary has an additional boosting effect for both product providers to raise commission payments.

Proposition 3.3 *In unique equilibrium, where both products are sold, the specialized product provider B's optimal commission payments are strictly higher than those of the standard product provider A.*

Proposition 3.3 states, that in equilibrium characterized by Proposition 3.2, the specialized product provider B has higher incentives to raise commission payments in comparison to the standard product provider A. This is a result of various factors, that are described before. First of all, in the absence of commission payments, the specialized product provider B possesses an inefficiently low market share below $G\left(\frac{1}{2}\right)$. Thus, the chargeable price is higher for the specialized product provider B in comparison to the standard product provider A and, furthermore, the dampening effect of a large market share for increasing commission payments is more severe for the standard product provider A in comparison to the specialized product provider B. On the other hand, these higher (ex ante) incentives for product provider B to raise commissions in comparison to product provider A yields a higher boosting effect, due to the strategic complementary of raising commissions, for product provider A. However, this effect does not compensate the higher incentives for the specialized product provider B due to the low market share and the higher chargeable price for their products.

3.4 Welfare analysis and policy implications

Turning to welfare analysis, we consider the quality of advice in terms of q^*_{fee} and q^*_{com} under both remuneration systems. Taking into account, that in equilibrium under a commission-based remuneration system, where products are sold, commission payments of the specialized product provider B are strictly higher than those of the standard

product provider A according to Proposition 3.3, a comparison of the advisor's thresholds, given by (3.7) and (3.13) yields a strictly higher threshold for the advisor under a commission-based remuneration system in comparison to a fee-based remuneration system, i.e. $q^*_{com} > q^*_{fee}$.

Considering the total welfare perspective, the advisor's compensation, regardless of the absolute height, does not have any implication on social welfare. The upfront fee f paid by consumers, as well as the commission payments f_A and f_B are transfers from this perspective. Furthermore, production costs for both products are equal and consequently do not affect total welfare either. However, another quality of advice implies, that the advisor incurs different expected costs for giving a product recommendation. These advisor's expected costs are a continuous function of the threshold q^*_{fee} and q^*_{com}, respectively, and are minimized by the advisor's dominant strategy in a fee-based remuneration system characterized by q^*_{fee}. Therefore, any change in quality of advice leads to higher expected costs that the advisor incurs for giving a product recommendation. In summary, a (potential) difference in total welfare between both remuneration systems due to a difference in quality of advice is affected by two factors: The corresponding difference in consumers' conditional product valuations and the difference in the advisor's expected costs for giving a product recommendation.

Proposition 3.4 *In unique equilibrium, where both products are sold, there exists a threshold $\Delta f^* > 0$. If the difference between the higher commission payment of the specialized product provider B and the lower commission payment of the standard product provider A are below (above) this threshold, i.e. $f_B - f_A < \Delta f^*$ ($f_B - f_A > \Delta f^*$), social welfare is strictly higher (lower) under a commission-based remuneration system for the advisor in comparison to a fee-based remuneration system. If $f_B - f_A = \Delta f^*$, social welfare is equal under both remuneration systems.*

Proposition 3.4 states, that in comparison, a commission-based remuneration system

is superior to a fee-based remuneration system from a total welfare perspective, if commission payments are not that far apart and vice versa. This result yields an interesting policy implication. When enacting a ban on commission payments for financial advice, a regulator should consider the present commission structure, since this has crucial impacts on total welfare. In our model, the only way to generate welfare is by matching consumers' needs with corresponding products. Since welfare affecting costs are minimized under a fee-based remuneration system according to (3.7), but welfare is higher under a commission-based remuneration system, if $f_B - f_A < \Delta f^*$ holds, a higher total welfare implies that more consumers are matched with their most suitable product.

Obviously, the question arises, whether the difference between commission payments are below this threshold in the real world or not. Empirical evidence for this case is provided by Anagol et al. (2017). Their empirical finding is, that a standard product which corresponds to a low commission payment is recommended inefficiently often in comparison to a specialized product which corresponds to a high commission payment. Applying this finding to our model yields an advisor's threshold under a commission-based remuneration system $q^*_{com} < \frac{1}{2}$. It is straightforward by the proof of Proposition 3.4, that in this case, the difference between commission payments are below the threshold Δf^* and consequently, total welfare is higher under a commission-based remuneration system.

3.5 Conclusions

The present analysis aims at considering fee-based and commission-based remuneration systems for financial advisors from a total welfare perspective under the assumption, that advisors face transaction costs from persuading consumers in the advice process and consumers have initial information about the suitability of products and their needs. To this end we show in a theoretical model, that a commission-based remuneration system is superior to a fee-based remuneration system, if the difference in commission payments

is sufficiently low. In this case, more consumers are matched with their best suitable product under a commission-based remuneration system in comparison to a fee-based remuneration system. Hence, our analysis contradicts the intuitive superiority of the latter one. Our results suggest, that regulators should consider the present structure of commission payments in the respective market, before enacting a ban on commissions, since this action is not a universal remedy for misconduct in financial advice, but may also backfire and lower the quality of advice as well as total welfare.

Appendix A. Proofs

Proof of Proposition 3.1. First, we consider the case, where advice is sufficiently informative, i.e. (3.11) holds. Purchase decisions at stage 5 are given in the analysis: Consumers who have declined the advisor's offer, do not purchase a product, consumers who have accepted the advisor's offer purchase the recommended product due to (3.9) and (3.10) if $E\left[v_A(q) \mid q \geq q^*_{fee}\right] - p_A \geq 0$ holds for $r = A$ or $E\left[v_B(q) \mid q < q^*_{fee}\right] - p_B \geq 0$ for $r = B$, respectively, and no purchase at all otherwise. At stage 4, the advisor gives his product recommendation according to (3.7) with $r = A$ for $q \geq q^*_{fee}$ and $r = B$ for $q < q^*_{fee}$ for those consumers, who accepted his offer. At stage 3, consumers accept the advisor's offer if their participation constraint (3.11) is fulfilled and decline the offer otherwise. At stage 2, prices are already fixed, so the advisor offers his product recommendation for a fee f that fulfills consumers' participation constraint, as well as his own participation constraint $f \geq E[c(q)]$. At stage 1, product providers set their respective prices in order to maximize their profit and to cover at least their production costs γ. Since products cannot be sold directly to consumers, product prices need to be set in accordance with consumers' and the advisor's participation constraint. In order to extract the maximum rent for product providers, both participation constraints are binding, since otherwise, product providers' profits are not maximized. Market shares are given by $G(q^*_{fee})$ for product provider B and $1-G(q^*_{fee})$ for product provider A, since by assumption (3.3) unconditional product valuations are below production costs, which implies conditional product valuations contrary to the advisor's product recommendation below production costs, i.e. $E\left[v_A(q) \mid q < q^*_{fee}\right] < \gamma$ and $E\left[v_B(q) \mid q \geq q^*_{fee}\right] < \gamma$. Thus, there is no possibility for product provider's to set a price which covers at least production costs and attracts consumers of purchasing their product contrary to the advisor's recommendation. Therefore, profit maximizing prices are uniquely given by $p_A(q^*_{fee}) = E\left[v_A(q) \mid q \geq q^*_{fee}\right] - E[c(q)]$ and $p_B(q^*_{fee}) = E\left[v_B(q) \mid q < q^*_{fee}\right] - E[c(q)]$,

so that both participation constraints are binding. This implies the advisor's offer is set to $f = E\left[c(q)\right]$ and due to assumption (3.11) all consumers request advice. Due to to the linear upward sloping density $g(q)$ and $q^*_{fee} < \frac{1}{2}$ given by (3.8), it holds $G\left(q^*_{fee}\right) < G\left(\frac{1}{2}\right)$ and $1 - G\left(q^*_{fee}\right) > 1 - G\left(\frac{1}{2}\right)$. Therefore, the standard product provider A possesses an inefficiently high market share, whereas the specialized product provider B possesses an inefficiently low market share. The case, where advice is not sufficiently informative is straightforward given by no product purchase at all and no market for financial advice, since consumers' participation constraint for advice cannot be fulfilled. ■

Proof of Proposition 3.2. We start with the case, where advice is not sufficiently informative. Then, consumers are not willing to pay a price above or equal to production costs for the corresponding products and as a consequence, product providers are not able to pay positive commission payments to the advisor. Since expected costs for giving a product recommendation are strictly positive, the advisor's participation constraint is not fulfilled and thus, no market for financial advice exists and no products are sold by assumption (3.3). The other case corresponds to sufficiently informative advice. We show the conditions for a unique equilibrium in three steps.

Sequential rationality: We assume a consumers' expected cutoff $\hat{q}^*_{com}$ and that the condition for sufficiently informative advice (3.20) holds. At stage 5, consumers purchase decisions are in line with the advisor's product recommendation according to conditional product valuations (3.9) and (3.10) for replacing q^*_{com} with $\hat{q}^*_{com}$ if these are not below corresponding product prices p_A and p_B. Otherwise, no products are purchased. Since (3.20) holds, the advisor's expected costs for giving a product recommendation are covered, and consequently the advisor gives product recommendation $r = A$ for $q \geq q^*_{com}$ and $r = B$ otherwise. At stage 3, all consumers request advice, since there is no upfront fee to pay and thus consumers' participation constraint is fulfilled. At stage 2, product providers set their commission payments according to the first order condition with by $f_A = \max\left\{0; v_A(q^*_{com}) - \gamma - 2d\frac{1-G(q^*_{com})}{g(q^*_{com})}\right\}$ and

$f_B = \max\left\{0; v_B(q^*_{com}) - \gamma - 2d\frac{G(q^*_{com})}{g(q^*_{com})}\right\}$, respectively. At stage 1, product providers set their prices in order to maximize their profits according to consumers expected cut-off $\hat{q}^*_{com}$ with $p_A(\hat{q}^*_{com}) = E\left[v_A\left(q\right) \mid q \geq \hat{q}^*_{com}\right]$ and $p_B(\hat{q}^*_{com}) = E\left[v_B\left(q\right) \mid q < \hat{q}^*_{com}\right]$.

Consistency of beliefs: For $q^*_{com} = \hat{q}^*_{com}$ participation constraints are satisfied, and thus the above described sequence, constitutes an equilibrium.

Uniqueness: In order to show uniqueness, $f_A(q^*_{com})$ and $f_B(q^*_{com})$ may not intersect more than once. We denote the slope of $g(q)$ with α. Since $g(q)$ is linear and strictly positive for all $q \in [0,1]$, and $\int_0^1 g(q)dq = 1$ holds (probability distribution), we can express $g(q) = \alpha q + \left(1 - \frac{\alpha}{2}\right)$, where $\alpha \in (0,2)$. Thus, it holds

$$\frac{\partial}{\partial q}\frac{G(q)}{g(q)} = \frac{\alpha^2(2q^2 - 2q + 1) + 4\alpha(q-1) + 4}{(\alpha(2q-1)+2)^2} > 0 \tag{3.21}$$

and

$$\frac{\partial}{\partial q}\frac{1-G(q)}{g(q)} = \frac{\alpha^2(-2q^2 + 2q - 1) + 4\alpha q - 4}{(\alpha(2q-1)+2)^2} < 0 \tag{3.22}$$

for $q \in [0,1]$. Together with $\frac{\partial v_A(q)}{\partial q} > 0$ and $\frac{\partial v_B(q)}{\partial q} < 0$, we derive partial derivatives for optimal commission payments $\frac{\partial f_A}{\partial q^*_{com}} > 0$ and $\frac{\partial f_B}{\partial q^*_{com}} < 0$ and thus a unique equilibrium.

■

Proof of Proposition 3.3. In equilibrium, where both products are sold, the advisor's participation constraint (3.20) hast to be fulfilled and thus, at least one of the two product providers possesses a strictly positive commission payment. We proof $f_B > f_A$ in equilibrium by contradiction.

Let optimal commission payments given by (3.18) and (3.19) satisfy $f_A \geq f_B$. This

is equivalent to

$$f_A - f_B \geq 0 \tag{3.23}$$

$$\Leftrightarrow v_A(q^*_{com}) - \gamma - 2d\frac{1-G(q^*_{com})}{g(q^*_{com})} - \left(v_B(q^*_{com}) - \gamma - 2d\frac{G(q^*_{com})}{g(q^*_{com})}\right) \geq 0 \tag{3.24}$$

$$\Leftrightarrow (2q^*_{com} - 1)(v_h - v_l) - 2d\frac{1-2G(q^*_{com})}{g(q^*_{com})} \geq 0. \tag{3.25}$$

For $q^*_{com} \leq \frac{1}{2}$, it holds $(2q^*_{com} - 1)(v_h - v_l) \leq 0$ and $-2d\frac{1-2G(q^*_{com})}{g(q^*_{com})} < 0$ due to the increasing distribution function $G(q)$ with $G\left(\frac{1}{2}\right) < \frac{1}{2}$. Therefore, $q^*_{com} > \frac{1}{2}$ has to hold. By definition (3.13) of q^*_{com}, this implies

$$\frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1 - 2G\left(\frac{1}{2}\right)\right)}{2d} > \frac{1}{2} \tag{3.26}$$

$$\Leftrightarrow - \frac{f_A - f_B}{2d} - \frac{k\left(1 - 2G\left(\frac{1}{2}\right)\right)}{2d} > 0 \tag{3.27}$$

$$\Leftrightarrow f_B - f_A > k\left(1 - 2G\left(\frac{1}{2}\right)\right). \tag{3.28}$$

Due to $k > 0$ and $G\left(\frac{1}{2}\right) < \frac{1}{2}$, it follows $k\left(1 - 2G\left(\frac{1}{2}\right)\right) > 0$ and thus $f_B - f_A > 0$, which contradicts the assumption $f_A \geq f_B$. Consequently, the optimal commission payments in equilibrium satisfy $f_B > f_A$. ■

Proof of Proposition 3.4. Since both products are sold, it holds $0 < q^*_{fee} < \frac{1}{2}$ by Proposition 3.1 and $0 < q^*_{com} < 1$ by Proposition 3.2. Furthermore, it holds $f_B > f_A$ due to Proposition 3.3. Thus, from (3.7) and (3.13), it follows $q^*_{com} = q^*_{fee} + \frac{f_B - f_A}{2d} > q^*_{fee}$. The change in consumer surplus is then given by

$$CS(q^*_{com}) = \int_{q^*_{fee}}^{q^*_{com}} \left(v_B(q) - v_A(q)\right) g(q)dq = (v_h - v_l) \int_{q^*_{fee}}^{q^*_{com}} (1 - 2q)\, g(q)dq. \tag{3.29}$$

The advisor faces a change in persuasion costs for recommending the specialized product B instead of the standard product A and a change in potential reputational costs d given

by

$$AC(q^*_{com}) = \int_{q^*_{fee}}^{q^*_{com}} (qd + c_B - (1-q)d - c_A)\, g(q)dq \tag{3.30}$$

$$= d\int_{q^*_{fee}}^{q^*_{com}} (2q-1)\, g(q)dq + \int_{q^*_{fee}}^{q^*_{com}} (c_B - c_A)\, g(q)dq \tag{3.31}$$

$$= -d\int_{q^*_{fee}}^{q^*_{com}} (1-2q)\, g(q)dq + \left[G\left(q^*_{com}\right) - G\left(q^*_{fee}\right)\right]\left(1 - 2G\left(\frac{1}{2}\right)\right)k, \tag{3.32}$$

where $AC(q^*_{com}) > 0$ holds, since the advisor's expected costs are minimized at q^*_{fee} and as a consequence are strictly higher for $q > q^*_{fee}$ due to (3.7). Since the advisor's compensation does not affect total welfare and production costs are equal for both products, the change in total welfare is given by

$$\omega(q^*_{com}) = CS(q^*_{com}) - AC(q^*_{com}) \tag{3.33}$$

$$= [(v_h - v_l) + d]\int_{q^*_{fee}}^{q^*_{com}} (1-2q)\, g(q)dq - \left[G\left(q^*_{com}\right) - G\left(q^*_{fee}\right)\right]\left(1 - 2G\left(\frac{1}{2}\right)\right)k. \tag{3.34}$$

Since $0 < q^*_{com} < 1$, it holds $q^*_{com} = \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1-2G\left(\frac{1}{2}\right)\right)}{2d}$. Thus $\omega(q^*_{com})$ is a continuous and differentiable function of $f_B - f_A$ (third degree polynomial due to linear density $g(q)$). If there is a change in sign of $\frac{\partial\omega(q^*_{com})}{\partial(f_B - f_A)}$ from positive to negative for $q^*_{com} \in (q^*_{fee}, 1)$, this implies the existence of a value in differences of commission payments, for which total welfare reaches its maximum dependent on $f_B - f_A$ and furthermore, the existence of a threshold Δf^* for which $\int_0^{\Delta f^*} \frac{\partial\omega(q^*_{com})}{\partial(f_B - f_A)} d(f_B - f_A) = 0$ holds. Then, total welfare is higher under a commission-based remuneration system in comparison to a fee-based remuneration system if $f_B - f_A < \Delta f^*$ holds due to the marginal change in total welfare for $f_B - f_A$ in this domain and vice versa for $f_B - f_A > \Delta f^*$. The latter case is guaranteed, since for such a high difference in commission payments, so that $q^*_{com} = 1$

holds, total welfare would be strictly negative by assumption (3.3) and consequently, this also holds for a sufficiently small domain around $q^*_{com} = 1$ due to the continuity of $\omega(q^*_{com})$. Taking the partial derivative of change in total welfare with respect to $f_B - f_A$ yields

$$\frac{\partial \omega(q^*_{com})}{\partial (f_B - f_A)} = [(v_h - v_l) + d] \frac{1}{2d} (1 - 2q^*_{com}) g(q^*_{com}) - \frac{1}{2d} g(q^*_{com}) \left(1 - 2G\left(\frac{1}{2}\right)\right) k. \tag{3.35}$$

Using $q^*_{com} = q^*_{fee} + \frac{f_B - f_A}{2d}$, it holds

$$\frac{\partial \omega(q^*_{com})}{\partial (f_B - f_A)} > 0 \tag{3.36}$$

$$\Leftrightarrow [(v_h - v_l) + d] \left(1 - 2(q^*_{fee} + \frac{f_B - f_A}{2d})\right) - \left(1 - 2G\left(\frac{1}{2}\right)\right) k > 0 \tag{3.37}$$

$$\Leftrightarrow [(v_h - v_l) + d] (1 - \frac{f_B - f_A}{d}) + [(v_h - v_l) + d] (-2q^*_{fee}) > \left(1 - 2G\left(\frac{1}{2}\right)\right) k \tag{3.38}$$

$$\Leftrightarrow -2q^*_{fee} > -(1 - \frac{f_B - f_A}{d}) + \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{(v_h - v_l) + d} \tag{3.39}$$

$$\Leftrightarrow q^*_{fee} < \frac{1 - \frac{f_B - f_A}{d}}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d} \tag{3.40}$$

$$\Leftrightarrow \frac{1}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2d} < \frac{1 - \frac{f_B - f_A}{d}}{2} - \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d} \tag{3.41}$$

Since $v_h - v_l > 0$ holds, it follows

$$\frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2d} > \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k}{2(v_h - v_l) + 2d}. \tag{3.42}$$

Thus, for sufficiently small differences between commission payments $f_B - f_A$, (3.41) holds.

Considering (3.34), it holds

$$[(v_h - v_l) + d] \int_{\frac{1}{2}}^{q^*_{com}} (1 - 2q) g(q) dq < 0 \tag{3.43}$$

for $q^*_{com} > \frac{1}{2}$. Since $g(q)$ is an upward sloping density, there exists $\bar{q}^*_{com} < 1$ such that for $q^*_{fee} > 0$ it holds

$$[(v_h - v_l) + d] \int_{q^*_{fee}}^{\bar{q}^*_{com}} (1 - 2q)\, g(q) dq = 0 \tag{3.44}$$

and

$$[(v_h - v_l) + d] \int_{q^*_{fee}}^{q^*_{com}} (1 - 2q)\, g(q) dq < 0 \tag{3.45}$$

for $q^*_{com} \in (\bar{q}^*_{com}, 1)$ and the left side of (3.45) strictly decreases with an increase in q^*_{com}. Considering $G\left(\frac{1}{2}\right) < \frac{1}{2}$ and $k > 0$, it holds

$$\left[G\left(q^*_{com}\right) - G\left(q^*_{fee}\right)\right] \left(1 - 2G\left(\frac{1}{2}\right)\right) k > 0 \tag{3.46}$$

due to $q^*_{com} > q^*_{fee}$ and strictly increasing distribution function $G(q)$ and consequently the subtrahend of (3.41) increases with an increase in q^*_{com}. Thus, in summary, it holds $\frac{\partial \omega(q^*_{com})}{\partial (f_B - f_A)} < 0$ for sufficiently high differences between commission payments $f_B - f_A$ so that $q^*_{com} = \frac{1}{2} - \frac{f_A - f_B}{2d} - \frac{k\left(1 - 2G\left(\frac{1}{2}\right)\right)}{2d} \in (\bar{q}^*_{com}, 1)$. ■

Chapter 4

Competing for consumers in financial markets under a fee-based compensation system for advisors[17]

Abstract

In financial markets where consumers can only be reached through an advisor, product providers usually compete indirectly through commissions payments to the advisor. Therefore, a regulatory ban on commissions restricts competition between product providers. We formulate a gametheoretical model in order to study the impact of a such a ban on competition between product providers. In a market with sufficiently differentiated products, competition through prices is not beneficial for product providers. However, marketing measures may serve as a competitive tool for product providers to attract consumers away from their competitors.

JEL Codes: D21, D43, G20, L15, M30

[17]The following chapter is a single authored manuscript by the candidate and yet unpublished.

4.1 Introduction

In markets with complex financial products consumers usually cannot judge which product best suits their needs. Thus, product providers can only reach their consumers through a financial advisor, whose main purpose is to explain product characteristics and why these characteristics suit consumers' needs. It is a widespread practice, that product providers pay direct or indirect commissions to financial advisors which enables them to steer advisors' product recommendations to consumers. Thus, it is often argued, that this practice leads to biased advice, which encouraged regulators in the United Kingdom and the Netherlands to enact a ban on commissions relating to financial advice.[18] However, commissions can be seen as a strategic tool for competition between product providers and a ban on commissions can restrict this competition.

This paper contributes to the literature by providing a framework to analyze the impact of a ban on commissions in markets for financial advice on competition between product providers who can only reach their consumers through an advisor. To this end, we extend the model of Schiller and Weinert (2018). There, the advisor need to conduct costly persuasion when recommending a product to a consumer, dependent on the consumer's initial belief about the suitability of products.[19] Our extension allows us to analyze competition between product providers if commissions are banned and the only compensation for the advisor is an upfront fee paid by his consumers. In particular, we analyze whether product providers are able to compete through two channels in the absence of commissions: First, price competition. Second, informative advertising. However, none of these channels enables product providers to circumvent the advisor.

[18] At the end of 2012, the Financial Services Authority (FSA), which was at this time responsible for regulating financial advice in the United Kingdom, enacted a ban on commissions for retail financial advice, both for independent and restricted advisors. In January 2013, the Netherlands Authority for the Financial Markets (AFM) banned commissions for complex financial products including mortgages and life insurance products.

[19] In this case, persuasion is considered as stating reasons and explanations why a particular product suits consumers' needs (Schiller and Weinert, 2018) or, put differently, advertising attributes of the product that are positively related to quality in a consumer's specific situation (Mullainathan et al., 2008).

Our model consists of a simple market with the following participants: Two product providers, one offering a standard product and the other offering a specialized product. Consumers with different needs who face the choice of buying one of these two products. An advisor who possesses superior knowledge about the suitability of products and consumers. Consumers' needs and product characteristics are horizontal differentiated and consumers' utility is maximized if the purchased product suits consumers' respective needs. Ex ante, consumers cannot observe, whether a product matches their needs. However, it is common knowledge, that the standard product matches consumers' characteristics more often than the specialized product. Consumers can consult an advisor in order to get more accurate information about the suitability of products to their needs. The advisor's only compensation is an upfront fee paid by consumers. Recommending the standard product and thus confirming consumers' initial belief goes in hand with lower persuasion costs for the advisor than recommending the specialized product. However, the advisor incurs a penalty payment imposed by a regulator, if the recommended product does not suit the consumers' needs. Thus, the advisor is facing a tradeoff between persuasion costs and potential penalty payments when recommending a product dependent on his private information. Product providers can set their respective product prices and engage in advertising. A lower product price may attract consumers of this product even though consumers know that the other product is more likely to match the respective needs. Advertising does not result in a direct effect for consumers, however, advertising for a product lowers the advisor's persuasion costs for this product and hence may steer the advisor's product recommendation.

Our main result is, that advertising may serve as a channel for competition between product providers in markets where commissions are banned, but consumers can only be reached through an advisor, whereas product providers do not have an incentive to engage in competition through product prices, if products are sufficiently differentiated. The penalty payment for advisors in case of an unsuitable product recommendation

plays a key role for competition between product providers, although the penalty payment only affects product providers indirectly, since in case, the penalty must be paid by the advisor. If the advisor has to fear a low penalty resulting from an unsuitable product recommendation, the specialized product provider would possess an inefficiently low market share with respect to consumer matching in the absence of any possibilities to influence the advisor's product recommendation, since then, the advisor will recommend the standard product too often due to the lower persuasion costs for this product in comparison to the specialized product. However, advertising allows the specialized product provider to increase his market share to a certain degree and consequently more consumers are matched with a suitable product. If the advisor has to fear a high penalty payment, both product providers possess a market share, where all consumers are nearly optimally matched. But even in this case, the standard product provider's market share is too large. In equilibrium with high penalty payments for the advisor, consumers are worse matched with suitable products when product providers are able to engage in advertising in comparison to a scenario without any competition, since in this case the standard product provider has higher incentives to engage in advertising than his competitor. As a consequence, the penalty payment imposed by the regulator for unsuitable product recommendations may have unintended consequences regarding consumer matching, if the penalty payment is set above a certain threshold.

The individual incentives of both product providers depend on various factors. Obviously, the effectiveness of marketing measures plays a key role for product providers incentives to raise marketing expenses. However, for a given level of effectiveness, a high margin results in high incentives to engage in marketing due to the classical tradeoff between pushing sales and reducing the margin, or price and quantity in oligopoly theory. A high margin necessarily corresponds to a high product price, which crucially depends on consumers' willingness to pay for a product. The willingness to pay for a product is determined by consumers' expected payoff from purchasing a product. If consumers

are pretty sure, that a product suits their needs, their willingness to pay is high. This is the case, if a product provider possesses only a small market share, since then, those consumers who decide to purchase this product are not mixed together with consumers for whom the competitor's product best suits their needs. Furthermore, incentives for a product provider to engage in marketing are high, if the competitor exhibits high expenses for marketing due to the following reason. For a given level of marketing expenses of a product provider, an increase in the competitor's marketing expenses would decrease the product provider's market share and consequently increase the consumers' willingness to pay for his product. This implies, that this product provider can charge a higher price for his product and thus increase his margin. As a consequence, the incentives for this product provider to raise his own marketing expenses increase. Thus, marketing measures can be seen as a competitive tool for product providers, since the amount that one product provider spends on marketing depends crucially on the competitor's expenses for marketing measures.

Our model is related to literature which analyzes competition between horizontal differentiated product providers, if consumers can only be reached through an advisor. This is the case in markets for complex products like financial products, where the benefit for consumers crucially depends on matching between product characteristics and individual needs, but consumers do not possess (sufficiently accurate) information about the suitability of products before purchasing them. We consider the case of experience goods, where consumers may learn after some time, whether a product suits their needs (Nelson, 1970). In extreme cases, financial products can also be considered as experience goods, where consumers cannot get any information about the suitability in retrospect of their purchase (Darby and Karni, 1973). Bolton et al. (2007) and Inderst and Ottaviani (2012a) show, that in financial markets, product providers indirectly compete for consumers through commission payments to the advisor. However, we consider the case, where advisors are exclusively compensated by consumers through an upfront fee.

Inderst and Ottaviani (2012b) show in a theoretical model, that consumers, who are able to anticipate the quality of advice, demand exclusively advice for a fee rather than an indirect payment through commissions. As a direct result, advice is unbiased in equilibrium. However, an implicit result is, that product providers do not compete for consumers under a fee for advice remuneration system, and especially do not try to influence the advisor's product recommendation. Focht et al. (2013) concludes that advice is not necessarily unbiased if commissions are banned, since product providers have the possibility to steer advisors through side contracts. However, if side contracting is not possible and commissions are banned, Focht et al. (2013) also implicitly conclude, that product providers do not compete for consumers.

A common assumption of the aforementioned literature is a perfect rational consumer, who is immune to any uninformative attempts by product providers to change his purchase decision. If it is not possible to reach a consumer directly, product providers do not have a possibility to compete for them, other than direct or indirect payments to the advisor. This assumption seems reasonable for models of markets with complex products and rational consumers. However, a real world phenomenon is, that consumers often possess various irrationalities, especially limited knowledge and a lack of intellectual capacity to process any information they are provided with (Campbell, 2016). Therefore, Gennaioli et al. (2015) identifies trust between consumers and advisor as a key source for the demand of advice, rather than objective measurements. For our analysis, we extend the model of Schiller and Weinert (2018), where consumers are not perfectly rational and advice is not just cheap talk (Crawford and Sobel, 1982). A key aspect of Schiller and Weinert (2018) is, that bounded rational consumers need to be persuaded of a product by the advisor in the sense of Mullainathan et al. (2008) and the advisor faces transaction costs in persuading them. Thereby, persuasion costs for a product are inversely proportional to the strength of consumers' initial belief that this product suits the respective needs. Empirical findings of Anagol et al. (2017) and Mullainathan et al.

(2012) indicate the existence of such persuasion costs as a real world phenomenon.

Another common assumption is, that it is not possible for product providers to directly communicate information about the suitability of products to consumers and thus circumvent the advisor (Inderst and Ottaviani, 2012a). We relax this assumption and allow product providers in our model to directly pass information to consumers in the following way. In the sense of Grossman and Shapiro (1984), Stahl II (1994), Meurer and Stahl II (1994) and Soberman (2004), we assume that product providers can engage in informative advertising. In this case, advertising is a way to communicate information about the suitability of products to the consumer and therefore may serve as a competitive tool to attract consumers away from other firms. In a market with simple products, informative advertising may replace an advisor. For example, Bertrand et al. (2010) find empirical evidence, that advertising content increases demand for simple consumer loans. Hamilton (2009) analyzes informative advertising in differentiated oligopoly markets and finds an oversupply of advertising if products are highly differentiated. This result is in line with our model, where marketing does not only serve to inform consumers, but is also used as a competitive tool. However, we consider the case of financial markets, where products are complex. Thus, we assume, that product providers are able to pass information to consumers by informative advertising, but the crucial aspect is, that consumers are not able to process these information directly due to a lack of knowledge and intellectual capacity (Campbell, 2016). In particular, we assume, that consumers cannot match product characteristics to their specific needs, even if they are provided with all information about product characteristics. However, it is easier for an advisor to persuade a consumer of a product, if the consumer is already familiar with all product characteristics. Our model puts this phenomenon of irrationality into the context of competition between product providers in a market with horizontal differentiable products, where consumers can only be reached through an advisor and commission payments are effectively banned by regulation.

4.2 Basic Model

We consider a modified model of Schiller and Weinert (2018), which is based on Inderst and Ottaviani (2012a). In particular, we consider a simple market for financial advice. This market is represented by two product providers $i = A, B$, a mass of one consumer and a monopolistic advisor.[20] All players are risk neutral and try to maximize their expected payoffs. Consumers face the choice of whether to purchase one single unit of the product providers' corresponding products A and B for respective prices p_A and p_B set by product providers. Product providers' production costs are normalized to zero. Each consumer is characterized by an unobservable binary state variable $\Theta = A, B$. If a purchased product matches a consumer's characteristics, he derives utility v_h and utility v_l otherwise, where $v_h > 0 > v_l$ holds. We normalize the utility of not purchasing to zero.

Although our analysis focuses on financial markets, we abstract from specific products. Hence, our model is applicable to various situations. In the sense of Inderst and Ottaviani (2012a) products can be seen as different investment plans or pension schemes, where the suitability depends on a consumer's financial condition, tax status or life expectancy. Furthermore, one could also interpret the two products as such that are not originated in the financial context like different drugs for curing a specific disease or other medical treatments.

One key aspect of our model is, that private information about the matching probability of consumers and products is possessed by the advisor, rather than by consumers or by product providers. Thus, consumers can consult an advisor in order to get more accurate information about the suitability of the products. Thereby, advisors help to explain product characteristics to consumers and why these characteristics suit the in-

[20] Usually, a monopolistic advisor market seems to be an oversimplification. Schiller and Weinert (2018) analyze different degrees of competition between advisors, since consumers' demand for advice is usually also not perfectly elastic due to personal connections and trust in an advisor. However, for our analysis, competition between advisors is of minor importance. We comment on the assumption of a monopolistic advisor market at the end of section 4.3.

dividual consumer's needs. In line with Schiller and Weinert (2018), we assume that advisors have superior knowledge about available products and thus can judge more accurately which products best suits consumers' needs than consumers themselves. The advisor cannot observe $\Theta = A, B$ directly, but possesses private information with respect to the probability of a matching product, denoted by $q = Pr(\Theta = A)$. We assume, that product A matches consumers' characteristics with higher probability than product B and thus refer to product A as a standard product and product B as a specialized product. In particular, we assume that q is distributed according to a commonly known distribution function $G(q)$ with differentiable density $g(q) > 0$ for all $q \in [0, 1]$ and furthermore stipulate that $\frac{\partial g(q)}{\partial q} > 0$ holds over $q \in [0, 1]$. The latter assumption allows us to capture different match probabilities of the standard and the specialized product with consumers' characteristics in a flexible way.

The advisor's only compensation is an upfront fee f paid by consumers, since we assume commissions paid by product providers to be effectively banned by regulation. If a consumer accepts the advisor's offer, the advisor gives a product recommendation $r = A, B$ to the consumer, dependent on his private information q. However, giving a product recommendation to the consumer is costly for the advisor, since he has to persuade consumers of the corresponding products. Thereby, persuasion costs depend on two factors. First, on consumers' ex ante belief $G(q)$ about the suitability of products. As in Schiller and Weinert (2018), we assume that this factor of persuasion costs is inversely proportional to the strength of consumers' common prior belief about the probability that a product matches their needs. Second, on product providers' expenses on marketing for their products. In particular, the advisor incurs persuasion costs of

$$c_A(m_A) = \left(\int_0^{\frac{1}{2}} g(q)dq \right) k(m_A) = G\left(\frac{1}{2}\right) k(m_A) \tag{4.1}$$

for recommending product A and

$$c_B(m_B) = \left(\int_{\frac{1}{2}}^{1} g(q)dq \right) k(m_B) = \left(1 - G\left(\frac{1}{2}\right) \right) k(m_B) \tag{4.2}$$

for recommending product B, where $k(m_i) > 0$ denotes the marginal persuasion costs for the advisor dependent on the marketing expenses of product provider $i = A, B$. Thus, product providers are able to affect the advisor's marginal persuasion costs for their product dependent on their expenses on marketing measures. In the sense of Grossman and Shapiro (1984) and Stahl II (1994), we assume that advertising has a beneficial effect for consumers, since it provides them with information about product characteristics. However, in markets with complex products, consumers are not able to judge whether a product suits their needs, even if they know product characteristics. Thus, in our model, advertising has an indirect beneficial effect on consumers, since it lowers the advisor's persuasion costs for the advertised product. In line with Grossman and Shapiro (1984) we assume a decreasing marginal effect of marketing expenses on the marginal persuasion costs, that is, we assume k to be a convex function of m_i with $\frac{\partial k(m_i)}{\partial m_i} < 0$ and $\frac{\partial^2 k(m_i)}{\partial m_i^2} > 0$ for $i = A, B$ and furthermore, that k is a bounded function with upper limit $\bar{k} = k(0)$ and lower limit $\underline{k} = \lim_{m_i \to \infty} k(m_i) > 0$. We do not differentiate in our analysis between different marketing measures targeting consumers, like advertising in newspaper, social media marketing or advertising on television. However, we assume, that all marketing channels have the same effect, namely, that product marketing reduces the cost of persuading a consumer of the corresponding product, due to the following reasons: If a product is advertised, it is easier for the advisor to catch phrases or facts regarding the corresponding product, since these are in mind of consumers due to the presence in media. Furthermore, an advisor can target exactly his persuading talk to consumers by highlighting facts of the product, that are already in consumers' mind due to the marketing measures of product providers. Even though, our analysis focuses

on informative advertising, our model is also applicable to persuasive advertising, since such sort of advertising may also lower persuasion costs for the advisor.

Following Schiller and Weinert (2018), it is straightforward, that $c_A(0) < c_B(0)$ holds. This shows, that in the absence of any marketing measures, it is less costly for the advisor to persuade a consumer of the standard product A in comparison to the specialized product B, due to the skewness of the common information about product suitability $g(q)$. Besides these driving factors for the advisor to give a product recommendation, we assume, that he incurs a penalty payment $d > 0$ imposed by a regulator in the case, that the recommended product does not match the consumer's characteristics Θ.[21]

In our model, the advisor's marginal persuasion cost function $k(\cdot)$, his potential penalty costs for a wrong product recommendation d, the distribution of the advisor's private information $G(q)$ and the derived utility levels v_h and v_l for the consumer are exogenously given. Thus minimum expected costs for giving a product recommendation for the advisor, dependent on q, m_A and m_B are given by

$$c(q, m_A, m_B) = \min\left\{(1-q)d + c_A(m_A); qd + c_B(m_B)\right\}. \tag{4.3}$$

A consumer's expected payoff from purchasing product A, dependent on the probability q, that a consumer is of type A, is given by

$$v_A(q) = q \cdot v_h + (1-q) \cdot v_l \tag{4.4}$$

and from purchasing product B

$$v_B(q) = (1-q) \cdot v_h + q \cdot v_l, \tag{4.5}$$

[21] Other sources of advisor's disutility subsequently of an unsuitable product recommendations can also be reputational costs and thus forgone future businesses or professional concerns for the consumers' well-being (Inderst and Ottaviani, 2012a).

respectively. In order to focus on financial markets, where advice is essential for consumers, we assume for consumers' expected payoff without advice

$$E\left[v_A\left(q\right)\right] = \int_0^1 v_A(q)g(q)dq < 0 \tag{4.6}$$

which implies $E\left[v_B\left(q\right)\right] = \int_0^1 v_B(q)g(q)dq < 0$, due to the skewness of $g(q)$. As a consequence, assumption (4.6) ensures, that it is not beneficial for consumers to purchase any product without (informative) advice. Furthermore, we stipulate that $\left(\underline{q}, \bar{q}\right) \subset (0,1)$ exists with

$$G\left(\hat{q}\right) E\left[v_B\left(q\right) \mid q < \hat{q}\right] + \left(1 - G\left(\hat{q}\right)\right) E\left[v_A\left(q\right) \mid q \geq \hat{q}\right] > E\left[c(q,0,0)\right], \tag{4.7}$$

for all $\hat{q} \in \left(\underline{q}, \bar{q}\right)$, where $E\left[c(q,0,0)\right]$ denotes the advisor's minimized expected costs for giving a product recommendation if marketing expenses of both product providers are equal to zero. This assumption guarantees, that the expected value of advice for consumers exceeds the advisor's expected costs for giving a product recommendation if advice is sufficiently informative and consequently a market for financial advice can exist.

Throughout our analysis we assume consumers to be aware of the advisor's trade-off between recommending standard product and specialized product, that is, d, $G(q)$ and $k(\cdot)$, are common knowledge. However, marketing expenses are not disclosed to consumers, whereas the advisor is able to infer these indirectly through his marginal persuasion cost function $k(m_i)$, $i = A, B$. We model the interaction between the three players by the following game. At stage 1, product providers simultaneously set their product prices p_A and p_B and subsequently their marketing expenses m_A and m_B. At stage 2, the advisor makes a take-it-or-leave-it offer f for his product recommendation service. At stage 3, consumers decide, whether to remain without advice or to engage in the advisor's offering. In the first case, the game continues at stage 5, otherwise,

at stage 4, the advisors gives his product recommendation $r = A, B$ to his consumer and incurs the corresponding persuasion costs. At stage 5 consumers make their final purchase decision and all payoffs are realized. For sake of simplicity, we do not discount payoffs in our analysis.

4.3 Equilibrium analysis

In line with Inderst and Ottaviani (2012a), we consider perfect Bayesian equilibria with some restrictions. We only consider pure strategy equilibria with sufficiently informative advice at stage 4. Such an equilibrium always exists by assumption (4.7), although off-equilibrium marketing expenses and thereto resulting advice may be not sufficiently informative so that a market for financial advice may exist. However, product providers are not able to sell their products directly to consumers by assumption (4.6). Consequently, in equilibria, where products are sold, advice is sufficiently informative for consumers, in order to generate profits for product providers. Also in line with Inderst and Ottaviani (2012a), we specify passive beliefs for consumers. Hence, consumers do not react to observed price changes by changing their expectations about marketing expenses of product providers. As a consequence, in any equilibrium, consumers hold (point) beliefs $\hat{m}_i$, $i = A, B$ about the respective marketing expenses.

When the advisor gives his product recommendation, product providers' marketing expenses m_A and m_B as well as the fee f are already determined. Following Schiller and Weinert (2018), the advisor's dominant strategy is to minimize his expected costs which he incurs for giving a product recommendation after receiving his upfront payment f. Explicitly, recommending the standard product A goes in hand with less expected costs than those, for recommending the specialized product B if $(1-q)d + c_A(m_A) \leq qd + c_B(m_B)$ holds. Hence, we derive a threshold q^* for which the advisor is better off by recommending product A if for his private information $q \geq q^*$ holds and recommending

product B otherwise, where

$$q^* := \begin{cases} 0 & \text{for} \quad \frac{1}{2} - \frac{\left(1-G\left(\frac{1}{2}\right)\right)k(m_B)}{2d} + \frac{G\left(\frac{1}{2}\right)k(m_A)}{2d} \leq 0 \\ \frac{1}{2} - \frac{\left(1-G\left(\frac{1}{2}\right)\right)k(m_B)}{2d} + \frac{G\left(\frac{1}{2}\right)k(m_A)}{2d} & \text{for} \quad 0 < \frac{1}{2} - \frac{\left(1-G\left(\frac{1}{2}\right)\right)k(m_B)}{2d} + \frac{G\left(\frac{1}{2}\right)k(m_A)}{2d} < 1 \\ 1 & \text{for} \quad \frac{1}{2} - \frac{\left(1-G\left(\frac{1}{2}\right)\right)k(m_B)}{2d} + \frac{G\left(\frac{1}{2}\right)k(m_A)}{2d} \geq 1. \end{cases} \tag{4.8}$$

The advisor minimizes his expected costs for recommending a product by two factors. First, potential penalty payments for unsuitable product recommendations, given by $(1-q)d$ for recommending product A and qd for recommending product B. Second, persuasion costs $c_A(m_A)$ and $c_B(m_B)$ for recommending product A and B, respectively. It is straight forward, that product providers are able to steer advice through their marketing expenses since,

$$\frac{\partial c_i(m_i)}{\partial m_i} < 0 \tag{4.9}$$

holds, for $i = A, B$.

We assume, that consumers are aware of the advisor's incentive issue and of the fact, that product providers may spend money on marketing measures, which may influence the advisor's cost of persuasion. However, marketing expenses are not disclosed to consumers. As a consequence, wary consumers form rational expectations about these expenses, denoted with $\hat{m}_A$ and $\hat{m}_B$. By plugging these expectations into (4.8), they derive an expected threshold $\hat{q}^*$ for the advisor to recommend product A if $q \geq \hat{q}^*$ holds and product B otherwise. In order to solve the game described, we start by analyzing sequential rationality for a given expected cutoff $\hat{q}^* \in (0,1)$.[22]

Beginning at stage 5 of the game, the final purchase decision, we have to differenti-

[22]For $\hat{q}^* = 0$ or $\hat{q}^* = 1$ consumers expect that advice is completely uninformative and thus do not request advice by assumption (4.6)

ate between consumers who requested advice at stage 3 and consumers who remained without advice. In the latter case, the purchase decision is straight forward given by (4.6) with no purchase at all. Those consumers who requested advice at stage 3, receive the advisors product recommendation by $r = A, B$ at stage 4. For $r = A$, the consumer reevaluates the two products, given his belief $\hat{q}^*$ by

$$\begin{aligned} E\left[v_A\left(q\right) \mid q \geq \hat{q}^*\right] &= \int_{\hat{q}^*}^{1} v_A(q) \frac{g(q)}{1 - G(\hat{q}^*)} dq \\ &> \int_{\hat{q}^*}^{1} v_B(q) \frac{g(q)}{1 - G(\hat{q}^*)} dq = E\left[v_B\left(q\right) \mid q \geq \hat{q}^*\right], \end{aligned} \tag{4.10}$$

and for $r = B$ by

$$\begin{aligned} E\left[v_B\left(q\right) \mid q < \hat{q}^*\right] &= \int_{0}^{\hat{q}^*} v_B(q) \frac{g(q)}{G(\hat{q}^*)} dq \\ &> \int_{0}^{\hat{q}^*} v_A(q) \frac{g(q)}{G(\hat{q}^*)} dq = E\left[v_A\left(q\right) \mid q < \hat{q}^*\right]. \end{aligned} \tag{4.11}$$

Strict inequalities thereby follow from the left skewed density $g(q)$. Consequently, consumers follow the advisor's product recommendation, if ex post valuations are weakly higher than the respective product prices p_A and p_B. Otherwise, consumers do not purchase any product.

At stage 4, the advisor gives his product recommendation according to his dominant strategy given by (4.8): For $q \geq q^*$, he gives a product recommendation $r = A$ and for $q < q^*$ he gives a product recommendation $r = B$.

At stage 3, consumers can either stay without advice and continue the game at stage 5 or request advice for a fee f. In the case, that advice is requested, consumers expect to receive the product recommendation $r = A$ with probability $1 - G\left(\hat{q}^*\right)$ and $r = B$ with probability $G\left(\hat{q}^*\right)$. Thus, their expected payoff for requesting advice equals their

maximum willingness to pay for advice for a given expected cutoff $\hat{q}^*$ and is given by

$$f\left(\hat{q}^*\right) = G(\hat{q}^*)\left(E\left[v_B\left(q\right) \mid q < \hat{q}^*\right] - p_B\right) + \left(1 - G(\hat{q}^*)\right)\left(E\left[v_A\left(q\right) \mid q \geq \hat{q}^*\right] - p_A\right). \quad (4.12)$$

At stage 2, marketing expenses of both product providers are already determined. The advisor makes his take-it-or-leave-it-offer according to consumers' participation constraint (4.12) and his own participation constraint dependent on marketing expenses m_A and m_B given by

$$f - \int_0^1 c(q, m_A, m_B)g(q)dq = f - E\left[c(q, m_A, m_B)\right] \geq 0 \quad (4.13)$$

or equivalently

$$f \geq E\left[c(q, m_A, m_B)\right]. \quad (4.14)$$

At stage 1, product providers first set their respective product prices p_A and p_B and subsequently their respective marketing expenses m_A and m_B. Corresponding expected payoffs are given by

$$\pi_A = p_A(1 - G(q^*)) - m_A \quad (4.15)$$

and

$$\pi_B = p_B G(q^*) - m_B, \quad (4.16)$$

respectively. It is straightforward, that the fraction of consumers who are assigned to each product provider by the advisor is affected by the true cutoff q^*. Although, q^* does not affect product providers' product prices directly, in equilibrium, it affects consumers' willingness to pay for advice and consequently the rent that can be extracted from consumers who accept the advisor's offer.

Differentiating expected payoffs yields

$$\frac{\partial \pi_A}{\partial m_A} = p_A g(q^*) \left(-\frac{G\left(\frac{1}{2}\right) \frac{\partial k(m_A)}{\partial m_A}}{2d} \right) - 1 \tag{4.17}$$

and

$$\frac{\partial \pi_B}{\partial m_B} = p_B g(q^*) \left(-\frac{\left(1 - G\left(\frac{1}{2}\right)\right) \frac{\partial k(m_B)}{\partial m_B}}{2d} \right) - 1. \tag{4.18}$$

Thus, we derive first order conditions for optimal marketing expenses for both product providers by

$$\frac{\partial k\left(m_A\right)}{\partial m_A} = \frac{-2d}{p_A g(q^*) G\left(\frac{1}{2}\right)} \tag{4.19}$$

and

$$\frac{\partial k\left(m_B\right)}{\partial m_B} = \frac{-2d}{p_B g(q^*) \left(1 - G\left(\frac{1}{2}\right)\right)}. \tag{4.20}$$

These conditions yield unique solutions for the optimal marketing expenses m_A and m_B, since $g(q)$ is an upward sloping function of q, $k(m_i)$ is a convex function of m_i, $i = A, B$ and prices p_A and p_B are already fixed at this time.

Product providers anticipate consumers' ex post valuation with advice of their products and anticipate that without advice, no products are sold. Thus, they need to satisfy the advisor's participation constraint and set their respective prices with optimal marketing expenses for a given cutoff $\hat{q}^*$ by

$$\begin{aligned} p_A(\hat{q}^*) &= \int_{\hat{q}^*}^{1} v_A(q) \frac{g(q)}{1 - G(\hat{q}^*)} dq - \int_0^1 c(q, m_A, m_B) g(q) dq \\ &= E\left[v_A\left(q\right) \mid q \geq \hat{q}^*\right] - E\left[c(q, m_A, m_B)\right] \end{aligned} \tag{4.21}$$

and

$$p_B(\hat{q}^*) = \int_0^{\hat{q}^*} v_B(q)\frac{g(q)}{G(\hat{q}^*)}dq - \int_0^1 c(q, m_A, m_B)g(q)dq$$
$$= E\left[v_B\left(q\right) \mid q < \hat{q}^*\right] - E\left[c(q, m_A, m_B)\right]. \tag{4.22}$$

Consumers' beliefs are passive, thus setting a price below $p_i(\hat{q}^*)$, $i = A, B$ is suboptimal for the corresponding product providers. Due to the skewness of $g(q)$, the optimal product price $p_A(\hat{q}^*)$ is decreasing with a decrease in the expected cutoff $\hat{q}^*$. If a consumer is pretty sure, that product A matches his characteristics, that is, he has a high expected cutoff $\hat{q}^*$, he is relatively sure to derive a high utility v_h and thus has a high willingness to pay for this product. However, if this cutoff is decreasing, he finds himself mixed in a pool with other consumers, for whom product A is less likely to match. Since he is not able to get more precise information about his match probability, he incorporates possible low utilities for mismatching with a certain probability in his willingness to pay. The same phenomenon analogously holds for $p_B(\hat{q}^*)$, which is decreasing with an increase in the expected cutoff $\hat{q}^*$.

Proposition 4.1 *There exists a unique equilibrium with sufficiently informative advice, i.e.* $q^* \in \left(\underline{q}, \bar{q}\right)$*, where the advisor charges a fee* $f = E\left[c(q, m_A, m_B)\right]$*, consumers accept this offer and purchase the recommended product. Product provider's marketing expenses are strictly positive, if the marginal effect on persuasion costs in the absence of marketing measures is below a (negative) threshold* $k^*\left(d, p_i\right)$*,* $i = A, B$*. This threshold is decreasing with an increase in the advisor's potential penalty* d *and increasing with an increase in product prices* p_i*,* $i = A, B$*.*

Proposition 4.1 states, that in equilibrium with sufficiently informative advice, consumers accept the advisor's offer and follow his advice. Marketing measures are used by product providers in order to steer the advisor's product recommendation, if the

decreasing effect on the advisor's persuasion costs is sufficiently large. The decision of product provider, to engage in marketing thereby depends on two crucial factors. First, the advisor's potential penalty payment d in case of an unsuitable product recommendation. Intuitively, a higher penalty payment reduces the efficiency of marketing, since the advisor is then less sensitive to a change in persuasion costs. Second, product prices and consequently margins for product providers. If product prices are high, product providers have room to engage in marketing, and consequently pushing sales. We analyze these effects in detail in the following section.

Another result of Proposition 4.1 is, that in equilibrium, a monopolistic advisor possesses zero expected profit. This result is driven by the fact, that product providers set their respective product prices in advance of the advisor's offer for his advice service. This game sequence is reasonable, since a product provider can launch a product in a market with a respective price before an advisor decides whether to recommend this product or not. Otherwise, an advisor would decide to recommend a specific product although it is unclear whether some product provider actually decides to launch this product or not. As a consequence, in a duopoly, product providers extract the whole rent from consumers and the participation constraint is binding for the advisor. Hence, this equilibrium outcome holds for any degree of competition in the sense of Schiller and Weinert (2018).

4.4 Policy Implications

In this section, we assume, that marketing measures are sufficiently effective, so that by Proposition 4.1, marketing expenses of both product providers are positive in equilibrium. However, optimal marketing expenses derived by (4.19) and (4.20) of both product providers depend on different driving factors. Product providers' profits (4.17) and (4.18) directly depend on the advisor's cutoff q^*. Thus a product provider has a greater incen-

tive to raise marketing expenses in comparison to his competitor if the marginal effect of his marketing expenses on q^* is larger than that of his competitor. Marketing measures of a product provider target the fraction of consumers who belief, that the competitor's product best suits their needs rather than those who already belief that the promoted product is the best fit. Since the standard product A matches consumers' characteristics with higher probability than the specialized product B, marketing measures of product provider B are targeting a greater fraction of consumers than those of product provider A. Consequently product provider B's marketing measures have a greater effect on q^* than those of product provider A. Analytically this effect follows from

$$1 - G\left(\frac{1}{2}\right) > G\left(\frac{1}{2}\right) \Leftrightarrow \left|\frac{\left(1 - G\left(\frac{1}{2}\right)\right)\frac{\partial k(m_B)}{\partial m_B}}{2d}\right| > \left|\frac{G\left(\frac{1}{2}\right)\frac{\partial k(m_A)}{\partial m_A}}{2d}\right| \Leftrightarrow \left|\frac{\partial q^*}{\partial m_B}\right| > \left|\frac{\partial q^*}{\partial m_A}\right| \tag{4.23}$$

Furthermore, product providers' incentives to engage in marketing are higher if the corresponding margins are higher. In our model margins and product prices are treated similarly, since production costs are normalized to zero by assumption. The advisor's marginal persuasion costs $k(m_i)$ are a downward sloping convex function of m_i, $i = A, B$. Thus, from first order conditions (4.19) and (4.20) it follows that a higher product price results in a less negative first derivative (or in absolute terms a less steeper slope) of persuasion costs at optimal marketing expenses which implies, due to the curvature of $k(m_i)$, higher optimal marketing expenses. This reflects the tradeoff between pushing sales and reducing the margin or intuitively the tradeoff between price and quantity in classical oligopoly theory.

Comparing product providers' optimal marketing expenses, $\frac{\partial k(m_A)}{\partial m_A} < \frac{\partial k(m_B)}{\partial m_B}$ implies $m_B > m_A$. Given that product prices are set according to (4.21) and (4.22) with $p_A(\hat{q}^*)$ and $p_B(\hat{q}^*)$ respectively, $\frac{\partial k(m_A)}{\partial m_A} < \frac{\partial k(m_B)}{\partial m_B}$ is equivalent to

$$E\left[v_A\left(q\right) \mid q \geq \hat{q}^*\right] G\left(\frac{1}{2}\right) < E\left[v_B\left(q\right) \mid q < \hat{q}^*\right]\left(1 - G\left(\frac{1}{2}\right)\right) \tag{4.24}$$

This inequality holds obviously if $E\left[v_A\left(q\right) \mid q \geq \hat{q}^*\right] < E\left[v_B\left(q\right) \mid q < \hat{q}^*\right]$, since $G\left(\frac{1}{2}\right) < 1 - G\left(\frac{1}{2}\right)$ holds due to the left-skewed density $g(q)$. However, for cutoff $\hat{q}^* = \frac{1}{2}$, it holds $E\left[v_A\left(q\right) \mid q \geq \frac{1}{2}\right] > E\left[v_B\left(q\right) \mid q < \frac{1}{2}\right]$ due to the higher fraction of consumers, for whom the standard product A matches their needs with higher probability in comparison to the specialized product B. Conditional expected product valuations are continuous functions of the anticipated cutoff $\hat{q}^*$. Thus for a sufficiently small $\delta\left(v_h, v_l\right) > 0$, for which $1 - 2G\left(\frac{1}{2}\right) < \delta\left(v_h, v_l\right)$ holds, we can find an $\epsilon > 0$, such that

$$E\left[v_A\left(q\right) \mid q \geq \frac{1}{2} - \epsilon\right] G\left(\frac{1}{2}\right) > E\left[v_B\left(q\right) \mid q < \frac{1}{2} - \epsilon\right] \left(1 - G\left(\frac{1}{2}\right)\right) \tag{4.25}$$

holds.[23] In this case, product provider A can use his advantage from ex ante information, in particular, that his product matches consumers' needs with higher probability in comparison to his competitor's product, to set a higher price than product provider B and thus possesses a higher margin. As described before, this results in a higher incentive for product provider A to engage in marketing and consequently steer advice in comparison to product provider B. This higher margin then outweighs product provider B's advantage to engage in marketing due to the higher marginal fraction of consumers he can steer towards himself due to the skewness of ex ante information $g(q)$.

Besides these effects, marketing expenses are also strategic complements for both product providers. For given marketing expenses m_i, product providers optimally set their product prices $p_i(q^*)$, $i = A, B$, in equilibrium. Suppose, product provider A raises his marketing expenses m_A. Since this decreases the advisor's costs for recommending product A, given by (4.9), the threshold q^* given by (4.8) also decreases. In equilibrium, consumers' belief equals the true cutoff, $\hat{q}^* = q^*$. Thus, consumers' conditional product valuations, given by (4.10) and (4.11), increases for product B and decreases for product

[23] If consumers' utility difference between matching and unmatching product, $v_h - v_l$ is sufficiently high, it holds $\delta\left(v_h, v_l\right) \geq 1$. In this case, $1 - 2G\left(\frac{1}{2}\right) < \delta\left(v_h, v_l\right)$ holds for any probability distribution with a left-skewed density.

A. This is due to the lower fraction of consumers, who are matched with product B and consequently posses a high probability that product B is indeed the best suiting product. Thus, product provider B can adjust his product price to the higher conditional product valuation of consumers and consequently possesses a higher margin and therefore a higher incentive to engage in marketing due to the raise in product provider A's marketing expenses. Analogous considerations hold for a raise in product provider B's marketing expenses and the corresponding response of product provider A.

All the aforementioned incentives for product providers to raise marketing expenses are dependent on the advisor's concern for giving unsuitable product recommendations. Precisely, if the penalty d that the advisor incurs subsequently of an unsuitable product recommendation is high, optimal marketing expenses given by (4.19) and (4.20) are low, since these are inversely proportional to d. Analogous, a low penalty d, results in high optimal marketing expenses. Intuitively, this effect can be explained by the following two reasons. First, a low penalty d induces the advisor to become more responsive to marketing expenses, that is, the absolute effect of m_i on q^* is higher for $i = A, B$. Second, the competitor's raise in his marketing expenses due to the higher responsiveness of the advisor to these has an additional feedback effect on a product provider to raise his own marketing expenses as a strategic complementary answer to the competitor's raise in marketing expenses.

Proposition 4.2 *There exists a threshold for the advisor's penalty in case of an unsuitable product recommendation. If the actual penalty is below (above) this threshold, the specialized product provider B exhibits in equilibrium higher (lower) marketing expenses than the standard product provider A. If the actual penalty is equal to this threshold, marketing expenses of both product providers are equal.*

Proposition 4.2 states, that the extend to which product providers engage in marketing crucially depends on the advisor's potential penalty payment subsequently of an

unsuitable product recommendation. In case of a low potential penalty, the specialized product provider B exhibits higher marketing expenses in comparison to the standard product provider A. Considering signs, from (4.23), it follows immediately, that in this case, q^* is higher in comparison to a case without any marketing measures of both product providers. Hence, marketing measures can serve as a channel for competition between product providers and increase matching of consumers and products. This is due to the fact, that the specialized product provider B has two advantages in competing through marketing with the standard product provider A. On the one hand, the specialized product provider's marketing measures are targeting a greater audience than those of his competitor and thus are more effective to steer advice. On the other hand, the small fraction of consumers who receive the advice to purchase the specialized product are pretty sure that this product best suits their needs, since no consumer whose best suitable product is the standard product gets this recommendation, whereas consumers who receive the recommendation to purchase the standard product are pooled with consumers for whom this is not the best suitable product. Hence, the specialized product provider is able to charge a higher price for his product and consequently possesses a higher margin due to the higher consumers' willingness to pay for the specialized product in comparison to the willingness to pay for the standard product. This gives the specialized product provider an advantage to raise marketing expenses. However, if the advisor is exposed to a high penalty payment, the standard product provider A exhibits higher optimal marketing expenses in comparison to the specialized product provider B. In this case, regulation may backfire with respect to consumer matching with products, since in the scenario of (4.25) consumer matching may be worse if product providers engage in marketing in comparison to the case without any marketing.

4.5 Conclusions

In this article, we provide a normative framework to analyze competition between product providers where commissions are banned but consumers can only be reached through an advisor. Our model indicates, that in markets with sufficiently differentiated products it is not beneficial for product providers to compete through respective product prices. However, if advisors face transaction costs for persuading consumers of a product, product providers may compete indirectly through marketing channels in order to influence the advisor's product recommendation. Whether marketing measures may serve as a competitive tool for product providers crucially depends on its effectiveness. If the effectiveness is sufficiently high, the extend to which product providers engage in marketing depends on various factors. If the advisor has to fear a high penalty subsequently of an unsuitable product recommendation, both product providers exhibit low expenses on marketing measures and vice versa. However, a high margin pushes expenses for marketing measures for both product providers. Additionally, a product provider has a greater incentive to engage in marketing if his competitor possesses high expenses in marketing measures, since these can serve as a strategic tool for competition. Comparatively, there arises different incentives for product providers to engage in marketing dependent on their market share. Especially, if one product provider possesses only a small market share in comparison to his competitor, his incentives to engage in marketing are higher, since he can reach a higher fraction of consumers with marketing measures, in comparison to his competitor. Hence, a small product provider extends his market share through marketing measures and possesses in equilibrium a higher market share in comparison to a scenario without any marketing.

As a consequence, marketing measures may not only serve as a competitive tool for product providers, but may also improve matching of products and consumers. This leaves the question open for future research, whether this is desirable from a welfare

perspective, especially in comparison to a commission based remuneration system for advisors. If marketing measures are used as a strategic tool, but have a decreasing marginal effect, our model indicates, that there will be an oversupply of marketing expenses in equilibrium compared to the welfare maximizing level. Commissions may also serve as a competitive tool for product providers, but at the same time also compensates the advisor. Therefore, commissions may serve for the same purpose as marketing expenses, but from a welfare perspective, commissions can be seen as transfers rather than costs. Consequently, the effectiveness of marketing measures will play a key role in a welfare analysis.

Appendix A. Proofs

Proof of Proposition 4.1. Uniqueness of product providers' best responses resulting from (4.19) and (4.20) and the fact, that they intersect at most once, follows from $\frac{\partial g(q^*)}{\partial q^*} > 0$, $\frac{\partial p_A(\hat{q}^*)}{\partial \hat{q}^*} > 0$ and $\frac{\partial p_B(\hat{q}^*)}{\partial \hat{q}^*} < 0$. Given that prices are optimally set according to (4.21) and (4.22), strategic complementary of marketing expenses m_i, $i = A, B$ follows from

$$\frac{\partial \frac{\partial k(m_A)}{\partial m_A}}{\partial m_B} = \frac{\partial \frac{-2d}{p_A g(q^*) G\left(\frac{1}{2}\right)}}{\partial m_B} = \frac{\frac{\partial g(q^*)}{\partial q^*}\left(1 - G\left(\frac{1}{2}\right)\right)\frac{\partial k(m_B)}{\partial m_B}}{p_A(\hat{q}^*) G\left(\frac{1}{2}\right)\left(g(q^*)\right)^2} < 0 \tag{4.26}$$

and

$$\frac{\partial \frac{\partial k(m_B)}{\partial m_B}}{\partial m_A} = \frac{\partial \frac{-2d}{p_B g(q^*)\left(1-G\left(\frac{1}{2}\right)\right)}}{\partial m_A} = \frac{\frac{\partial g(q^*)}{\partial q^*} G\left(\frac{1}{2}\right)\frac{\partial k(m_A)}{\partial m_A}}{p_B(\hat{q}^*)\left(1 - G\left(\frac{1}{2}\right)\right)\left(g(q^*)\right)^2} < 0 \tag{4.27}$$

with $\frac{\partial k(m_i)}{\partial m_i} < 0$ and $\frac{\partial^2 k(m_i)}{\partial m_i^2} > 0$ for $i = A, B$. Uniqueness of equilibrium follows from consistency of beliefs, that is, $\hat{q}^* = q^*$ and from (4.7).

Given equilibrium prices with $p_A(q^*)$ and $p_B(q^*)$, differentiating product providers' profits and evaluating at $m_i = 0$, $i = A, B$ yields

$$\left.\frac{\partial \pi_A}{\partial m_A}\right|_{m_A=0} = p_A(q^*) g(q^*) \left(- \frac{G\left(\frac{1}{2}\right) \left.\frac{\partial k}{\partial m_A}\right|_{m_A=0}}{2d} \right) - 1 \tag{4.28}$$

and

$$\left.\frac{\partial \pi_B}{\partial m_B}\right|_{m_B=0} = p_B(q^*) g(q^*) \left(- \frac{\left(1 - G\left(\frac{1}{2}\right)\right) \left.\frac{\partial k}{\partial m_B}\right|_{m_B=0}}{2d} \right) - 1. \tag{4.29}$$

If (4.28) and (4.29) are strictly positive, marketing expenses of product providers A and B, respectively, are strictly positive. Beginning with product provider A, $\left.\frac{\partial \pi_A}{\partial m_A}\right|_{m_A=0} > 0$ is equivalent to

$$\left.\frac{\partial k}{\partial m_A}\right|_{m_A=0} < \frac{-2d}{p_A(q^*) g(q^*) G\left(\frac{1}{2}\right)} = k^*(d, p_A(q^*)). \tag{4.30}$$

Given, that marketing expenses are strictly positive, it holds $p_A(q^*) > 0$ in equilibrium, since marketing expenses are paid by earnings through a strictly positive product price. Consequently, it holds

$$p_A(q^*)g(q^*)G\left(\frac{1}{2}\right) > 0. \tag{4.31}$$

Thus, for equilibrium prices, it holds

$$\frac{\partial k^*(d, p_A(q^*))}{\partial d} = \frac{-2}{p_A(q^*)g(q^*)G\left(\frac{1}{2}\right)} < 0 \tag{4.32}$$

and

$$\frac{\partial k^*(d, p_A(q^*))}{\partial p_A(q^*)} = \frac{2d}{p_A(q^*)^2 g(q^*)G\left(\frac{1}{2}\right)} > 0. \tag{4.33}$$

Analogous, $\frac{\partial \pi_B}{\partial m_B}\Big|_{m_B=0} > 0$ is equivalent to

$$\frac{\partial k}{\partial m_B}\Big|_{m_B=0} < \frac{-2d}{p_B(q^*)g(q^*)\left(1 - G\left(\frac{1}{2}\right)\right)} = k^*(d, p_B(q^*)). \tag{4.34}$$

and analogous to (4.31) it holds

$$p_B(q^*)g(q^*)\left(1 - G\left(\frac{1}{2}\right)\right) > 0. \tag{4.35}$$

Hence, also $\frac{\partial k^*(d,p_A(q^*))}{\partial d} < 0$ and $\frac{\partial k^*(d,p_A(q^*))}{\partial p_A(q^*)} > 0$ holds. The remaining assertions are shown by the backward analysis in section 4.3, using $\hat{q}^* = q^*$ in equilibrium. ■

Proof of Proposition 4.2. As a composition of continuous functions, q^* is a continuous function of d. From (4.8) it follows $\lim_{d\to\infty} q^* = \frac{1}{2}$ irrespective of both product providers' marketing expenses. Thus, (4.25) implies, that optimal marketing expenses, characterized by (4.19) and (4.20) are higher for product provider A in comparison to product provider B, if the penalty d is sufficiently high.

For $m_A = m_B = 0$, (4.8) directly implies $\lim_{d\to 0} q^*|_{m_A=m_B=0} = 0$. However, optimal

marketing expenses, characterized by (4.19) and (4.20) depend crucially on product prices, since a higher margin leads to higher optimal marketing expenses. Considering equilibrium prices, $p_A(q^*) < p_B(q^*)$ holds, if $E\left[v_A\left(q\right) \mid q \geq q^*\right] < E\left[v_B\left(q\right) \mid q < q^*\right]$ holds. L'Hôpital's rule yields

$$\lim_{q^* \to 0} E\left[v_B\left(q\right) \mid q < q^*\right] = \lim_{q^* \to 0} \int_0^{q^*} v_B(q) \frac{g(q)}{G(q^*)} dq = \lim_{q^* \to 0} \frac{v_B(q^*) g(q*)}{g(q*)} = v_h \qquad (4.36)$$

whereas (4.6) implies $\lim_{q^* \to 0} E\left[v_A\left(q\right) \mid q \geq q^*\right] < 0$. Hence, for a sufficiently small penalty d, product provider B charges in equilibrium a higher price than product provider A. Since $G\left(\frac{1}{2}\right) < 1 - G\left(\frac{1}{2}\right)$, (4.19) and (4.20) imply, that in this case, product provider B's marketing expenses are strictly higher than those of product provider A. Continuity of q^* implies then the existence of a penalty d^* for which marketing expenses of both product providers are equal. Considering the first derivative of q^* at this point yields

$$\left.\frac{\partial q^*}{\partial d}\right|_{d=d^*} = \frac{\left(1 - 2G\left(\frac{1}{2}\right)\right) k(m_A)}{2d^2} > 0. \qquad (4.37)$$

Thus, for given optimal marketing expenses $m_A = m_B$, a marginal decrease in d leads to a decrease in q^*. However, in equilibrium, optimal marketing expenses are adjusted to q^* and are driven by optimal product prices $p_A(q^*)$ and $p_B(q^*)$. Since, conditional product valuations are always higher than marginal valuations, i.e. $E\left[v_B\left(q\right) \mid q < q^*\right] > v_B(q^*)$ and $E\left[v_B\left(q\right) \mid q < q^*\right] > v_B(q^*)$holds, $\frac{\partial g(q)}{\partial q} > 0$ implies an increase in product provider B's optimal product price in equilibrium $p_B(q^*)$ and a decrease in product provider A's optimal product price in equilibrium $p_A(q^*)$ with a decrease in q^* and vice versa. Thus, for $d < d^*$, optimal marketing expenses (4.19) and (4.20) are higher for product provider B in comparison to product provider A and for $d > d^*$ optimal marketing expenses are higher for product provider A in comparison to product provider B. As a consequence, d^* is unique. ■

Chapter 5

General Conclusions

Many consumers seek advice when making important purchase decisions for complex financial products like mortgages, retirement savings or life insurance. Thus, the quality of advice has a large impact on consumers' wealth, especially in the retirement age. Various policy interventions aim at preventing consumers from inadequate advice. In particular, the compensation of financial advisors is subject to intense discussions. This dissertation contributes to the literature by theoretically analyzing effects of fee-based and commission-based remuneration systems in markets for financial advice.

To this end, chapter 2 aims at making reasonable assumptions about consumers and financial advisors and at analyzing how these assumptions affect the advice process. In particular, it is assumed that consumers demand for reasons and explanations, why a particular product should suit their needs, when receiving a product recommendation. As a consequence, advisors face transaction costs for recommending a product, since a product cannot be simply recommended, but also, reasonable explanations for the product selection have to be provided to consumers. These transaction costs are considered as persuasion costs. The theoretical model shows, that advice might not be solely distorted by commission payments, but also by these persuasion costs. Therefore, advice can also be biased in the case, that the advisor is exclusively compensated by consumers. The

extent to which advice is biased depends crucially on market shares of product providers and on potential reputational costs for the advisor enforced by market discipline.

In chapter 3, quality of advice and total welfare are theoretically analyzed under fee-based and commission-based remuneration systems. The benchmark model is similar to that of chapter 2 and shows, that under a fee-based remuneration system, competition through product prices is not beneficial for product providers and consequently no competition takes place in equilibrium. A modified model, where the advisor is compensated by product providers via commission payments shows, that product providers have different incentives to compete through commission payments in dependency of market shares, consumers' product valuations and potential reputational costs for the advisor. If the difference of commission payments for different products is sufficiently small in equilibrium, a commission-based remuneration system leads to a strictly higher total welfare in comparison to a fee-based remuneration system due to a higher fraction of consumers, who are matched with their best suitable product. Otherwise, total welfare is higher under a fee-based remuneration system.

Chapter 4 considers competition between product providers in markets, where products cannot be sold directly to consumers and commission payments are banned by regulation. The theoretical framework is based on chapter 2 and considers persuasion costs in the advice process as a central assumption. It is analyzed, whether competition between product providers is possible through two channels: Competition through product prices and competition through informative advertising. In line with chapter 3, it is shown, that competition through product prices does not take place in equilibrium. However, informative advertising may serve as a channel for competition between product providers, if the effect of steering advice is sufficiently high. The intuition behind is, that product providers may provide consumers with relevant product information, so that the advisor faces lower persuasion costs for an advertised product. By this, product providers are able to steer advice towards an advertised product. Analogous to

commission payments, product providers' incentives to engage in informative advertising depend on market shares, consumers' product valuations and potential reputational costs for the advisor. If market shares are uneven, consumers' product valuations are sufficiently high and potential reputational costs for the advisor are low, it is shown, that competition through informative advertising leads to an increased fraction of consumers, who are matched with their most suitable product.

In summary, this thesis provides detailed insides of an advice process and the affiliated interaction of driving factors which influence the quality of advice. The underlying analysis of this thesis shows, that a fee-based remuneration system for financial advisors does not constitute a universal remedy for biased advice and total welfare losses in the corresponding markets. Therefore, regulators should carefully consider, if a ban on commission payments is a suitable tool for achieving unbiased advice. In some cases, such a regulatory intervention may backfire and lead to a higher bias in advice and as a consequence to a lower total welfare. Based on this thesis, future research could address the impact of persuasion costs on further important steps in the advice process like consumer canvassing, risk classification of consumers and the provision of these information to product providers.

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