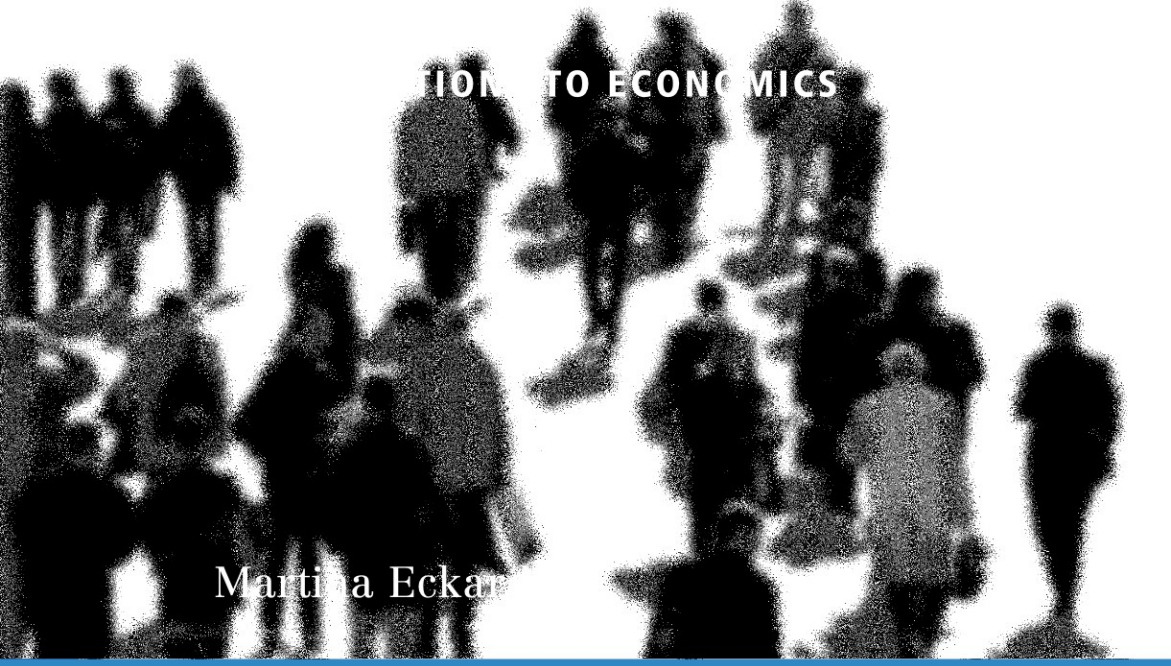

Martina Eckardt

Insurance Intermediation

An Economic Analysis of the Information Services Market

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Werner A. Müller
Martina Bihn

Author

PD Dr. Martina Eckardt
Witten/Herdecke University
Faculty of Management and Economics
Alfred-Herrhausen-Straße 50
58448 Witten
Germany
martina.eckardt@uni-wh.de

Library of Congress Control Number: 2007921530

ISSN 1431-1933

ISBN 978-3-7908-1939-7 Physica-Verlag Heidelberg New York

Physica-Verlag is a part of Springer Science+Business Media

springer.com

Production: LE-TEX Jelonek, Schmidt & Vöckler GbR, Leipzig
Cover-design: WMX Design GmbH, Heidelberg

SPIN 11955139 134/3100YL - 5 4 3 2 1 0 Printed on acid-free paper

Contents

1 Intermediaries in the Insurance Market

1.1 Introduction

Due to the demographic changes ahead and to persistent labor market problems the social security systems of most EU member states are under increasing pressure. For at least two decades, both at the national and at the EU level reforms have been on the political agenda. It becomes more and more obvious that the post-war social security systems are no longer viable and that fundamental changes are necessary. This holds true especially for the so-called Bismarck type of social security systems, where most of the social risks like old-age, illness, disability or unemployment are covered by public schemes. In these countries, until recently private insurance against these risks has been only of minor importance. However, regulatory reforms already carried out, currently under way or in discussion for implementation in the near future strengthen the weight of private insurance schemes.

In addition, the introduction of a common insurance market in the EU has led to fundamental changes in national insurance markets. By applying a liberal approach in regulating the insurance industry, countries like Germany or France introduced extensive deregulations in their formerly strictly regulated insurance markets. Although there are still no truly integrated EU-wide insurance markets, there is, nevertheless, more competition within the individual markets both with respect to prices and to product differentiation. Increasing product heterogeneity has two conflicting effects. On the one hand, it allows consumers to find products, which better match their preferences, thus increasing consumer welfare. On the other hand, it reduces market transparency, which may allow insurance companies to realize monopolistic profits. In this respect it decreases consumer welfare.

Hence, also from a social policy point of view, the working of private insurance markets comes into focus. Insurance markets are characterized by incomplete information on both market sides, which may easily induce moral hazard behavior and adverse selection. Furthermore, insurance products for old-age, illness, disability or unemployment are complex ex-

perience and credence goods. Insurance contracts are often of a very long-term nature, which gives rise to additional uncertainty. With the growing importance of private protection against temporary or permanent loss of income due to these risks, consumers are in need of comprehensive information about the kind and scope of risks covered by a policy to purchase adequate insurance.

A number of institutions have evolved to mediate between consumers and insurance companies. In particular, insurance intermediaries, like exclusive agents or insurance brokers, help to ease coordination and to further market transactions. They take an important position as match-makers between the supply and demand sides on insurance markets. On the one hand, they provide distribution and marketing services for insurance companies. On the other hand, they supply informational and advisory services for consumers. Insurance intermediaries assist in concluding an insurance contract by economizing on information and transaction costs. They provide low cost information to consumers about their risk profiles, insurance needs and suitable insurance products, thus reducing complexity for consumers.

However, while insurance intermediaries in principle contribute to enhancing transparency in insurance markets, the market for insurance intermediaries is itself characterized by imperfect information. Consumers act under incomplete and asymmetric information about the quality of the information and advisory services provided by insurance intermediaries. These services are again experience and credence goods. A consumer cannot assess the service quality provided by competing insurance intermediaries in advance, but only after information and advice have been "consumed". However, even this is often barely possible. Especially for long-term insurance products like old-age or disability insurance, the quality of the information and advice given can be evaluated only after the insured risk has actually occurred – which often takes place decades later. Common business practices that have evolved over time add to the lack of transparency. This holds true in particular for remuneration practices and disclosure requirements about business relations between intermediaries and insurance companies. Consequently, consumers have only very restricted information about potential conflicts of interest and potential bias in the information and advice given by insurance intermediaries.

The objective of this study is to analyze both from a theoretical and empirical point of view the contribution of insurance intermediaries in assisting consumers in making well-informed purchase decisions. Due to the complexity of the issue, we concentrate on positive aspects. In the following, we first address the particularities of consumers' decision-making problems in insurance markets (*section 1.2*) to discuss then in a more gen-

eral way the potential net gains from intermediated exchange (*section 1.3*) and to describe the overall market microstructure in insurance markets (*section 1.4*).

Chapter 2 seeks an answer to the question why there are insurance intermediaries at all. Based on a general approach to information intermediation (*section 2.1*), we develop a search theoretical model of insurance intermediation, which helps to explain the benefits that result from the existence of insurance intermediaries (*section 2.2*).

In *chapter 3* we then analyze the working properties in the market for insurance intermediation. We use industrial organization theories to study market conduct and performance in more detail. Starting with the assumption that consumers view the services of insurance intermediaries as being close substitutes, we analyze the resulting consequences on market entry and on the degree of horizontal product differentiation (*section 3.1*). In a next step we explore the effect of consumers having only incomplete information about the quality of the information services provided by different insurance intermediaries on market behavior and outcome (*section 3.2*). We consider also the impact of differences in consumers' information level. Finally, we extend the theoretical analysis to encompass also asymmetric information of consumers about the true content of the information supplied by intermediaries (*section 3.3*). Again, the resulting consequences on market behavior and outcome are discussed.

In order to test the main implications of the theories discussed until then, in *chapter 4* we provide an empirical study of the largely unregulated German market for insurance intermediaries. After a short overview of the existing empirical literature (*section 4.1*) we describe the hypotheses to be tested, the data and the methodology (*section 4.2*) and then present and discuss the econometric results (*section 4.3*). A summary of the main insights is given in *chapter 5*.

1.2 Incompletely Informed Consumers in Personal Insurance Markets

The starting point of our analysis entails the consumers, who seek personal insurance against the permanent or temporary loss of income due to old-age, illness, inability or unemployment. For a rational consumer an optimal insurance cover is that which fits best her preferences and needs given her income and the substitution products available. To conclude such an optimal insurance contract, ideally, a consumer is in need of comprehensive information about a lot of factors that influence the performance of the in-

surance product over the policy term. To this extent, she is in need of expert knowledge to correctly process and assess the information gathered. Concluding a sub-optimal contract may lead to insufficient insurance protection and/ or to financial loss due to too high-priced policies, thus, reducing overall consumer welfare.

The transaction process between the consumer and the insurance company comprises the following stages (Fig. 1.1). After having recognized her need for insurance protection, the consumer will seek information about the optimal policy given her preferences and needs and evaluate the possible alternatives. If contract negotiations are successful, a contract is concluded between the consumer and the insurance company. When the need for insurance coverage is not limited to a certain period but persists over a longer time span, insurance contracts often are of a long-term nature. This, however, requires to regularly controlling the insurance contract. Changes in the circumstance of the insured consumer may require adaptations of the insurance contract. In this case, renegotiations are carried out with the present contract being perhaps modified or even terminated. If the insured event occurs, then the contract is executed with loss settlement taking place. Depending on the insured risk and on the type of contract, this does not automatically lead to the termination of the insurance contract. However, provisions and clauses could be part of the original policy according to which a loss triggers renegotiations and, thus, modifications of the original contract.

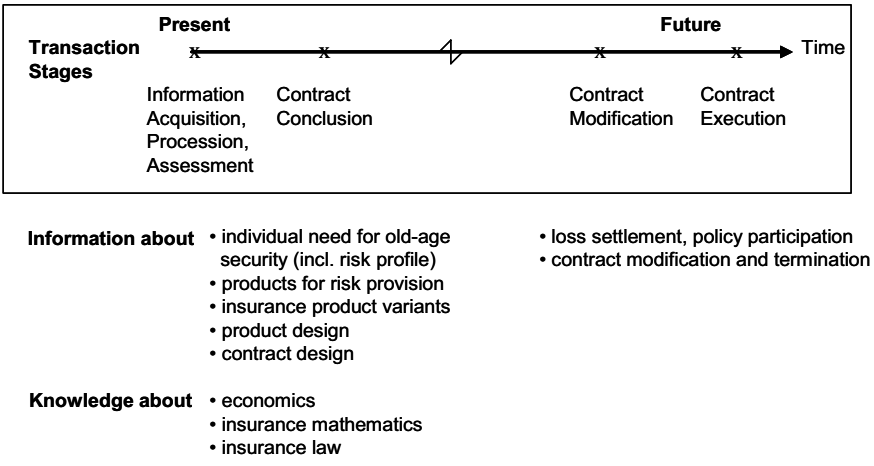

Fig. 1.1. Relevant Information in the Transaction Stages

For a consumer to make a rational decision about the optimal insurance cover, ideally, comprehensive information about a lot of variables would be necessary to correctly assess the quality of the insurance contract on which she finally concludes. The decision-making problem is further complicated in that a consumer should also take into account information which arises only after contract conclusion and, thus, will be available not before future events have taken place. In this respect all information referring to contract execution and to contract modification is of particular relevance. To correctly evaluate the information gathered, the consumer is in need of the necessary knowledge. In many respects, this requires special or expert knowledge and skills. To assess the quality of policies offered by different insurance companies, it is not sufficient to compare simply the premiums to be paid. These have to be contrasted with the performance in case of loss occurrence. To this extent, knowledge about and skills in risk management as well as in insurance mathematics are necessary. Besides, contractual clauses and General Conditions of Insurance are widely used in insurance contracts to cope with the uncertainty about future states of the world. Thus, to correctly assess the economic significance of such specific contractual provisions, legal knowledge about the meaning and the resulting legal consequences is also essential.

To illustrate the complexity a consumer faces, who wants to buy insurance, in the following, we show in more detail the *ex ante* and *ex post* information necessary to make a fully informed decision.[1] It is assumed that a consumer wants to purchase insurance protection against the risk of insufficient income due to longevity. After having recognized the need to take financial provisions, firstly, the consumer should determine her financial goals and make a risk analysis to detect whether there is a gap between her desired income after retirement and the prospective income according to her old-age provisions taken so far. To this extent, she should compare the current value of her present insurance and financial assets with the amount needed for attaining these goals. In particular, she should take into account her life expectancy or mortality rate, the long-term rate of inflation and possible changes in the structure of demand in old age. Secondly, she should decide on the composition of her portfolio for old-age protection. After having identified the necessary amount of additional financial provisions, she is in need of information about the presently available types of financial assets, like bonds, shares, investment funds, pension funds, life insurance, annuities or real estate. The advantages and disadvantages in terms of profitability, safety and liquidity should be analyzed for each of

[1] Note, however, that due to positive search costs, such a fully informed decision would not be optimal.

them. If different financial assets are linked to different tax advantages and/or if they depend on different social policy regulations, then these aspects should be included as well.

If the consumer decides to purchase insurance, she should estimate the amount of coverage needed and decide on the best type of policy to meet her needs. Thus, she should inform herself about the different types of old-age insurance products available, like cash-value life insurance or annuities. She should dispose of information concerning exactly which risks are covered by each product variant offered (only old-age or also disability, death or survivor benefits?), how premiums are calculated, which costs are included, how contributions and benefits are designed (are they level or do they rise or decline over time?) and whether dividends are paid. In case of a participating life insurance policy, information on how the relevant profits are calculated is also needed. The consumer should additionally acquire information about the (dis-)advantages of the various policy designs. She should know what benefits are guaranteed, what the main factors in calculating the surplus are or what percentage of the income earned by the savings component of the premium accrues to the consumer. In general, for all long-term insurance policies, which involve reserves for future benefits, information about the long-term business conduct of the respective insurance company should be taken into account. In this case the solvency and financial strength of the insurance company issuing the policy is of particular importance for the consumers' long-term insurance protection. It is influenced both by corporate policy (like investment decisions and the risk aversion of the management) as well as by exogenous factors like financial market regulations, market risks and the general economic development over time.

Finally, information about how an insurance company acts in case the insured event occurs is also important for making a fully informed decision. The consumer is in need of information on whether claim settlement takes place quickly, whether there are administrative obstacles or whether an insurance company has a reputation for denying coverage so that it becomes likely that a legal dispute will arise. In addition, during the contract period circumstances can change, which may require an adaptation of the contract. For example, due to changes of income caused by unemployment or divorce, premiums may become so high so that it becomes optimal to discontinue payments temporarily or permanently. In this case charges for contract modification or termination as well as the surrender value of a policy must be considered. Besides, the consumer should inform herself about the procedures used by different insurance companies for contract adaptation. Therefore, she should compare the contract design of different policies because differences in wording, contract clauses and insurance

terms and conditions can imply large variations in costs when modifying a contract. Finally, the existence and costs of conflict settlement procedures, like out-of court redress, should also be considered for the case that no agreement might be reached in case of fundamental disagreement about the proper meaning of the contract.

After having collected all this information, the consumer should evaluate the various alternatives in order to choose the best one available. This, again, requires special knowledge and skills in the relevant fields of law and economics.

The traditional rational choice model assumes that consumers have complete information about all relevant aspects of a transaction. However, in reality consumers are characterized by bounded rationality, incomplete information and limited cognitive capacities, which aggravate the problem of information acquisition, procession and assessment (North 1990; Williamson 1985). Consumers must not only spend search costs and invest in special knowledge and skills, but they also evaluate information in the light of subjectively held theories and beliefs about cause-and-effect relations which is in contrast to the assumptions of the rational choice model. Moreover, they use problem-solving heuristics and routines to make decisions. Therefore, it is by no means certain that the alternative eventually chosen will really be the best available from an objective point of view with complete information. In principle, workable competition can alleviate the negative effects of sub optimal initial choices by consumers to a certain degree. While consuming the goods and services purchased, consumers acquire additional information about their true value. If the services do not fulfill consumers' needs satisfactorily consumers will turn to another product. Given competition among suppliers, therefore, over time market performance should improve despite consumers' incomplete information and cognitive limits.

However, insurance products show some particularities that limit competition. Insurance companies are financial intermediaries that provide insurance protection. An intermediary is defined as

> "an independent, profit-maximizing economic agent mediating between two market sides in presence of market imperfections. Intermediation is the bridging of incompatibilities between the two (market) sides involved in a transaction by transformation of output attributes of the supply market side to appropriate input attributes of the demand market side" (Rose 1999, 51).

In economic theory, intermediation is discussed especially in the fields of trade, finance and information economics (Bhattacharya and Thakor 1993; Rose 1999; Spulber 1998). Financial intermediaries balance incompatibilities between payments among investors and beneficiaries over time.

They perform qualitative asset transformations (that is claims transformation with respect to duration, size, risk, and liquidity) and provide brokerage services, like matching and transacting (Bhattacharya and Thakor 1993; Gerke and Pfeufer 1995, 732–733; Neuberger 1998, 16–23). Insurance companies perform financial intermediation services by selling commitments in order to assume risks in the future for the consumer against the premium paid by the latter. By bringing together individuals, who are exposed to the same risks, and by pooling their assets, these risks are diversified, thus reducing the individual costs of loss protection. To this extent, insurance companies carry out various transformational services as well as brokerage services (Table 1.1).

It proves to be very difficult for consumers to evaluate the differences concerning the quality of the financial intermediation services provided by insurance companies. Generally, services differ from goods in that they are intangible, heterogeneous, perishable and simultaneously produced and consumed (Zeithaml and Bitner 2003, 20–23). In contrast to other goods it is also difficult to assess the quality of the insurance product even after having purchased it, since insurance products are complex experience and credence goods (Darby and Karni 1973; Hirshleifer 1973; Nelson 1970). Unlike inspection goods, their main attributes cannot be evaluated before purchasing a policy. However, it is also not possible for a consumer to assess how well she is protected by the policy she had purchased sometime ago before the insured event actually occurs. Besides, optimal insurance cover also depends on individual attributes as well as on the behavior of the insured consumers. Therefore, insurance companies performance further relies on the co-operation and future behavior of the insured person herself.

Table 1.1. Transformational Services of Insurance Companies

Transformation of …	Intermediary Activity
Lot size	Aggregation of small size premiums to large “pools”
Risk	Balance of diverging attitudes towards risk by means of • risk classification • risk diversification • risk allocation
Term	Transformation of short term invested capital into long-term funds
Information	Monitoring and control of insured persons (to prevent moral hazard behavior)

Source: Following Gerke/ Pfeufer (1995, 732–733).

Accordingly, an insurance product shows pronounced experience good qualities because its properties can only be evaluated by consuming it. Above that, some types of insurance policies exhibit strong credence good characteristics (Bosselmann 1994, 97–102; Eisen 1989, 163; Zeithaml and Bitner 2003, 36–37). In this case, the consumer is not able to reliably assess the quality of her policy even after having consumed the protection thus provided. This holds especially for long-term personal insurance like cash-value life insurance, annuities or health insurance for which dividends are paid or which are participatory. Usually, the insured person cannot decide whether the surplus earned by the insurance company is the best possible one or not given the relevant economic and financial determinants.

However, the experience and credence goods characteristics of insurance protection services do not set limits to *ex post* competition alone. Competition among insurance companies is further limited if there are lock-in effects (Farrell and Shapiro 1988; Klemperer 1987; Schlesinger and von der Schulenburg 1991). In particular, regarding long-term insurance contracts, special product and contract design can lock-in consumers to a particular insurance company. Such lock-ins result from high switching costs since it becomes costly to terminate a policy in favor of a better offer. Especially for policies, which include a savings component or for which reserves are booked, a premature termination usually implies such losses combined with higher premiums to be paid for the new policy because of the insured's advanced age and additional risks that there is no effective competition after contract conclusion.

In summary, insurance markets are characterized by overall low transparency, which limits both *ex ante* and *ex post* competition. Consumers lack complete information about the utility of the services provided by insurance companies.[2] Due to high information costs they have only a limited overview about the product variants offered. Besides, the experience and credence goods characteristics of insurance policies and their long-term nature add further uncertainties. In this way market outcomes can be severely affected. Consequently, competition on insurance markets is limited both before and after contract conclusion. In the following section, the

[2] Insurance companies also act under incomplete and asymmetric information about consumers' characteristics and actions. This may result in adverse selection and/ or moral hazard behavior. For an overview of the relevant issues and further references to this well-explored problem in insurance markets, see Chiappori (2000), Crocker and Snow (2000), Dionne (2000), Dionne, Doherty and Fombaron (2000), Winter (2000), Zweifel and Eisen (2000, 291–344).

impact of intermediaries on the transparency of insurance markets and, thus, for better market performance is analyzed.

1.3 Net Gains from Trade through Intermediated Exchange

As has been shown above, due to its complexity insurance coverage causes a great demand for information about insurance product and contract design as well as about loss settlement and investment behavior of insurance companies. Because of the long-term nature of most personal insurance, information must be gathered, processed and assessed repeatedly. Moreover, in order for the whole transaction to take place other activities beyond information search must be carried out. Bargaining and administrative activities, which arise whenever the terms of the insurance contract are (re-)negotiated and/or loss settlement takes place, are the most important ones. Like information acquisition and assessment, these activities also require special knowledge and skills. Thus, they cause costs for the necessary investment and for the time spent in carrying them out. Taken together these costs add up to the total transaction costs.

These activities can be performed either personally or with the help of intermediaries, who are specialized in providing such informational, bargaining and administrative services. Generally, consumers and insurance companies will turn to intermediaries whenever intermediated exchange creates greater net gains from trade than direct exchange (Spulber 1998, 256–286). Intermediaries can realize such higher net gains by increasing the gains from trade or by reducing transaction costs.

Suppose that under direct exchange the value the insured consumer yields is V^D, which equals her willingness to pay given the opportunity costs C^D of the insurance company (Spulber 1998, 261–262). For the transaction to come about, the insured consumer must spend the transaction costs T_{Con}^D and the insurance company the transaction costs T_{Ins}^D. Under intermediated exchange, the value realized would be V^I for the consumer with the opportunity costs C^I of the insurance company. In this case the transaction costs of the consumer amount to T_{Con}^I and those of the insurance company to T_{Ins}^I. Generally speaking, consumers and insurance companies benefit from using the services of intermediaries when the latter raises the net gains from trade, so that

$$\left(V^D - C^D\right) - \left(T^D_{Con} + T^D_{Ins}\right) < \left(V^I - C^I\right) - \left(T^I_{Con} + T^I_{Ins}\right). \quad (1.1)$$

If there are no differences in the gains from trade under direct or intermediated exchange, so that $(V^D - C^D) = (V^I - C^I)$, intermediaries increase net gains from trade when they cause lower transaction costs, i.e. $\left(T^I_{Con} + T^I_{Ins}\right) < \left(T^D_{Con} + T^D_{Ins}\right)$.

Reasons for lower transaction costs of intermediated exchange are (1) coordination cost savings and positive network externalities, (2) absolute cost advantages because of division of labor, specialization and learning effects over time as well as (3) economies of scale and scope with respect to the fixed costs of a transaction (Rose 1999, 58–66; Spulber 1998, 262–266).

Coordination costs are lower in intermediated than in direct exchange since the number of contacts between potential trading partners is reduced by bringing in an intermediary (Fig. 1.2). In this case, not all *m* consumers have to contact all *n* insurance companies (and vice versa) to collect the necessary information about their products and contract terms. By involving an intermediary the number of marketing channels is reduced due to the fixed costs associated with coordinating potential trading partners. This leads to further cost reductions because of the increasing returns realized. Above that, there are also positive network externalities if the intermediary acts as a communication center (Baligh-Richartz effect, Rose 1999, 60).

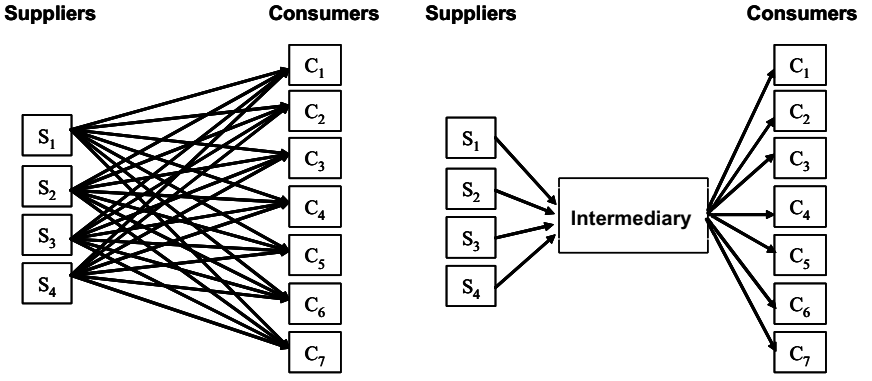

Fig. 1.2. Coordination Cost Reductions in Intermediated Exchange (Rose 1999, 60, Fig. 8)

In contrast to direct exchange, intermediaries in insurance markets economize on transaction costs over the whole transaction process by providing informational and advisory services, bargaining services and admin-

istrative services at lower costs (Table 1.2). Such transaction cost reductions result from higher productivity as a consequence of specialization and division of labor, learning effects over time and economies of scale and scope. Whereas in direct exchange consumers perform the activities related to the insurance transaction only for this particular transaction, intermediaries in insurance markets perform these activities more frequently and for a higher volume of transactions. In this manner gains can be realized by assisting in searching and matching, negotiating, monitoring, and executing insurance transactions. While single consumers use investment in human capital, search technologies or expertise to increase the productivity of transactional activities only for the transaction at hand, intermediaries can repeatedly use the same information. In this way, economies of scale and scope are obtained. All in all, intermediaries in insurance markets can improve market transparency between the two market sides at lower costs than under direct exchange.

Table 1.2. Sources of Transaction Cost Reductions from Intermediation

Transaction Stages	Intermediary Service	Cost Reduction
Searching and matching	• direct sales of information • matchmaking • market-making	• search costs • information costs • opportunity costs of time
Availability of products and immediacy	• compensation of variances in demand and supply	• opportunity costs of time
Negotiating and Contracting	• strong bargaining position • exploitation of differences in contract terms between supply and demand market side • to standardize contracts	• negotiation costs • information costs • administrative costs • opportunity costs of time
Monitoring and Guaranteeing	• expertise in determining product and service quality • cross-sectional and temporal reuse of information • guaranteeing high product quality	• information costs • monitoring and control costs • costs resulting from uncertainty • investment in expertise

Source: Following Rose (1999, 65, Table 6).

However, intermediaries not only economize on transaction costs, but also cause additional search, agency or delegation costs. Since, in general, not only one, but a large number of intermediaries exist, both insurance

companies and consumers must spend resources to decide with what intermediary to cooperate. While intermediaries assist in reducing incomplete information and mitigating the problem of asymmetric information between insurance companies and consumers, the market for insurance intermediaries is itself characterized by incomplete and asymmetric information with respect to the characteristics, actions and qualities of intermediaries as well as the services provided by them. Thus, intermediated exchange also requires spending transaction costs for information search and bargaining and administrative activities in order to contract with intermediaries. Above that, agency costs for monitoring the performance of insurance intermediaries must be incurred if there is a long-term relationship. Therefore, intermediated exchange is only advantageous if the total transaction costs net the agency costs of using an intermediary are lower than the transaction costs of direct exchange $\left(T_{Con}^{I} + T_{Ins}^{I}\right) < \left(T_{Con}^{D} + T_{Ins}^{D}\right)$. However, even when intermediaries entail the same transaction costs as direct exchange, such that $\left(T_{Con}^{I} + T_{Ins}^{I}\right) = \left(T_{Con}^{D} + T_{Ins}^{D}\right)$, intermediated and direct exchange coexist if intermediaries can raise the gains from trade so that $(V^I - C^I) > (V^D - C^D)$. This will be the case if they increase consumers' willingness to pay V^I and/or reduce the opportunity costs of insurance companies in providing insurance coverage against loss C^I.

Consumers' willingness to pay V^I depends on their preferences and purchasing power. It increases when their preferences are changed in such a way that they value insurance protection more compared to other goods and services or when their purchasing power is increased. Consumers' preferences can be influenced by information and marketing activities of intermediaries. As a consequence, given the usual assumptions about consumer utility functions, a higher preference for insurance coverage compared to all other goods and services would lead *ceteris paribus* to a higher individual willingness to pay for insurance coverage. This also results in a higher total market demand for insurance coverage. However, intermediaries have only a larger impact on consumers' preferences than insurance companies if they are more credible than the latter in convincing consumers of the utility of insurance coverage.

Adequate insurance cover also influences consumers' purchasing power over their life cycle (Rejda 1997, 28–30). With adequate coverage there is sufficient indemnification if an insured loss actually occurs so that no additional opportunity costs arise to restore the former financial position. Above that, the utility of the consumer is enhanced since worry and fear about the financial security of one's dependents are lower. As far as insurance companies are engaged in loss prevention, even the risk of a loss may

be reduced. Finally, due to the financial security guaranteed by adequate insurance coverage, the insured person is a better credit risk when it comes to borrowing capital. Her credit increases while the related costs are lower. Given a higher purchasing power, the general demand for insurance products also increases if insurance coverage is a normal good with a positive elasticity of income (Zietz 2003; Zweifel and Eisen 2000, 20–26). Thus, by informing about and selling adequate insurance coverage, both insurance companies and intermediaries can positively affect consumers' purchasing power and, thus, increase their willingness to pay for insurance coverage in general. If insurance intermediaries have better access to consumers and can more credibly communicate the advantages of adequate insurance coverage to consumers, they will have a stronger impact on consumers' willingness to pay V^I than insurance companies.

Beyond that, intermediaries are able to raise gains from trade if they contribute to the reduction of the opportunity costs of insurance companies C^I in producing insurance protection. The main activity of insurance companies is to transform risks by pooling the losses of a few consumers over a large group. This requires that a large number of exposure units is given and that loss is accidental and unintentional and can be determined and measured with respect to cause, time, place and amount (Rejda, 1997, 21–22). If the law of large numbers can be applied and neither adverse selection nor moral hazard occur, the opportunity costs of providing insurance coverage are low. Intermediaries contribute in reducing these costs if they are more successful in marketing insurance policies than insurance companies so that risks can be pooled over a larger number of insured persons. Moreover, if intermediaries have better information about the actual characteristics and actions of the insured persons, problems of adverse selection and moral hazard are mitigated. As a consequence, the opportunity costs of insurance provision are lower and therefore the gains from intermediated trade increase compared to direct exchange between insurance companies and consumers $(V^I - C^I) > (V^D - C^D)$, even if the same amount of transaction costs occurs. As might be readily clear, different types of intermediaries will affect consumers' willingness to pay, the opportunity costs of insurance companies in providing insurance and the transaction costs of both insurance companies and consumers to a different degree.

1.4 Insurance Market Microstructure

In contrast to most other markets, where merchant intermediaries dominate, broker intermediaries are prevalent in insurance markets (Hackett 1992; Rose 1999, 66–69; Spulber 1998). While the former acquire property rights on the goods or services traded, hold inventories, take over risks and realize their profit from the bid-ask spread, broker intermediaries are pure match-makers. They

> "facilitate the exchange of goods and services by matching buyers and sellers without taking ownership on the goods traded. Broker intermediaries are compensated for their activities by a revenue-sharing commission either paid by the seller, by the buyer or split up between the two" (Rose 1999, 68).

They coordinate supply and demand by providing information and advisory services, bargaining services and administrative services. According to Yavas (1992), broker intermediaries are superior to merchant intermediaries in markets with costly search processes and heterogeneous products as is the case in most insurance market segments (Table 1.3).

Broker intermediaries can be further classified as either transaction intermediaries or pure information intermediaries. Information intermediaries exclusively assist in collecting, processing and assessing information about potential trading partners. *Transaction intermediaries* also provide other services relevant for the transaction, like bargaining services during contract (re-)negotiation and administrative services in claim settlement. They are involved in the whole transaction process, although to different degrees. They assist in the searching for and matching of transaction partners from both market sides, in negotiating and concluding contracts and in monitoring and guaranteeing during contract execution. One of their main tasks is to bridge incompatibilities between the two market sides such that a transaction in fact takes place. They may take over additional service functions for one or both market sides. After contract conclusion, they may continue to monitor the risk situation of the consumer and inform him or her about necessary changes in her insurance cover. Besides, they also perform services for the insurance company, like premium intake or claim settlement. Since transaction intermediaries form a more personal relationship with their clients, this more direct contact allows the intermediary to acquire more specific information about the consumer.

Table 1.3. Merchant and Broker Intermediaries in Insurance Markets

	Merchant Intermediary (Market-Maker)	Broker Intermediary (Match-Maker)
Activity	• buying and selling services • acquiring property rights on services	• matching of supply and demand • coordinating buyers and sellers
Source of income	• price spread between buying and selling prices • fixed percentage commission paid either by buyer or seller or split up between the two	• fixed percentage commission paid either by buyer or seller or split up between the two
Risk of activity	• risk from buying goods when demand and selling prices are uncertain	• risk from investment in matching technology and effort
Optimal contract form if …	• demand variance is relatively low • search is relatively efficient and inexpensive • products are homogeneous	• demand variance is relatively high • search is relatively inefficient and costly • products are heterogeneous
Examples	• captive brokers • larger brokers specialized in commercial insurance lines	• sales representatives • exclusive agents • independent agents • insurance brokers

Source: Following Rose (1999, 69, Table 7).

By contrast, *information intermediaries* only provide information services. They are not actively engaged in the entire transaction process, but merely in reducing information costs. Compared to transaction intermediaries, information intermediaries provide rather general information, which is normally not designed to help a particular transaction take place. Therefore, pure information intermediaries often have no personal contact with their clients. They often use media to spread the information they have collected and processed.

Due to these differences, transaction and information intermediaries are partly engaged in separate markets. Their incomes also result from different sources. Most transaction intermediaries receive commissions or fees, which are paid either by insurance companies or by consumers. Information intermediaries are also paid by fees or charges. Some of them, however, sell information like a commodity in form of magazines and the like

demanding a price for the purchase of the media used to distribute it.[3] However, since the acquisition, procession and dissemination of information are the central activities for both transaction and information intermediaries, both can be characterized as "an independent, profit maximizing economic information processing system performing its activities (information acquisition, processing, and dissemination) on behalf of other economic agents' information needs" (Rose 1999, 79).[4]

Because transactions in insurance markets are very complex and characterized by profound lack of information on both market sides, it is not surprising that a large variety of transaction and information intermediaries is engaged in insurance markets. Fig. 1.3 gives an overview over the insurance market microstructure by depicting the main types of intermediaries which are engaged in assisting transactions in insurance markets to come about.

Transaction intermediaries are the most important actors, who facilitate exchange between insurance companies and consumers in the insurance markets. These include tied or exclusive insurance agents, joint or independent insurance agents, insurance brokers, sales organizations, banc assurance, annex distribution and captive brokers, just to name a few of the most important ones (Rejda 1997, 494–509). Exclusive insurance agents represent exclusively the products of a single insurance company, whereas joint or independent insurance agents sell policies of different insurance companies, but normally for each line of insurance only from one insurance company. Opposed to the latter, insurance brokers are independent from insurance companies and principally distribute all insurance products available on the market. While insurance agents and brokers are normally only of a small firm size, sales organizations are often organized according to the principle of pyramid or multi-level selling. They usually employ large numbers of representatives, who carry out this job only as a second job.

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[3] See for example the magazine "Finanztest" published by *Stiftung Warentest*, a German consumer protection association, or "map-report" which sells ratings and rankings concerning German insurance companies and their products, http://www.map-report.de, 25/05/05.

[4] According to Rose (1999, 41) there are three types of entrepreneurs operating in markets for information: information producers, which use information as raw material, information middleman, which sell information as a commodity, and information service providers, which "perform information processing on behalf of their clients". Although no strict assignment of these types to transaction or information intermediaries is possible, information intermediaries more often act as pure information middlemen.

Bank assurance has quite a number of different meanings (von Hülsen, Schacht and Schulz 2003; Warth 1999). Generally, it applies to the cooperation between banks and insurance enterprises. The extent of their organizational and legal integration can range from a very loose joint venture between legally and economically independent insurance and bank enterprises to a merger. The main rationale behind such a cooperation lies in the supposed advantages of using each others sales channels and customer base. Annex distribution refers to the sale of insurance policies that are complementary to other goods and services through the same distribution channels. Car dealers, who offer third-party motor insurance additional to cars or travel agencies offering withdrawal insurance, are typical for annex distribution. Captive brokers are broker firms set up by large enterprises, which procure all the necessary coverage for the enterprise, like for example commercial insurance and occupational pensions. Lawyers must also be classified as transaction intermediaries, at least to the extent that they provide assistance in carrying out an insurance contract. However, they are primarily specialized in giving legal advice about contract terms and modifications as well as in negotiating rather than in searching and evaluating information about potential trading partners.

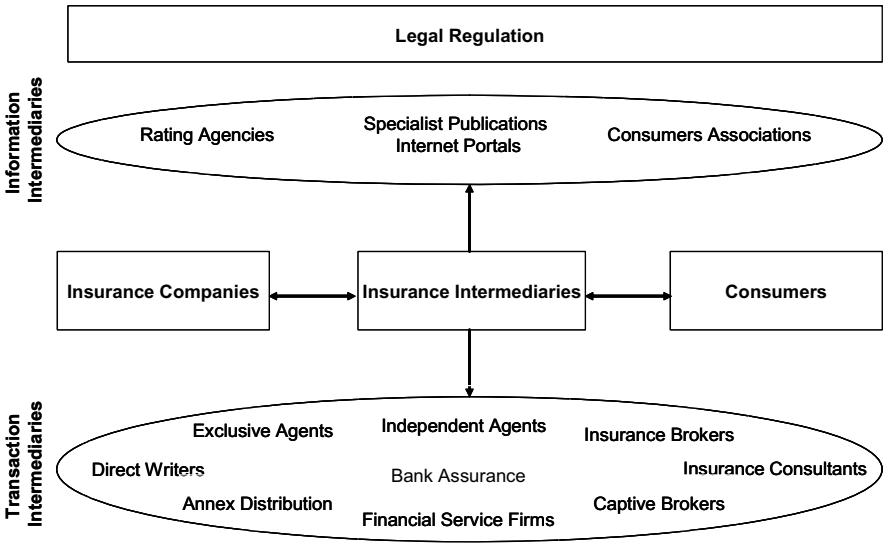

Fig. 1.3. Insurance Market Microstructure

The most important *information intermediaries* engaged in insurance markets are insurance consultants, consumer protection associations, rating agencies and pure information middleman like the business press. In con-

trast to insurance agents or brokers, insurance consultants are not engaged in the distribution of insurance products. They provide information and advisory services about policy and contract design, but they do not assist in matching potential trading partners. Consumer protections associations provide rather general information about the risks to be covered, the quality of insurance products and contracts or about important characteristics of insurance companies. Sometimes they also provide advisory services with respect to contractual issues. Rating agencies also provide relevant information on insurance companies. However, the information provided by them to consumers is more or less a by-product of their original task, which is the evaluation of company performance for investors. However, since, for the most part, personal insurance for old-age, health or disability is of a long-term nature, specific information on the market conduct of insurance companies is of importance for assessing their future performance. Finally, there are different types of pure information middlemen, who sell information about insurance products and companies like a commodity. Of particular importance are rankings about the performance of different insurance companies and their products, which are published by business media, be it in printed form, on television or on the internet. They provide general information on special features of insurance policies and their suitability for different needs and preferences. To this end, often idealized settings are used and advice is given on the extent of insurance coverage necessary in specific phases of the life cycle. Nevertheless, they also provide information on the behavior of insurance companies with respect to claim settlement or contract modification.

All transaction intermediaries, with the exception of lawyers, who are less concerned with the search for adequate trading partners, are engaged in each stage of the transaction process (Table 1.4). While they perform all of the information and advisory, bargaining and administrative services necessary to carry out a transaction, they, nevertheless, differ in many other respects. According to their specialization on particular insurance lines, consumer segments, transaction stages or services, their impact on transaction costs $\left(T_{Con}^{I} + T_{Ins}^{I}\right)$ as well as on consumers' willingness to pay V^{I} and insurance companies' opportunity costs C^{I} varies.

Table 1.4. Types of Insurance Intermediaries and Services Provided

	Types	Transaction Stages Engaged	Services Provided
Transaction Intermediaries	• tied or exclusive agents • joint or independent agents • insurance brokers • sales organizations • annex distribution • banc assurance • captive brokers	• searching and matching • negotiating and contracting • monitoring and guaranteeing	• information services • advisory services • bargaining services • administrative services
	• lawyers	• negotiating and contracting • monitoring and guaranteeing	• information services • advisory services • bargaining services • administrative services
Information Intermediaries	• consumer protection associations	• searching and matching	• information services • advisory services
	• insurance consultants	• negotiating and contracting • monitoring and guaranteeing	• information services • advisory services • bargaining services
	• rating agencies • insurance information middleman (rankings)	• searching and matching	• information services

Source: Own composition.

In contrast to transaction intermediaries, information intermediaries are much more heterogeneous in the products and services they offer. For example, rating agencies produce information relevant for consumers merely as a by-product of their original purpose, which is the provision of information for investors. By comparison, consumer protection associations generate information for consumers. Besides, they often additionally provide advisory services for individual consumers and do not only offer exemplary advice, like it is mostly the case in publications provided by insurance information middleman. Moreover, consumer protection associations also operate under different legal and organizational con-

straints. While some are set up by the state, others are privately organized interest-groups. Finally, insurance consultants, which are similar to consumer protection associations in that they represent the interests of the insured persons against insurance companies, provide more specific advisory services than the latter. They usually also charge higher fees.

Intermediaries which provide similar services over the same transaction stages compete with one another more directly than with intermediaries specialized on other services or transaction stages. The closer substitutes the services offered by different types of intermediaries are, the more intense the competition between intermediaries is. For example, exclusive insurance agents and insurance brokers compete more directly with one another than with insurance information middlemen, who publish rankings of different insurance products. The former provide similar and more specific information, bargaining and advisory services, which are therefore closer substitutes for consumers than the more general information provided by rankings. However, for consumers all types of intermediaries are substitutes compared to the self-procurement of the transaction service, in particular with respect to direct personal search for information. As has been shown in *section 1.2*, intermediaries allow one to realize gains from specialization and economies of scale and scope in acquiring, processing and disseminating information. Thus, they are expected to increase consumers' information as well as transparency in insurance markets. The higher transparency should lead to more intense competition and accordingly to better performance of the underlying insurance market.

In summary, different types of transaction and information intermediaries specialize in different transaction stages and/or services to different degrees. However, information and advisory services are central activities provided by all types of insurance intermediaries. They are, thus, all actively engaged in the acquisition, procession and dissemination of information to consumers. Therefore, in the following we concentrate on the information services provided by insurance intermediaries when analyzing conduct and performance in the market for insurance intermediaries in more detail.

2 An Economic Explanation of Insurance Intermediation

Based on a general approach to information intermediation (*section 2.1*), we develop a search theoretic model of insurance intermediation in *section 2.2* in order to analyze the benefits of intermediated search for consumers. *Section 2.3* applies the model to insurance agents and brokers.

2.1 The Basic Model of Information Intermediation

As has been shown above, information search is the main service provided by insurance intermediaries. In the following we present a basic search theoretic model for information intermediation, which we apply to insurance intermediaries in the next *section 2.2*. It captures the fundamental decision-making problems of consumers when deciding on personal versus intermediated search.

2.1.1 Personal Search versus Intermediated Search

The information intermediary model outlined in the following applies to pure information intermediaries (Rose 1999, 76–162).[5] Their main task is the search for information which is then sold to consumers. In a given market suppliers are assumed to produce heterogeneous goods or services, while remaining passive with respect to the dissemination of information about their products. In contrast, consumers, who have an indefinite time horizon with respect to the search process, actively engage in searching for information about those products whose attributes best match their preferences. However, gathering, processing and assessing information through direct personal search causes costs. Alternatively, consumers can use the services of information intermediaries. These engage in the same search activities like consumers to gather information about the various attribute values of the heterogeneous product variants offered by suppliers. They

[5] Rose (1999) is based on Hey (1981).

help in matching supply and demand without actually acquiring property rights of the commodities traded. For providing information about the quality of a product they charge a fee.

A utility-maximizing consumer compares the potential outcome of her own search efforts with that resulting from buying information from an intermediary. Only if the expected utility gained from the price-quality level offered by the intermediary is higher than the expected utility obtained through own personal search efforts, a consumer purchases information from the intermediary instead of engaging herself in personal search activities. All in all, consumers must solve a two-stage decision-making problem. Firstly, they have to decide on the optimal product quality of the final good they want to purchase by determining the optimal amount of information searched for about product quality. Secondly, they have to decide whether to personally engage in search activities or whether to use the services of an intermediary. The following static search model shows the rationale for using an information intermediary. Due to the complexity of real-world decision-making problems a number of simplifying assumptions are made for the model to be of a rather general nature and to remain mathematically tractable.

In an initial step, it is assumed, that there is only one intermediary engaged in performing search activities (Rose 1999, 84–86).[6] He is active in two markets: in the suppliers' market and in the consumers' market. On the supply side, a commodity (product, service or information) is offered by various suppliers. It differs only in one dimension (= its quality), that is, in the value of a single attribute, X_i, where i represents a specific object or observation made. The higher the attribute's value is, the higher the quality of the commodity is. A cumulative density function (CDF) $F(X)$ describes the constant and known distribution of the objects' attribute values from which the random variable X is drawn. In the suppliers' market, the intermediary acquires information about the various qualities of the commodity under consideration. If he finds an attribute value that at least equals his optimal information level X^I, then he sells this information in the consumers' market. However, only consumers, whose valuation β of this information commodity is high enough, are willing to pay the fee F^I charged by the intermediary for his search activities.

[6] For the more realistic case of an oligopolistic market, see Sect. 2.1.3.

It is assumed that information is incomplete but symmetric. There is no asymmetric information between consumers and the intermediary. They have the same incomplete knowledge about the quality distribution of the commodity traded, so that they do not know the location of specific attribute values. Moreover, it is assumed that the intermediary honestly reveals the true attribute value (= quality) of the commodity to his clients. That is, there are no problems of moral hazard or adverse selection to be considered in this basic model.

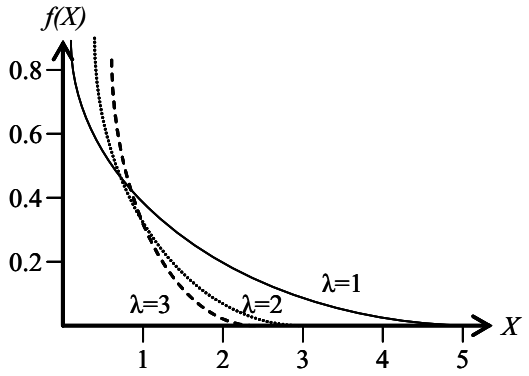

Fig. 2.1. Exponential Probability Density Function $f(X) = \lambda \cdot e^{-\lambda \cdot X}$, $\lambda = 1,2,3$ (Rose 1999, 96, Fig. 13)

In addition, it is supposed that information about the quality of a product is negatively correlated with the total amount of information available on the market. Therefore, high product quality corresponds to high density of relevant information on markets for information. According to Rose (1999, 120) the determinants of the density of relevant information are "the density of adequate information sources, and the density of relevant information available from these sources". When only a very small fraction of the huge amount of information available about the attribute values X_i of a particular commodity is relevant, then the exponential probability density function

$$f(X) = \lambda \cdot e^{-\lambda \cdot X} \tag{2.1}$$

with its cumulative distribution function

$$F(X) = \left[1 - e^{-\lambda \cdot X}\right] \tag{2.2}$$

is well-suited to describe such a market (Rose 1999, 95–96).[7] The parameter λ indicates the concentration of values around the origin of the coordinate system. The higher the value of λ is, the lower is the remaining cumulative probability to find a variant with a higher quality of the commodity traded respectively information about such a variant (Fig. 2.1). The density of relevant high quality information decreases strongly with the magnitude of information available.[8]

Consumers and the intermediary apply the same search technology. Hence, they have the same search costs (Rose 1999, 85–86, 98). For simplicity it is assumed that there are no fixed costs of search. The search costs for a single observation, c, comprise all direct costs a consumer or intermediary spends to gather and process information about the commodity under consideration. They entail also the opportunity costs of time spent for the search process. They are positive, so that $c > 0$. It is supposed that these costs are constant over the whole search process, that is they do not depend on the number of observations already made during a search process.

In the course of the search process, a consumer makes a number of observations of the random variable X. These observations are drawn from the known cumulative density function $F(X)$. Each observation made has a particular attribute value X_i. The consumer eventually chooses the observation with the highest attribute value, i.e. the highest quality. Since she only knows the distribution of the random variable, but not the location of a particular attribute value in the distribution, and since each search step causes costs, she must decide when to stop her search and accept the object with the highest attribute value observed up to that point. Such a recall to a previous observation causes no additional costs (Rose 1999, 86). In a sequential search procedure the search process ends if a value X_m is observed, which is higher than the predetermined optimal reservation value x^*.

The reservation value x^* is obtained in equilibrium when the marginal cost of a further search step equals the resulting expected return of this search step. It can be formally shown that this reservation value x^* is given when the expected net reward $G(X_m)$ is exactly zero (Rose 1999, 88–89):

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[7] Of course, other probability density functions can be used instead, like log-normal probability density functions, for example.

[8] The relevance of information for a consumer can be interpreted as the quality of this information, with higher values of X_i implying higher relevance of the information at hand.

$$G(X_m) = 0 \Leftrightarrow \int_{X_m}^{\infty} [1 - F(x)]dx = c \,. \tag{2.3}$$

If $X_m = x^*$, the consumer is indifferent between stopping or continuing the search. In this case the expected net reward from a further observation is $G(X_m) = 0$. If $X_m < x^*$ a further search step would still increase the expected net reward, while if $X_m > x^*$ an additional search step would reduce the expected net reward. Therefore, $G(X_m) = 0$ signals the optimal stopping rule for the consumer's search activities.

This result can be transformed to obtain the consumer's maximum utility by introducing the utility function $U_j(X_i)$. It represents the valuation of the j^{th} searcher for a certain attribute value X_i of the random variable X (Rose 1999, 89–90). By assuming that $U_j(X_i)$ is a monotonous function and after some transformations one gets the following equation which determines the optimal reservation value x^* (Rose 1999, 246–247 according to Hey 1981, 63):

$$\int_{x^*}^{\infty} [1 - F(x)]dU_j(x) = c \,. \tag{2.4}$$

Since consumers are assumed to be risk neutral, a linear utility function is used to describe the j^{th} consumer's valuation of a particular attribute:

$$U_j(X_i) = \beta_j \cdot X_i \tag{2.5}$$

The parameter β_j measures the j^{th} consumer's willingness to pay for a particular quality (= attribute value) by assigning monetary units to the unit of attribute value. The individual willingness to pay differs in a population. However, it is reasonable to assume that β follows a normal distribution $N[\mu_\beta; \sigma_\beta]$ with the probability density function *h(β)* (with $\beta \in [0;\infty]$) and the cumulative density function *H(β)*. The medium value of the willingness to pay in the population is expressed by the mean μ_β, while the degree to which consumers' preferences in the analyzed market is homogenous are expressed by the standard deviation σ_β. Markets with a larger mean μ_β indicate a higher willingness to pay for a particular attribute value and, thus, a higher valuation for high quality products by consumers in this market. A low standard deviation σ_β shows that consumers' preferences are relatively homogenous, whereas a higher standard deviation σ_β indicates more heterogeneous preferences.

By inserting this utility function in Eq. 2.4 the optimal reservation value x^* is determined by

$$\int_{x^*}^{\infty} [1 - F(x)] \cdot \beta_j dx = c \,. \tag{2.6}$$

With the exponential cumulative density function from Eq. 2.2 this results in

$$\int_{x^*}^{\infty} e^{-\lambda \cdot x} \cdot \beta_j dx = c \,. \tag{2.7}$$

After solving this integral the optimal reservation value x^* is given when the expected marginal utility from an additional search step equals the marginal cost of this step:

$$\frac{1}{\lambda} \cdot e^{-\lambda \cdot x^*} \cdot \beta_j = c \,. \tag{2.8}$$

Solving Eq. 2.8 results in the optimal reservation value x^*. It indicates a consumer's indifference between accepting a commodity of this quality and performing a further search step. The expected utility of the consumer from following this optimal search strategy is given by inserting x^* in Eq. 2.5:

$$U_j\left(x^*\right) = \beta_j \cdot x^* = \beta_j \cdot x^*\left(\beta_j\right). \tag{2.9}$$

Since the willingness to pay β_j positively affects the expected net reward from search, this utility function is strictly convex (Fig. 2.2).

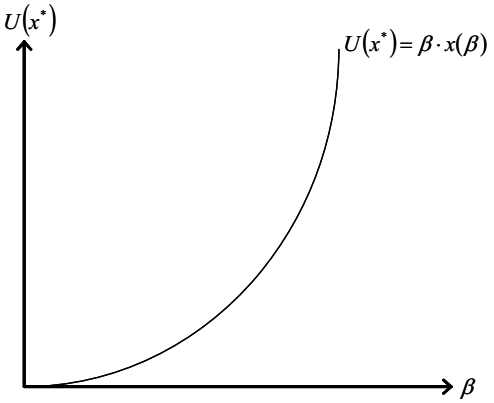

Fig. 2.2. Expected Net Reward from an Optimal Search Strategy (Rose 1999, 98, Fig. 14)

Alternatively to personal search activities, the consumer can use the services provided by an intermediary who offers a certain quality level X^I for which he charges a fee F^I. The resulting utility for the consumer from using the services of the intermediary is given by

$$U_j^I = \beta_j \cdot X^I - F^I . \tag{2.10}$$

A consumer will prefer purchasing information from an intermediary to a personal search of information about product qualities, if the expected reward U_j^I of intermediated search is higher than the expected net reward $U_j\left(x^*\right)$ resulting form personal search:

$$U_j^I = \left(\beta_j \cdot X^I - F^I\right) > U_j\left(x^*\right) = \beta_j \cdot x^*\left(\beta_j\right). \tag{2.11}$$

Thus, the consumer's "make-or-buy decision" on information search is a function of her willingness to pay β, the minimum quality level guaranteed by the intermediary X^I and the fee F^I charged for it (Rose 1999, 103–106). By plotting the utility functions of personal and intermediated search against the willingness to pay β, the two graphs separate those areas where it is advantageous to search personally from those where it is more advantageous to turn to an intermediary (Fig. 2.3).

It is intuitively plausible and can be shown formally that only consumers with a medium willingness to pay $\left(\beta_l < \beta < \beta_u\right)$ consult an intermediary. For consumers with a very low willingness to pay $\left(\beta < \beta_l\right)$, the price-quality combination offered by an intermediary is not advantageous, because the fee F^I charged for the minimum quality level X^I offered is too high compared to the relatively low costs of personal search activities. The exact opposite is the case for consumers with a rather high willingness to pay $\left(\beta > \beta_u\right)$. For them, the minimum quality level X^I guaranteed by the intermediary is too low to meet their requirements. Thus, they prefer to perform their own personal search.

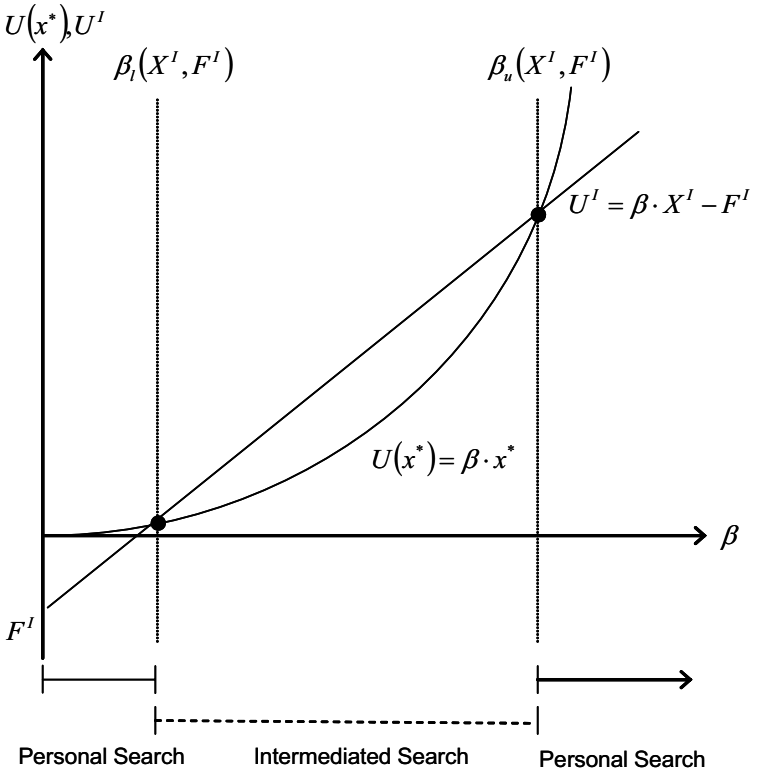

Fig. 2.3. Consumer's Make-or-Buy Decision on Personal vs. Intermediated Search (Following Rose 1999, 103, Fig. 18)

The critical values $\beta_l(X^I, F^I)$ and $\beta_u(X^I, F^I)$ for which consumers are indifferent between direct personal search or intermediated search are obtained by solving the following system of Eq. 2.6 and Eq. 2.11 simultaneously:

$$\left| \begin{array}{l} \int_{x^*}^{\infty} [1 - F(x)] \cdot \beta dx = c \\ U^I = (\beta \cdot X^I - F^I) = U(x^*) = \beta \cdot x^* \end{array} \right| . \tag{2.12}$$

Inserting the exponential cumulative density function $F(X) = \left[1 - e^{-\lambda X}\right]$ from eq. 2.2 results in

$$\left| \begin{array}{l} \frac{1}{\lambda} \cdot e^{-\lambda \cdot x^*} \cdot \beta = c \\ (\beta \cdot X^I - F^I) = \beta \cdot x^* \end{array} \right| . \tag{2.13}$$

From the first equation the optimal reservation value x^* is derived where marginal cost equal the expected net reward of a further personal observation. The second equation indicates a consumer's indifference with respect to personal or intermediated search, given her optimal reservation value x^*. It defines the boundaries $\left[\beta_l\left(X^I, F^I\right), \beta_u\left(X^I, F^I\right)\right]$ within which intermediated search yields a higher utility than personal search activities. To each price-quality combination $\left(X_i^I, F_i^I\right)$ offered by an intermediary a certain pair of critical values $\left[\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$ applies. Depending on the decision variables X^I and F^I, this system has 0, 1, or 2 solutions.[9]

When the intermediary decides on his profit-maximizing price-quality combination $\left(X_i^I, F_i^I\right)$, he must take into account the resulting boundaries from consumers' make-or-buy decision with regard to personal or intermediated exchange. The intermediary, who is assumed to be risk neutral like consumers, is engaged in two activities: (1) in costly search for information about the attribute values X in the suppliers' market by following an optimal stopping rule which results in his reservation value X^I, and (2) in selling this information to consumers for a fee F^I. Thus, the optimization problem for the intermediary is to find the values of the control variables X^I and F^I for which he maximizes his expected profit $P^I\left(X^I, F^I\right)$:

$$\underset{X^I, F^I}{Max}\, P^I(X^I, F^I) = \underset{X^I, F^I}{Max} \left[R^I(X^I, F^I) - C^I(X^I)\right] \tag{2.14}$$

where $R^I\left(X^I, F^I\right)$ is his expected revenue and $C^I\left(X^I\right)$ are his total search costs.

In the basic model it is assumed that the intermediary uses the same search technology as consumers (Rose 1999, 98–102). Therefore, he has to incur the same costs c for a single observation. For simplicity, again fixed costs of gathering and processing information are not considered. Besides, it is also assumed that the information about the quality of the commodity under consideration can be copied and sold by the intermediary without additional costs. Thus, once an intermediary has decided on the optimal in-

[9] For a formal analysis, see Rose (1999, 248–249).

formation about product quality X^I, the search costs spent so far become fixed costs with respect to disseminating this information. Therefore, he can realize economies of scale by repeatedly selling information about X^I for which he charges each time a fee F^I. Like consumers, the intermediary follows an optimal search strategy. He stops searching for additional information if an attribute value of the commodity exceeds his optimal minimum quality level, so that $X > X^I$.

His total search costs $C^I\left(X^I\right)$ result from the costs of a single observation *c* times the expected number of observations $E[n]$. The expected optimal number of observations is found when an observation with $X \geq X^I$ is drawn from the cumulative distribution function $F(X)$:

$$E[n] = \sum_{n=1}^{\infty} n \cdot F(X^I)^{n-1} \cdot \left[1 - F(X^I)\right] = \frac{1}{\left[1 - F(X^I)\right]} = e^{\lambda \cdot X^I} \quad . \tag{2.15}$$

The total search costs amount to

$$C^I(X^I, c) = E[n] \cdot c = \frac{c}{\left[1 - F(X^I)\right]} = c \cdot e^{\lambda \cdot X^I} \quad . \tag{2.16}$$

The intermediary's total search costs are a positive linear function of the costs of a single observation *c* and an exponentially increasing function of the minimum quality level X^I and the density of the acceptable qualities of the given distribution, which is indicated by λ (Table 2.1).

Table 2.1. First and Second Order Partial Derivatives of the Intermediary's Cost Function

First Order Partial Derivative	Second Order Partial Derivative	
Search Costs c		
$\frac{\partial}{\partial c} C^I(.) = \frac{1}{\left[1 - F\left(X^I\right)\right]} = e^{\lambda \cdot X^I} > 0$	$\frac{\partial^2}{\partial c^2} C^I(.) = 0$	(2.17)
Optimal Information Level about Product Quality X^I		
$\frac{\partial}{\partial X^I} C^I(.) = \frac{c \cdot f\left(X^I\right)}{\left[1 - F\left(X^I\right)\right]^2} = c \cdot \lambda \cdot e^{\lambda \cdot X^I} > 0$	$\frac{\partial^2}{\partial \left(X^I\right)^2} C^I(.) = c \cdot \lambda^2 \cdot e^{\lambda \cdot X^I} > 0$	(2.18)

Table 2.1. (cont.)

First Order Partial Derivative	Second Order Partial Derivative
Density of High Quality Information λ	
$\frac{\partial}{\partial\lambda}C^I(.)=\frac{\partial}{\partial\lambda}\left(\frac{c}{\left[1-F\left(X^I\right)\right]}\right)=$	$\frac{\partial^2}{\partial\lambda^2}C^I(.)=c\cdot\left(X^I\right)^2\cdot e^{\lambda\cdot X^I}>0$ (2.19)
$=\frac{\partial}{\partial\lambda}\left(c\cdot e^{\lambda\cdot X^I}\right)=c\cdot X^I\cdot e^{\lambda\cdot X^I}>0$	

Source: Following Rose (1999, 101).

The total search costs are the higher, the higher the costs of a single observation *c*, the higher the optimal reservation value X^I or the lower the density λ of high quality objects in the distribution are (Fig. 2.4).

$C^I\left(X^I,\lambda\right)$ depending on λ for c = 1 $C^I\left(X^I,c\right)$ depending on c for λ = 1

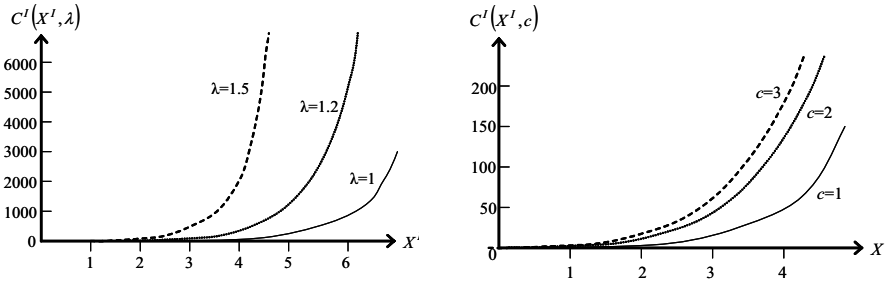

Fig. 2.4. Total Search Costs $C^I\left(X^I\right)$ (Rose 1999, 102, Figs. 16 and 17)

The expected revenue of the information intermediary $R^I\left(X^I,F^I\right)$ is given by the fee F^I charged for selling the information and by the expected number of clients $E[N]$ (Rose 199, 107–108). Assuming that there are *N* consumers on the market, the intermediary's clients are those for which using his services results in a higher utility than performing personal search activities. Thus, given the distribution of the willingness to pay *H(β)* with the probability density function *h(β)*, the expected number of clients is given by the integral of the probability density function *h(β)* over the interval $\left[\beta_l\left(X^I,F^I\right),\beta_u\left(X^I,F^I\right)\right]$:

$$E[N] = N \cdot \int_{\beta_l(X^I,F^I)}^{\beta_u(X^I,F^I)} h(\beta)d\beta \,. \tag{2.20}$$

As a result, the expected revenue of the intermediary is given as

$$R^I(X^I,F^I) = F^I \cdot E[N] = F^I \cdot N \cdot \int_{\beta_l(X^I,F^I)}^{\beta_u(X^I,F^I)} h(\beta)d\beta \,. \tag{2.21}$$

The higher the quality offered by the intermediary X^I is, the higher is the proportion of consumers for which intermediated search becomes advantageous in contrast to personal search, and thus the higher the expected revenues are *ceteris paribus*. Opposed to that, expected revenues decrease by an increase in fees F^I charged for a given quality level X^I (Fig. 2.5).

$R^I\left(X^I,F^I\right)$ depending on X^I for $F^I = (10,20)$

$R^I\left(X^I,F^I\right)$ depending on F^I for $X^I = (4,8)$

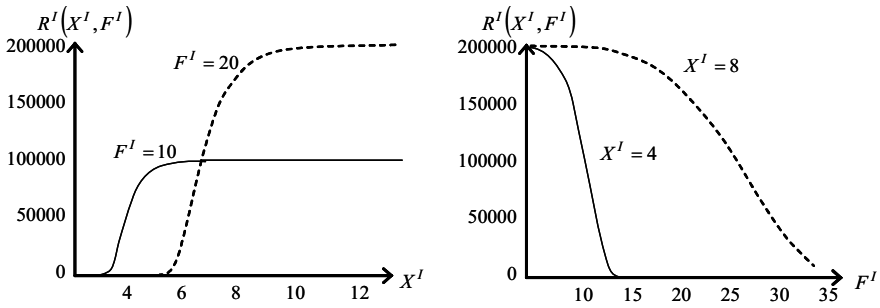

Fig. 2.5. Expected Revenues $R^I\left(X^I,F^I\right)$ (Rose 1999, 108, Figs. 20 and 21)

The expected profit of the intermediary is derived by inserting Eq. 2.16 and Eq. 2.21 in Eq. 2.14:

$$\underset{X^I,F^I}{Max}\, P^I(X^I,F^I) = \underset{X^I,F^I}{Max}\left[F^I \cdot N \cdot \int_{\beta_l(X^I,F^I)}^{\beta_u(X^I,F^I)} h(\beta)d\beta - \frac{c}{\left[1-F(X^I)\right]} \right] \tag{2.22}$$

$$= \underset{X^I,F^I}{Max}\left[F^I \cdot N \cdot \int_{\beta_l(X^I,F^I)}^{\beta_u(X^I,F^I)} h(\beta)d\beta - c \cdot e^{\lambda \cdot X^I} \right].$$

The intermediary's optimal strategy is obtained by setting the partial derivatives of this function for X^I and F^I to zero.[10] For a given fee F^I, variations in the quality level offered by the intermediary X^I result in higher expected revenues R^I. However, since total search costs which are necessary to provide a higher quality, increase disproportionately, expected profits P^I decline after a maximum quality level (Fig. 2.6).

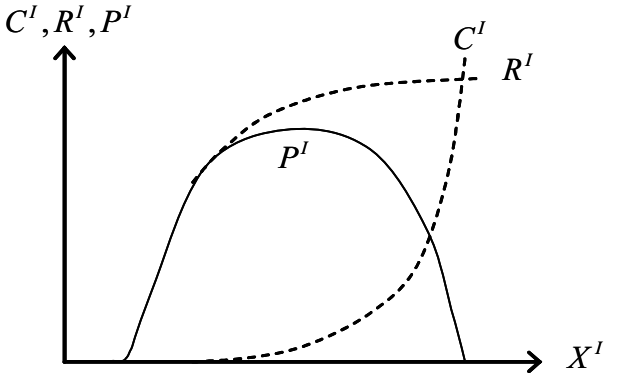

Fig. 2.6. Expected Revenues, Search Costs and Profits Given a Certain Fee (Rose 1999, 109, Fig. 22)

2.1.2 Comparative-Static Analysis

In the following the influence of the exogenous parameters on the optimal values for X^I and F^I is discussed. To maximize his expected profits, an intermediary can follow one of three strategies (Rose 1999, 111–114).[11] Firstly, he can simultaneously choose the optimal values for X^I and F^I. Secondly, he can play a fixed-quality-level strategy $P^I(X^I = const., F^I)$ by choosing the profit maximizing value of F^I for a given and constant quality level X^I. Thirdly, he can play a fixed-fee strategy $P^I(X^I, F^I = const.)$ by selecting the optimal quality level X^I for a given value of F^I. The exogenous variables of the model are (1) the search costs for a single observation *c*, (2) the density λ of relevant information about the qualities on the supply side, (3) the valuation of quality by consumers, expressed by the mean willingness to pay μ_β for information of a certain quality, (4) the het-

[10] In some cases this can be done only numerically depending on the functions involved. For further details, see Rose (1999, 250–251).

[11] For an application, see Sect. 2.2.1 below.

erogeneity of consumers' preferences with respect to quality, expressed by the standard deviation σ_β and (5) the number of potential users N in the market. Rose (1999, 115–137) shows that in the case of changes in the exogenous variables *ceteris paribus* the simultaneous strategy generally yields the highest expected profit compared to both a fixed-quality-level and a fixed-fee strategy.

(1) Search Costs c

In the basic model it is assumed that search costs are the same for both personal and intermediated search. Increasing search costs $dc > 0$ cause a lower reservation value x^* on the consumer's side (see Eq. 2.6) and, thus, a lower utility gained from personal search activities (see Eq. 2.8).[12] For the intermediary, higher search costs for a single observation directly increase total search costs $C^I(X^I, c)$ (see Eq. 2.16). Expected revenues $R^I\left(X^I, F^I\right)$ (Eq. 2.21) are also indirectly affected via the boundaries $\left[\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$, which determine the intermediary's expected number of clients. These boundaries result from the optimal reservation value x^* of personal search by consumers and from the optimal quality level X^I offered and the fees F^I charged by the intermediary.

When applying a simultaneous strategy, it is optimal for the intermediary to react to higher search costs c by reducing the quality level X^I without changes in the optimal fee F^I charged, since F^I is independent of the search costs c. Consequently, the number of expected clients and thus his expected profits decline. The same holds true if the intermediary follows a fixed-fee strategy. In the case of a fixed-quality-level strategy, however, the intermediary has committed himself to a certain quality level $\overline{X}^I$. If search costs c increase, the only way for him to further maximize his profits is to charge higher fees F^I. This may result either in higher or lower expected profits, depending on the other independent variables and on the chosen quality level $\overline{X}^I$.

(2) Distribution of Qualities λ

The different qualities of the commodity traded are expressed by its attribute values X_i (Sect. 2.1.1). Again, the intermediary's total search costs $C^I(X^I, \lambda)$ depend directly on the density distribution of the qualities λ,

[12] For a more formal treatment, see Rose (1999,115–120).

while his expected revenues $R^I\left(X^I, F^I\right)$ depend only indirectly on λ via the boundaries $\left[\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$ (Rose 1999, 120–126).

A lower density of relevant information on the market, that is an increase in λ, also lowers the reservation value x^* and, thus, the utility from personal search compared to that from intermediated search. However, as the same density distribution is assumed for consumers and the intermediary, the latter's total search costs $C^I(X^I, \lambda)$ increase as well. Considering the fixed-quality-level strategy, with higher fees $F^I(\lambda)$ the intermediary can adjust to the changed circumstances, but cannot prevent a steep decline in profits since higher fees lead to a reduction in the expected number of clients. Again, the simultaneous strategy proves to be more advantageous, since the intermediary can react to the decline of the density of relevant information by simultaneously lowering the quality level X^I provided and increasing the fees F^I demanded. Although he will also realize a decline in profits, the decrease will be smaller than when following a fixed-quality level strategy. In contrast, a fixed-fee strategy would be less advantageous compared to the simultaneous strategy from the intermediary's point of view, but still much better than applying a fixed-quality-level strategy.

(3) Valuation of Quality by the Consumers: Mean Value μ_β of the Willingness to Pay for a Certain Quality Level

Consumers' valuation of information about the quality of the commodities considered is expressed by their willingness to pay, β. A higher valuation of information about quality results in a higher willingness to pay (Rose 1999, 126–129). As a consequence, for the relevant market the mean value μ_β increases. The intermediary decides on his profit-maximizing quality X^I given a specific willingness to pay by consumers. Whenever its mean distribution μ_β shifts, the intermediary is forced to adapt.

The reservation value x^* of a consumer's personal search increases with a higher willingness to pay β (Table 2.2). Without adaptations, the intermediary's previous optimal quality level X^I now becomes sub optimal.

Table 2.2. First and Second Order Partial Derivatives of the Reservation Value $x^* = \frac{1}{\lambda} \cdot \ln \frac{\beta_j}{c \cdot \lambda}$. [13]

First Order Partial Derivative	Second Order Partial Derivative	
Consumer's Willingness to Pay β		
$\frac{\partial}{\partial \beta_j} x^* = \frac{1}{\lambda} \cdot \frac{1}{\beta_j} > 0$	$\frac{\partial^2}{\partial {\beta_j}^2} x^* = -\frac{1}{\lambda} \cdot \frac{1}{{\beta_j}^2} < 0$	(2.23)

On the one hand, consumers, who formerly had a too low willingness to pay, now enter the interval $\left]\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$, which is defined by the new reservation value x^* and the former optimal quality level X^I, and use the intermediary's services. On the other hand, for other consumers, who had up to this point been potential clients of the intermediary, the old quality level X^I now becomes too low, so that they no longer use his services and leave the interval $\left]\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$. Due to this shift in the number of potential clients, the intermediary is forced to adapt his action parameters.

Note that Rose (1999, 126–129) does not discuss the consequences of an exogenous shift in the willingness to pay for the reservation value x^*. Hence, he does not take into account how this affects the interval $\left]\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$ and in turn requires the intermediary to adapt also his optimal quality level X^I. Therefore, he concludes that in case of a higher willingness to pay the intermediary can demand higher fees without having to expect any reduction in the number of expected clients and, thus, in expected revenues. According to this reasoning, profits rise proportionally with an increase in μ_β and no difference arises between following a simultaneous and a fixed-quality-level strategy.

Only a fixed-fee strategy is less preferable, since the higher willingness to pay does by definition exclude higher fees. However, to correctly analyze the impact of a change in the consumers' mean willingness to pay requires taking into account the location of μ_β relative to the boundaries $\left]\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$, which define the intermediary's market. In gen-

[13] From Eq. 2.8 $\frac{1}{\lambda} \cdot e^{-\lambda \cdot x^*} \cdot \beta_j = c$ it follows that $x^* = \frac{1}{\lambda} \cdot \ln \frac{\beta_j}{c \cdot \lambda}$.

eral, it holds true that the larger the net effect of additional potential clients in the interval, the more the intermediary can rely on an increase in fees without having to adapt the optimal quality level provided.

(4) Heterogeneity of Consumers' Preferences with Respect to Quality: Standard Deviation σ_β of the Willingness to Pay

The more homogeneous the preferences in the market considered are, the smaller the standard deviation σ_β is. In this case individual consumers' willingness to pay is closer to the mean value μ_β. Conversely, more heterogeneous preferences are expressed through a higher standard deviation σ_β. While the standard deviation σ_β does not directly affect the intermediary's cost and revenue function, it, however, indirectly influences the number of potential clients (Rose 1999, 129–133). With a higher standard deviation σ_β, a larger part of the probability density function *h(β)* lies outside the boundaries $\left[\beta_l\left(X_i^I, F_i^I\right), \beta_u\left(X_i^I, F_i^I\right)\right]$. Thus the number of potential clients becomes smaller.

A reduction in fees F^I can compensate only to some degree this loss of potential clients. As a result, profits decline in the case of a fixed-quality-level strategy. Obviously, the same holds true also for the simultaneous strategy, although the decrease in profits is lessened since the intermediary can cut costs by lowering the quality level offered. Also a fixed-fee strategy allows cost reductions by offering a lower quality. However, since fees cannot be adjusted, this results in a loss of potential clients for which personal search now becomes more advantageous than intermediated search with a lower quality provided for the same fees.

(5) Number of Potential Clients in the Market N

Since expected revenues depend on the number of expected clients $E[N]$, profits are positively correlated with it (Rose 1999, 134–137). In the fixed-quality-level strategy expected profits are directly proportional to the number of potential clients. Namely, an increase in the number of consumers N (i.e. in market size) results also in an increase in expected profits. If the intermediary simultaneously sets the optimal quality level and fees charged, things become more complicated. On the one hand, a higher number of potential consumers N in the market induce a rise in the optimal quality level offered. A higher quality level means higher total costs and because information once acquired by the intermediary is assumed to be disseminated at no costs, total search costs per client are decreasing. Besides, due to the

monopolistic position of the intermediary, which is assumed so far, a larger number of potential clients $E[N]$ allow the intermediary to raise his profit-maximizing fees, however, only to a decreasing degree. As a consequence, the optimal quality level, the optimal fees charged, and the resulting profits increase with a higher number of potential consumers in the market.

All in all, the comparative analysis shows that no matter which exogenous variable changes, from the intermediary's point of view the simultaneous strategy is always preferable to both other strategies. The fixed-quality level strategy is the second-best alternative in case of alterations on the consumer side, whereas the fixed-fee strategy is advantageous in case of higher search costs or changes in the quality distribution.

To summarize, the basic intermediary model allows deriving the following hypotheses about the relationship between changes in the independent variables and the quality level offered when either a simultaneous or a fixed-fee strategy is followed by the intermediary (Table 2.3).[14] Both an increase in the search costs for a single observation *c* and a lower density λ of relevant information available lead to a decrease of the optimal quality X^I offered by the intermediary. Contrastingly, an increase in consumers' mean willingness to pay μ_β and in the heterogeneity of consumers' preferences measured by the standard deviation σ_β as well as a higher number of consumers in the market *N* also result in an increase in the quality X^I provided by the intermediary.

Table 2.3. Changes in the Exogenous Variables, Optimal Quality Level and Expected Profits

Changes in Exogenous Variables	Changes in X^I	Changes in P^I
Search costs of a single observation c	-	-
Density distribution of relevant information λ	-	-
Consumers' mean willingness to pay μ	+	+
Heterogeneity of consumers' preferences σ	+	+
Market size N	+	+

[14] Since a fixed-quality level strategy by definition assumes a constant quality level $\overline{X}^I$ offered, it is not taken into account in the following.

2.1.3 Market Conduct and Performance

So far, it has been assumed that only one intermediary is in the market, who competes with direct search by consumers. In reality, however, markets for intermediaries are oligopolistic. In the following the effects of different forms of market conduct on market performance are analyzed by assuming a duopoly, that is a market with only two intermediaries who compete with each other and with direct personal search by consumers (Rose 1999, 138–150).

In this case, an individual consumer has three alternatives. She can (1) carry out personal search activities which result in the utility $U_j\left(x^*\right)=\beta_j \cdot x^*$, (2) acquire information from intermediary I_1 and thus yield the utility $U_1^I=\beta_j \cdot X_1^I - F_1^I$, or (3) purchase information from intermediary I_2 which results in the utility $U_2^I=\beta_j \cdot X_2^I - F_2^I$. A consumer maximizes her expected utility U_j by choosing the alternative that results in the highest utility:

$$\max U_j = \left[\left(\beta_j \cdot x^*\right), \left(\beta_j \cdot X_1^I - F_1^I\right), \left(\beta_j \cdot X_2^I - F_2^I\right)\right]. \tag{2.24}$$

In case of a duopoly, the activities of one intermediary also influence the profit of the other intermediary (strategic interaction). Thus, to obtain his maximum expected profit, each intermediary must take into account the impact of the quality X_i^I offered and the fee F_i^I charged by his competitor *i*. Accordingly, the expected profit of intermediary I_1 results from:

$$P_1^I\left(X_1^I, F_1^I, X_2^I, F_2^I\right) = R_1^I\left(X_1^I, F_1^I, X_2^I, F_2^I\right) - C_1^I\left(X_1^I\right) \tag{2.25}$$

$$= F_1^I \cdot N \cdot \int_{\beta_l^{I_1}\left(X_1^I, F_1^I, X_2^I, F_2^I\right)}^{\beta_u^{I_1}\left(X_1^I, F_1^I, X_2^I, F_2^I\right)} h(\beta)d\beta - \frac{c}{\left[1-F\left(X_1^I\right)\right]}.$$

To obtain the reservation value x^* for direct personal search and, thus, the boundaries $\left[\beta_l^{I_1}, \beta_u^{I_1}\right]$ of the integration, for intermediary I_1 the following system of equations must be solved:

$$\left| \begin{array}{l} \int_{x^*}^{\infty} \left[1-F(x)\right] \cdot \beta_j dx = c \\ U_1^I = \left(\beta_j \cdot X_1^I - F_1^I\right) = \left\{\left(\beta_j \cdot x^*\right), \left(\beta_j \cdot X_2^I - F_2^I\right)\right\} \end{array} \right| \tag{2.26}$$

For intermediary I_2, a corresponding set of equations to those of Eqs. 2.25 and 2.26 exists. From these equations both the market segments are derived where consumers gain more utility from personal search, but also the market segments served by each intermediary are obtained.

If consumers have no preferences with respect to a particular intermediary and if the two intermediaries behave identically, that is if they offer the same price-quality combinations $\left(X_1^I, F_1^I\right) = \left(X_2^I, F_2^I\right)$, then the market is equally divided among these two. If they offer different price-quality combinations $\left(X_1^I, F_1^I\right) \neq \left(X_2^I, F_2^I\right)$, they serve different consumer segments in the market. Given that intermediary I_1 offers a lower quality for which he also charges a lower fee than intermediary I_2 such that $\left(X_1^I, F_1^I\right) < \left(X_2^I, F_2^I\right)$, Fig. 2.7 depicts the resulting market segmentation.

Consumers with a very low or a very high willingness to pay prefer direct personal search, while consumers with a medium willingness to pay consult intermediary I_1. Consumers with a somewhat higher willingness to pay acquire information from intermediary I_2. The area under the probability density function $h(\beta)$ represents the respective market share of the two intermediaries.

If the two intermediaries have identical cost functions and compete either only in prices or in quality levels, it can be shown that they both realize negative profits (Rose 1999, 141–143). Assuming price competition, when offering homogeneous qualities $X_1^I = X_2^I$ each intermediary has incentives to undercut his competitor by charging a slightly lower fee for the same quality level offered. In the end such price competition results in the same minimum fee $F_1^I = F_2^I = F_{\min}^I$ and thus in equal market shares for both intermediaries. Given this minimum fee $F_{\min}^I$, no further price reductions are profitable for each intermediary. The minimum fee $F_{\min}^I$ is determined separately by each intermediary by taking into account the profits resulting from serving the whole market as a monopolist through slightly undercutting the competitor (*Bertrand price competition*). However, in the resulting equilibrium each intermediary obtains only half the revenues, but must bear the full costs of acquiring information $C\left(X_1^I\right) = C\left(X_2^I\right)$.[15] As a

[15] In contrast to the usually applied models of Bertrand price competition where fixed costs are zero and only positive marginal costs exist, in this model fixed costs for acquiring information are positive, whereas marginal costs for copying and disseminating information are zero. For more details, see Rose (1999, 142, fn.692).

consequence the expected profit gained by each intermediary is negative. Therefore, such a market has a tendency towards a natural monopoly.

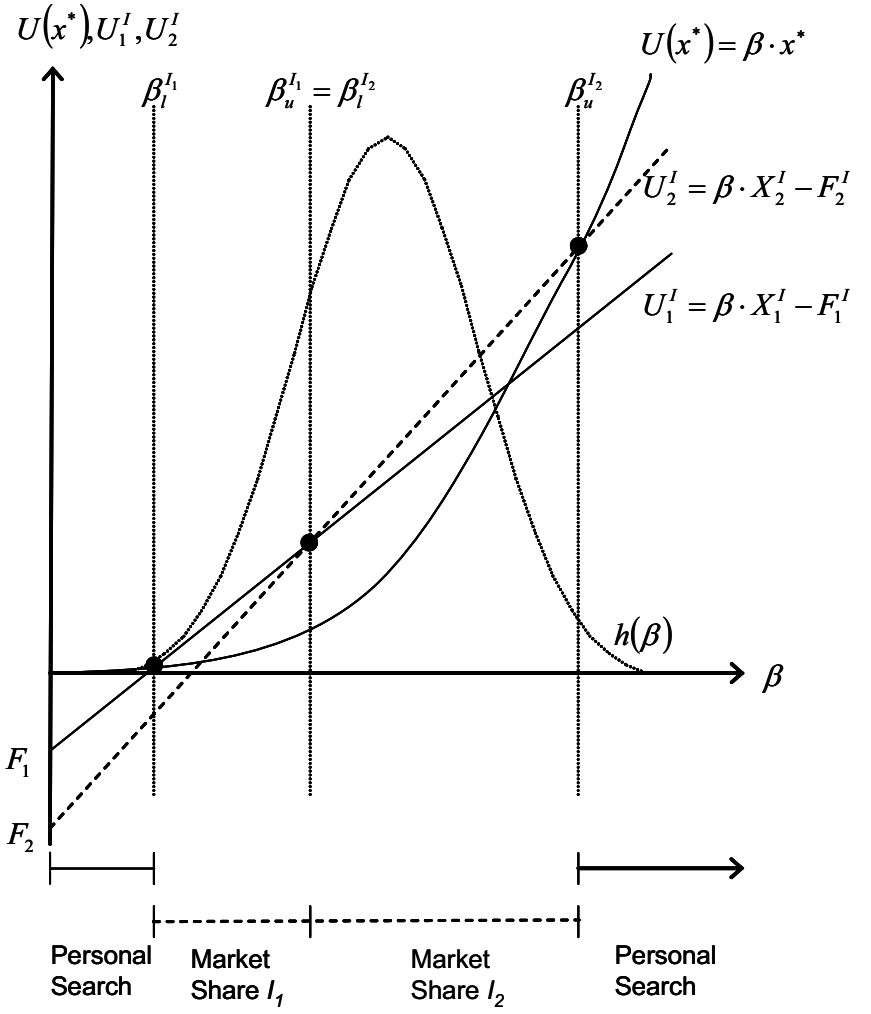

Fig. 2.7. Market Segmentation in a Duopoly given $\left(X_1^I, F_1^I\right) < \left(X_2^I, F_2^I\right)$ (Following Rose 1999, 140, Fig. 44)

The same follows if both intermediaries compete only in the quality levels offered while charging identical fees $F_1^I = F_2^I$, to which they apply the optimal profit-maximizing quality level X_i^I (Rose 1999, 143–144). In

general, the intermediary offering the highest quality level captures the whole market. Therefore, an incentive exists for both to outdo each other in providing higher quality levels. Thus, equilibrium results in both offering the same maximum quality level $X_1^I = X_2^I = X_{\max}^I$, which is only limited by the search costs $C\left(X_{\max}^I\right)$ necessary to obtain $X_{\max}^I$. Since these costs are assumed to be the same for both intermediaries, again profits are negative because the maximum quality level $X_{\max}^I$ is separately determined by each intermediary with regard to serving the whole market as a monopolist, whereas in equilibrium he only serves half the market share.

In reality, however, intermediaries compete in prices *and* quality. By using a game theoretic approach, the resulting effects can be analyzed (Rose 1999, 144–145). Intermediaries can compete simultaneously in a discrete strategy space, that is without taking into account the other intermediary's choice of fees and quality with all other variables being the same. In this case each intermediary has four alternatives with different price-quality combinations available

$$\left\{\left(X_{high}^I, F_{high}^I\right), \left(X_{high}^I, F_{low}^I\right), \left(X_{low}^I, F_{high}^I\right), \left(X_{low}^I, F_{low}^I\right)\right\}$$

from which he individually chooses the one that maximizes his expected profits. The resulting payoff matrix in Table 2.4 reveals that only one Nash equilibrium exists where both intermediaries offer high quality X_{high}^I for low fees F_{low}^I. Only through collusion can they gain higher profits by charging higher fees F_{high}^I for high quality X_{high}^I. In both cases the market is divided equally among the two with both realizing the same profit $P_1^I = P_2^I$.

So far, the relevant exogenous parameters were assumed to be the same for the two competing intermediaries. However, when allowing for differences, the results obtained in *section 2.1.2* as to the effects of changes in the independent variables on the optimal quality level X^I apply. For example, if intermediary I_2 uses a better search technology than intermediary I_1 so that there are cost differences with $c_1 > c_2$, the optimal quality X_1^I offered by intermediary I_1 is lower than the quality X_2^I offered by intermediary I_2, so that $X_1^I < X_2^I$, with the optimal fees charged differing accordingly with $F_1^I < F_2^I$. Consequently, even in the case of a simultaneous game, it is economically viable that different quality levels are provided in the market.

Table 2.4. Payoff Matrix for a Simultaneous Game

		Intermediary 2			
	$\left(P_1^I; P_2^I\right)$	$X_{high,}^I F_{high}^I$	$X_{high,}^I F_{low}^I$	$X_{low,}^I F_{high}^I$	$X_{low,}^I F_{low}^I$
Intermediary 1	$X_{high,}^I F_{high}^I$	(88943; 88943)	(-22027; 102563)	(199913; -148)	(199913; -148)
	$X_{high,}^I F_{low}^I$	(102563; -22027)	(40268; 40268)	(102563; -148)	(102563; -148)
	$X_{low,}^I F_{high}^I$	(-148; 199913)	(-148; 102563)	(-148; -148)	(-148; 95434)
	$X_{low,}^I F_{low}^I$	(-148; 199913)	(-148; 102563)	(95434; -148)	(47643; 47643)

The variables are chosen arbitrarily: $X_{high}^I = 10$, $X_{low}^I = 5$, $F_{high}^I = 25$, $F_{low}^I = 12.5$ $\left(c = 1, \lambda = 1, \mu_\beta = 4, \sigma_\beta = 1, N = 1000\right)$.

Source: Rose (1999, 145, Table 10).

In contrast to simultaneous games, assuming sequential decision-making is more adequate when analyzing incentives for market entry or when studying the consequences if there are leaders and followers in oligopolistic markets (Rose 1999, 145–148). Given that strategies are sequentially chosen within a continuous strategy space, it can be shown that it is optimal for intermediaries to offer different price-quality combinations like those in Fig. 2.7 even if they have identical cost and revenue functions. It is assumed that each intermediary can follow one of the four price-quality combinations $\left\{\left(X_{high}^I, F_{high}^I\right), \left(X_{high}^I, F_{low}^I\right), \left(X_{low}^I, F_{high}^I\right), \left(X_{low}^I, F_{low}^I\right)\right\}$.

In case of a fixed-quality-level strategy, first both intermediaries independently choose their respective quality level $X_1^I \neq X_2^I$. Then intermediary I_1 decides on his optimal fee F_1^I to which intermediary I_2 in turn reacts by setting his optimal fee F_2^I. In case of a profit-maximizing strategy intermediary I_1 first decides on his optimal price-quality combination $\left(X_1^I, F_1^I\right)$. Intermediary I_2 then chooses his optimal price-quality-combination $\left(X_2^I, F_2^I\right)$ given $\left(X_1^I, F_1^I\right)$. Since consumers differ with respect to their willingness to pay β for information about product quality, both intermediaries realize positive profits by serving different consumer segments. They offer different quality levels $X_1^I \neq X_2^I$ and accordingly charge

different fees $F_1^I \neq F_2^I$ (Fig. 2.7 *above*). For both the fixed-quality-level strategy and the simultaneous strategy, it can be shown that the follower has the more advantageous position since he can optimally react to the leader's strategy. Thus, he realizes a higher profit, which results from offering higher quality and demanding higher fees. In contrast to the case of a simultaneous game, the two intermediaries neither outcompete each other in the quality levels offered, nor in the fees charged. As a result, they can both obtain monopolistic profits for the market segments they serve.[16]

Thus, the following hypotheses as to the impact of competition on the quality provided by intermediaries can be derived (Table 2.5). Given a simultaneous choice of price-quality combinations within a discrete strategy space, competition results in the same high quality level offered by the competing intermediaries for the same low fees charged. If the competitors collude, then higher fees are demanded for the same high quality level. However, with differences in cost or revenue functions between the competitors, differing price-quality combinations result. Assuming a sequential choice of price-quality combinations within a continuous strategy space, competition leads to a high-quality-high-fee combination of the follower (or market entrant) with the leader offering low quality for low fees. Therefore, sequential decision-making leads to market segmentation with the follower realizing higher profits, even under identical cost and revenue functions.

Table 2.5. The Impact of Market Conduct on the Optimal Quality Level X_i^I (given identical cost and revenue functions)

	Competition	**Collusion**
Simultaneous choice of $\left(X^I, F^I\right)$	$X_1^I = X_2^I = high$ $F_1^I = F_2^I = low$ $P_1^I = P_2^I$	$X_1^I = X_2^I = high$ $F_1^I = F_2^I = high$ $P_1^I = P_2^I$
	Leader	**Follower**
Sequential choice of $\left(X^I, F^I\right)$	$X_1^I = low$ $F_1^I = low$	$X_2^I = high$ $F_2^I = high$
	$P_1^I < P_2^I$	

Source: Following Rose (1999, 138–150).

[16] The same result is obtained by employing a fixed-fee strategy.

2.1.4 Summary

The search theoretic model presented above is based on a number of rather restrictive assumptions, which must be taken into account when drawing general conclusions for the problem under consideration. It is a static one-period model with two types of risk neutral utility-/ profit- maximizing actors (consumers and intermediaries), who interactively determine the optimal product quality. Heterogeneity is assumed solely with regard to product quality and to consumers' preferences about it. In all other respects consumers and intermediaries are identical. They have the same search technologies and the same incomplete but symmetric information about the quality distribution of the commodity offered by different suppliers. In particular, it is assumed that intermediaries honestly reveal the information acquired by search to consumers. Therefore, no other information asymmetries exist so that no adverse selection or moral hazard problems arise.

Search costs must be spent only once for acquiring information about a certain quality level. Copying and disseminating this information causes no further costs, so that marginal costs of information dissemination are zero. Therefore, for intermediaries the original search costs have the character of fixed costs since they can sell the same information once acquired to several consumers at no additional cost. The positive welfare effects they create stem from the resulting economies of scale. In contrast to consumers, who use the searched information only once, intermediaries serving numerous consumers realize cost savings (Rose 1999, 150–156).

The endogenous action parameters of the intermediaries are the quality level and the fee charged. Intermediaries can follow three different strategies to maximize their profits by either varying only one of these two parameters or both (fixed-quality level strategy, fixed-fee strategy, simultaneous strategy). The optimal parameter values are gained by taking into account both the exogenous variables and the optimal reservation value x^* set by consumers. The exogenous variables comprehend the search costs c, the density distribution λ of information on the product quality available, the mean value of the consumers' willingness to pay μ_β, the heterogeneity of their preferences with respect to different quality levels σ_β and the number of potential clients N in the market under consideration. Given an oligopolistic market structure, it can be shown that different price-quality combinations provided by different intermediaries are economically viable. That is, not only does the product quality offered by suppliers differ, but also the information provided about it by intermediaries. This is due to the assumption of consumers' heterogeneous preferences. Differences in the information about optimal quality levels become more pronounced when there are differences in the underlying exogenous variables.

So far, neither differences in search technologies (and, thus, in the resulting search costs) nor in the abilities of consumers to grasp the information provided by the intermediaries, nor information asymmetries between consumers and intermediaries about the true quality have been explicitly taken into account.[17] Before doing this, the basic model shall be modified in the following *section 2.2* to better apply to the particularities of markets for insurance intermediaries.

2.2 A Search Theoretical Model of Insurance Intermediation

In the previous section, the basic search theoretic model of information intermediaries was outlined. In this section, it is modified to grasp the particularities of intermediaries engaged in insurance markets. As has been discussed in *section 1.4*, intermediaries in insurance markets are typically match-makers, who assist in matching supply and demand by coordinating consumers and insurers without actually acquiring property rights on the insurance products traded. Information and advisory services are essential to their activities, irrespective of the transaction stages in which they are engaged. In *section 2.2.1* we make some modifications of the basic search theoretical model in order to capture the main features of search by insurance intermediaries, that is by exclusive and independent agents and by insurance brokers. Therefore, the meaning of the various variables employed in the model is discussed in detail. In *section 2.2.2* the consequences of changes in the main exogenous variables are discussed, while *section 2.2.3* extends the analysis to include information asymmetries. *Section 2.2.4* analyzes the consequences of oligopolistic competition by assuming a Bertrand duopoly.

[17] But see Rose (1999, 156–160).

2.2.1 Insurance Intermediaries in the Basic Intermediation Model

Like in the basic model (Sect. 2.1.1) three types of actors are engaged in the market: insurance companies, insurance intermediaries and consumers. Insurance companies offer a variety of differentiated insurance products. They are assumed to behave passively in all other respects. There is only one insurance intermediary in the market, who maximizes his profits. It is further assumed that consumers seek to maximize their utility by deciding either on personal or intermediated search activities. In order to buy the best insurance product variant, consumers rely on in-depth information about how well the products available match their preferences and needs. In order to gather such information they can either carry out personal search activities or turn to an insurance intermediary.[18] For reason of simplification all actors are assumed to be risk neutral.[19]

In contrast to the basic intermediary model, consumers do not directly pay a fee to insurance intermediaries when they use their information services. Instead the insurance premium, which consumers have to pay after concluding an insurance contract, includes not only the insurance coverage but – among other administrative costs – also the fee insurance intermediaries receive for their services. Usually, consumers pay a commission as a percentage of the insurance premium. If personal search activities maximize their utility, they are assumed to directly conclude an insurance contract with an insurance company, which then keeps the fee. If consumers' utility is higher when turning to intermediated search, they are assumed to conclude the insurance contract through an insurance intermediary, who in turn receives the fee for his services directly from the respective insurance company. The fee for the information services of insurance intermediaries is normally not used as a parameter of price competition among insurance companies. Moreover, in many markets it is not even explicitly stated. Thus, it seems quite reasonable to assume that consumers act under a "free-fee" illusion. Therefore, in contrast to the basic intermediary model, the fees an insurance intermediary receives for his information services do not influence consumers' make-or-buy decision.

Like in *section 2.1.1*, we first discuss the make-or-buy decision of consumers before we analyze the profit-maximizing behavior of a single in-

[18] The consequences of competition among insurance intermediaries are discussed in Sect. 2.2.4 and in Chap. 3.

[19] Note that consumers being risk averse with respect to insurance demand does not exclude them being risk neutral in regard to the acquisition of information about insurance coverage.

termediary. Both the endogenous and exogenous variables are explored consecutively. Like in the basic model above, information about the various types and qualities of insurance products offered is assumed to be incomplete. No information asymmetries between consumers and the intermediary exist, so that neither adverse selection nor moral hazard behavior occur. This restriction is removed in *section 2.2.3* below.

First of all, the decision variable must be determined. In the basic search model, vertical product differentiation for a product X is assumed. That is, all i variants of the product X with $i = 1 \ldots m$ can be ordered hierarchically according to their objective quality (Martin 1993, 261). Since it is assumed that consumers do not differ in their perception of different variants, all rank the different features of X in the same way so that a uniform score can be attributed. In this manner, the higher the value of a certain variant X_i is, the higher its quality relative to other variants is. That is to say, information about a product variant X_i with a higher score is more "useful" and, thus, of higher quality for a consumer than information about a product variant with a lower score. Thus, in the case of vertical product differentiation, the quality of the information and advisory services of an intermediary can be measured by simply referring to the quality of the underlying product variant.

However, with consumers searching for the optimal insurance cover given their preferences and needs, there is also horizontal product differentiation. This means that the different variants of a product cannot be ordered in an objective way (Chamberlin 1933, 56–57). Due to their heterogeneous preferences and needs, different consumers prefer different product variants such that no uniform ranking is possible. Consequently, there is no direct relationship between the features of a specific insurance product, its overall objective quality and the quality of the information provided.

As has been described in *section 1.2*, consumers who wish to make a rational decision about their optimal insurance cover, need comprehensive information about a number of quite complex issues. Since the optimal insurance cover is the one which best fits a consumer's preferences and needs given her income, she needs information not only with respect to the differences of the insurance products offered by various insurance companies, but also about her own preferences and risks as well as about the insurance companies' behavior in case of risk settlement. If a long-term insurance contract is to be concluded, additional information about alternative financial assets and changing economic conditions are also necessary. Correct assessment of all this information requires the acquisition of the necessary economic and legal knowledge. Since consumers differ widely in their preferences, needs or risk profiles and since insurance

companies offer a large variety of differentiated insurance products, usually there is no single insurance product on the market, which displays the highest overall quality in any objective sense. Rather, there is quite a variety of different products that are well-suited for persons with different preferences and risk profiles.

A consumer performs search activities to find the individually best matching insurance product. Thus, there is no objective overall valuation of the quality of a certain insurance product without reference to the preferences and needs of a particular consumer. For consumers with different preferences and needs no uniform ranking of insurance product variants is possible. However, for a certain consumer (or for a group of identical consumers) again a number of different variants exist, which fulfill the preferences and needs of this particular consumer to a higher or lower degree, so that they can be ranked hierarchically with respect to this particular consumer (vertical product differentiation). If consumers have identical preferences and needs they can, of course, be grouped into a single segment.

In the following, X is defined as a random variable with the attribute value of X_{ij} indicating the quality of a particular insurance product i from a population of differentiated insurance products in relation to a particular consumer j. The higher this value is, the higher the usefulness of the respective insurance product for the specific consumer is, i.e. the better it matches a specific consumer's preferences and needs relative to other insurance products:

$$\vec{X} = \begin{pmatrix} X_{11} & \dots & X_{1n} \\ \vdots & X_{ij} & \vdots \\ X_{m1} & \dots & X_{mn} \end{pmatrix} \tag{2.27}$$

with $i = 1 \dots m$ (insurance products with different features) and $j = 1 \dots n$ (consumers with different preferences and needs).

Due to the differences in consumers' preferences and needs, the same variant of the insurance product X can have different values expressing its usefulness ("quality") for different consumers. For example, variant 1 may better match consumer 1's preferences and needs than those of consumer 2, so that $X_{11} > X_{12}$. Likewise, different insurance products can be of the same use ("quality") for different consumers. For example, product variant 2 may result in the same usefulness for consumer 3, like product variant 6 for consumer 4, so that $X_{23} = X_{64}$. As a consequence, a ranking of all the insurance product variants can be only made for a particular consumer or a group of consumers with identical preferences and needs.

Thus, in contrast to the basic search theoretical model analyzed above, one can no longer directly conclude from the features of a product variant

to its usefulness ("quality") without taking into consideration the preferences and needs of a particular consumer or consumer segment. Accordingly, the same holds true regarding the quality of the information gathered in the search process. Therefore, in the following it is assumed that by engaging in search activities consumers make observations about the attribute values of different objects, X_{ij}. These are randomly drawn from a constant and known probability distribution $g(X)$ with the cumulative probability distribution $G(X)$ and are randomly assessed in the light of consumers' individual preferences and needs. The resulting information Y about the usefulness of a certain insurance product given a specific consumer's preferences and needs is therefore also a random variable from a probability distribution $f(Y)$ with the cumulative density distribution $F(Y)$.

It is assumed that consumers identically rank the relevance of information, which indicates the usefulness of different insurance product variants in matching their preferences and needs. Thus, although insurance products are horizontally differentiated, information about those being of the same "usefulness" for different consumers is valued by all the consumers in the same way. The higher the value Y_i is, the higher the relevance and, thus, the quality of the information about the usefulness X_{ij} of a certain insurance product i for a particular consumer j. Besides, consumers put different weight on the informational quality, no matter whether gained through personal or through intermediated search activities. Their respective preferences are expressed by their different willingness to pay β for a certain quality level Y_i. Y refers to information both about the features of single insurance products and about the particularities of individual consumers. This information can be gathered by consumers from a number of different sources. Besides information provided by insurance companies and specialized intermediaries, there is a whole range of media publishing articles on optimal insurance protection, the latest rankings of insurance products or on up-to-date ratings of insurance companies. The internet has become a powerful medium for collecting information as well. Moreover, experiences made by relatives, neighbors, friends or colleagues also play an important role as an additional source of information. In addition, consumers are in need to possess the necessary knowledge to correctly process and assess the information gathered. Again, this can be done in a number of different ways, ranging from a thorough study of financial literature to a rather superficial knowledge gained from popular media.

Y can follow different probability distributions. Due to the variety of sources providing relevant information Y, it seems plausible to assume that it follows an exponential probability function $f(Y) = \lambda \cdot e^{-\lambda \cdot Y}$ with the cumulative density function $F(y \leq Y) = 1 - e^{-\lambda \cdot Y}$, like in the basic model. Its

mean and standard deviation are both the inverse of the parameter λ which indicates the density of relevant information, i.e. $\mu_{\text{inf}} = \sigma_{\text{inf}} = \frac{1}{\lambda}$. The higher λ is, the lower the remaining cumulative probability to find relevant (= high quality) information, that is such information about insurance products that well match the preferences and needs of a certain consumer.

If consumers and the intermediary have the same sources of information available, then the same probability function applies to both, with $\lambda^{pers} = \lambda^{I}$. However, if consumers and the intermediary have different access to information with the intermediary having access to "better" sources of information (or with having better knowledge of where to search for information due to experience or learning), then $\lambda^{pers} > \lambda^{I}$ resulting in $\mu_{\text{inf}}^{pers} < \mu_{\text{inf}}^{I}$. In this case, the intermediary has a higher probability than consumers to find relevant information for the problem at hand (see Sect. 2.2.2 for a more detailed discussion).

Alternatively, one can assume the relevant information for a consumer's decision about insurance cover to be log-normally distributed with the probability function $f(Y) = \frac{1}{\sqrt{2 \cdot \pi} \cdot \sigma \cdot y} e^{\frac{1}{2}[(\ln y - \mu)/\sigma]^2}$. In this case, there is a very small probability to merely find irrelevant information, while the probability to gather more adequate information is high, however, with a steeply declining probability to find information about the best matching insurance product variants. Again, better access of the intermediary to information can be expressed by $\mu_{\text{inf}}^{pers} < \mu_{\text{inf}}^{I}$.

Although part of the information collected and evaluated is a public good, consumers must, nevertheless, spend costs for acquiring it. Most important are the opportunity costs of the time spent in the search process. However, there are also costs of buying media specialized in providing information about insurance coverage or costs related to the use of the internet, like costs of computer hardware and software. As in the basic model, it is assumed that there are no fixed costs involved and that the personal search costs c^{pers} of a single search step are positive but constant, so that $c^{pers} > 0$.

Again, we assume a linear utility function with $U_j(Y_i) = \beta_j \cdot Y_i$. The consumer's willingness to pay for information services is supposed to follow a normal distribution $N[\mu_\beta; \sigma_\beta]$ with the probability density function *h(β)* (with $\beta \in [0; \infty]$) and the cumulative density function *H(β)*. The medium value of the willingness to pay in the population is expressed by the mean

μ_β, while the degree to which consumers' preferences in the analyzed market is homogenous are expressed by the standard deviation σ_β. Markets with a larger mean μ_β indicate a higher willingness to pay for a particular attribute value and, thus, a higher valuation for high quality information by consumers in this market. A low standard deviation σ_β shows that consumers' preferences are relatively homogenous, whereas a higher standard deviation σ_β indicates more heterogeneous preferences.

A rational consumer is not searching information Y about the *overall* best insurance product given her preferences and needs, but only about the *relative* best one which maximizes her utility so that $U\left(y^*\right)=\beta\cdot y^*$. She stops searching for further information when the marginal cost of a further search step equals the marginal revenue obtained from the best product variant observed so far. Like in the basic search model, the optimal stopping rule defines the reservation value y^*:

$$\int_{y^*}^{\infty}\left[1-F(y)\right]\cdot\beta dy = c^{pers} \qquad \rightarrow y^*. \tag{2.28}$$

With the information being exponentially distributed this results in:

$$\frac{1}{\lambda}\cdot e^{-\lambda\cdot y^*}\cdot\beta = c^{pers} \qquad \rightarrow y^*. \tag{2.29}$$

If information about a product X_{ij} is acquired which results in y^*, then the consumer stops searching and buys this product variant. Again, it is assumed that consumers are able to recall to previous observations without having to incur additional costs. Although the time horizon of the search process is thought to be infinite, usually it can be reasonably assumed to be of a rather short duration, so that consumers can easily recall previous product variants and their features.

Instead of performing direct personal search activities, consumers can use the services provided by an insurance intermediary. As in the basic model, a consumer is indifferent between direct and intermediated search if both result in the same utility $U^I=U\left(y^*\right)$:

$$\beta\cdot Y^I-\left[C(O)-C\left(O^I\right)\right]=\beta\cdot y^* \qquad \rightarrow\left[\beta_l\left(Y^I,O^I\right),\beta_u\left(Y^I,O^I\right)\right] \tag{2.30}$$

The utility of personal search is the optimal quality determined by the reservation value y^* weighted with the consumer's willingness to pay β. Again, it is assumed that consumers' differences in their valuation of information with the same relevance or quality follow a normal distribution $h(\beta)$. The utility gained from relying on the services of an intermediary is the quality level Y^I provided by the intermediary times the consumer's

willingness to pay β, but minus the net costs $\left[C(O)-C\left(O^I\right)\right]$ of using the services of an intermediary. Solving this equation determines the boundaries $\left[\beta_l\left(Y^I,O^I\right),\beta_u\left(Y^I,O^I\right)\right]$, which define the market segment within which consumers are better off when using the services of an insurance intermediary.

Consumers must bear costs $C(O)$ when using the services of an insurance intermediary (Ehrlich and Fischer 1982; Neuberger 1998, 166–171).[20] These include in particular opportunity costs of the time spent with an intermediary, but also additional transaction and information costs like travel costs or costs spent for searching an intermediary. Despite turning to an intermediary, a consumer may undertake additional personal search activities, which additionally cause costs. The amount of these transaction costs $C(O)$ can be reduced by the intermediary if he carries some of the costs himself. For example, if he visits consumers at home or runs his agency in the vicinity of potential clients, their travel and time costs are reduced. The intermediary's marketing costs include the costs of setting up an agency at a certain location as well as costs spent on advertising in local newspapers, distributing leaflets or engaging in other marketing activities. By spending marketing costs $C\left(O^I\right)$, the overall costs $C(O)$ of using an intermediary decreases for a consumer and therefore her utility gained increases. Nevertheless, due to the opportunity costs of time spent for communicating with an intermediary, it always holds true that $C(O)-C\left(O^I\right)>0$.

Unlike in the basic search model, the fee F^I an intermediary receives for his services does not enter the consumer's utility function. It is customary that consumers do not directly pay for using the services of an insurance intermediary. Therefore, in the following, it is assumed that they act under a "free-fee" illusion. Although consumers finally carry the costs of the information and transaction services provided by insurance intermediaries, they usually have no information about its share on premiums neither before concluding an insurance contract nor afterwards. Moreover, consumers are required to pay the fees F^I in any case if there are only gross premiums offered by insurance companies, even if they prefer pure personal search activities. Except for direct insurers, who run no sales organizations and do not use the services of insurance intermediaries, consumers must buy the preferred insurance cover via an insurance intermediary, who receives the fee, whether he has provided information services or not. There-

[20] See Sect. 3.1 for a more detailed discussion of the role of intermediaries' marketing costs as an action parameter under monopolistic competition in the market for insurance mediation.

fore, the fee or commission F^I eventually paid is not part of consumers' decision-making calculation. It is negotiated between insurance intermediaries and insurance companies.[21] *Inter alia* its amount depends on the type of insurance intermediary, the kind of sales organization an insurance company runs, the bargaining power of the two market sides, the type of insurance police sold, etc. In general, however, it is fixed for a certain time period and cannot be changed arbitrarily by the intermediary. In some countries it is explicitly prohibited for insurance intermediaries to use the fee F^I as an action parameter (Regan and Tennyson 2000, 734–737). This should prevent that less informed consumers or consumers with lower bargaining power have to pay for better informed and/ or more powerful consumers. As a consequence, it seems to be reasonable to assume that consumers act under a "free-fee" illusion with the fee F^I playing no role for consumers when deciding whether to use the services of an intermediary or to perform personal search activities.

In contrast to the basic model presented in *section 2.1*, the utility gained from using an intermediary does not only depend on the quality Y^I of the information provided by the intermediary, but also on the costs $C(O^I)$ borne by him, while the fee F^I is of no importance in the decision-making calculus of a consumer. The market segment served by the intermediary is determined from Eq. 2.30 by $\left[\beta_l(Y^I, O^I), \beta_u(Y^I, O^I)\right]$.

The intermediary derives the optimal values (Y^I, O^I) of his decision variables from his profit maximization calculation:

$$\underset{Y^I, O^I}{Max}\ P^I(Y^I, O^I) = \underset{Y^I, O^I}{Max}\left[R^I(Y^I) - C^I(Y^I, O^I)\right]. \tag{2.31}$$

Note that, in contrast to the basic model, the intermediary's revenue and costs are both influenced by the information level Y^I provided and by the marketing costs $C(O^I)$ spent by him to reduce consumers' expenses in using his services. It is assumed that the intermediary also has only variable search costs $c^I > 0$, which are constant for each search step. Using an exponential probability distribution function for the information Y, his costs are given as follows:

$$C^I(Y^I, O^I, c^I) = E[n] \cdot c^I + C(O^I) = \frac{c^I}{\left[1 - F(Y^I)\right]} + C(O^I) \tag{2.32}$$

[21] See Sect. 3.3.3 for a more detailed discussion of these aspects.

$$= c^I \cdot e^{\lambda \cdot Y^I} + C\left(O^I\right)$$

The insurance intermediary's total search costs $C^I(Y^I, O^I, c^I)$ are a positive function of the costs of a single observation c times the expected number of observations $E[n]$ made and the marketing costs $C\left(O^I\right)$, which are assumed to be independent of the number of potential customers.

Table 2.6. First and Second Order Partial Derivatives of the Insurance Intermediary's Cost Function

First Order Partial Derivative	Second Order Partial Derivative	
Search Costs c^I		
$\frac{\partial}{\partial c^I} C^I(.) = \frac{1}{\left[1 - F\left(Y^I\right)\right]} = e^{\lambda \cdot Y^I} > 0$	$\frac{\partial^2}{\partial \left(c^I\right)^2} C^I(.) = 0$	(2.33)
Marketing Costs $C\left(O^I\right)$		
$\frac{\partial}{\partial O^I} C^I(.) = C'\left(O^I\right) > 0$	$\frac{\partial^2}{\partial \left(O^I\right)^2} C^I(.) = C''\left(O^I\right) \geq 0$	(2.34)
Optimal Information Level Y^I		
$\frac{\partial}{\partial Y^I} C^I(.) = \frac{c^I \cdot f\left(Y^I\right)}{\left[1 - F\left(Y^I\right)\right]^2} = c^I \cdot \lambda \cdot e^{\lambda \cdot Y^I} > 0$	$\frac{\partial^2}{\partial \left(Y^I\right)^2} C^I(.) = c^I \cdot \lambda^2 \cdot e^{\lambda \cdot Y^I} > 0$	(2.35)
Density of High Quality Information λ		
$\frac{\partial}{\partial \lambda} C^I(.) = \frac{\partial}{\partial \lambda}\left(\frac{c^I}{\left[1 - F\left(Y^I\right)\right]}\right) = \frac{\partial}{\partial \lambda}\left(c^I \cdot e^{\lambda \cdot Y^I}\right) = c^I \cdot Y^I \cdot e^{\lambda \cdot Y^I} > 0$	$\frac{\partial^2}{\partial \lambda^2} C^I(.) = c^I \cdot \left(Y^I\right)^2 \cdot e^{\lambda \cdot Y^I} > 0$	(2.36)

Total search costs increase exponentially with the optimal information level Y^I and the density λ of the acceptable qualities of the given distribution (Table 2.6). Hence, total search costs are the higher, the higher the costs of a single observation c, the higher the marketing costs $C\left(O^I\right)$, the higher the optimal information level Y^I and the higher the density λ of high quality objects in the distribution are.

The intermediary's revenues result from the expected number of clients $E[N]$ times the fees F^I negotiated with the insurance companies. For reasons of simplification the latter are assumed to be fixed for the period analyzed. The expected number of clients depends on the market size N and on the market segment served by the intermediary, which is determined through the interval $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$. Thus, his revenues are given by

$$R^I(Y^I, O^I) = F^I \cdot E[N] = F^I \cdot N \cdot \int_{\beta_l(Y^I, O^I)}^{\beta_u(Y^I, O^I)} h(\beta) d\beta \,. \tag{2.37}$$

In order to find the profit-maximizing values for the information level Y^I and the marketing efforts O^I, the insurance intermediary must optimize

$$\underset{Y^I, O^I}{Max}\, P^I(Y^I, O^I) = \tag{2.38}$$

$$= \underset{Y^I, O^I}{Max}\left[F^I \cdot N \cdot \int_{\beta_l(Y^I, O^I)}^{\beta_u(Y^I, O^I)} h(\beta) d\beta - \frac{c^I}{\left[1 - F(Y^I)\right]} - C\left(O^I\right) \right]$$

$$= \underset{Y^I, O^I}{Max}\left[F^I \cdot N \cdot \int_{\beta_l(Y^I, O^I)}^{\beta_u(Y^I, O^I)} h(\beta) d\beta - c^I \cdot e^{\lambda \cdot Y^I} - C\left(O^I\right) \right].$$

Figure 2.8 depicts the resulting market segmentation given the optimal values for $\left(Y^I, O^I\right)$ graphically. Intermediated search takes place when $U^I > U\left(y^*\right)$.

Like in the basic model, the intermediary can follow different strategies to maximize his profit. Due to the assumption of a "free-fee" illusion, F^I is a given variable. However, besides deciding on the profit-maximizing level of information Y^I provided to consumers, the intermediary can also influence his profits by deciding on his marketing efforts O^I. Again, the intermediary can follow three different types of strategy. Like in the basic model, an insurance intermediary can play (1) a *simultaneous strategy* by deciding on both the optimal level of Y^I and O^I, (2) a *quality-optimizing strategy* where he seeks the optimal information standard Y^I given a fixed level of marketing efforts $\overline{O}^I$ or (3) a *fixed-quality-level strategy* where he

decides on the optimal level of his marketing efforts O^I given a fixed information level $\overline{Y}^I$.

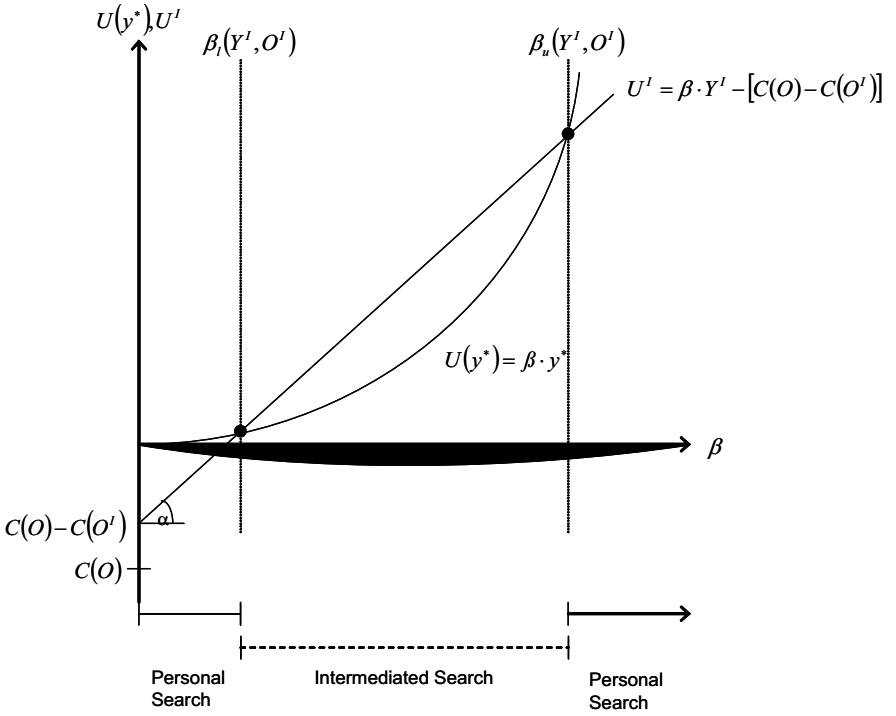

Fig. 2.8. Consumer's Make-or-Buy Decision for Insurance Intermediation

The *simultaneous strategy* prevails when the intermediary spends resources both on the optimal level of information Y^I and on marketing activities O^I to gain the maximum profit $P^I\left(Y^I, O^I\right)$. By contrast, he applies a *quality-optimizing strategy* if the optimal level of marketing costs is fixed, so that he can solely influence his profits $P^I\left(Y^I, O^I = const.\right)$ by choosing the optimal value for Y^I. This may be the case either if the intermediary does not spend any variable marketing costs or if their level is determined exogenously. For example, if an insurance intermediary decides to operate as an agent tied to an insurance company which operates a franchise system, the kind of marketing activities and the resulting expenses are fixed once this decision has been made. A *fixed-quality-level strategy* with $P^I\left(Y^I = const., O^I\right)$ should be experienced only exceptionally. It may be followed in case an insurance intermediary decides to become member

of a professional association, which prescribes a certain quality level. To reap the potential reputational gains, the intermediary must then provide the promised fixed information level $\overline{Y}^I$ while being free with respect to his marketing efforts O^I.

To summarize, some modifications of the basic search model have been made to better match the particularities of markets for insurance intermediation. The exogenous variables, which ultimately determine the make-or-buy decision of consumers and the profit maximization of insurance intermediaries, are the number of potential consumers *N*, the distribution of consumers' willingness to pay *h(β)* with its mean value μ and its standard deviation σ, the search costs *c*, the distribution of relevant information expressed either by an exponential distribution or by a log-normal distribution as well as the transaction costs $C(O)$ to be spent by consumers to use an intermediary's services. In contrast to the basic model, the fees F^I, which are ultimately borne by consumers, are taken as exogenous, since they usually cannot be changed autonomously by insurance intermediaries, but are negotiated between insurance companies and intermediaries, and since consumers usually have no information about their amount. Therefore, it can be reasonably assumed that consumers act under a "free fee" illusion with the fees not entering their utility maximization calculation. The level of information Y^I provided about insurance products characteristics, which match the preferences and needs of consumers and the marketing efforts O^I spent by the intermediary to reduce consumers' expenses in using his services are the decision variables in the modified model. Depending on which of the above discussed strategies an intermediary follows, he maximizes his expected profit P^I by either providing an optimal value for Y^I or for O^I or for both variables. In the following *section 2.2.2* the effects of changes in the exogenous variables on the optimal information level Y^I are discussed.

2.2.2 Comparative-Static Analysis under Symmetric Information

In the following the impact of changes in the exogenous variables (density of relevant information, search costs, consumers' costs of using an intermediary, consumers' attitude towards quality, market size and penetration, fees) on the optimal information quality Y^I provided by the insurance intermediary is analyzed. For reasons of simplification it is still assumed that only one intermediary is engaged in providing information and that there are no asymmetries either in regard to the underlying distribution of rele-

vant information or to the truthfulness of the information given. These points and their impact on the optimal information quality Y^I are discussed in more detail in *section 2.2.3*.

2.2.2.1 Density of Relevant Information

Like the basic model, the insurance intermediary model assumes that consumers and the intermediary have access to the same sources of information about the different insurance product variants and about consumers' individual characteristics. Applying an exponential distribution function, the relevance of information depends on the density parameter λ. A higher λ states that the more information available on the market, the lower the probability is to find the adequate (= high quality) information about such insurance product variants, which exactly match the preferences and needs of a particular consumer (Sect. 2.2.1). The overall information available may increase because the number of sources from which both consumers and the intermediary can extract relevant information increases. It may also result from a higher degree of product differentiation by insurance companies which increases the number of insurance product variants from which the best one has to be chosen. With an increase in the overall information available, the density of relevant information decreases. This is expressed by $d\lambda > 0$ given the assumed exponential probability distribution.

Given an increase in λ consumers' reservation value y^* decreases according to Eq. 2.29 in *section 2.2.1*. Without adaptations of the optimal information level Y^I by the intermediary and his marketing efforts O^I, the market segment served by the intermediary expands. The interval defined by the boundaries $\left]\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right[$ becomes broader because now intermediated search becomes profitable to more consumers than direct personal search. However, the intermediary must adapt his decision variables, since he too suffers higher costs due to the increase in λ (see Eq. 2.36, Table 2.6, Sect. 2.2.1). When he follows a simultaneous strategy, he can react to the increase in costs resulting from $d\lambda > 0$ by reducing the optimal information level Y^I provided and his marketing efforts O^I. This leads to a smaller interval defined by the boundaries $\left]\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right[$ and, thus, to a smaller market segment served. When following one of the other strategies, the intermediary can only change the variable which is not fixed. In case of the quality optimizing strategy this would lead to a decrease in the quality of the information level Y^I provided, while by definition it would remain constant in the fixed-quality-level strategy.

2.2.2.2 Search Costs

In the following, we analyze the impact of changes in search costs given consumers and the intermediary have (1) identical search technologies respectively (2) they use different technologies. Finally, we shortly discuss the consequences that arise when (3) search technologies exhibit fixed costs.

(1) Identical Search Technologies

Like in the basic model, it is assumed that both consumers and the intermediary engaged in the market use the same search technology, so that the costs for a single search step are the same with $\left(c^{pers} = c^I\right) > 0$. An increase in the costs of a single search step $d\left(c^{pers} = c^I\right) > 0$ influences both market sides. Consumers react to it by lowering the reservation value of their information level y^*. This also affects the intermediary's boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$. However, higher search costs also lead to higher total costs $C^I\left(Y^I, O^I, c^I\right)$ of the insurance intermediary with $\frac{\delta C^I}{\delta c^I} > 0$ (see Eq. 2.33, Table 2.6, Sect. 2.2.1). Following a simultaneous strategy, the intermediary can adapt to this by lowering both his optimal level of information Y^I and his marketing efforts O^I. Both variables influence his revenues, since they tend to reduce the interval $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$, which determines his market segment. As a consequence, the intermediary will adapt Y^I and O^I, so as to minimize the loss of revenue. If he follows a quality-optimizing strategy given a fixed level of $\overline{O}^I$, he can only react to the increase in search costs by reducing the level of information Y^I provided to consumers. Given a fixed-quality-level strategy with $\overline{Y}^I$, an increase in search cost can be compensated only by reducing O^I.

(2) Differences in Search Technologies

So far, it has been assumed that consumers and the intermediary use the same search technology and, thus, have identical search costs. However, it seems to be more realistic that the intermediary has lower search costs than consumers (Rose 1999, 116, 119–120). The costs of a single search step not only include the costs of collecting information about different insurance products, companies and the specific preferences and needs (esp. the risk profile) of a consumer, but also the costs of evaluating this informa-

tion. Given that both consumers and the intermediary have to cope with the same information distribution, both have to spend costs for using the given information sources. This may entail personal contacts along with communication and traveling costs. Nevertheless, the use of the internet also causes costs for the acquisition of the necessary computer hardware and software. Besides, depending on the information source (like specialized magazines or on-line available data bases), costs must be spent to purchase the desired information be it in printed or in electronic form. In addition, to evaluate the information gathered requires investment in human capital, which causes high fixed costs. Since an intermediary can use such investment in technology and in human capital repeatedly, it pays for him to undertake more asset specific investments, which makes his search more efficient, thus reducing the costs of a single search step. In addition, he can also realize economies of scale when negotiating contracts with the producers of the information he is interested in if he regularly purchases data and therefore reaches larger volumes than a single consumer. Moreover, in contrast to a single consumer an intermediary can realize dynamic economies of scale due to positive learning curve effects. As a consequence, it seems plausible that costs for a single search step are higher for consumers than for intermediaries, so that $c^{pers} > c^{I}$, also when assuming that both have the same information distribution.

The higher the costs of a single search step c^{pers} are for a single consumer, the lower is her reservation value y^{*}. At the same time, the lower the costs of a single search step c^{I} for the intermediary are, the higher the optimal information level Y^{I} he provides.[22] Taken together, an intermediary with lower search costs serves a larger market segment since both effects lead to a wider interval delimited by the boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$.

If either the intermediary's costs of a single search step decrease or those of consumers increase, their difference becomes larger, so that $d(c^{pers} - c^{I}) > 0$. For example, an increase in consumers' search costs may result from higher wages, which increase their opportunity costs of the time spent for gathering and evaluating information about insurance coverage. A decrease in the search costs of the intermediary may be the result of innovations in search technology. Since new technologies are produced and sold at high prices in the early phases of their life cycle, their acquisition does not pay for a single consumer. However, it may be advantageous for an intermediary since he can use the new technology more often and,

[22] Of course, this does not hold true if he follows a fixed-quality level strategy.

thus, realize economies of scale. Accordingly, lower search costs compensate for the high acquisition costs.

An increase in the difference between the search costs of consumers and the intermediary lowers consumers' reservation value y^*, thus, broadening the market segment served by the intermediary. An intermediary following either a simultaneous or a quality-optimizing strategy can respond to this with decreasing his information level Y^I provided. If the underlying information distribution follows either an exponential distribution or a log-normal distribution, an increase in the information level offered causes disproportionately higher costs $C^I\left(Y^I, O^I, c^I\right)$, since $\frac{\delta C^I}{\delta Y^I} > 0$ and $\frac{\delta^2 C^I}{\delta\left(Y^I\right)^2} > 0$ (see Eq. 2.35, Table 2.6, Sect. 2.2.1). Conversely, a reduction in Y^I results in a disproportionate cost reduction. Although the market segment served becomes smaller due to a smaller interval delimited by the boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$, the decrease of y^* counteracts this effect. In case of a simultaneous strategy the intermediary may additionally use part of the resources saved on information acquisition to increase his marketing efforts O^I. This also produces a positive effect on the market segment served. If the intermediary follows a fixed-quality-level strategy, by definition he can only react by reducing his marketing efforts O^I.

(3) Fixed Search Costs

Up until now, only variable costs have been taken into account both for personal and intermediated search activities. In reality, however, both consumers and insurance intermediaries must also spend fixed costs when gathering and evaluating information on insurance product variants and their usefulness for a particular person. Especially investment in human capital and in durable goods (like computers, office furniture and technology) cause fixed costs. For insurance intermediaries investment in reputation also exhibits fixed costs characteristics. Introducing fixed costs for consumers $C_{fix}^{pers} > 0$ affects consumers' make-or-buy decision. While the optimal reservation value y^* does not change, the utility gained by personal search becomes smaller. As a consequence, the boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$ change in a way that the market segment for which intermediated search is more advantageous becomes broader (Fig. 2.9) since the consumers' indifference condition changes to

$$\beta \cdot Y^I - \left[C(O) - C\left(O^I\right)\right] = \beta \cdot y^*(\beta) - C_{fix}^{pers}. \tag{2.39}$$

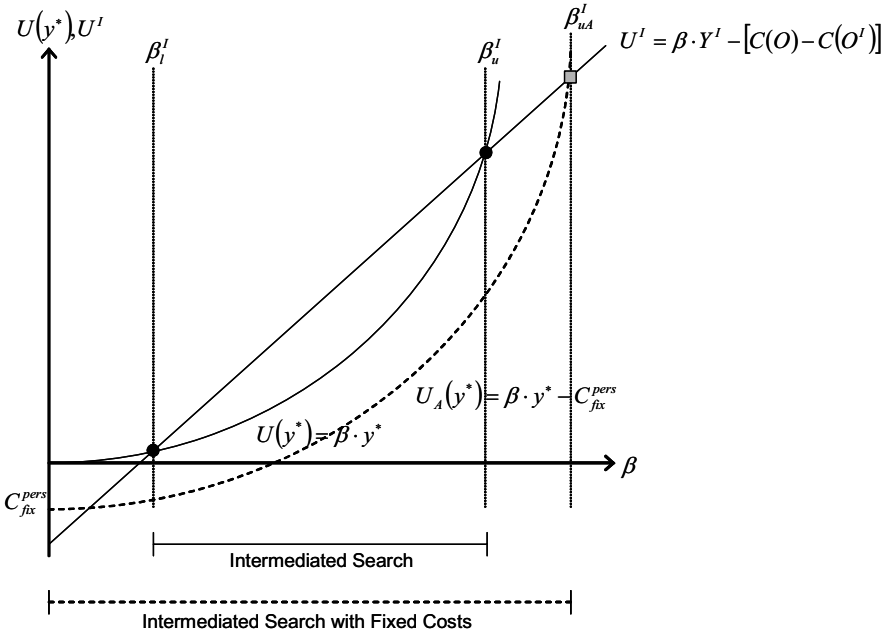

Fig. 2.9. Personal versus Intermediated Search with Fixed Costs

However, since there is another optimal value of the intermediary's decision variables for each interval $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$, the intermediary must adapt his decision variables to further maximize his profits. The broader market segment allows him to earn higher revenues, so that he can reduce the optimal information level Y^I offered and/or his marketing efforts O^I, depending on what strategy he follows.

If the intermediary must also spend fixed costs $C_{fix}^I > 0$, these costs are, however, of no importance when it comes to the determination of the optimal values of the decision variables Y^I and O^I. Given the modified total costs of the intermediary

$$C^I(Y^I, O^I, c^I) = \frac{c^I}{\left[1 - F(Y^I)\right]} + C_{fix}^I + C\left(O^I\right) \tag{2.40}$$

$$= c^I \cdot e^{\lambda \cdot Y^I} + C^I_{fix} + C\left(O^I\right),$$

his marginal costs and, thus, the profit maximizing values of the optimal information level Y^I and his marketing efforts O^I are not influenced by fixed costs that result from search. However, they reduce his expected net profit. Thus, they are of importance for intermediaries when deciding whether to enter a market and what search technology to employ.

Changes in fixed search costs dC^I_{fix} inversely affect consumers' net utility and the intermediary's expected profit. Therefore, incentives exist to invest in capital goods since they reduce the amount of fixed costs and because of this are profitable for consumers and/or the intermediary. However, these incentives are weaker, the less often search activities are undertaken. That is, the more often a consumer plans personal search activities and/ or the larger the expected number of an intermediary's clients is, the stronger the potential gains from investing in lower fixed costs are. Accordingly, incentives for consumers to invest in search technology, which reduces fixed search costs, should be lower than those for the intermediary.

Nevertheless, whenever consumers' fixed costs become smaller so that $dC^{pers}_{fix} < 0$, an intermediary following a simultaneous or a quality-optimizing strategy has to increase the level of information Y^I provided because of the then smaller boundaries determined by the consumers' make-or-buy decision. By contrast, a reduction in the intermediary's fixed costs $dC^I_{fix} < 0$ increases his expected net profits without affecting the optimal choice of his decision variables Y^I and O^I.

2.2.2.3 Consumers' Transactions Costs when Using an Intermediary

Although it is assumed that consumers act under a "free-fee" illusion, they take other transactions and information costs *C(O)* into account, which result from using the services of an insurance intermediary. As has been discussed in *section 2.2.1* above, these costs are the costs incurred when searching an intermediary, traveling costs and the opportunity costs of time spent with an intermediary. An increase in these costs to $C(O)_A$ results in a decline in consumers' utility gained from the services of an intermediary (Fig. 2.10). Consequently, the market segment the intermediary serves becomes smaller and, thus, his expected profits as well. Such a cost increase may arise because of higher travel and communication costs, for example due to higher oil prices or higher taxes. It may also emerge from services, which are substitutes offered by other types of intermediaries if the latter

raise the opportunity costs of using the services of an insurance intermediary.

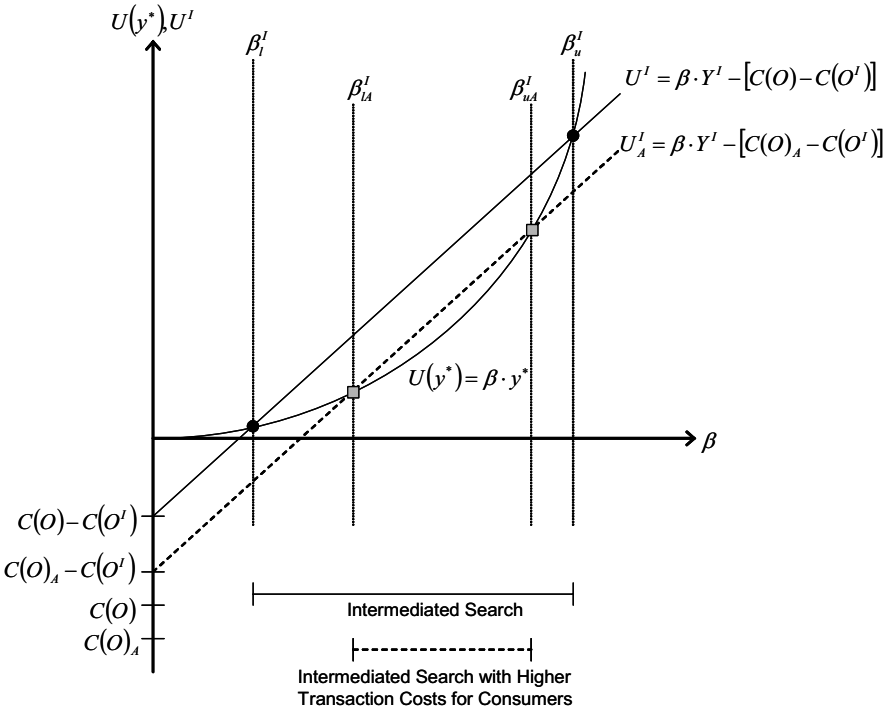

Fig. 2.10. Increase in Consumers' Transactions Costs of Using an Intermediary $dC(O) > 0$

Nevertheless, the intermediary can influence the size of the total costs $C(O) - C(O^I)$ consumers have to bear through his marketing efforts O^I. Although more efforts spent on marketing leads to an increase in his marketing costs $C(O^I)$, the negative effect on his profits is lessened by the positive effect on the extent of the market segment served, since higher marketing efforts widen the relevant interval through its boundaries $[\beta_l(Y^I, O^I), \beta_u(Y^I, O^I)]$.

If the intermediary follows a fixed-quality-level strategy, he can adapt to consumers' changed costs of using his services only in this way. Contrary to that, if he follows a quality-optimizing strategy, which implies a constant level of marketing efforts $\overline{O}^I$, he can adapt by increasing the information level Y^I provided. Although this involves disproportionately

higher total search costs, it again increases the number of potential clients in the market and, thus, counteracts the impact of consumers' higher costs of using the intermediary's services. If the intermediary applies a simultaneous strategy, he can react by adapting both through an increase in the information level Y^I offered and/ or the marketing costs $C\left(O^I\right)$ spent. Since the former requires disproportionately higher costs, it is more likely that he will mainly react to the decrease in potential clients with an increase in $C\left(O^I\right)$. Nevertheless, each strategy results in lower expected profits.

2.2.2.4 Consumers' Attitude Towards Quality

Like in the basic model, it is assumed that consumers differ in their attitudes towards high quality information services. The model captures these differences by assuming that the willingness to pay for a certain quality level follows a normal distribution *h(β)*. The mean willingness to pay μ_β states the average evaluation of information quality. The standard deviation σ_β expresses the heterogeneity of consumers' preferences in the market. Different markets are characterized by differences in consumers' mean willingness to pay and in the standard deviation.

Consumers' attitude towards quality affects the expected profit of the intermediary through the expected number of clients who are within the boundaries of the interval $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$ that defines the market segment served by the intermediary. To maximize his expected profit he must therefore provide an information level Y^I and spend marketing costs $C\left(O^I\right)$ so that given the resulting total costs expected revenues are maximized. The higher both the mean willingness to pay μ_β and the standard deviation σ_β are, the higher are the optimal information level Y^I and the marketing efforts O^I *ceteris paribus*.

A higher mean willingness to pay $d\mu_\beta > 0$ indicates a higher valuation of high quality information about well-matching insurance product variants by consumers. This might result from reforms of the underlying social security system, as it can be currently observed. In many EU member states, reforms of the compulsory old-age security systems lead to a stronger reliance on private old-age insurance provisions to further maintain the current pension level. Thus, private old-age insurance coverage becomes more important to maintain one's preferred income level after retirement. The same holds true with respect to health insurance. Again, in many EU member states reforms lead to a partial shift of benefits so far provided by statutory sick benefit funds to private health insurance. Since

rational consumers are aware of the significance of a comprehensive protection against the underlying risks, it can be reasonably assumed that this will also lead to a higher valuation of high quality information about individually well matching insurance product variants and, thus, to a higher mean willingness to pay $d\mu_\beta > 0$. Such profound reforms of public social security systems are normally accompanied by intense political debates and public discussions. Usually insurance companies also intensify their marketing and advertising efforts. As a consequence one can assume that this may also result in a lower heterogeneity of consumers' preferences for high quality information, so that the standard deviation σ_β becomes smaller with $d\sigma_\beta < 0$.

If only the mean willingness to pay rises, so that $d\mu_\beta > 0$, this leads to a smaller market segment served by the intermediary given his current optimal information level Y^I. Consequently, his expected revenues decrease with his profits also decreasing. To further maximize his profit, the intermediary must adapt his decision variables. If he follows a simultaneous strategy, he can react to the decreasing revenues by increasing the costs spent on the information level Y^I provided and/or on marketing activities O^I. Increases in both variables widen the interval through its boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$, so that the intermediary can again capture a larger share of potential consumers in the market. In case of a quality-optimizing strategy where marketing efforts O^I are constant he can increase the quality of the information level Y^I, while in case of a fixed-quality-level strategy he can only respond by spending more on marketing efforts O^I.

If consumers' attitude towards high quality information about insurance product variants becomes more homogenous, the standard deviation becomes smaller, so that $d\sigma_\beta < 0$. In this case a larger proportion of potential consumers falls within the previous boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$. Consequently, the intermediary can increase his profits by reducing costs through a reduction of the optimal information level Y^I and/or his marketing activities O^I depending on the strategy he follows. However, depending on the precise position of the consumers' mean willingness to pay an increase in the information level Y^I may lead to an additional increase in profits despite the higher costs to be spent on it. If both effects (higher willingness to pay and more homogeneous preferences with respect to high quality information) occur simultaneously, no clear-cut answer in regard to the direction of either Y^I or O^I can be made without further information

about their relative size. Another important implication of this reasoning is that a target market is the more profitable for an intermediary to enter, the higher the mean willingness to pay and the more homogeneous the attitudes towards high quality information is in this consumer segment.

2.2.2.5 Market Size and Market Penetration

Not only the absolute number N of consumers in a market, but also the degree of market penetration determine the market outcome for an intermediary. The impact of changes in both factors on the optimal quality level provided is discussed in the following.

(1) Number of Potential Consumers

The number of potential consumers N in the intermediary's target market can change over time. For example, social security reforms may increase the number of potential users. If risks previously covered by public social security schemes must now be covered by private insurance, market size increases. Given that the number of potential consumers N in the market rises, so that $dN > 0$, the intermediary's expected revenues $R\left(Y^I, O^I\right)$ increase all other things remaining equal. When following a fixed-quality-level strategy, his expected profits increase proportionately. When following either a simultaneous or a quality-optimizing strategy, the larger number of potential clients N allows the intermediary to increase his optimal information level Y^I and/ or his marketing efforts O^I. However, the former increases only to a lower degree due to the disproportionately higher costs incurred by an increase in the optimal quality. Since these costs exhibit fixed costs characteristics, with a growing number of users economies of scale are realized. Generally speaking, it holds true that expected profits are the higher, the larger the target market is.

(2) Market Penetration

Usually the number of clients actually reached by an intermediary is lower than the number of potential customers N (Rose 1999, 136–137). To express the degree to which all potential consumers are aware of the services provided by the intermediary, a factor u with $0 \le u \le 1$ is introduced. It indicates the extent of the market penetration by the intermediary. The share of consumers actually reached is, thus, given by $(u \cdot N)$. An increase in market penetration $du > 0$ has the same consequences as an increase in the number of potential consumers $dN > 0$. Such an increase in consumers'

awareness of the services provided by the intermediary may be generated either by exogenous actors or by the intermediary himself. In the latter case, he has to spend additional costs, which must be weighted against the possible positive effects. However, due to media coverage such higher awareness might also come along without costs for the intermediary.

Information once produced and transmitted exhibits to some degree public goods characteristics because it can be further disseminated for very low marginal costs without involving an intermediary. In this case, the latter will not cover all the costs incurred in producing this information. Consequently, the more general applicable the information searched for is, the lower the willingness to pay β for it will be. If information Y about individually best matching insurance product variants is searched for, this is of less importance the more consumers differ in their preferences and needs with respect to insurance cover. In contrast, when information about the quality or usefulness of a product is directly proportional to its attribute values X_i, then the information gathered and processed by an intermediary is not consumer-specific. In this case, once such information has been produced and transmitted to just a single consumer, she can spread it to all others interested in it. Therefore, widespread market failure should be expected (Rose 1999, 137).

However, even then information is no pure public good since consumers must at least communicate with one another to learn about this specific information. Thus, information exhibits positive network externalities. The more widespread transmitted a particular information already is, the higher is the likelihood to obtain it. Thus, a higher degree of market penetration and therefore a higher value of u should lead to a growing reluctance to pay for this information or – more generally – to use the services of an intermediary to obtain this information. Even in the case of highly specific information about insurance products, which match a particular consumer's preferences and needs, strong positive network externalities might exist. Although consumers differ in many respects, they, nevertheless, can be classified according to their preferences and risk profiles and be grouped in different market segments (Benkenstein 2001, 51–60, 101–116; Benkenstein 2002, 13–34; Zeithaml and Bitner 2003, 164–174). In this case the higher the market penetration of an intermediary is for a particular target market, the more likely it is that two consumers belonging to the same category meet and communicate.

Generally, an intermediary can react to such externalities by either choosing the optimal degree of penetration of his target market and/or by offering personalized by-products which show no public goods characteristics. Note that the more homogenous consumers' preferences are and the

smaller the intermediary's target market is, the more relevant this problem becomes. Therefore, the extent of additional products and services offered should be higher, the higher the market penetration ratio u and/or the lower the standard deviation σ_β is.[23]

2.2.2.6 Fees

In contrast to the basic model, it is assumed in the insurance intermediary model that the fees F^I an insurance intermediary receives for his services are exogenous. The central factor influencing the level of fees and, thus, the revenues received by an intermediary, all other things being equal, is the insurance coverage, since the fees are usually a certain percentage of it. The higher the coverage is, the higher the absolute amount of fees received *ceteris paribus*. Since insurance coverage and, thus, premiums differ according to the type of risk covered, an intermediary can determine the absolute amount of fees he can earn by deciding which type of insurance to distribute. However, risks, which require a larger insurance coverage, are also more complex and therefore more time must be spent on information search.

Since insurance companies take this into account when deciding on the commission and brokerage schemes applied to insurance agents or insurance brokers, it can be argued that on average it makes no difference whether an intermediary spends a given amount of time per period on insurance types that generate higher fees but require more time spent on them than on insurance types that bring lower fees, but are sold more often within the same period. Besides, the relative bargaining power of the two parties is decisive. It seems reasonable to assume that a single intermediary has less bargaining power than an insurance company. This holds true at least as long as there is competition among intermediaries.

However, with a higher degree of organization among intermediaries or with a rise in overall income, fees might increase, so that $dF^I > 0$. The consequences for an intermediary's profit-maximization are the same as an increase in the market size due to $dN > 0$ (Sect. 2.2.2.5). When following either a simultaneous or a quality-optimizing strategy the intermediary will increase his information level Y^I, nevertheless, disproportionately, while in the case of a fixed-quality level strategy he raises his marketing efforts O^I. Despite the higher costs involved, this allows him to reach more con-

[23] For a discussion of horizontal product differentiation in the market for insurance intermediation see Sect. 3.1.

sumers by widening the interval $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$ and, thus, to increase his profits.

2.2.2.7 Summary

To summarize the above discussion, the following empirically testable hypotheses can be derived from the insurance intermediary search model (Table 2.7). Given that the intermediary follows either a simultaneous or a quality-optimizing strategy, a lower information level Y^I is expected to be provided if there is a decrease in the relevant information available or if there is an increase in either variable or fixed search costs. An increase in search cost disparities between consumers and the intermediary due to better search technology employed by the intermediary also results in a lower information level Y^I provided. By contrast, the intermediary offers a higher information level Y^I if consumers' costs for using his services rise. The same holds true if consumers' mean willingness to pay for information rises or if their preferences become more homogeneous. Furthermore, an increase in the total number of potential customers or in market penetration also implies an increase in the information level offered. The same holds true if the fees negotiated between insurance companies and the intermediary increase.

Table 2.7. Changes in the Exogenous Variables and the Optimal Information Level Y^I

Changes in Exogenous Variables	Changes in Y^I
(1) Density of relevant information λ	-
(2) Search Costs	
Identical variable search costs c	-
Different search technologies $c^{pers} > c^I$	-
Fixed search costs C_{fix}	-
(3) Consumers' transaction costs C(O)	+
(4) Consumers attitude towards information service quality	
Consumers' mean willingness to pay μ	+
Heterogeneity of consumers' preferences σ	-
(5) Market size and penetration	
Number of potential consumers N	+
Market penetration rate u	+
(6) Fees F	+

2.2.3 Comparative-Static Analysis under Asymmetric Information

So far, it has been assumed that there are no information asymmetries between consumers and the intermediary. However, in reality there are profound asymmetries in favor of insurance intermediaries with respect to the underlying information distribution (*section 2.2.3.1*) and also in regard to the content of the information provided by the intermediary to consumers (*section 2.2.3.2*). In the following, for the modified insurance intermediary model the resulting consequences are discussed.

2.2.3.1 Asymmetric Information about the Underlying Information Distribution

Up until now it has been assumed that both consumers and the intermediary know the true information distribution, which underlies their search activities. It was characterized through the parameter λ in case of an exponential distribution. If one takes into account that both consumers and the intermediary misperceive the underlying distribution to the same extent, this can be expressed by a parameter ε_λ with $\varepsilon_\lambda \in [-1;+1]$. This noisiness in the underlying information distribution can be expressed by the distribution parameter $\lambda \cdot (1+\varepsilon_\lambda)$. Applying this formula to the optimal search strategies of consumers and the intermediary has the same effect as assuming a higher degree of irrelevant information (Sect. 2.2.2.1). Both consumers' reservation value y^* and the optimal information level Y^I offered by the intermediary decline.

It is even more realistic to assume that the probability density distributions from which consumers and intermediaries draw information Y about well matching insurance product variants differ. Hence, it is assumed that intermediaries have access to a probability distribution with a higher density of relevant information. This may be due to the better knowledge intermediaries have gained by learning and experience about superior information sources. The higher density of relevant information intermediaries face in contrast to consumers is expressed by $\lambda^{pers} > \lambda^I$. Accordingly, the differences in the knowledge about the underlying information distribution can be stated by $\lambda^{pers} = \lambda^I \cdot (1+\varepsilon_\lambda)$ with $\varepsilon_\lambda \in [-1;+1]$ (Rose 1999, 158). If it is assumed that the intermediary has access to the correct information distribution, so that $\lambda^I = \lambda$, then the parameter ε_λ describes the differences in knowledge between consumers and the intermediary about the correct information distribution.

If consumers must search from a more noisy population of relevant information than the intermediary, then this has the same effect as higher search costs. It implies a lower reservation value y^* and, thus, a higher utility gained from using the services of an intermediary (Sect. 2.2.2.2). Consequently, the intermediary serves a larger market segment defined by $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$ given his profit-maximizing values for the information level Y^I provided and the marketing efforts O^I spent.

When differences in the access to information increase further, so that $d\left(\lambda^{pers} - \lambda^I\right) > 0$, the intermediary will adapt his profit-maximizing values for the information level Y^I provided and the marketing efforts O^I spent and will retain a higher profit. The difference in the density of relevant information between the consumers' and the intermediary's probability distribution may increase because of an increase (decrease) in irrelevant information for consumers (for the intermediary). This may be caused by more information sources becoming available to consumers, for example due to the internet, or by more insurance product variants offered by insurance companies. However, while consumers now have to cope with more overall information, it can be reasonably assumed that the intermediary is not affected by these developments or at least only to a lesser degree. This may be due to his better knowledge and longer experience. In addition, the intermediary's better access to high relevant information may result from a change in insurance companies distribution strategies. If insurance companies give better processed information to the intermediary (like information that is better directed to the intermediary's target groups) than to consumers, the latter's probability to find high relevant information decreases while it increases for the intermediary.

In case of a larger difference in access to high relevant information expressed by $d\left(\lambda^{pers} - \lambda^I\right) > 0$ or by a higher disturbance parameter $d\varepsilon_\lambda > 0$, consumers' optimal reservation value y^* decreases. Accordingly, the market segment served by the intermediary increases. As a consequence he can realize higher revenues. By adapting his decision variables Y^I and O^I he can further increase his profit. A lower information level Y^I implies a disproportionate reduction in costs, so that despite a smaller market segment defined by the boundaries $\left[\beta_l\left(Y^I, O^I\right), \beta_u\left(Y^I, O^I\right)\right]$, the expected profit may be even higher. However, this modification is only possible when he follows a simultaneous or a quality-optimizing strategy. When following a fixed-quality-level strategy an increase in the extent of information asymmetries between consumers and the intermediary about the correct infor-

mation distribution λ leads merely to a reduction of marketing efforts O^I, which result in a lower increase in profits.

Nevertheless, due to this information asymmetry the intermediary can earn higher profits, no matter what strategy he follows. This increase in profits are *informational rents* because they are not the result of better performance delivered by the intermediary. Their effects on market competition are analyzed in more detail in *section 2.2.4*.

2.2.3.2 Asymmetric Information about the Quality of an Intermediary's Information Services

Up until now, it has been assumed that the information provided by intermediaries reveals the *true* quality of a certain product variant for a specific consumer. However, in reality this must not be the case because intermediaries possess better knowledge about the true attribute value of a certain object than consumers do. There are a number of reasons why intermediaries should provide inaccurate information about how well a particular insurance product variant matches the preferences and needs of a certain consumer. Besides incomplete knowledge on consumers' part, to provide incorrect, misleading or false information to consumers depends on the profits possible and on the incentives set by insurance companies.[24] Since insurance intermediaries are their main action parameter in selling insurance contracts, insurance companies try to induce intermediaries via their remuneration schemes to sell their insurance product variants, irrespective of how well they match consumers' preferences and needs. Moreover, in order to maximize their expected profits, intermediaries have incentives to especially recommend such products for which they receive a relatively high commission or brokerage. Since consumers usually have no or only incomplete knowledge about the fees related to a particular insurance coverage, there is scope for intermediaries to recommend such products from which they obtain a higher revenue although they are less adequate from a consumer's point of view, for example.

Of course, consumers can reduce information asymmetry by checking on the true value of the information provided by an intermediary, but this affords them to spend additional resources and, thus, reduces the value of using an intermediary's services. Even in this case a consumer cannot be sure about the true content of the information provided unless she has the same knowledge and undertaken the same search activities. However, when doubling the information search of an intermediary, no advantages from using his services remain. Therefore, in the following it is assumed

[24] See *section 3.3.3* for a more detailed analysis.

that consumers have only a subjective knowledge about the true value of the services provided by an intermediary. Moreover, it is assumed that they usually overrate the relevance of the information provided by an intermediary.[25]

Information Y^I provided by the intermediary is perceived by consumers to be of a higher relevance with $Y^I_{cons} = Y^I \cdot (1+\varepsilon_Y)$. The disturbance parameter ε_Y indicates the extent of the existing information asymmetry between consumers and the intermediary. In principle, it can take different values with $\varepsilon_Y \in [-1;+1]$. However, if one assumes that consumers generally overrate the information Y^I provided by an intermediary, then $\varepsilon_\lambda \in [0;+1]$.[26] Besides, it is assumed that the intermediary knows the extent to which consumers overrate the content of the information Y^I he provides.

This alteration in the assumption about information provided requires to modify both consumers' make-or-buy decision and the profit-maximizing behavior of the intermediary. Consumers' reservation value y^* is not affected by this asymmetric information, because it depends solely on the marginal cost and revenues borne by consumers. However, when comparing the utility gained from personal search versus intermediated search, consumers overrate the utility U^I_A gained from information provided by the intermediary (Fig. 2.11).

The resulting interval $\left[\beta_l\left(Y^I \cdot (1+\varepsilon_Y), O^I\right), \beta_u\left(Y^I \cdot (1+\varepsilon_Y), O^I\right)\right]$ which defines the market segment served by the intermediary thus becomes broader. The intermediary takes this also into account when deriving the profit-maximizing values for the optimal information level Y^I and the marketing efforts O^I spent. While his revenues are a function of consumers' overratedly perceived information level $Y^I_{cons} = Y^I \cdot (1+\varepsilon_Y)$, he must only spend costs for the actually provided information level Y^I. He must therefore maximize his expected profit:

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[25] See Gravelle (1991; 1992; 1993) and *section 3.3.1* for more details.

[26] Consumers may also underrate the information level provided, so that $\varepsilon_\lambda \in [-1;0]$. This is the case if one assumes that consumers are well aware that they act always under incomplete information with respect to the true content of information provided by insurance intermediaries, so that they make a deduction.

$$\underset{Y^I, O^I}{Max}\, P^I(Y^I, O^I) = \underset{Y^I, O^I}{Max} \left\{ R^I\left[Y^I \cdot (1+\varepsilon_Y), O^I\right] - C^I(Y^I, O^I) \right\}. \tag{2.41}$$

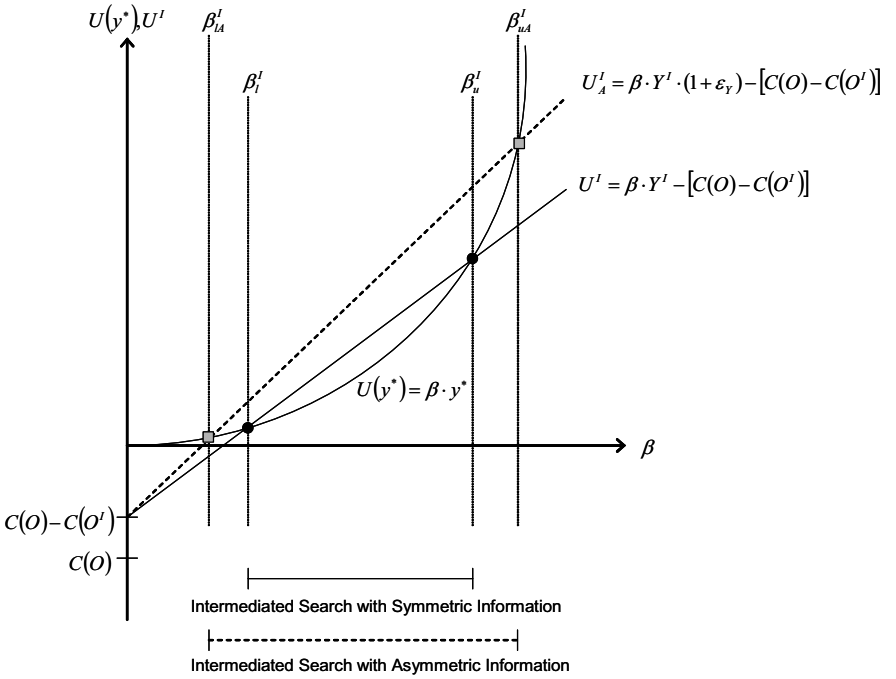
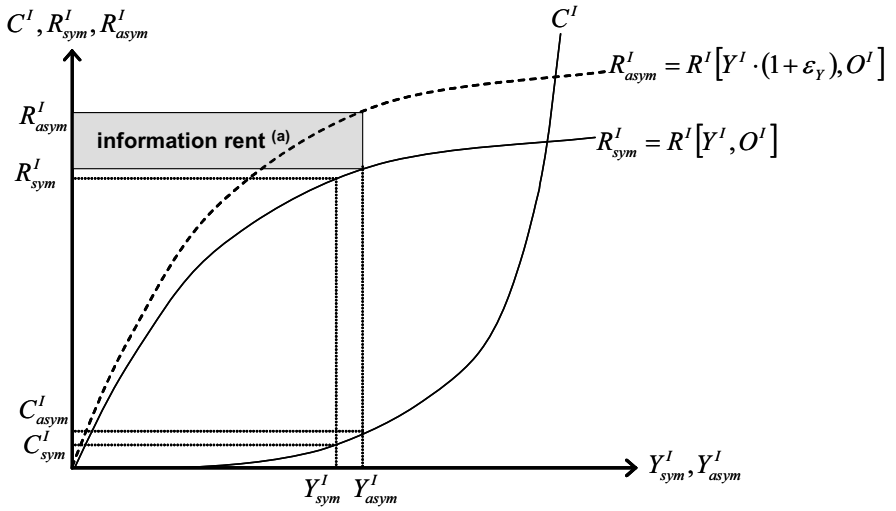


Fig. 2.11. Market Segments under Symmetric and Asymmetric Information

The disturbance parameter ε_Y has the same effect on the market segment served by an intermediary as an increase in the mean willingness to pay of consumers' underlying valuation of information μ_β. An increase in the extent of asymmetric information $d\varepsilon_Y > 0$ consequently results in an increase of the optimal information level Y^I provided by the intermediary when he follows either a simultaneous or a quality-optimizing strategy. Since it is assumed that consumers overrate the true quality of the information provided to the same percentage, revenues from providing a higher information level increase disproportionately. Therefore, despite the also disproportionately rising costs of providing better information quality, for an intermediary it becomes optimal to adapt his profit-maximizing value Y^I (Fig. 2.12). In case of a fixed-quality-level strategy he will increase his marketing efforts O^I.



(a) Note that the information rent plotted matches the exact information rent only approximately since the latter is the difference in profits under symmetric and asymmetric information.

Fig. 2.12. Costs and Revenues under Symmetric and Asymmetric Information

Thus, in contrast to intuition a higher degree of incorrectly perceived information quality provided by an intermediary results in a higher information level than under symmetric information. Conversely, a decrease in consumers' incorrect perception of the true quality of the information services provided by an intermediary leads to the provision of lower information quality compared to that provided under asymmetric information. This results in a lower market segment served by the intermediary and in a higher degree of personal search activities.

No matter what strategy the intermediary follows, his profits are higher due to this information asymmetry. As in the case of asymmetric information about the underlying information distribution λ (Sect. 2.2.3.1), the intermediary earns an information rent. This rent is the difference between his profits in case of symmetric and asymmetric information about the true content of the information provided by him.

2.2.3.3 Summary

Modifying the insurance intermediary model, so as to capture information asymmetries between consumers and the intermediary either with respect to the underlying probability density distribution of the relevant information *f(Y)* or in regard to the true content of the information Y^I revealed to

consumers, results in the following conclusions (Table 2.8). The closer the information distribution, from which consumers make their observations when searching for the relevant information *Y*, comes to the intermediary's distribution, the higher is the information level Y^I provided by the intermediary, all other things being equal.

If there are information asymmetries between consumers and the intermediary with respect to the true content of Y^I, then the larger these asymmetries are the higher is the information level Y^I offered by the intermediary. This rather counter-intuitive conclusion results from the fact that a higher degree of information asymmetry enables the intermediary to realize higher revenues which, in turn, allow more costs to be spent for search activities. Moreover, the model shows that the higher the information asymmetry with respect to the true probability distribution respectively the true content of the information level Y^I is, the higher the intermediary's expected profits are. The share of the expected profits, which are due to information asymmetries, are *information rents*.

Table 2.8. Changes in the Exogenous Variables and the Optimal Information Level Y^I

Exogenous Variables	Changes in Y^I
(1) Asymmetric information about the density of relevant information $\lambda^{pers} = \lambda^I \cdot (1 + \varepsilon_\lambda)$	-
(2) Asymmetric information about the true content of the intermediary's information level offered $Y^I_{cons} = Y^I \cdot (1 + \varepsilon_Y)$	+

2.2.4 Oligopolistic Competition in the Market for Insurance Intermediaries

Up until now, the consequences of personal vs. intermediated search have been studied by only considering the existence of a single intermediary. However, markets for insurance intermediaries are usually oligopolistic markets characterized by low barriers to market entry and a large extent of product differentiation (see also Sect. 3.1). In the following, the effects of competition resulting from a duopoly are studied within the search theoretic model of insurance intermediation developed above. *Section 2.2.4.1* analyzes competition under incomplete, but symmetric information of con-

sumers about the quality of the information services provided by insurance intermediaries. *Section 2.2.4.2* then discusses the consequences of information asymmetries on consumers' side. In each section, firstly, insurance intermediaries are assumed to be identical. The effects of competition on the optimal quality provided by intermediaries and on their expected profits are derived for simultaneous and sequential decision-making. Secondly, the consequences on market outcomes resulting from heterogeneities in search technologies, target markets or information distribution are analyzed. In particular, it is studied whether different levels of information provided by intermediaries are economically viable or whether adverse selection leads to the provision of a single low-quality information level.

2.2.4.1 Competition under Symmetric Information about the Quality of an Intermediary's Information Services

(1) Identical Insurance Intermediaries

In order to derive the effects of competition in case of a duopoly (Sect. 2.1.3), a market with two identical insurance intermediaries is assumed. Each consumer to whom they offer their information services has three alternatives. She can (1) personally search for information y^* from which she receives the utility $U_j\left(y^*\right)=\beta_j \cdot y^*$, (2) use the information Y_1^I provided by intermediary I_1 which results in the utility $U_1^I=\beta_j \cdot Y_1^I-\left[C(O)-C\left(O_1^I\right)\right]$, or (3) use the information level Y_2^I provided by intermediary I_2 and gain utility $U_2^I=\beta_j \cdot Y_2^I-\left[C(O)-C\left(O_2^I\right)\right]$. To maximize her expected utility, consumer *j* chooses the alternative that results in the highest utility from

$$\max U_j=\left\langle\left\{\beta_j \cdot y^*\right\};\left\{\beta_j \cdot Y_1^I-\left[C(O)-C\left(O_1^I\right)\right]\right\};\left\{\beta_j \cdot Y_2^I-\left[C(O)-C\left(O_2^I\right)\right]\right\}\right\rangle \tag{2.42}$$

As in the case of a single intermediary, the two competitors try to maximize their expected profits by choosing the optimal information levels Y_1^I and Y_2^I and the optimal marketing efforts O_1^I and O_2^I. In doing this, each takes into account the feedback from its competitor's optimal choice on its own expected profits. For example, intermediary I_1 maximizes his profits by solving the following calculation (intermediary I_2 does the same):

$$\underset{Y_1^I, O_1^I}{Max}\ P_1^I\left(Y_1^I, O_1^I, Y_2^I, O_2^I\right)= \tag{2.43}$$

$$= R_1^I\left(Y_1^I, O_1^I, Y_2^I, O_2^I\right) - C_1^I\left(Y_1^I, O_1^I\right)$$

$$= F_1^I \cdot N \cdot \int_{\beta_l^{I_1}(Y_1^I, O_1^I, Y_2^I, O_2^I)}^{\beta_u^{I_1}(Y_1^I, O_1^I, Y_2^I, O_2^I)} h(\beta)d\beta - \frac{c}{\left[1 - F\left(Y_1^I\right)\right]} - C\left(O_1^I\right).$$

Consumers' optimal reservation value y^* and the resulting market segment served by intermediary I_1 is derived by solving the following system of equations:

$$\left| \begin{array}{l} \int_{y^*}^{\infty} \left[1 - F(y)\right] \cdot \beta dy = c \\ \left\{\beta \cdot Y_1^I - \left[C(O) - C\left(O_1^I\right)\right]\right\} = \left\langle (\beta \cdot y^*), \left\{\beta \cdot Y_2^I - \left[C(O) - C\left(O_2^I\right)\right]\right\}\right\rangle \end{array} \right| \quad (2.44)$$

The same holds true for intermediary I_2. As in the basic model (Sect. 2.1.3), the market is equally divided between the two insurance intermediaries if they are identical and behave in the same way, that is, if they offer the same combination of information $Y_1^I = Y_2^I$ and marketing efforts $O_1^I = O_2^I$.

If one assumes that they choose their optimal parameter values $\left(Y_1^I, O_1^I\right)$ resp. $\left(Y_2^I, O_2^I\right)$, while simultaneously taking their competitor's actions as given, within a discrete strategy space each can choose one of the following four combinations $\left\{\left(Y_{high}^I, O_{high}^I\right), \left(Y_{high}^I, O_{low}^I\right), \left(Y_{low}^I, O_{high}^I\right), \left(Y_{low}^I, O_{low}^I\right)\right\}$. Again, like in the basic model, only a single Nash equilibrium exists (Sect. 2.1.3). It is reached when both intermediaries offer high quality Y_{high}^I and spend large resources O_{high}^I to reduce consumers' opportunity costs O. If both collude instead of competing with one another, they increase their expected profits by reducing their marketing efforts while further providing a high level of information. Since in both cases they follow the same strategy, each intermediary serves half of the total market for which intermediated search is more beneficial than personal search. Therefore, they yield the same expected profits $P_1^I = P_2^I$. Compared to the case where only one intermediary is active in the market, the resulting optimal information level $Y_1^I = Y_2^I$ is higher and the profits are lower.

Additionally, in case of a sequential game within a continuous strategy space, each intermediary can follow one of these four options

$\left\{\left(Y_{high}^I, O_{high}^I\right), \left(Y_{high}^I, O_{low}^I\right), \left(Y_{low}^I, O_{high}^I\right), \left(Y_{low}^I, O_{low}^I\right)\right\}$. If both intermediaries follow a simultaneous strategy,[27] first intermediary I_1 decides on his optimal values for $\left(Y_1^I, O_1^I\right)$, then intermediary I_2 makes his choice by taking intermediary's I_1 optimal values $\left(Y_1^I, O_1^I\right)$ into account.

It can be shown that given identical cost functions and the same information distribution, the leader provides a lower information level while spending more resources on marketing efforts than the follower, such that the two intermediaries realize the following combinations $\left\{\left(Y_{1:low}^I, O_{1:high}^I\right), \left(Y_{2:high}^I, O_{2:low}^I\right)\right\}$. No matter what strategy is followed, again like in the basic model (Sect. 2.1.3) the follower always realizes higher profits, since he can optimally react to the leader. Due to consumers' differences in their willingness to pay β for a certain level of information quality Y, both intermediaries yield positive profits by serving different market segments (Fig. 2.13).

[27] In case of a fixed-quality-level strategy, first both intermediaries fix their quality levels with $Y_1^I \neq Y_2^I$, then intermediary I_1 decides on his optimal marketing efforts O_1^I. Intermediary I_2 takes them into account when choosing his optimal efforts O_2^I. In the same way, the optimal values are determined when both intermediaries follow a quality-optimizing strategy. See Rose (1999, 146–147).

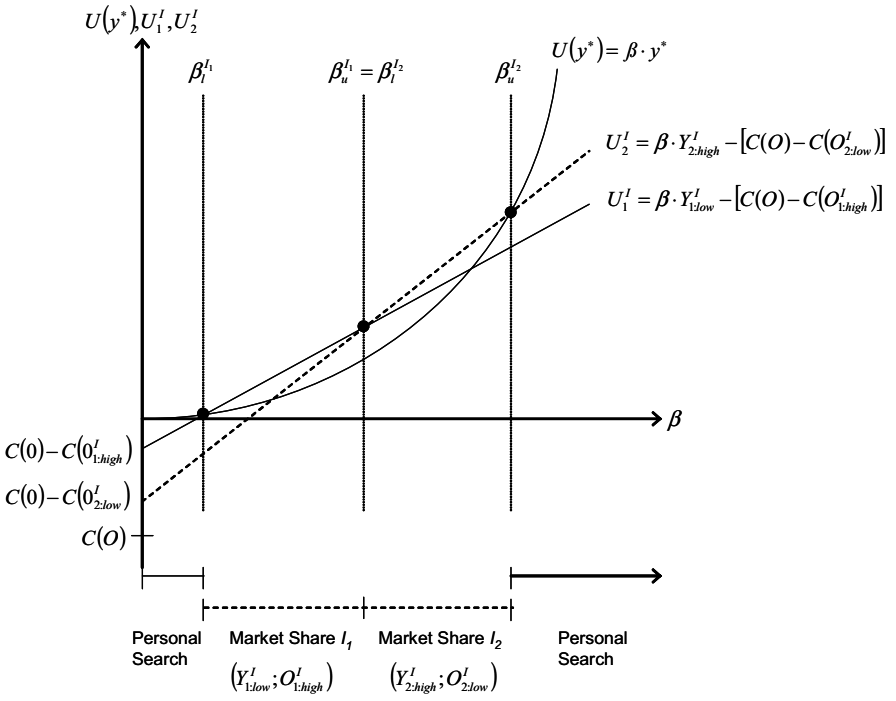


Fig. 2.13. Market Segmentation Given $\left\{\left(Y_{1:low}^I, O_{1:high}^I\right), \left(Y_{2:high}^I, O_{2:low}^I\right)\right\}$

(2) Heterogeneous Insurance Intermediaries

When allowing for differences in exogenous parameters between the two competing intermediaries, the intermediary, who faces either lower costs or has access to a probability distribution with a higher density of relevant information, will gain at the expense of his competitor. Assume for example that intermediary I_2 has either a better search technology, so that he has lower search costs than intermediary I_1 with $c_1 > c_2$, or that he takes his observations from an information distribution which contains more relevant information, so that $\lambda_1 > \lambda_2$. Then even in case of a simultaneous game with a discrete strategy space it is economically viable that both intermediaries serve different market segments.

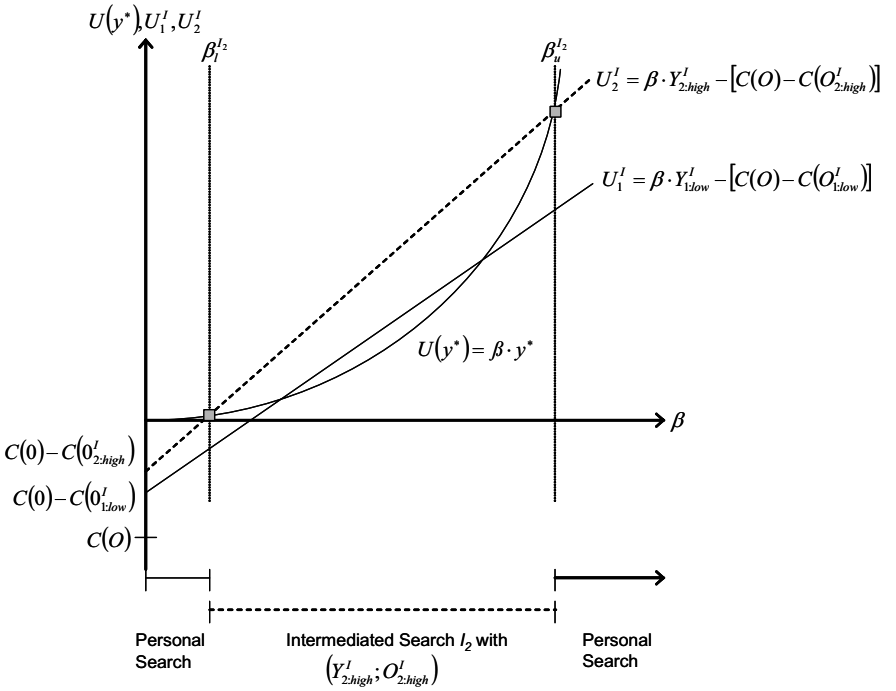


Fig. 2.14. Market Segmentation for $\left(Y_1^I < Y_2^I\right) \wedge \left(O_1^I < O_2^I\right)$

However, the necessary condition for this result is not only that intermediary I_2 offers a higher information level than intermediary I_1, but that he also spends less resources on marketing efforts so that the combination $\left\{\left(Y_{1:low}^I, O_{1:high}^I\right), \left(Y_{2:high}^I, O_{2:low}^I\right)\right\}$ results. Only then the same market segmentation like in the case of identical intermediaries following a sequential decision-making procedure is obtained. In any other case the intermediary, who provides better overall services, captures all consumers for which intermediated search is more beneficial than personal search activities (Fig. 2.14)

(3) Asymmetric Information about the Underlying Information Distribution

Market outcomes do not change qualitatively if information asymmetries exist between consumers and the two intermediaries with respect to the underlying information distribution such that $\lambda^{pers} = \lambda^I \cdot (1 + \varepsilon_\lambda)$ with $\lambda^I = \lambda_1^I = \lambda_2^I$. However, as has been already discussed in *section 2.2.2* due

to asymmetric information on consumers' side, intermediated search becomes more profitable than personal search for a larger number of consumers.

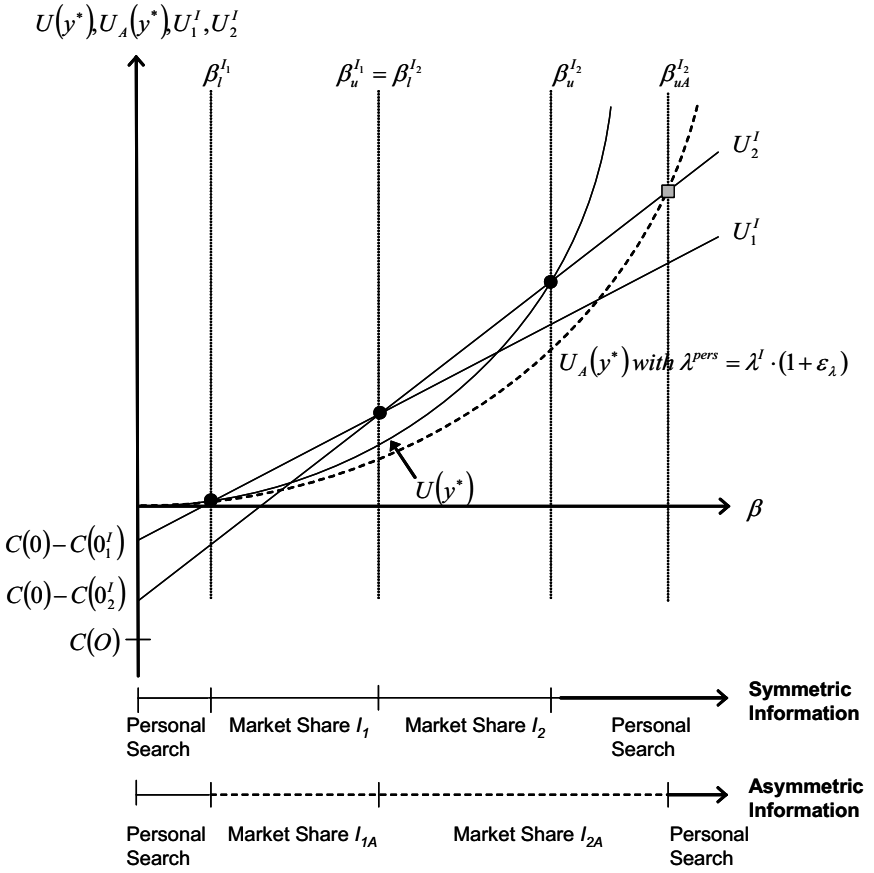


Fig. 2.15. Market Segmentation with $\lambda^{pers} = \lambda^I \cdot (1+\varepsilon_\lambda)$

Because of the resulting broader market segment served by intermediaries, it becomes profitable for intermediaries to offer a higher information level than under symmetric information. If both intermediaries are identical and play a simultaneous game, each still serves half the market. If both serve different market segments by providing heterogeneous information levels, it depends on whether the intermediary, who already provides a higher information level, increases his information level still more compared to his competitor (Fig. 2.15 above).

If there is asymmetric information with respect to the underlying information distribution between the two intermediaries, this yields the same results like them having different access to the probability distribution. While the latter is expressed by different density parameters, for example with $\lambda_1^I > \lambda_2^I$, such information asymmetries are given by $\left[\lambda_1^I = \lambda_2^I \cdot \left(1 + \varepsilon_\lambda^1\right)\right] > \left(\lambda_2^I = \lambda^{pers}\right)$, with the parameter ε_λ^1 indicating the noisiness of the distribution faced by intermediary I_1.

Because of its poorer information distribution, intermediary I_1 must make more observations to yield the same information level $Y_1^I = Y_2^I$ like intermediary I_2. Since this implies disproportionately higher search costs to be spent while competing for the same consumers, the only way to realize positive profits for intermediary I_1 is to specialize in a different market segment. All other things being equal, the only promising strategy for intermediary I_1 is, thus, to offer a lower information level while spending more resources to reduce consumers' costs O for using his services. As a consequence, the market is segmented with both intermediaries offering different information levels and spending different marketing costs $\left\{\left(Y_{1:low}^I, O_{1:high}^I\right), \left(Y_{2:high}^I, O_{2:low}^I\right)\right\}$ (Fig. 2.16 below). Obviously, intermediary I_1 realizes lower profits than intermediary I_2, so that $P_1^I < P_2^I$.

In case of non-identical intermediaries playing a simultaneous game or intermediaries playing a sequential game, in principle the same qualitative results are obtained. The intermediary, who acts under an informational disadvantage with respect to the underlying information distribution, reduces the information level provided, while the other increases his information level. Thus, given intermediary I_1 provides a lower information level than intermediary I_2 so that $Y_1^I < Y_2^I$, while at the same time facing a more noisy information distribution $\left[\lambda_1^I = \lambda_2^I \cdot \left(1 + \varepsilon_\lambda\right)\right] > \left(\lambda_2^I = \lambda^{pers}\right)$. This leads to an increase in the heterogeneity of the information levels offered on the market. Accordingly, intermediary I_2 will gain additional market shares, while intermediary I_1 will loose consumers. Conversely, if intermediary I_2 acts under asymmetric information, such that $\left[\lambda_2^I = \lambda_1^I \cdot \left(1 + \varepsilon_\lambda\right)\right] > \left(\lambda_1^I = \lambda^{pers}\right)$, he now provides a lower information level and intermediary I_1 a higher one so that the two information levels come closer.

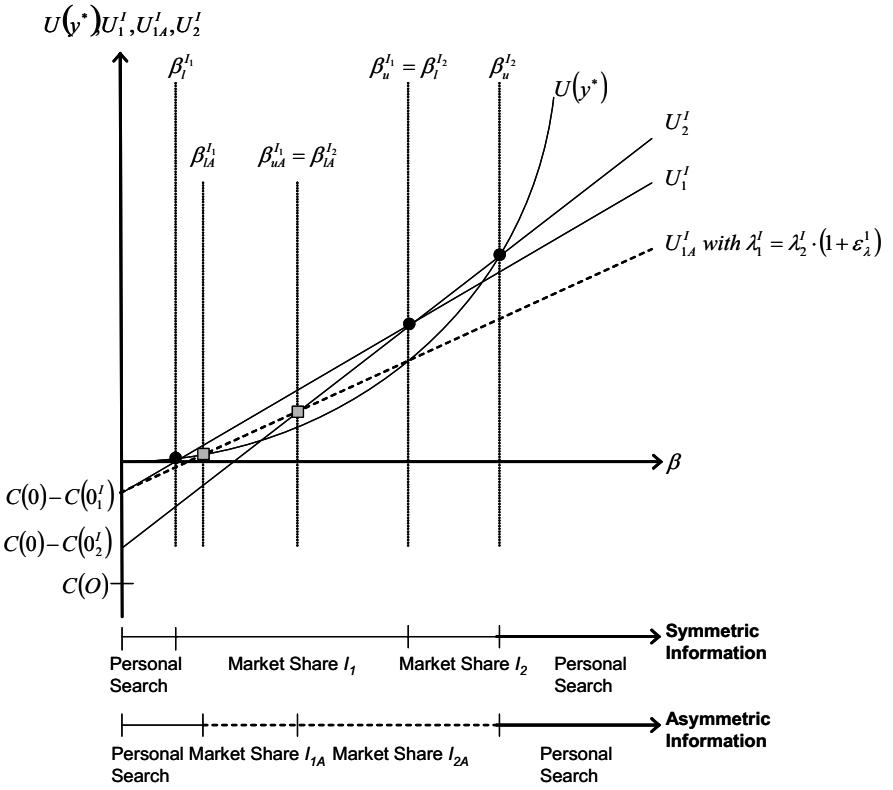


Fig. 2.16. Market Segmentation with $\left[\lambda_1^I = \lambda_2^I \cdot (1 + \varepsilon_\lambda^1)\right] > \left(\lambda_2^I = \lambda^{pers}\right)$

Due to the information asymmetries about the correct density distribution, informational rents are obtained independent on whether the information asymmetries exist between consumers and intermediaries or between the competing intermediaries. These information rents again are the difference between the profits given asymmetric and symmetric information. Consumers' welfare is affected negatively when consumers act under asymmetric information. With a decrease in information asymmetries they can realize a higher utility level. This result does not apply to all consumers in case of information asymmetries between intermediaries. In this case some consumers gain and some lose from the resulting changes in the optimal information level provided by the competing intermediaries. However, overall utility should be higher given no asymmetric information and, thus, no distortions between personal and intermediated search activities.

In both cases discussed, no adverse selection takes place. However, if information asymmetries exist among intermediaries, then for some con-

sumers it now becomes more advantageous to personally search for relevant information than to use the information provided by an intermediary. That is, in case of lower information asymmetries intermediated search activities result in a higher information level. Nevertheless, asymmetric information does not drive out the intermediary providing a higher information level.

2.2.4.2 Competition under Asymmetric Information about the Quality of an Intermediary's Information Services

Real world situations are characterized by consumers having incomplete information about the true content of the information provided by insurance intermediaries. As has been shown in *section 2.2.3.2*, such asymmetries can be captured in the insurance intermediary search model by assuming that consumers incorrectly overrate the true information level Y^I by adding a disturbance parameter $\varepsilon_Y \in [0;+1]$ so that they face the information level $Y^I_{cons} = Y^I \cdot (1+\varepsilon_Y)$. In the following, the effects of such asymmetric information are analyzed for Bertrand competition between intermediaries.

First a *simultaneous game with identical intermediaries* is assumed. In the case of symmetric information it has been shown above that both intermediaries provide the same combination of information level and marketing effort $\left\{\left(Y^I_{1:high}, O^I_{1:high}\right), \left(Y^I_{2:high}, O^I_{2:high}\right)\right\}$. Each serves half of the market segment of those consumers for which intermediated search is more advantageous than personal search activities with both realizing the same profit $P^I_1 = P^I_2$. Under asymmetric information it is assumed that consumers overrate the information level provided by both intermediaries to the same degree, so that $Y^I_{cons} = Y^I_1 \cdot (1+\varepsilon_Y) = Y^I_2 \cdot (1+\varepsilon_Y)$ with $\varepsilon_Y \in [0;+1]$. This results in a broader market segment served by intermediaries, which is defined by the interval $\left]\beta_l\left(Y^I_1, O^I_1\right), \beta_u\left(Y^I_2, O^I_2\right)\right[$, because consumers overestimate the value of information provided by an intermediary compared to information gained by personal search activities. Since now for each information level provided by the two intermediaries a broader market segment results due to the disturbance parameter $\varepsilon_Y \in [0;+1]$, the two intermediaries adapt their optimal information level to further maximize their profits. Assuming for simplicity a quality-optimizing strategy, this results in providing a higher information level than under symmetric information. Because consumers overrate the true content of the information provided by intermediated search, higher revenues can be obtained, which cover the

necessary production costs for higher information quality. Again, both intermediaries offer the same combination of relevant information and marketing efforts with each serving half the market. They still make the same profits, but they are higher compared to symmetric information.

In comparison, in *a simultaneous game with heterogeneous intermediaries* or in *a sequential game with identical intermediaries* under symmetric information the two intermediaries serve different market segments by providing a combination of high-quality information and low marketing efforts or low-quality information and high marketing efforts, like for example $\left\{\left(Y^I_{1:low}, O^I_{1:high}\right), \left(Y^I_{2:high}, O^I_{2:low}\right)\right\}$ (Sect. 2.2.4.1). Under asymmetric information it is again assumed that consumers overrate the true content of the information provided by both intermediaries to the same degree, so that, for example, $Y^I_1 \cdot (1+\varepsilon_Y) < Y^I_2 \cdot (1+\varepsilon_Y)$ with $\varepsilon_Y \in [0;+1]$. Similarly as discussed for identical intermediaries, for more consumers intermediated search becomes beneficial compared to personal search activities because of the asymmetric information (Fig. 2.17).

Since a specific optimal information level and level of marketing efforts applies to each particular market segment, both intermediaries adapt their decision variables to maximize their profits. Due to the asymmetric information they can realize higher revenues. In case of a quality-optimizing strategy it becomes profitable to increase search efforts to provide a higher information level Y^I_i since the higher costs are covered by higher revenues. As a consequence, under asymmetric information both intermediaries provide a higher information level than under symmetric information. Due to the changes in their optimal information level, there is also a shift of customers between the two market segments. Whether the low quality or the high quality intermediary gains more customers, ultimately depends on the location and distribution of consumers' willingness to pay.

Thus, given that consumers overrate the information provided by intermediaries to the same degree, intermediaries offering different information levels are still economically viable. However, there is also some degree of adverse selection possible if the intermediary, who actually provides information of lower relevance for consumers, gains a higher market share. Again, information rents result as the difference from expected profits under asymmetric and symmetric information.

Besides, it is also possible that consumers attach to one of the intermediaries a higher credibility than to the other. If the extent of the information asymmetry with respect to the two intermediaries differs this can be expressed by $\varepsilon_{Y1} \neq \varepsilon_{Y2}$ with $\varepsilon_{Y1}, \varepsilon_{Y2} \in [0+1]$. Assume a *simultaneous game with otherwise identical intermediaries*, who both provide the same

optimal information level $Y_1^I = Y_2^I$. When consumers assume that intermediary I_2 is more credible than intermediary I_1, so that $\varepsilon_{Y1} < \varepsilon_{Y2}$, this results in the consumers perceiving the information level provided by intermediary I_1 to be lower than that provided by intermediary I_2, so that $Y_1^I \cdot (1+\varepsilon_{Y1}) < Y_2^I \cdot (1+\varepsilon_{Y2})$. As a consequence, intermediary I_2 would capture the whole market, while intermediary I_1, whose information services consumer assess more realistically so that they overrate them to a smaller degree, would be driven out of the market. In any other case, no clear-cut statements on the precise effects can be made without detailed information as to the credibility consumers attach to the each of the two intermediaries.

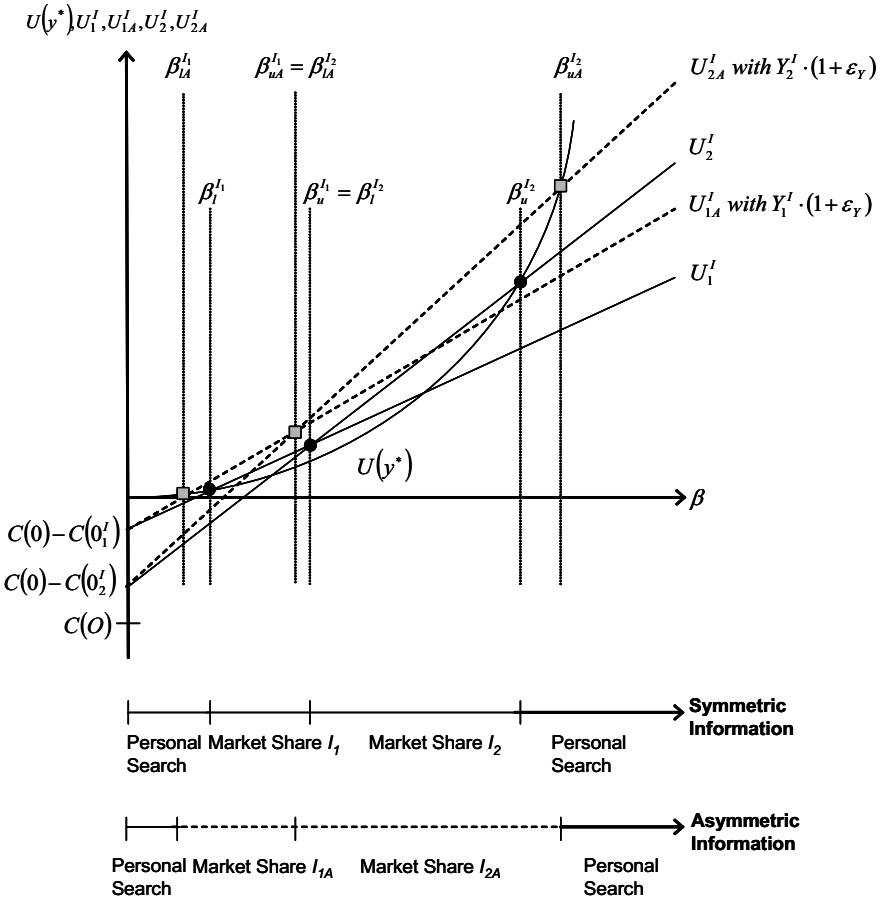


Fig. 2.17. Market Segmentation for $\left(Y_1^I < Y_2^I\right)$ and $\left(\varepsilon_{Y1} = \varepsilon_{Y2}\right)$

So far, we have assumed that information asymmetries arise because consumers wrongly overestimate the content of the information provided by an intermediary. However, most consumers are very well aware that such asymmetries exist and that intermediaries have incentives to provide incomplete, false or misleading information about insurance coverage. This may lead consumers to attach a negative disturbance parameter, which takes such faulty information into account $\varepsilon_{Y1}, \varepsilon_{Y2} \in [-1;0]$. As a consequence, when consumers underrate the true content of the information provided by intermediaries, a smaller share of consumers using intermediated search should be expected if they wrongly underestimate the true quality of the information provided by intermediaries.

2.2.4.3 Summary

The above discussion about the effects of competition on the market for insurance intermediaries showed some very interesting results. Given that there are no information asymmetries, identical intermediaries, who simultaneously decide on their action parameters, provide the same high level of information and spend the same efforts to reduce the (opportunity) costs for consumers in order to use their services. The market segment of consumers for whom intermediated search is more advantageous than personal search is equally divided among the competing intermediaries. By comparison, sequential decision-making of identical intermediaries leads to market segmentation. Despite identical cost and revenue functions it pays for the follower to provide a higher information level while spending fewer resources on marketing efforts than does the leader. Thus, in case of competition, intermediaries, who offer different information levels are economically viable.

The same holds true when there are differences between insurance intermediaries in regard to their underlying cost and revenue functions. Although the intermediary with the more advantageous exogenous cost or revenue parameters profits more, intermediaries offering different information levels are still economically viable. This holds true even in the case of simultaneous decision-making given that the intermediary with the lower costs provides a higher information level while otherwise spending less resources on marketing efforts. If however both intermediaries provide the same information level, the low cost intermediary captures the whole market so that the other intermediary is driven out of the market.

If one allows for asymmetric information about the underlying information distribution when consumers have an incorrect perception of the best information sources compared to intermediaries, no change in the qualitative results occurs. However, because of the information asymmetries for a

larger proportion of consumers intermediated search becomes advantageous. This leads to an increase in the optimal information level provided by the intermediaries after having adapted their action parameters. Nevertheless, due to these information asymmetries, intermediaries realize information rents. Asymmetric information about the underlying information distribution between the insurance intermediaries would have nearly the same effect like differences in search technologies. Already existing differences in the optimal information level provided increase further, since an intermediary, who experiences lower asymmetries enhances his information level. He then realizes higher profits from the resulting informational rents.

When consumers have asymmetric information about the true content of the information provided by intermediaries and overrate the true information quality, intermediaries, who offer different information levels, are still economically viable. Profit-maximizing behavior of intermediaries may again lead to a higher information level provided due to the larger market served. In real-world markets it is plausible to assume that consumers attach different degrees of credibility to different insurance intermediaries. To derive the resulting market performance with respect to the information quality provided, however, it is necessary to specify in more detail the game played (simultaneous or sequential) as well as the underlying cost and revenue functions.

2.3 Insurance Agents and Brokers in the Insurance Intermediation Model

The objective of this section was to provide a theoretic foundation for the existence of insurance intermediaries. Since the provision of information and advisory services is their main activity, a search theoretic model seems to be adequate to capture their essential contribution. By modifying the basic search theoretic model for information intermediaries presented in *section 2.1*, the particularities of insurance intermediaries are taken into account. In addition, like the basic model, the modified version includes both horizontal and vertical product differentiation. It is assumed that the quality of the information Y^I provided by an intermediary can be objectively assessed and thus ranked (vertical product differentiation), while consumers attach heterogeneous weights to each quality level. This is indicated by their – differing – willingness to pay for a certain quality (horizontal product differentiation).

It is shown that even in case of identical search costs among consumers and intermediaries intermediated search is beneficial for consumers with a medium willingness to pay for information quality. This results from the assumption that the intermediary's search costs once spent become fixed. Since he can repeatedly sell the information once gathered, he can realize scale economies and thus provide information services of higher quality as it would be optimal for most of the consumers in case they rely on personal search. Under reasonable assumptions about differences in the exogenous variables of consumers and intermediaries, intermediated search becomes even more favorable. This result holds even when information asymmetries about the true content of the information provided by an intermediary are taken into account. In this case, however, the intermediary realizes informational rents.

To analyze the impact of competition among insurance intermediaries on market conduct and performance, Bertrand competition in a duopoly was assumed. If intermediaries are identical with respect to their search technology and with respect to their informational restraints, both provide the same information quality when setting their decision variables simultaneously. The resulting market for insurance intermediation is equally divided by them. In all other cases, that is given non-identical restrictions or when setting their decision variables sequentially, different optimal information levels result. It holds that the better the access to the underlying information distribution of an intermediary, the lower his costs compared to those of his competitors and the more in favor for him information asymmetries are, the higher is the information quality he provides. This comes along with a larger market share and higher profits. Besides, depending on the precise formulation of the game, intermediaries who provide information services of different quality are economically viable. In this case intermediaries who offer information services of higher quality, neither automatically outcompete intermediaries who provide lower quality nor does the reverse take place. Moreover, even when assuming information asymmetries about the true content of the information provided by insurance intermediaries, the model allows for the co-existence of intermediaries offering differing qualities. Again, informational rents are earned. These results correspond to empirical findings about the market microstructure for insurance mediation where both exclusive agents as well as insurance brokers are active.

As has been shown above, insurance intermediaries offering different information qualities are economically viable given that they spend different marketing efforts. Taking this into account, the search theoretic approach developed can be used to model the co-existence of insurance agents and insurance brokers. Insurance agents distribute only the products

of a particular insurance company, whereas insurance brokers provide information about the whole product range offered by insurance companies on the market. Thus, insurance agents restrict their information search and assessment to a subset of insurance product variants. Although there may exist better product variants from other insurance companies for a certain consumer, these are not considered by an insurance agent. Hence, the overall quality of the information provided by insurance agents can be said to be lower than that provided by insurance brokers, so that $Y_{agent} < Y_{bro\,\mathrm{ker}}$ (Table 2.9). Posey and Yavas (1995) and Posey and Tennyson (1998) also provide search theoretic models which capture the co-existence of insurance agents and brokers. However, in contrast to our approach, which assumes identical search technologies and concentrates on the behavior of insurance intermediaries, these models assume different search technologies and focus on differences among insurance companies.

Rational consumers are aware of these differences in information quality. Accordingly, they will only turn to an insurance agent if they have a preference for low quality information or if the lower information level is substituted by lower costs of using the intermediary. Insurance agents that concentrate on consumers with a lower willingness to pay will follow a high turnover strategy. To this end, they will set up agencies close to consumers so that their travel costs are reduced. Moreover, since they provide information about a smaller subset of insurance product variants, they have to spend less time for explaining differences and for giving information and advice. In contrast, both travel costs and time spent with an insurance broker should be higher. Since it is assumed in the model that consumers' valuation of information quality – expressed by their willingness to pay – follows a normal distribution, there is only a small number of consumers with a high willingness to pay for high information quality. Therefore, the potential market segment for insurance brokers should be rather small. Accordingly, it allows only a lower number of insurance brokers to earn a living so that consumers' travel costs should be expected to be higher due to the lower number of brokers in the market. Besides, because of the larger and more heterogeneous range of insurance products a broker distributes, providing information takes more time. Thus, the resulting opportunity costs of using an insurance broker are higher. Accordingly, consumers' costs of using the services of an insurance agent can be reasonably assumed to be lower than those of using an insurance broker, so that $C(O_{agent}) < C(O_{bro\,\mathrm{ker}})$ (Fig. 2.13, Sect. 2.2.4.1).

Since insurance agents use only a subset of all the information about insurance product variants available on the market, they can also be said to provide information from a distribution with lower relevance. Given an

exponential probability distribution, this results in a higher density parameter with $\lambda_{agent} > \lambda_{broker}$. Besides, consumers may overrate the content of the information provided by insurance agents to a larger degree than that provided by insurance brokers, so that $\varepsilon_{agent} > \varepsilon_{broker}$. For example, if insurance companies, which rely on insurance agents to distribute their products, are successful in influencing consumers' perceptions about the true quality of their products, information asymmetries with respect to insurance agents' services should be higher than for those provided by insurance brokers. Since consumers with a high preference for high quality information can be plausibly assumed to have a more critical attitude towards the true content of the information provided by insurance intermediaries, differences in information asymmetries are intensified. Consequently, market segmentation takes place with insurance brokers providing higher information quality for consumers with a higher willingness to pay, while insurance agents provide lower service quality by focusing on consumers with a lower willingness to pay.

Table 2.9. Insurance Agents and Brokers in the Insurance Intermediation Model

Insurance Intermediary	Information Level	Marketing Efforts
Insurance Agent	$Y_{agent} = low$	$O_{agent} = high$
Insurance Broker	$Y_{broker} = high$	$O_{broker} = low$

3 Competition between Insurance Intermediaries

The previous chapter concentrated on consumers' make-or-buy decision in regard to personal or intermediated search for information about adequate insurance coverage. The search theoretical model developed showed that consumers can increase their utility by using the information services of insurance intermediaries. In the following chapter, we analyze the working properties of the market for insurance intermediation in more detail. We study the impact of market behavior on market performance when consumers have incomplete and asymmetric information about the quality of the information services provided by insurance intermediaries. We start with a short discussion of the consequences of monopolistic competition on the extent of horizontal product differentiation in *section 3.1*. In *section 3.2* we examine the effect of incomplete information on consumers' side about the information service quality of insurance intermediaries. Finally, *section 3.3* explores what consequences result from asymmetric information on market conduct and performance and on the market microstructure. *Section 3.4* resumes.

3.1 Monopolistic Competition and Horizontal Product Differentiation

3.1.1 The Extent of Horizontal Product Differentiation under Monopolistic Competition

In the insurance intermediation model developed in *chapter 2*, the number of intermediaries engaged in the market was taken as exogenously given. In the following this assumptions is relaxed. In order to analyze the consequences of market entry for competition and the resulting market performance, we turn to a model of monopolistic competition in which the equilibrium number of insurance intermediaries and the extent of product differentiation are endogenous.

Since consumers cannot properly distinguish between insurance intermediaries, who offer different service qualities, it can be rationally as-

sumed that they view insurance intermediaries as offering horizontally differentiated services. Horizontal product differentiation is given when consumers differ with respect to the valuation they attach to the characteristics of a product or service. Hence, it cannot be unanimously ranked according to a single quality order (Chamberlin 1933, 56–57; Martin 1993, 261). In section 2.2 horizontal product differentiation was assumed to exist solely in regard to the valuation consumers attach to a certain information level provided by intermediaries, which was expressed by differences in their willingness to pay for the same quality level. Now we assume that consumers differ also in their preferences and tastes for differently located intermediaries, for the way in which insurance intermediaries provide their services as well as for what additional services they offer. Moreover, for reason of simplification we no longer assume a free-fee illusion like in section 2.2. Instead we assume that consumers have to pay insurance intermediaries for their information, bargaining and administrative services.

Markets for insurance intermediation resemble typical characteristics of markets with monopolistic competition. Therefore, a representative consumer model like that originally presented by Chamberlin (1933) can be appropriately applied.[28] This set of models assumes that there is a large number of competitors in the market, who offer differentiated information, transaction and bargaining services. Their services are differently located both in the economic and geographic space with variations in the kind and scope of the services provided, their selling environment etc. Since insurance intermediaries entering the market must spend relatively low costs, market entry is easy. Depending on the respective public regulation, not even any qualifications might be required. Thus, in order to work as an insurance intermediary, one only requires expenses to get a license (which is the case in nearly every country), to establish a firm and to negotiate the potential fees with insurance companies. Besides, it is not even necessary to spend the costs for buying a customer list and therefore an already established customer base. Any insurance intermediary can also go from door to door to sell insurance contracts or use other marketing activities to reach potential customers. In addition, one must not even rent office space and buy office equipment on a large scale. Thus, besides having a minimum of information about the insurance products one wants to sell, a

[28] In contrast to representative models of monopolistic competition, locational models assume that consumers have preferences for products which are close to them either spatially or with respect to certain product characteristics. See *section 3.3.4* for the application of such a locational model to insurance intermediaries. For a general overview see Anderson, de Palma and Thisse (1992) and Carlton and Perloff (2005, 200–243).

computer, an internet access, a telephone, a fax and a traditional mail address suffice to provide information services and sell insurance policies. Moreover, for the most part these costs are not sunk since they can be either reused in other employments or regained by selling the respective objects.

Consumers differ in tastes and preferences. Accordingly, it is assumed that they view the services offered by different insurance intermediaries not as identical, but as close substitutes. Thus, insurance intermediaries face no horizontal, but downward sloping demand curves. The steeper they are, the more consumers value the services offered by a particular intermediary compared to those offered by his competitors who provide slightly different services. Therefore, each insurance intermediary has some monopoly power with respect to the demand for his product variant. However, since there are so many intermediaries and market entry is assumed to be free, there is no strategic interaction. Because the price p_k charged, the quantity q_k offered or the quality provided by an intermediary affects the residual demand faced by his competitors only to a very small degree, his competitors do not react to a change of his action parameters. As a consequence, each insurance intermediary takes the supply of his competitors as given when deciding on his own profit-maximizing supply. Thus, their behavior is non-cooperative.

To simplify matters, it is further assumed that all insurance intermediaries face identical linear demand functions, although they offer differentiated products.[29] Thus, the demand function of a representative intermediary *k* can be written as

$$p_k = a_k - b_k \cdot q_k - b_j \cdot \sum_{\substack{j=1 \\ j \neq k}}^{n} q_j = a_k - b_k \cdot q_k - b_j \cdot (n-1) \cdot q_j, j \neq k \tag{3.1}$$

where $\sum_{\substack{j=1 \\ j \neq k}}^{n} q_j$ is the sum of the output of all other $(n-1)$ insurance intermediaries except intermediary *k*, which is equal to $(n-1) \cdot q_j$ under the assumption of symmetry. Moreover, vertical market size $a > 0$ and $b_j > 0$ with $j = 1 \ldots n$. It holds true that the direct price elasticity of demand b_k is higher than the cross price elasticity b_j, so that $b_k > b_j$. The more the services offered by intermediary *k* differ from those of his competitors, the

[29] The formal analysis follows Neumann (1994, 198–203).

lower is the resulting direct elasticity of demand and the higher is the intermediary's monopoly power.

On the supply side it is assumed that all insurance intermediaries have the identical total costs $C(q_k) = c(q_k) \cdot q_k + C_{fix}$ (Sect. 2.2.2), although they offer slightly different product variants. Variable costs $c(q_k) \cdot q_k$ are the costs of the services provided, which are necessary to conclude a single insurance contract, like the time spent with the customer to inform her about different insurance product types, drafting an insurance contract or negotiating contract details with insurance companies (Sect. 1.4). Fixed costs C_{fix} consist of the capital costs involved in running an agency, like office rent, expenses for computer equipment, advertising, or other marketing costs, for example. However, a large share of these fixed costs stem from information acquisition and procession about insurance product characteristics. While transmission costs are largely variable costs, the costs necessary to provide relevant information to consumers (= costs of information production) can be regarded as largely fixed costs. Fixed costs cause economies of scale in the production and provision of the information, bargaining and administrative services offered by an insurance intermediary. Consequently, marginal and average cost curves are U-shaped.

Furthermore, it is assumed that there is free market entry and exit.

For a given number of insurance intermediaries in the market, an individual intermediary maximizes his profit when marginal costs equal marginal revenues, so that

$$a_k - 2 \cdot b_k \cdot q_k - b_j \cdot (n-1) \cdot q_j = C'(q_k) \text{ with } j,k = 1 \ldots n . \tag{3.2}$$

If the resulting equilibrium price exceeds average costs for the services provided at that price, the intermediary makes positive profits. Such positive profits induce other intermediaries to enter the market. Since each new intermediary offers a slightly different product variant, a larger number of intermediaries in the market leads to a greater extent of horizontal product variation. However, as all intermediaries offer close substitutes, the residual demand facing each intermediary diminishes with a larger number of intermediaries in the market. Consequently, each intermediary's residual demand curve shifts inward until it is tangent to the average cost curve *AC* (Fig. 3.1). In the long-run market equilibrium, the price obtained by each intermediary equals his average costs, so that profits are zero:

$$a_k - b_k \cdot q_k - b_j \cdot (n-1) \cdot q_j = \frac{C(q_k)}{q_k} \tag{3.3}$$

Thus, no incentives for further market entries exist. Solving Eq. 3.2 and Eq. 3.3 simultaneously results in the equilibrium output q_k of each intermediary and in the equilibrium number of firms n in the market.

Although all insurance intermediaries cover their costs at equilibrium price, the services provided are not produced at minimum costs. Compared to a fully competitive market structure, there may be too many intermediaries in the market, each providing less output, so that economies of scale are not fully exhausted. Hence, consumers pay the higher degree of product differentiation in the form of higher prices.[30]

All in all, the number of insurance intermediaries and, thus, the degree of product differentiation is a consequence of the fixed costs necessary to provide intermediation services. For a given total demand for intermediary services the lower fixed costs are, the more insurance intermediaries n are in the market. This results in a higher degree of product differentiation since each intermediary offers slightly differing services.

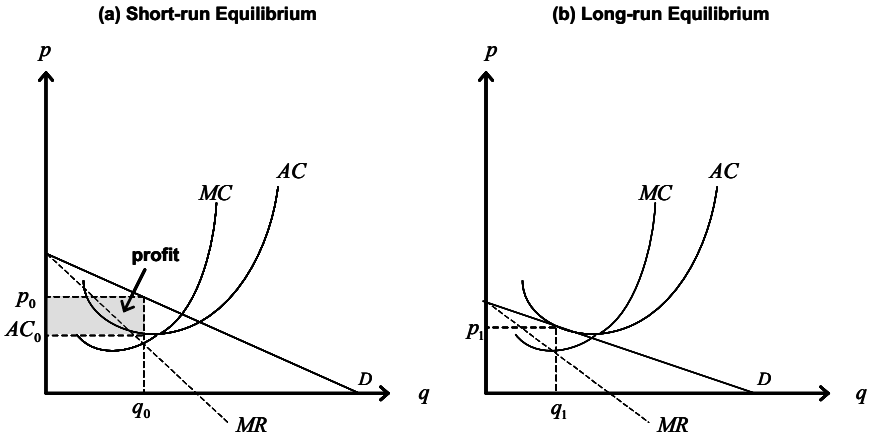


Fig. 3.1. Short- and Long-Run Equilibrium under Monopolistic Competition (Following Neumann 1994, 200, Fig. 3)

3.1.2 Market Conduct: Incentives to Increase Product Differentiation and/ or to Reduce Fixed Costs

In the long-run equilibrium where price equals average costs, the number of insurance intermediaries and, thus, the degree of product differentiation is given. However, under competitive pressure insurance intermediaries

[30] For models that analyze the welfare implications of monopolistic competition see, for example, Dixit and Stiglitz (1977) or Hart (1985).

have incentives to change their behavior, so that they can earn at least temporal profits. Their profits will diminish only to the extent that their actions can be imitated by their competitors. In order to earn positive profits, an intermediary can (1) strengthen his monopolistic position by additional product differentiation or (2) reduce his average costs. These two cases are discussed in the following section.

(1) Incentives to Increase Product Differentiation

An intermediary can strengthen his monopolistic position by shifting outward his demand curve through increased sales efforts (Ehrlich and Fischer 1982). In the above model of monopolistic competition it is assumed that consumers have to spend no other resources than the market price *p* to use the services provided by insurance intermediaries. Nevertheless, consumers usually incur additional transaction and information costs. These result from incomplete information about the services provided by an insurance intermediary, but also from incomplete information about the location of a particular intermediary. Besides, travel costs must additionally be spent in order to contact an intermediary. Thus, the total price of the services consumed consists of the market price p_k and the additional transaction costs which include information and travel costs.[31] These additional costs can be summed up as the time t_{ki} spent by consumer *i* for getting and complementing a certain service from intermediary *k* multiplied with her wage rate w_i, which indicates her opportunity costs when using an intermediary's services. Accordingly, the total price π_k a consumer pays is

$$\pi_k = p_k + w_i \cdot t_{ki} \tag{3.4}$$

with $t_{ki} = t_{ki}(E_k, K_{ki})$, and *t* being a decreasing and convex function in E_k, K_{ki}. The time t_{ki} spent by a consumer *i* to acquire the desired intermediation services depends on the insurance intermediary's sales efforts E_k and the consumer's own knowledge K_{ki} about insurance products and the services provided by intermediary *k*. Sales efforts E_k include promotional expenses and advertising efforts, while consumer knowledge K_{ki} depends on the consumer's age, education, and income, as well as on her

[31] The formal analysis follows Neuberger (1998, 166–171) and Neuberger and Lehmann (1998) who used this approach to analyze direct banking as a new distribution channel for banks.

own search experience and search efforts. E_k and K_{ki} are substitutes. Consequently the inverse demand function faced by intermediary *k* is

$$p_k = \pi_k - w_i \cdot t_{ki}(E_k, K_{ki}). \tag{3.5}$$

Inserting Eq.3.1 leads to

$$p_k = \pi_k - w_i \cdot t_{ki}(E_k, K_{ki}) = a_k - b_k \cdot q_k - b_j \cdot (n-1) \cdot q_j, j \neq k\ . \tag{3.6}$$

With an increase in sales efforts E_k, opportunity costs $w_i \cdot t_{ki}$ decrease, so that the inverse demand function p_k shifts outward for intermediary *k* (Fig. 3.2).

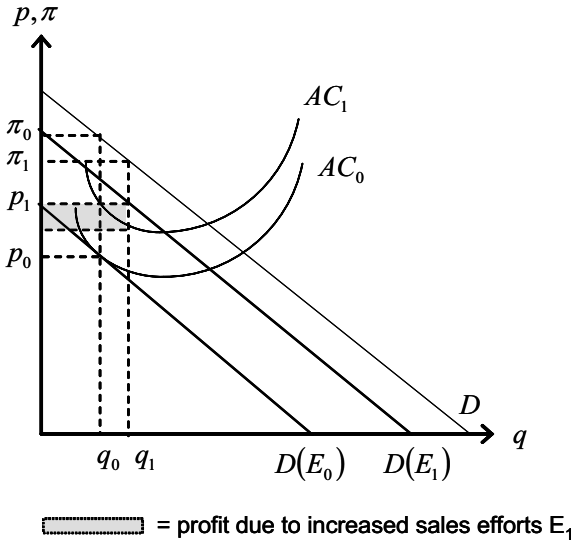


Fig. 3.2. Market Equilibrium with Increased Sales Efforts (following Neuberger 1998, 170)

Like in the Chamberlin model of monopolistic competition, it is assumed that all intermediaries (including potential market entrants) produce slightly different product variants at the same costs. A representative insurance intermediary's cost function entails production costs $C(q_k)$ for a certain quality level of the information, bargaining and administrative services provided as well as costs for sales efforts *E*. It is assumed that for each level of sales efforts *E* a fixed amount of costs *e* has to be spent. Thus, an insurance intermediary's total costs *T* sum up to

$$T(q_k, E) = C(q_k) + e \cdot E \tag{3.7}$$

An intermediary can increase sales efforts *E* by increasing informational advertising and/ or by locating his office closer to his potential clients, so that they have to spend lower information and/ or travel costs. Given all other assumptions of the basic model of monopolistic competition, market equilibrium is characterized by a certain level of sales efforts E_0.

An increase in sales efforts to $E_1 > E_0$ has two effects.[32] For one it shifts the demand curve faced by the intermediary outward from $D(E_0)$ to $D(E_1)$. However, since higher sales efforts require higher costs to be spent, cost curves shift upward as well. In the new equilibrium, the insurance intermediary sells services q_1 at the new equilibrium price p_1, which is above the old equilibrium price p_0. However, consumers are willing to pay this higher market price for the intermediary's services, since at the same time the increase in sales efforts reduces their opportunity costs, so that they actually spend a lower total price $\pi_1 < \pi_0$ for a higher volume of intermediary services $q_1 > q_0$.

For an insurance intermediary there is an incentive to increase sales efforts *E* as long as the resulting increase in average costs AC_1 is smaller than the increase in market price p_1, so that he earns positive profits $(p_1 - AC_1) \cdot q_1 > 0$.

The higher the total price elasticity of demand given an initially low level of sales efforts is, the more the residual market demand curve shifts outward when the insurance intermediary increases his sales efforts. Since the elasticity of demand faced by each insurance intermediary is higher, the fewer intermediaries are in the market (see the basic model above), increases in sales efforts are expected to be the more profitable, the lower the number of competitors is. However, given that sales efforts *E* and consumers' knowledge *K* are substitutes, consumers' demand for sales efforts will be lower, the higher consumers' knowledge is (Neuberger 1998, 167). Consequently, given the same elasticity of demand, for intermediaries who target customers with higher income, education, experience or a younger age it pays less to increase sales efforts, since such consumers usually have more knowledge *K*.

In addition, an insurance intermediary can also try to make his residual demand curve more inelastic by providing additional services which let consumers value his services more. For example, a good reputation may increase customer loyalty and thus lead to a steeper, that is more inelastic demand curve. Given the time horizon being long enough, despite the

[32] For a formal analysis see Neuberger and Lehmann (1998).

higher costs, which are necessary to build a good reputation, the discounted value can pay off. An insurance intermediary can also try to target special consumer segments through his advertising efforts, thus, convincing this customer segment that he is providing an additional value for them. For example, by placing adverts with an appropriate message in special interest magazines, an insurance intermediary may appeal to the target group of these magazines, hoping that they would apply higher credibility to his services than to those of other insurance intermediaries.

(2) Incentives to Reduce Costs

Besides incentives to increase product differentiation and, thus, his monopolistic position, an insurance intermediary can also increase his profits by reducing the costs spent. Positive profits are realized if the resulting average costs become smaller than the price obtained. Therefore, there are especially incentives to reduce fixed costs. The largest amount of costs is spent on producing information relevant for consumers. Investment in human capital is necessary to correctly and efficiently process information about all the aspects relevant for an insurance contract to be concluded. Besides, costs spent on information acquisition and procession sum up to a large proportion of fixed costs. By using more efficient techniques in information production, these fixed costs can be reduced. This can be realized by better computer software or by access to data bases, which contain more relevant information with respect to the target customers, for example. In addition, also the formation of associations with other insurance intermediaries to rationalize on information production increases productivity by reducing the fixed costs each intermediary must bear.

However, fixed costs can also be saved by reducing the efforts spent on information production. This would quite inevitably result in a reduction of the level of information provided to customers and thus to information services of lower quality. If this leads to an increase of the elasticity of demand of a particular intermediary's demand curve, he will lose potential clients. Consumers will turn to other intermediaries whose services they see as substitution products. But an intermediary can replace a high information level without losing customers, if his customers view other service characteristics as substitutes for the information level provided so far. For example, by better targeting potential customers through advertising or by spending more time with clients, an intermediary can replace fixed costs of information production with variable costs of information transmission. Despite lower information service quality and, thus, a lower residual demand, this may nevertheless result in higher profits if the decline in net total average cost is larger than the resulting price decline. Accordingly, high

competitive pressure in the market for insurance intermediaries not only leads to a large extent of horizontal product differentiation, but it may also set incentives to decrease the quality of the information services to save fixed costs.

3.1.3 Summary

In representative models of monopolistic competition the number of insurance intermediaries in the market and, thus, the degree of product differentiation depends crucially on the amount of fixed costs. The lower these are, the higher the number of intermediaries is. This affects also the resulting transaction and information costs spent by consumers. On the one hand, the more intermediaries there are and the higher the degree of product differentiation is, the better consumers' preferences are matched. Besides, the more intermediaries are in the market, and the less concentrated they are geographically, the lower the travel costs are for consumers. On the other hand, with a larger number of competitors incentives may rise to reduce costs for information provision and, thus, to offer more low quality information services. Therefore, in the next section we analyze the consequences of incomplete information on consumers' side and, thus, of positive search costs about the service quality of insurance intermediaries in more detail.

3.2 Incomplete Information and Costly Search

3.2.1 A Basic Model of Price-Quality Dispersion

In the following we analyze in more detail the consequences of incomplete information on consumers' side about the service quality of insurance intermediaries. In the insurance intermediation model developed in *section 2.2.4*, it was assumed that consumers have incomplete information about insurance products, but complete information about the information services provided by insurance intermediaries. In that framework, the provision of different service qualities by insurance intermediaries results from differences in consumers' valuation of information quality. In contrast, in the following we take into account that by using intermediary services incomplete information about insurance products is partly replaced by incomplete information about intermediaries' services. Thus, consumers have to incur search costs in order to determine the service quality pro-

vided by different intermediaries, while at the same time economizing on search costs about insurance products.

In order to analyze the more realistic case that consumers lack information about a particular intermediary's service quality, we again use a search theoretic approach which was developed by Salop and Stiglitz (1977).[33] However, originally, this model takes the quality of the good supplied in the market as given and analyzes the impact of incomplete information and, thus, of positive search costs about the prices charged by different suppliers on market outcome. Therefore, we first have to make some assumptions to account for the particularities of the market for insurance intermediary services.

We again assume that consumers act under a "free-fee" illusion about the information services provided by insurance intermediaries (Sect. 2.2.1). That is, fees do not serve as a signal for differences in service quality. For reason of simplification, it is assumed that intermediaries charge identical fees for their services, so that fees play no role in competition among intermediaries. However, to use the services of an intermediary requires consumers to spend time for getting information and advice. Thus, the opportunity costs of using an intermediary's services are the time spent multiplied with a consumer's wage rate. It is assumed that all consumers have the same opportunity costs $w \cdot t$. However, intermediaries differ in the quality of the services they provide. Accordingly, each consumer has to spend the same opportunity costs, no matter what quality of intermediary services she receives. Suppose that the degree of quality can be measured with s being the units of service quality provided by an intermediary. Then the implicit price p per unit service quality s paid for by consumers is given by $p = \frac{w \cdot t}{s}$.

For constant opportunity costs, the lower the price p is, the more units s of service quality a consumer receives. Accordingly, a low price p implies high service quality s and vice versa. Based on these considerations, the price dispersion model applied accounts also for the quality dispersion of intermediary services faced by consumers.

In the following it is assumed that all insurance intermediaries have identical cost functions in producing and distributing their intermediation services.

Consumers are assumed to have identical demand functions for intermediation services. They know the general price-quality distribution of intermediary services, but have incomplete information about which of the n

[33] For the formal analysis see also Carlton and Perloff (2005, 452–470) and Stiglitz (1989a).

intermediaries exactly charges which price p and, thus, provides which amount of service quality s for their given and identical opportunity costs.

Consumers can gather information about intermediaries' service quality by incurring search costs. Hence, their total costs of using an intermediary's services are at least $p + c$, with $c > 0$ being their time costs and other expenses like travel costs they spend for choosing an intermediary's services. By incurring higher search costs c, they can learn more about the prices charged and therefore about the service quality provided by different intermediaries.

Suppose that there is a fixed number n of insurance intermediaries in the market. If consumers were fully informed about the price-quality dispersion of the n intermediaries, the competitive price p^c charged by insurance intermediaries would equal marginal costs. Each intermediary would provide the competitive service quality s^c. However, under incomplete information about the precise price-quality dispersion, this is no equilibrium. Due to the positive search costs $c > 0$ that consumers must incur, it pays for an intermediary to charge a higher price $p^* = p^c + \varepsilon$ where ε is a positive mark up. As long as $\varepsilon < c$, he would lose no consumer and thus make higher profits. Only when the mark up ε exceeds search costs c, a consumer would be better of by incurring additional search costs c and turning to another intermediary. Salop and Stiglitz (1977) show that p^* is also not a stable equilibrium, because it pays for other intermediaries to raise their prices by also charging a mark up on p^*. If there is a large number of intermediaries in the market, the only single-price equilibrium results if each intermediary charges the monopolistic price p^m for which marginal revenues equal marginal costs. In this case, each intermediary provides only low monopolistic service quality s^m.

Given there is a single-price equilibrium with a small number of intermediaries in the market, who charge the monopolistic price p^m. If this monopolistic price p^m exceeds average costs, positive profits are earned. Therefore, if there are no barriers of entry new insurance intermediaries will enter the market charging the same monopolistic price p^m. Nevertheless, due to the higher number of intermediaries in the market, each gains a lower number of consumers, so that his profits fall. Market entry stops, when profits are driven down to zero. Despite increased competition, consumers do not gain any advantage from additional intermediaries being in the market, since they must further pay the monopolistic price p^m for which they receive the same low service quality s^m.

However, in case that there are only few insurance intermediaries in the market, consumers' search for low-price-high-quality intermediaries could

be advantageous since the chance of finding such an intermediary is higher. In this case it may pay for an insurance intermediary to cut his price by more than consumers' search costs *c*, that is, to strongly increase his service quality *s*. Although the intermediary loses per sale, total sales as well as profits increase by attracting more consumers. In this case, there is no single-price equilibrium (Carlton and Perloff 2005, 455). Similarly, effective competition may be increased even with a large number of insurance intermediaries. If they form a chain and collude in cutting their prices, again chances for consumers rise to find a low-price-high-quality intermediary (Stiglitz 1979, 340).

To summarize, given that all consumers have positive search costs *c* with respect to the price-quality distribution of the services offered by insurance intermediaries and that there is a large number of intermediaries, the long-run monopolistically competitive equilibrium is characterized by a monopolistic price where marginal revenues equal marginal costs. Given free market entry, additional insurance intermediaries will enter the market until price exactly covers average costs so that profits are zero. However, additional market entry does not lower price and, thus, does not increase service quality. Compared to a full information competitive equilibrium, due to consumers' incomplete information and positive search costs lower service quality is provided.

3.2.2 Differences in Consumers' Information and Market Outcome

In the following we study the impact of consumers with different information levels as well as with different search costs on the price-quality of the services provided by insurance intermediaries. We show that even given a large number of intermediaries, it is possible that some offer low-price-high-quality services. However, this depends on the extent of consumers with a high information level and, thus, low search costs (Salop and Stiglitz 1977, 501).

Again it is assumed that all of the *n* insurance intermediaries in the market have identical cost functions. Consumers have identical demand functions, but they differ with respect to their search costs. Consumers, who are fully informed about the price-quality combination offered by intermediaries, have zero search costs $c = 0$, while consumers with incomplete information have positive search costs $c > 0$. Consequently, fully informed consumers use only the services provided by low-price-high-quality insurance intermediaries.

If there are *L* consumers in the market, the number of informed consumers is $\alpha \cdot L$ and the number of uninformed consumers is $(1-\alpha)\cdot L$. Each consumer buys only one unit of the services provided by an intermediary as long as the price charged does not exceed her maximum willingness to pay p^u.

Given these assumptions, it can be shown that if there are enough informed consumers, there is a single fully-information competitive price equilibrium. Each intermediary, who charges the fully competitive price p^c, sells to all his informed customers $\frac{\alpha \cdot L}{n}$ plus his share of uninformed customers $\frac{(1-\alpha)\cdot L}{n}$, so that his total sales amount to $q^c = \frac{L}{n}$. If an intermediary deviates from the fully competitive price p^c and charges a higher price, for example the one which equals consumers' maximum willingness to pay p^u, then he would lose all the informed customers. Because of the large share of informed customers, the reduction in total customers could become so large that the intermediary makes a loss despite the higher price p^u charged. Conversely, it does not pay for any intermediary to reduce the price charged below the full information competitive price p^c, since then he is not able to fully cover his costs (Fig. 3.3).

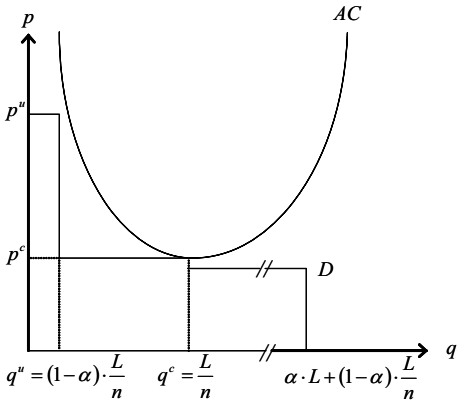


Fig. 3.3. Single-Price Full-Information Competitive Equilibrium Given a Large Number of Informed Consumers (Carlton and Perloff 2005, 460, Fig. 13.1)

However, if there are only few informed consumers, in the long run a two-price equilibrium results. If an intermediary raises his price to p^u, he

will lose all informed customers. However, since they sum up to only a small proportion of all consumers, the intermediary's residual demand q^u is large enough to still cover his resulting average costs. If $p^u > AC$, the intermediary earns positive profits (Fig. 3.4a).

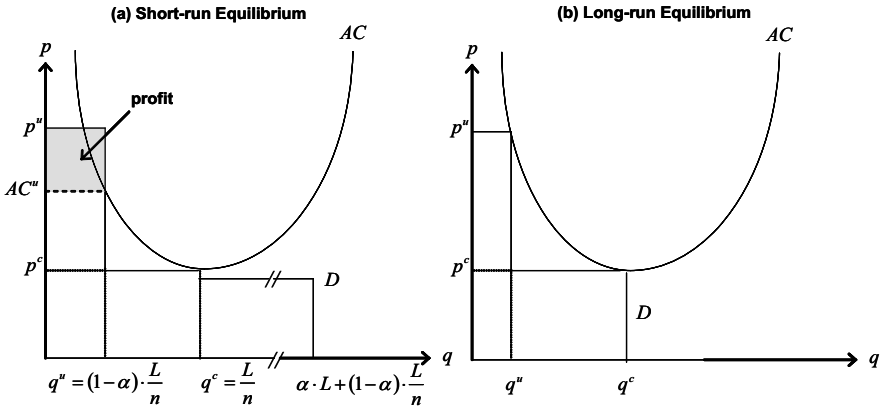


Fig. 3.4. Two-Price Equilibrium Given a Low Number of Informed Consumers (Following Carlton and Perloff 2005, 461–462, Fig. 13.2 and 13.3)

This sets incentives either for additional intermediaries to enter the market or for intermediaries already in the market to increase their price, that is to reduce their service quality. However, due to the larger number of high-price-low-quality intermediaries, the residual demand of uninformed consumers for each intermediary diminishes. The long-run market equilibrium is reached when so many high-price-low-quality intermediaries are in the market that they sell exactly so much that their average costs AC are still covered by charging the maximum price p^u (Fig. 3.4b).

In equilibrium, both high and low price intermediaries make zero profits. Each low-price-high-quality intermediary has a larger market share than a high-price-low-quality intermediary, since he gets all the informed customers and his share of all uninformed consumers, who just by chance use the services of a low price intermediary. Thus, given the assumptions of this model the high quality intermediaries' market share is larger than the proportion of informed consumers (Salop and Stiglitz 1977).

Accordingly, the number of informed customers necessary to obtain a single-price equilibrium depends on the shape of the average cost curve and on consumers' maximum willingness to pay for intermediary services p^u. A higher maximum willingness to pay, lower fixed costs (which im-

ply a lower minimum of the average cost curve), or a smaller cost digression due to economies of scale increases the possibility of a two-price equilibrium. In general, an increase in consumers' knowledge or information level about low-price-high-quality intermediaries increases overall quality since the demand curve facing an intermediary becomes more elastic (Carlton and Perloff 463–465). The higher the share of informed consumers as well as their information level, the more consumers an intermediary is likely to lose if he is raising his price respectively lowering the quality of his services.

3.2.3 Summary

Section 3.2.1 applied a search theoretic framework in order to include positive search costs for consumers about the quality of the services provided by insurance intermediaries. With consumers being uninformed about intermediaries' service quality, a larger number of competitors in the market usually does *not* lead to lower prices respectively to higher service quality. Nevertheless, as *section 3.2.2* showed, given there are enough informed consumers, the competitive full information equilibrium results. In contrast, with only few informed consumers both high and low quality intermediaries are economically viable. This results from differences in consumer search costs, not from differences in their valuation of different service qualities, like in the Bertrand model discussed in *section 2.2.4*.

3.3 Asymmetric Information, Market Conduct and the Market Microstructure

In the above we analyzed the impact of competition on the variety and quality of the services provided by insurance intermediaries. Implicitly, the models presented in *sections 3.1* and *3.2* assume that consumers are able to correctly distinguish between intermediaries who provide different kinds of services, be they horizontally or vertically differentiated. In the following, we extend our analysis to additionally account for information asymmetries. Moreover, we also consider the impact of other market participants (insurance companies, outside intermediaries) on market conduct and performance. Insurance intermediaries mediate between insurance companies and consumers. Thus, there are multiple principal-agent relationships (Fig. 3.5). Consumers, as principals, rely on high service quality, in particular regarding the information provided by insurance intermediaries. In contrast, insurance companies as principals are mainly interested in the

sales efforts of their intermediaries. These differing objectives of the principals may be in conflict with one another. Besides, there are also profound information asymmetries both between consumers and intermediaries and between insurance companies and intermediaries. In part these asymmetries can be reduced through signaling instruments, contractual design or specific compensation schemes. Besides, such information asymmetries provide opportunities for outside intermediaries. They can capture some of the resulting informational rents by offering additional information services that reduce at least part of the information asymmetries.

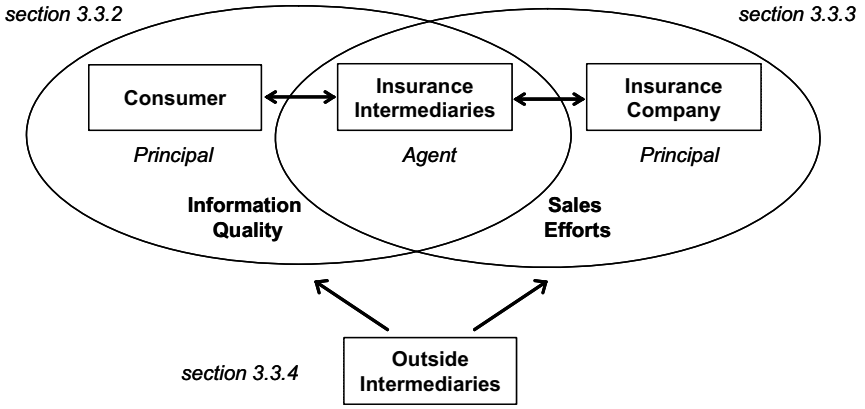


Fig. 3.5. Multiple Principal-Agent Relationships

In the following, we firstly discuss the impact of asymmetric information on the information quality provided by insurance intermediaries (*3.3.1*). Secondly, we analyze the main signaling instruments available to insurance intermediaries in order to credibly signal high quality services to consumers (*3.3.2*). Thirdly, the impact of insurance companies' choice of distribution channels and of compensation schemes on intermediaries' service quality is analyzed (*3.3.3*). Finally, the incentives for outside intermediaries to compete with insurance intermediaries and the consequences for the market microstructure are taken into account (*3.3.4*).

3.3.1 Asymmetric Information and Information Quality

The following model shows the impact of information asymmetries on the information quality provided by insurance intermediaries. In contrast to the search theoretic models applied above, Gravelle (1993) assumes that consumers behave completely passively. Only in case that a consumer is con-

tacted by an insurance intermediary, she decides whether to buy insurance or not. Besides, it is assumed that insurance companies gain access to consumers only through insurance intermediaries – be they agents or brokers.[34] That is, insurers compete indirectly for consumers by directly competing for intermediaries via the commission they pay.

It is assumed that consumers become informed about insurance products only when contacted by an intermediary. After they have learned about insurance products' characteristics, they purchase one unit if the resulting benefit b of the insurance product equals at least its price p:

$$b \geq p\,. \tag{3.8}$$

The benefits are distributed with $F(b)$ over the population, with $F(b)$ being twice differentiable and with b lying in the range between $[b_l, b_u]$.

Insurance companies are assumed to be risk neutral. They produce homogeneous goods at marginal costs c. In order to sell their products they have to pay a commission k to the intermediary so that their costs per unit are $c+k$. Accordingly, the price paid by consumers amounts to $p=c+k$.

There is free market entry for intermediaries. It is assumed that each intermediary contacts only one consumer. This causes acquisition costs $K(n)$ for advertising, traveling or administrative services, for example. If there are negative marketing externalities resulting from the number of intermediaries n, $K'(n) > 0$. The more intermediaries there are in the market, the more difficult it is for each single intermediary to contact a new consumer. Hence, acquisition costs $K(n)$ are increasing in the number of intermediaries. If there are no such congestion costs, then $K'(n) = 0$. Besides, intermediaries have opportunity costs w. That is, at least their reservation wage w must be covered; otherwise they will exit the market.

Intermediaries have full knowledge about the distribution of benefits $F(b)$, but not about the actual value b for a single consumer. After having been contacted and correctly informed by an intermediary, a consumer will purchase an insurance product with the probability

$$\Pr[b \geq p] = 1 - F(p). \tag{3.9}$$

Consequently, if the consumer decides to purchase the insurance product, an intermediary's expected revenue r is

$$r = k \cdot [1 - F(p)] = r(p,k)\,. \tag{3.10}$$

[34] Gravelle (1991) takes into account direct marketing by insurance companies as well as collusion among insurers to control intermediaries' commission.

Given free market entry for intermediaries, in equilibrium expected revenue equals the marginal intermediary's costs

$$r(p,k) = K(n) + w\,. \tag{3.11}$$

The supply function of intermediaries is given by solving Eq. 3.11 for the equilibrium number of intermediaries

$$n = n[r(p,k), w]. \tag{3.12}$$

The number of intermediaries is positively related to the commission k paid and negatively related to the product price p, because a higher price implies a lower probability that a consumer will purchase the insurance product. An increase in the reservation wage w also leads to a decrease of intermediaries in the market.

Since insurance companies can sell their products only through intermediaries, the latter act like a monopolist, who has purchased the insurance product for a price c and now sells it by maximizing its expected revenue $r(p,k)$ under the restriction that the price p of the insurance product has to cover its production and distribution costs $(c+k)$.

Figure 3.6 shows the equilibrium for a uniform distribution of the benefits *F(b)* and $c \in [b_l, b_u]$. The left-hand panel shows the revenue maximizing price p^* where expected marginal revenue *MR* equals marginal costs c of a contacted consumer. The intermediary receives the expected revenue r. The right-hand panel shows his maximum expected commission k^e. The optimal number of intermediaries is given where the intermediary supply function n^e for particular price-commission pairs (p,k) is tangent to the insurance company's break-even line $(c+k)$.

Because of information asymmetries, intermediaries can provide consumers with incomplete, misleading or false information about the characteristics of the insurance product. In this way, consumers may overestimate the benefits of the product or underestimate its price. Due to such misrepresentation, consumers' perceived benefits β of the insurance product are larger than the true benefits b with

$$\beta = \beta(b,l) \tag{3.13}$$

where l denotes the amount of incomplete, false or misleading information an intermediary provides. If intermediaries correctly inform consumers, true and perceived benefits are the same with $\beta = \beta(b, l=0) = b$.

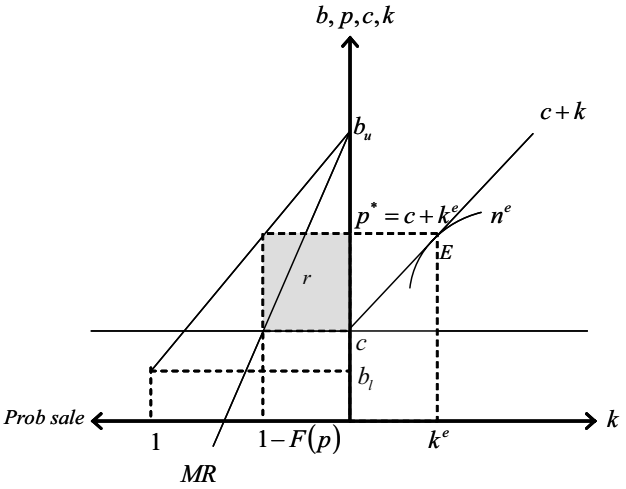


Fig. 3.6. Competitive Equilibrium with Correct Information (Following Gravelle 1993, 36, Fig. 2)

For reasons of simplification it is assumed that l is the same for all intermediaries, if they decide to provide incorrect information. Besides, it is assumed that the perceived benefit increases both with the true benefit b and/ or with the incorrect information l, so that $\beta_b > 0$ and $\beta_l > 0$.

As in the case of correct information, a consumer contacted by an intermediary will buy the insurance product if her perceived benefit β is larger than the price p

$$\beta = \beta(b,l) \geq p\,. \tag{3.14}$$

The true benefit ρ of the marginal misled consumer at the price p is defined by $\beta(\rho,l) = p$ so that

$$\rho = \rho(p,l)\,. \tag{3.15}$$

It can be shown that the first partial derivative for p is positive while it is negative for l.

All consumers buy, if $b \geq \rho(p,l)$. Therefore, incorrectly informed consumers will buy the product at price p with the probability

$$1 - F(\rho(p,l)) \tag{3.16}$$

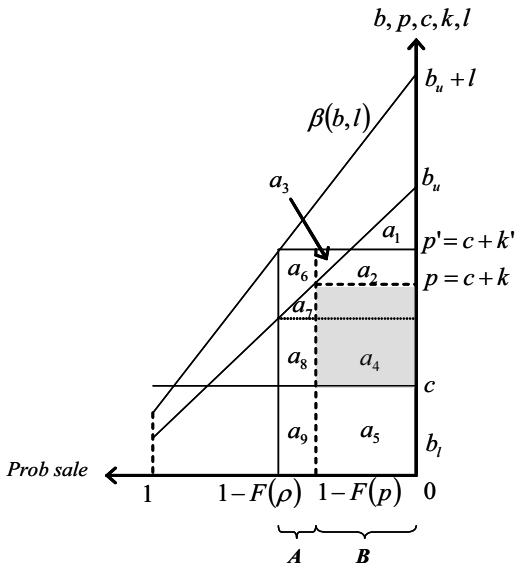


Fig. 3.7. The Effect of Incorrect Information (Following Gravelle 1993, 42, Fig. 3)

By overstating the benefits of the insurance product the distribution of perceived benefits and the expected demand curve shift outward. This also implies a higher commission k and, thus, higher expected revenues for the intermediary (Fig. 3.7).

The proportion of consumers A, who would be better off without the insurance product if they had been correctly informed, is $F(p)-F(\rho)$. The expected expenditure of a consumer, who belongs to this group, is $p[F(p)-F(\rho)]$, that is $a_6+a_7+a_8+a_9$. Her expected benefit from buying this insurance product if she had been correctly informed is $a_7+a_8+a_9$. Thus, a misled consumer realizes a net loss of a_6.

The proportion B of those consumers, who would have bought the insurance product already with correct information, realizes higher additional expenditures of a_2+a_3 because now they have to pay a higher price. This includes the loss of consumer surplus a_2.

Insurance intermediaries gain from providing incomplete, false or misleading information because they can realize additional expected revenues $a_2+a_3+a_6+a_7+a_8$. Even insurance companies have an incentive for intermediaries providing incorrect information, since they realize additional sales of a_9. If insurance is not priced competitively, so that the costs c entail a mark up, insurance companies also profit from information asymme-

tries, which allow intermediaries to exaggerate the true benefits of insurance products.

In order to analyze the incentives for intermediaries to take advantage of information asymmetries and provide low quality information to consumers, Gravelle (1993, 43–46) assumes that there are two types of intermediaries. Intermediaries are either honest and provide correct information and, thus, high quality information services, or they are dishonest and provide incorrect information and thus low quality information services. The expected revenue per contact for an honest intermediary (*0*) is

$$r_0 = k \cdot \left[1 - F(p)\right] = r(p,k,l=0), \tag{3.17}$$

while a dishonest intermediary (*1*) gains

$$r_1 = k \cdot \left[1 - F(\rho(p,l))\right] = r(p,k,l). \tag{3.18}$$

Furthermore, it is assumed that cheating involves some dishonesty costs δ, which result from a loss of self-esteem due to being dishonest or from risks of being detected and punished by the regulatory authorities. A potential intermediary will enter the market if his expected revenue covers at least his costs, that is, his reservation wage *w*, and also his dishonesty costs δ if he provides low quality information services:

$$\max\{r_0 - K - w, r_1 - K - w - \delta\} \geq 0\,. \tag{3.19}$$

The intermediary will be dishonest if the gain from providing low quality information services exceeds the dishonesty costs, so that

$$r_1 - r_0 \geq \delta\,. \tag{3.20}$$

The reservation wage *w* and the dishonesty costs δ are assumed to be independently distributed. Besides, a proportion of θ potential intermediaries have identical positive dishonesty costs $\delta > 0$. Given that Eq. 3.20 is satisfied, they will provide incorrect information. The remaining proportion $(1-\theta)$ of potential intermediaries will never cheat, since their dishonesty costs are assumed to be so high that Eq. 3.20 never holds.

It can be shown that the reservation wage of the marginal (dis-)honest intermediary depends on the number and on the proportion of (dis-)honest intermediaries in the market. Thus, honest and dishonest intermediaries enter the market until the marginal entrants just break even:

$$r_0 = K(n_0 + n_1) + w_0(n_0, \theta) \tag{3.21}$$

$$r_1 = K(n_0 + n_1) + \delta + w_1(n_1, \theta)\,. \tag{3.22}$$

Solving Eq. 3.21 and Eq. 3.22 yields the supply function n_i of honest (*i=0*) and dishonest (*i=1*) intermediaries

$$n_i = n_i(r_0, r_1, \theta, \delta) \quad \text{with } i = 0, 1. \tag{3.23}$$

Table 3.1 shows the effects of changes in expected revenues *r*, the proportion of dishonest intermediaries θ, the extent of cheating *l*, and the dishonesty costs δ on the number of honest and dishonest intermediaries in the market and, thus, on the overall information quality.

Table 3.1. Supply Responses of Honest and Dishonest Intermediaries

	n_0	n_1	$n_0 + n_1$	$\frac{n_1}{n_0 + n_1}$	Overall Information Quality Provided
r_0	+	sign – K'	+	–	+
r_1	sign – K'	+	+	+	–
θ	–	+	+	+	–
L	sign – K'	+	+	+	–
δ	sign K'	–	–	–	+

0 = correct information provided; *1* = incorrect information provided

Source: Following Gravelle (1993, 45, Table 1).

When expected revenues for high quality intermediaries r_0 rise, more honest intermediaries n_0 will enter the market. If there are negative marketing externalities, so that $K'(n) > 0$, low-quality intermediaries realize additional costs from increased competition for potential customers. Consequently, some will leave the market and their number n_1 decreases, so that overall information quality will rise. If there is no congestion from a larger number of intermediaries so that $K'(n) = 0$, an increase in r_0 and hence, in honest intermediaries n_0 has no effect on the number of dishonest intermediaries n_1. Nevertheless, their proportion θ decreases and the overall information quality in the market rises, too.

Conversely, an increase in the extent of cheating *l* within the amount of incorrect information provision leads to an increase in the number of dishonest intermediaries n_1. Due to the higher revenues r_1 they can realize by exaggerating the benefits of insurance products, more dishonest intermediaries will enter the market and provide incorrect information (see Eq. 3.18 to Eq. 3.20). Accordingly, the overall quality of the information provided by intermediaries in the market declines, since $\frac{n_1}{n_0 + n_1}$ increases**.** How-

ever, by suitable regulatory rules the extent of cheating l may be reduced. There may be regulatory requirements on the content of promotional literature or intermediaries must disclose their affiliation with a particular insurance company so that consumers are informed about potential conflicts of interests. In this case, the proportion of dishonest intermediaries θ decreases and the average information quality in the market rises.

Additionally, dishonesty costs δ may be raised by new regulatory provisions. For example, intermediaries may be required to document the content of consultations, especially the reasons for recommending a certain insurance product to consumers. This would also lead to a decrease in the number of dishonest intermediaries and to an increase in the number of honest intermediaries given that there are congestion costs $K'(n) > 0$. In any case, the overall quality of the information services provided in the market improves.

Although consumers are assumed to behave completely passive in this model, it allows analyzing the impact of information asymmetries on the information quality provided in more detail.

3.3.2 Asymmetric Information and Signaling Incentives of Intermediaries

As has already been shown, the relationship between consumers and insurance intermediaries is characterized by asymmetric information, in particular with respect to the quality of the information provided by intermediaries. However, the extent of information asymmetries can be reduced by high quality (= honest) intermediaries if they can credibly signal their true service quality. In the following we discuss the incentives for honest intermediaries to use signaling instruments and, thus, reduce the potential extent of cheating for dishonest intermediaries.

Insurance intermediary services are experience goods. Consumers can evaluate whether intermediaries have provided correct information only after consumption, so that there are information asymmetries *ex ante*, that is, before consumption. Besides, this is a typical principal-agent relationship (Fig. 3.5 above) (Grossman and Hart 1983; Laffont and Martimort 2002; Macho-Stadler and Pérez-Castrillo 2001; Milgrom and Roberts 1992; Molho 1997; Salanie 1997). The agent (= the insurance intermediary) agrees to provide services to the principal (= the consumer) in return for some form of compensation. The objectives of principals and agents differ. The principal has only incomplete information about the agent's characteristics, knowledge and experience before contract conclusion as well as about the agent's proper intentions and actions after contract conclusion.

Therefore the performance of the agent can be only incompletely assessed by the principal. She cannot correctly assess whether a particular performance is the proper result of the contractually agreed efforts of the agent under the given circumstances or the consequence of a contract violation. Such contracts are usually incomplete because not all contingencies can be explicitly specified *ex ante*. Therefore, contract fulfillment can be only incompletely enforced by courts *ex post* as well.

As a consequence of the agent's privately held information, adverse selection and/ or moral hazard may occur (Horsch 2004; Kurland 1995, 1996). Adverse selection results from asymmetric information before contract conclusion. Since the principal is aware about her incomplete knowledge, she is only willing to pay for an average performance. Thus, it does not pay for agents to provide high quality services that require higher efforts and thus higher production costs. They either leave the market or reduce the quality level of the services they provide. As it is well-known from Akerlof's discussion of the *lemon problem* (Akerlof 1970), this can lead to a complete market break down. In any case market performance will be lower in terms of the overall service quality offered than with less information asymmetries. Besides, moral hazard of the agent can occur after contract conclusion. Agents can display hidden actions by spending fewer efforts than those necessary for the proper contract fulfillment. If the principal anticipates this effect, she can require a "risk premium" in the form of a deduction from the agent's remuneration. Again, this may induce agents with lower (innate) incentives for moral hazard behavior to leave the market, so that overall market performance declines. In the extreme, this may also result in a complete market break down.

However, insurance intermediaries providing high quality services can offer additional information to consumers (as their principals). By credibly *signaling* higher service quality, information asymmetries are mitigated and the resulting problems of adverse selection and moral hazard are lessened (Boulding and Kirmani 1993; Cho and Kreps 1987; Ippolito 1990; Macho-Stadler and Pérez-Castrillo 2001, 185–230; Molho 1997, 61–80; Riley 2001; Spence 1973, 2002). Nevertheless, for a signal to be credible, it must meet certain requirements. Above all, it must be credibly stated that the agent sending it belongs to a particular subgroup from the whole population of agents. In our case, a signal must credibly communicate that the insurance intermediary applying it provides high quality services. It must be related in some way or another to the quality of the intermediary's services and it must not be easily copied by agents from other subgroups, thus, wrongly pretending to offer high quality services, as well. Otherwise, consumers cannot rely on it for distinguishing between intermediaries of different service quality, so that the signal has no informational content. In

order to avoid being easily imitated, the signal must exhibit some costs. Given these requirements, a signal is informative. An insurance intermediary is indifferent to applying a signal or not, when the costs of using it equal the resulting discounted future gains.

In the literature a variety of different types of signals are analyzed (Carlton and Perloff 2005, 446–450; Kirmani and Rao 2000; Kreps 1990; Milgrom and Roberts 1992; Riley 2001; Vahrenkamp 1991; Wein 1997). Voluntary property liability insurance, guarantees or warranties, standards, certification and licensing along with reputation, price and advertising are the most widespread used signals we discuss in the following.

(1) Voluntary Property Liability Insurance

Voluntary property liability insurance by the intermediary himself is a rather simple instrument for signaling high quality services.[35] The signal sent to potential customers works as follows. By currently spending more resources in form of the property liability insurance premiums, the intermediary acknowledges the possibility that his services may lack quality and, thus, cause a client damage. He assures his customers that for such a case he has undertaken the necessary precautions to compensate them. Voluntary property liability insurance serves as a credible signal of an intermediary's commitment to high quality services, since in case of low quality provision the intermediary must pay higher premiums for his liability insurance coverage. Consequently, intermediaries providing low quality services have lower incentives to imitate this signal, since they have to spend higher costs. In addition, however, for voluntary property liability insurance to be an effective signal requires that consumers believe that in case of damage they will really be compensated. If consumers perceive claim settlement as uncertain or necessitating additional costs (like involving claim settlement experts or taking recourse to the courts), then it is unlikely that they view voluntary property liability insurance as a credible signal for high quality intermediary services.

(2) Guarantees and Warranties

Guarantees or warranties can also serve as a signal (Gal-Or 1989, Grossman 1981; Lutz 1989; Wiener 1985). If insurance intermediaries can guarantee their customers credibly that they provide high quality services, this can also increase their market share. For example, such a guarantee

[35] This, however, requires that liability rules exist which impose on intermediaries legal liability if they violate certain duties. See Spence (1977).

can take the form of a promise to pay for any detriment a customer might realize due to insurance intermediary improperly performing the services (like giving incomplete, misleading or false information and recommendations).[36]

However, it is rather unlikely that such a guarantee can be credibly provided by an insurance intermediary at costs which are not prohibitively high. It must be specified *ex ante* in what cases and under what circumstances an insurance intermediary fails to provide the promised service quality. Moreover, since the outcome of any consultation process also involves the active participation of the client, her behavior also affects the outcome. Besides, it must be ensured that the intermediary honors the promise in the future. It is particular unlikely that these requirements are met in case of services pertaining to long-term insurance contracts. It would be prohibitively costly, if not impossible at all, to exactly specify all the contingencies to which such a guarantee should apply. There always remain a lot of controversial issues, for which complete *ex ante* specification would be prohibitively costly. Besides, especially in case of long-term insurance contracts where deficiencies of the quality promised may show up only after decades, both to locate the insurance intermediary and to evaluate the former information and consultation services *ex post* might prove to be impossible. Even when the parties affected can turn to the courts (or to other arbitrators), this may not sufficiently decrease the uncertainty about the true content of the guarantee. Again, the result of legal recourse is rather uncertain. Besides it exhibits high transaction costs. But even if such a guarantee could be specified satisfactorily to become a credible signal, this might not be cost-effective. If it requires too high costs, for example for additional insurance of the intermediary to cover potential future claims of clients, then no intermediary would be willing to issue such a guarantee. To reduce these costs, the content of the guarantee can be restricted to a narrow range of issues. In this case, however, the signal is easily imitated by low quality. Consequently, it loses its informational content and thus its value for consumers as well as for high quality intermediaries.

[36] For the working of service guarantees as signaling instruments to evaluate the quality of service firms, see Erevelles (1993); Kashyap (2001); Ostrom and Iacobucci (1998); Kumar, Kalwani and Dada (1997); Hart, Schlesinger and Maher (1992); Shimp and Bearden (1982); Wirtz, Kum and Lee (2000).

(3) Standards, Certificates and Licensing

Standards, certificates or licensing, provided by independent third parties can also credibly signal high quality intermediary services (Leland 1979, 1980; Shapiro 1986; Spence 1973; Stiglitz 1989b).[37] A wide-spread signal used in many professions is *education* and *training*. In revealing one's schooling and training background, an insurance intermediary expresses information about an important input factor for producing high quality services. Deciding on the best insurance cover for a particular consumer's preferences and needs requires not only information about insurance alternatives on the market, but also knowledge to correctly assess and evaluate all the relevant information. Both formal schooling as well as further training in the respective fields of insurance economics and financial economics provides an intermediary with the necessary analytical skills and theoretical knowledge. This investment in human capital cannot be easily copied; at least not when it comes to government regulated formal qualifications, as it is the case with school or university diplomas.

The same holds true for vocational training and/or certificates issued by independent organizations, like professional associations. *Membership in a professional association* can therefore also serve as a signal, when such membership requires meeting certain standards, be it in terms of qualification, regular further training, and/or additional guarantees for clients like property liability insurance. Therefore, in case that such membership entails additional costs so that it cannot be easily copied, it also serves as a credible signal. However to work in this manner, consumers must be inexpensively informed about the existence of such a professional association *and* about the respective membership requirements. Given that this is no public information, such an association has to communicate its objectives and – at best – try to become publicly recognized as an organization in which membership serves as a credible guarantor of high quality services. This, however, entails large fixed costs. It becomes more complicated, if there are several independent organizations all claiming to provide standards, which certify high quality services of their members. In this case, for potential clients to correctly assess the quality of the signal given by membership in such associations requires information about each of these competing organizations. In principle, thus, search costs about the quality of the services of single intermediaries are partly replaced by search costs

[37] According to Carlton and Perloff (2005, 448) a standard is "a metric scale for evaluating the quality of a particular product", and certification is "a report that a particular product has been found to meet or exceed a given level on a standard."

about the quality of intermediaries' associations. Consumers' search costs about the quality of different professional associations are fixed costs. For a consumer it only pays to spend these costs, if they are lower than direct search costs about the quality of insurance intermediaries.

Information costs resulting from competing standards, certificates or professional associations are reduced, when meeting certain minimum standards and certificates or membership in an association is legally demanded. However, this may pose negative effects on welfare (Leland 1979, 1980). By setting minimum standards the average quality of the services offered in the market increases, but this comes at higher costs for consumers. Besides, the supply of lower quality services, which usually are offered at lower prices, is excluded. Therefore, consumers, who value high quality services, experience less welfare losses. Depending on consumers' preferences with respect to price and quality, this can lead either to net welfare gains or losses. Since no regulatory body has the relevant knowledge and information to correctly set and adapt such minimum standards over time, a welfare optimum can be realized only by chance. Besides, mandatory minimum standards and certificates allow for anticompetitive behavior as well. If particular licenses and certificates are mandatory, this can create barriers to entry for intermediaries, who do not meet the respective qualifications and requirements. If due to informational advantages single professions are allowed to set their own licensing requirements, they can use such certificates as an instrument to restrict market entry and thus stronger competition.

(4) Reputation

Reputation can also serve as a signal for high quality services (Allen 1984; Biglaiser and Friedman 1999; Kreps and Wilson 1982; Milgrom and Roberts 1982; Shapiro 1982, 1983; Stiglitz 1989a, 822–831; von Weizsäcker 1980; Wilson 1985). Since it is built up over time, it requires multiple interactions over several periods. Reputation models assume experience goods, that is the characteristics of a product or service are not known before purchase, but only after consumption. High quality services are assumed to require higher production costs than low quality services. When a consumer learns about a high quality service, she will repeatedly use the same high quality intermediary or communicate her experiences about his service quality to others. Due to word-of-mouth, reputation as being a high quality insurance intermediary generates additional business for an intermediary. However, to building up a reputation takes time and requires extra costs, while it is lost by simply providing low quality services. Cheating on consumers by providing low quality has two effects. On the one

hand, costs are lower when producing the low quality service. On the other hand, however, it devalues the investment made so far in building reputation as being a high quality firm. While lower production costs can be realized only in the current period, the ensuing loss of reputation leads to a decrease in demand over all future periods respectively to a higher price elasticity of demand, so that the firm has no longer any competitive advantages compared to low quality intermediaries. Consequently, an intermediary has an incentive to permanently produce high quality products, if the discounted net value of the profits thus realized exceeds the one time profit from cheating by providing low quality products.

It is uncontroversial that under these conditions it pays for an intermediary to build up a reputation as providing high quality services. However, the question remains how in the very beginning a firm can credibly signal to provide high quality services given incomplete and asymmetric information (Stiglitz 1989a, 827–829). Suppose there are two types of intermediaries (high and low quality firms), with the low quality intermediaries demanding a lower price than the high quality intermediaries. Then a market entrant can signal to offer high quality services by demanding an introductory price which is slightly below the price charged by the low quality firm. Although the low quality intermediary could also easily imitate this signal and charge a low price, this would not pay for him since consumers would at once realize that he has offered only a low quality. Therefore, they would refrain from future purchases and/ or communicate this experience to other consumers. Consequently, the low quality intermediary would realize only one-time additional sales. On the contrary, the high quality firm would permanently realize a higher demand since consumers value his quality. Therefore, the initial losses due to the low introductory price can be compensated by higher prices in the future. The signal sent by the high quality intermediary is not the low introductory price. The initial loss signals an intermediary's confidence to gain enough customers due to its high quality to compensate him in the future.

(5) Price and Other Costly Activities

In the market for insurance intermediaries, price is not an action parameter, since it is customary that fees are negotiated between insurance companies and intermediaries, so that most consumers act under a "free-fee" illusion (Sect. 3.3.2). Thus, lower introductory prices cannot serve as a signal for high quality intermediaries (Schmalensee 1978). However, the same effect may be realized by additionally offering costly services for free, which pay only if there are repeated transactions in future. Although intermediaries, who provide only low quality services, can imitate this signal, it would not

pay for them. After consumers have learned about the low quality they provide, they will not turn to these intermediaries again for further transactions. Besides, they will communicate this experience to other consumers. As a result, a low quality intermediary cannot reap the future benefits from costly initial investment. Moreover, disappointing customers' expectations about his service quality may even lead to the generation of "bad" reputation, which also spreads by word-of-mouth.

Furthermore, it may pay high quality intermediaries to specialize in market segments where consumer demand is less elastic, consumers' willingness to pay is higher, and/ or customer relationship may last longer (Farny 2000, 389–399). Given these conditions, chances rise that the initial losses pay off in the future. A lower price elasticity of demand is given when there are fewer substitution goods. This might be the case when there is only a small demand for particular intermediary services in relation to large economies of scale. This holds true for example for self-employed persons or small and medium sized companies. These consumers simultaneously demand both personal *and* commercial insurance. They require more tailor-made coverage and, thus, more complex intermediary services. However, this is a rather small fraction of all consumers, while it requires insurance intermediaries to invest in additional human capital to competently inform about the respective insurance. Consumers of this target group must additionally provide more detailed information both about their private and their business lives for an optimal contract conclusion. Thus, a more personal relationship between customer and client develops. This results in longer-term customer relationships and a lower elasticity of demand of this market segment compared to the average demand elasticity. Besides, given that insurance is a normal good, high income consumers should be willing to spend more on insurance in absolute terms. They might on average both conclude more insurance contracts as well as purchase higher coverage. Consequently, higher income can be earned by insurance intermediaries from this market segment. In addition, the younger customers are, the more repeated transactions are possible. Thus, it should pay for high quality insurance intermediaries to specialize in long-term relationships with young, self-employed and/ or high income consumers to reap the gains from investment in reputation.

(6) Advertising

Advertising is another means to overcome adverse selection of experience goods due to asymmetric information by signaling high quality services (Bester 1998; Carlton and Perloff 2005, 481–483, 489–491; Lehmann 1999; Khilstrom and Riordan 1984; Klein and Leffler 1981; Milgrom and

Roberts 1986; Nelson 1974; Rogerson 1986; Schmalensee 1978; Shapiro 1983).[38] Like in the case of reputation, it is argued that it does not pay for low quality firms to spend the costs of advertising. While advertising leads to repeated sales for high quality firms, for low quality firms it only increases sales in the current period. Given that high and low quality firms have identical variable costs, spending on advertising may serve as a credible signal for high quality firms. Thus, high quality firms should be expected to spend more on advertising than low quality firms. In comparison to that, given that low quality firms realize substantially lower costs than high quality firms, it may pay for them to falsely advertise high quality products in order to induce consumers to make a trial purchase. Even if consumers refrain from further purchases in the future because they then know about the firm's low quality, a fly-by-night firm can, thus, earn high enough profits to make the spending on advertising worthwhile. Therefore, although the benefits from advertising are in principle higher for a high quality firm, only in case of identical or low variable cost differences extensive advertising of a high quality firm serves as a credible signal to consumers (Kotowitz and Mathewson 1986).[39] However, investment in reputation is more advantageous compared to spending on advertising, since it requires incurring only an initial loss to build up reputation, which is then disseminated almost costless for the high quality firm by word-of-mouth of its customers. In contrast, advertising requires permanently higher spending to reach potential customers (Carlton and Perloff 2005, 490, fn.21).

Applying this line of reasoning to insurance intermediaries, it depends on the cost differences between intermediaries providing high or low quality services whether advertising serves as a credible signal. If high quality intermediary services require higher fixed costs of information acquisition and procession, while variable costs are identical compared to low quality intermediary services, more advertising by high quality intermediaries should be expected. However, if variable costs also differ, because more customer-specific information must be generated and more time spent for informing and consulting each customer, advertising does not pay as a signal for the high quality intermediary. Moreover, reputation is a low cost substitute for advertising in signaling high quality services. Thus, the older an insurance intermediary firm is, the more it should be expected to rely on

[38] While informational advertising provides information about a product's characteristics, persuasive advertising aims to shift consumers' tastes, see Carlton and Perloff (2005, 476–477).

[39] Following the underlying argument, it is unimportant whether a firm provides informational or persuasive advertising, since it is the amount spent on advertising, which serves as a signal, not the content of the advertising message.

the rather inexpensive word-of-mouth mechanism. On the contrary, for younger intermediary firms, advertising might be a comparable means to indicate its high quality.

Public presentations on insurance matters are another marketing instrument to signal high quality services.[40] For example, an insurance intermediary may give a public presentation on the latest pension reforms and their consequences for old-age security. This comes rather close to informational advertising, since the intermediary shows publicly his knowledge and competence about the respective field. Thus, potential customers can gain an impression about his service qualities. Like investment in reputation or spending on advertising, such presentations also require additional costs (time and resources spent for preparing the lecture given or rent for the lecture room.). Therefore, such activities only pay for high quality insurance intermediaries who can reap gains from such events over an extended time span, but not for low quality intermediaries.

To summarize, like on other markets, voluntary property liability insurance by intermediaries, guarantees, certifications, reputation and advertising all might correctly signal high quality services in the market of insurance intermediation, although to a different degree. Voluntary property liability insurance is a rather weak means, since it is accompanied by high transaction costs. Guarantees, too, provide only a weak signal, since not all contingencies can be specified in advance and/or verified at low costs. Certificates are in principle a clear-cut signal. However, if the organization issuing the certificate has no reputation for itself being credible, the problem for consumers in determining the quality of an intermediary is only shifted to determining the quality of a certificate. By contrast, reputation seems to be a more appropriate signal. Nevertheless, since it is rather expensive to build up reputation, the necessary investment pays only for intermediaries, who serve target markets where they can realize higher net gains over a longer period. In principle, the same holds true for spending on advertising and on other promotional activities, which seem to be second-best substitutes compared to investment in reputation.

Credible signals reduce information asymmetries and, thus, the problem of adverse selection for high quality providers – at least to some extent. Since such signals are costly, profit-maximizing firms spend only so much that the net discounted gains from higher transparency and therefore from a larger market share equal signaling costs. These gains set incentives for high quality intermediaries to use such signals. In turn, due to lower in-

[40] The same holds for the publication of articles about insurance matters, be it in the popular business press or in form of a newsletter, distributed for example through the internet.

formation asymmetries low quality providers should realize a decrease in profits. A larger portion of the information rents captured so far by low quality providers are now partly dissipated by spending on signaling and partly redistributed to higher profits of high quality firms and higher consumer rents. Given the costliness of signaling instruments, high quality insurance intermediaries should rely on them the more, the more intense competition is. As long as there are information asymmetries, there remain at least some information rents that can be exploited. By increasing spending on signaling, high quality intermediaries can try to attract additional customers and/ or increase vertical product differentiation, thus, eventually reducing competitive pressure.

3.3.3 Insurance Companies' Choice of Distribution Channels and Information Quality

So far, insurance companies have been treated as purely passive while the analysis has concentrated on the relationship between consumers and insurance intermediaries. However, in reality insurance companies play a very active role in the design of the insurance market microstructure. Because selling insurance contracts is the necessary condition for realizing profits, having an effective distribution system is an essential action parameter for insurance companies. Through the choice of their distribution channels they determine the degree of vertical integration in the insurance industry.[41] Thus, there is also a principal-agent relationship between insurance companies as principals who are interested in optimal sales efforts of insurance intermediaries as their agents (Fig. 3.5). In the following, we analyze in more detail the resulting consequences. First of all, we give a short overview from insurance companies' point of view of the (dis-) advantages of independent distribution channels and on the vertical restraints deployed to reduce potential problems. We then discuss the impact of different distribution channels on the quality of the information services provided by intermediaries to consumers. To this end, we take an extra look at the remuneration schemes for intermediary services.

[41] Traditional theory explains vertical integration as resulting from market imperfections like market power, free riding, uncertainty, or economies of scale. Transaction costs economics stresses asset specificity, complexity, and uncertainty, while agency theory emphasizes information asymmetries, which are accompanied by adverse selection and moral hazard behavior. See Carlton and Perloff (2005, 395–438); Crocker (1983); Holmstrom and Milgrom (1987; 1994); Joskow (2005); Motta (2004, 302–410); Spulber (1999, 289–318); Williamson (1985; 1996).

(1) Advantages of Independent Distribution Channels

As has been shown in *section 1.4* there are quite a number of different distribution channels in insurance markets. Insurance companies can choose between using a single channel or multiple channels to reach the largest number of potential consumers at the lowest costs (Farny 2000, 679–712). Besides company owned channels (= vertical integration of distribution through an own sales force), insurers distribute their products through exclusive agents, independent agents, insurance brokers and/ or electronic channels. The higher the expected sales and the lower the costs of a particular channel are, the more profitable it is for the insurance company to use this channel alternative. However, since the relationship between the insurance company and its intermediaries is a typical principal-agent relationship, the costs associated with the resulting information asymmetries also play an important role when deciding on which alternative to use. Since an insurance company can only incompletely observe the selling efforts of its intermediaries, conflicts may arise with respect to objectives and performance as well as costs and rewards (Zeithaml and Bitner 2003, 385–387).

Generally, an insurance company will use independent distribution channels if the net returns are higher than by using a company-owned sales force (Farny 2000, 699–712; Muehlberger 2002; Perry 1989; Zeithaml and Bitner 2003, 378–409). The main advantage of a company owned channel is that the insurance company completely controls the outlets and the employment relationship. Furthermore, it can better monitor the service quality provided by its sales force and can therefore better protect its brand values and the customer relationship. However, selling insurance strongly relies on face-to-face interaction. Therefore, with an independent distribution system an insurance company transforms fixed costs for salaries, office space and equipment into variable costs. Besides, independent intermediaries may have more knowledge about local markets than employed salespersons. It enables an insurance company to realized wider geographic representation. Moreover, financial risks are reduced, in particular, if an insurance company enters new markets, be it in locational or product terms. Above that, independent distribution channels enable small insurers to enter the market and distribute its products at lower total costs, because a company-owned sales force results in high fixed set-up costs. Table 3.2 summarizes the advantages and disadvantages of using independent distribution channels from an insurance company's point of view.

Table 3.2. Advantages and Disadvantages of Independent Distribution Channels

Advantages	Disadvantages
Transformation of fixed costs in variable costs	No direct control of selling efforts
Better local knowledge available	Lack of protection of brand and reputation
Wider geographic representation	
Lower financial risks	
Enables market entry and lower cost distribution for small insurance companies	
Alleviation of agency problems in regard to company ownership form	

Source: Following Zeithaml and Bitner (2003, 392–396).

It is also argued that independent agents and brokers help to mitigate principal-agent problems resulting from insurance company ownership form (Kim, Mayers and Smith 1996; Krishnaswami and Pottier 2002; Mayer and Smith 1981; Ward 2003). There are conflicting objectives in insurance companies between shareholders, managers and policyholders (Fig. 3.8).

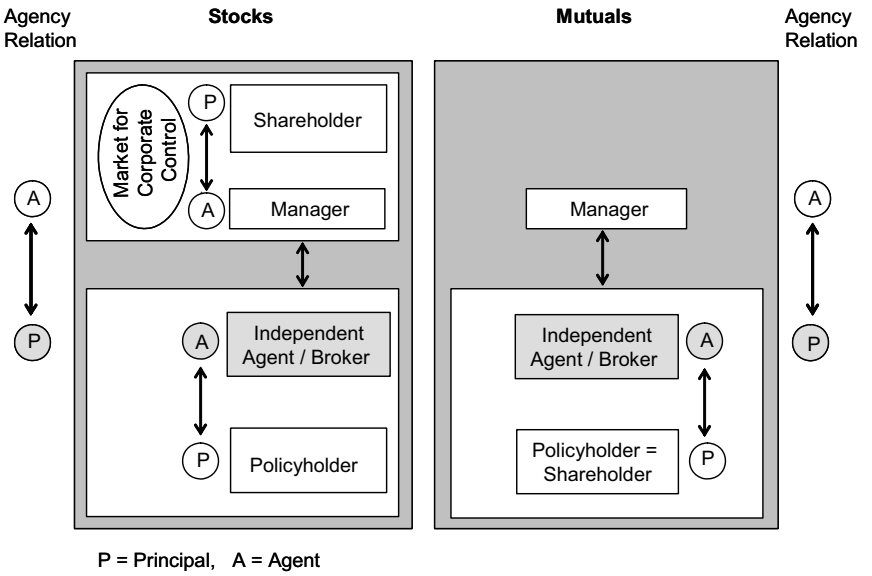


Fig. 3.8. Company Ownership Form and Agency Relationships (Following Ward 2003, 369, Fig. 2)

For mutuals, policyholders are simultaneously shareholders, so that there arise no principal-agent conflicts in this respect. In contrast to that, in stock companies stockholders and policyholders follow different objectives. While potential conflicts between shareholders and management are alleviated by the market for corporate control, potential opportunism of shareholders can be controlled at low costs by independent agents and brokers acting as agents of policyholders. Because independent agents and brokers own the client list, they can credibly threaten an insurance company behaving opportunistically that they will advise their clients to turn to another insurer. By contrast, for mutuals there exists no governance structure to control managerial discretion that is comparable to the market for corporate governance. Nevertheless, again, independent agents and brokers can act as agents for policyholders/shareholders in order to monitor and discipline the managers in mutuals at low costs.

However, additional factors like the complexity of the products distributed and uncertainty arising from policyholders' risks have a decisive impact on what the most cost effective distribution channel is for different lines of insurance and different ownership forms of insurance companies (Regan and Tzeng 1999). Nevertheless, under certain circumstances independent agents and brokers seem to provide low cost monitoring services for policyholders, thus, mitigating agency problems resulting from the insurance firms' ownership form.

(2) Disadvantages of Independent Distribution Channels and Vertical Restraints

Despite the benefits presented above, using independent distribution channels also show some disadvantages (Carlton and Perloff 2005, 414–438; Zeithaml and Bitner 2003, 395–396). These result not only from the potential loss of control over marketing activities and service performance, which may negatively affect the insurance company's reputation. Lower net returns can also be due to a double monopoly mark-up. Assume that both the insurance company and its independent intermediary are monopolists. In this case both add a monopoly mark-up by setting prices higher than marginal costs. This leads to lower sales and, thus, to lower net returns for the insurance company than in case of vertical integration by a company owned sales force. This also holds true under monopolistic competition in both the underlying insurance market and the market for insurance intermediation. Besides, free riding among intermediaries or insurance companies can also lead to negative externalities. Between intermediaries who distribute the same firm's products free riding on advertising and other marketing activities can take place. The same effect

holds for insurance companies that deploy independent agents or brokers. They can also free ride on the promotional efforts or training services which other insurance companies provide to intermediaries. By setting remuneration incentives for intermediaries, they may induce them to switch customers, who in the first place had responded to the marketing efforts of competing insurers to their products. As a consequence, intermediaries and/or insurance companies will spend lower sales and marketing efforts. This again results in negative externalities in the form of lower sales and profits. The same follows from an insurance company's point of view when insurance intermediaries, who distribute their products, lack coordination of competition on locations, prices or quality. Thus, by controlling competition among its distributors, an insurance company can achieve higher profits.

These negative effects of independent distribution channels can be limited by deploying vertical restraints (Katz 1989; White 1985) (Table 3.3). Such vertical restrictions are, for example, granting exclusive dealership and exclusive territory, limiting the number of distributors, negotiating fees and, thus, setting a maximum price, providing marketing assistance and IT support, and designing compensation schemes so as to reward sales efforts. In this way, insurance companies can control sales efforts and reduce the potentially negative effects stated above.

Table 3.3. Vertical Restraints and Incentives Set on Independent Distribution Channels

Problems in Distribution	Insurance Companies' Responses: Vertical Restraints
Double monopoly mark up	Encourage competition among intermediaries. Sell at marginal cost and charge a franchise fee. Establish sales quotas or maximum fees.
Free riding among intermediaries	Establish exclusive territories or restrict the number of dealers. Establish minimum price (resale price maintenance). Take over the marketing effort. Monitor and subsidize and pay for intermediaries' sales efforts.
Free riding among insurance companies	Impose exclusive dealing on intermediaries.
Lack of coordination among intermediaries leading to externalities	Use a combination of the policies above.

Source: Following Carlton and Perloff (2005, 428, Table 12.1).

Consequently, insurance companies will prefer rather less independent intermediaries by applying vertical restraints to enhance control and limit the possible negative effects. Accordingly, to distribute standardized insurance products, exclusive agents, who are tied to a particular insurance company, should be the most favored distribution channel from insurance companies' point of view. On the contrary, insurance companies should prefer independent agents and insurance brokers for specialized market segments. The latter have more specific knowledge about consumers' preferences and needs, which compensates insurance companies for the ensuing loss of control. Besides, in particular commercial customers often need tailor-made insurance contracts, which require the cooperation of different insurance companies. Again independent agents and insurance brokers should be better suited for this target market due to their broader overview of the market.

Electronic channels can be operated by either insurance companies, agents or brokers (Zeithaml and Bitner 2003, 397). The more communication and face-to-face interaction an insurance transaction requires, the less it can rely solely on electronic channels. However, even in the case of less standardized insurance contracts, electronic channels widen the geographic area of markets by reaching more potential customers at lower costs through distributing information about different insurance products cheaper to consumers. Thus, electronic channels increase consumers' information base. Besides, they also strengthen competition among insurance companies and/or their distribution channels by lowering the costs for distributing their products and services.

(3) Distribution Channels and Information Quality

Given that insurance companies prefer independent distribution channels to a company-owned sales force, the question arises as to the impact of a particular distribution channel on the average service quality provided by its intermediaries. Since information costs are most important for consumers when deciding for a particular insurance product, one must ask whether distribution channels differ in the information quality they provide to consumers. In the following, we discuss three dimensions of information quality. The first refers to the amount of information given, the second to the objectivity of the information provided and the third to its specificity.

The *more information about different insurance products* an intermediary provides, the broader the information base a consumer gets at low costs. While exclusive agents provide only detailed information on the insurance products of the company they represent, insurance brokers provide information about a larger number of products from different insurance

companies. To get the same amount of information on insurance products, a consumer has to visit different exclusive insurance agents, which results in higher search costs. Thus, turning to an insurance broker reduces consumers' travel and time costs. Besides direct savings, there are also cost reductions due to economies of scale and scope. With an independent agent or a broker, for a consumer it suffices to state only once her preferences and needs. She must not repeatedly explain them to each new agent she visits. The intermediary must also explain the particularities of insurance coverage for a certain risk only once. Accordingly, for the same information costs spent, independent agents and insurance brokers provide a larger amount of information than exclusive agents or a company-owned sales force.

The *objectivity of information* on a particular insurance product differs among the distribution channels as well. The more the range of products distributed by an intermediary is limited to a particular insurance company, the more the income of the intermediary depends on this company. Consequently, the less likely it is that an intermediary informs a customer that another company's products better matches her preferences and needs. Hence, the more incentives exist for an intermediary to provide incomplete, misleading or even false information to customers. Generally, the objectivity of information should be the higher, the more independent an intermediary is from an insurance company both in legal and in economic terms. Given the various distribution channels, on average insurance brokers should provide more objective information about the benefits and disadvantages of different insurance products compared to other types of intermediaries.

Finally, the quality of the information provided by an intermediary about the insurance products he sells also depends on how *specific the information* is. Generally, the more an intermediary knows about the products he sells, the more specific information about them he is able to provide. Consequently, one should assume that a company-owned sales force or exclusive agents, who sell the products of only one particular insurance company, possess more specific knowledge about their products. Thus, they should be able to provide more specific information to consumers than insurance brokers, who distribute insurance products from different companies. However, a closer look at this issue reveals a somewhat different result.

Insurance companies are the primary source of information about the products they offer, no matter what distribution channel they use. Besides information about their products they also provide marketing assistance and training in selling techniques. In order for insurance agents to have more specific information than insurance brokers about an insurance com-

pany's products, that company must provide more information to its agents than to brokers. However, from an insurance company's point of view, providing special sales training to its agents should be more important than providing product information. Both for the insurance company and its agents it is vital that a customer is induced to sign an insurance contract once there is a sales talk. If a consumer has decided to go to a particular insurance company's agent, she has either already become informed about this company's products or she has to be convinced about its benefits, no matter whether these products are really the best one's on the market for this particular consumer's needs. Because if the consumer should leave without signing a contract, it would be very unlikely that she would just go to another agent of the same company instead of choosing an altogether different insurance company. Even if the consumer only refrains from concluding a contract because she is discontent with the services provided by the agent and not with the product of the insurance company, it is highly improbable that she would not transfer the negative service perception to the product as well. In this case then, not only the agent but also the insurance company would have lost a potential client. Accordingly, providing detailed information about its insurance products should be only of second order to insurance companies when training its agents.[42] In addition, since insurance agents sell only the products of one insurance company they are not forced to make comparisons between different companies' products. Therefore, they need less specific information as to the pros and cons of different product specifications in counseling interviews. In comparison, insurance brokers must be able to explain the differences of various insurance companies' products to their customers. To accomplish this, they need more general training as well as more specific information about insurance products than insurance agents.

However, insurance companies have only small incentives to provide such detailed information to insurance brokers, even if they rely exclusively on this distribution channel. Insurance companies differentiate their products by specifying the risks covered, the total premiums to be paid over the contract term or the net benefits in case of a loss, etc. (Farny 2000, 363–386, 631–668). This reduces transparency on the market. By preventing easy comparisons of their products with respect to their price-benefit relation insurance companies can realize monopolistic profits. Therefore, they have only small incentives to provide such specific information to insurance brokers. Not only would the latter disseminate such information at low costs. Besides, once spread this would become public in-

[42] In Sect. 3.3.1 we showed that also insurance companies profit from additional sales due to incorrect information provided by its intermediaries.

formation among consumers through word-of-mouth and, thus, additionally increase transparency as well as competition among insurance companies.[43] Nevertheless, insurance brokers have more incentives to get the necessary information from additional sources besides those provided by insurance companies since their clients expect more profound information on the products they distribute. Therefore, insurance brokers should spend more time on information acquisition and procession and less on promotional activities than insurance agents.

(4) Compensation Schemes and Information Quality

However, insurance companies not only influence the quality of insurance intermediary services by deciding on what distribution channel to use. From the wide range of vertical restraints available to control intermediary activities and performance, the design of compensation schemes is one of the most important instruments (Basu et al. 1985; Lal and Srinivasan 1993; Lazear 1998). Industry convention has let fees[44] for intermediary services being negotiated between insurance companies and intermediaries,[45] although economically the consumer ultimately pays for the intermediary services. Usually, fees are deducted from insurance premiums after an insurance contract has been concluded. Since consumers typically are only poorly informed about these details, they can be said to act largely under a "free-fee" illusion. Nevertheless, the design of compensation systems sets different incentives for intermediaries to provide high or low quality services.[46]

Depending on their relative bargaining power, insurance companies can use compensation schemes to induce intermediaries to act according to their objectives. While a lower bound on fees is set by competition among insurance companies about scarce distribution channels, an upper bound is set by overall competition among insurance intermediaries. Since usually barriers to market entry are very low for insurance intermediaries, without further interest group formation they only have weak bargaining power. However, given highly specialized market segments, which are typically

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[43] Note that newly entered insurance companies who still have to build up a reputation should have more incentives to provide specific information about their products to insurance brokers.

[44] In the following, the term fee includes all different types of compensation paid to insurance intermediaries, like salaries, commissions, brokerage or bonuses.

[45] This holds also for insurance brokers, even though they legally act on behalf of their customers.

[46] See Gravelle (1992) for a comparison of the incentives set when intermediaries are compensated either by commissions or fees.

served by a small number of insurance brokers, these have rather strong bargaining power due to their small number and their homogenous interests (Olson 1965). Accordingly, the latter should be able to realize higher commission or brokerage rates (Cummins and Doherty 2005).

By designing their compensation schemes, insurance companies try to direct their intermediaries' sales efforts according to their objectives and to reduce moral hazard problems arising from asymmetric information between insurance companies and insurance intermediaries (Farny 2000, 712–720; Kutz 1993, 1997; Ludwig 1994; Mäder 1995; Puelz and Snow 1991; Zweifel and Eisen 2000, 187–190). On the one side, insurers are interested in high sales in order to gain as many customers as possible. This points to outcome-oriented compensation schemes that reward intermediaries, who are successful primarily in generating new business. The main share of intermediaries' income stems from "premium-based commissions" where the compensation is calculated as a percentage of the premiums paid on the policies bought by consumers (Cummins and Doherty 2005). On the other side, insurers apply performance-oriented compensations schemes, which, for example, take into account loss ratios. With such "contingent commissions" they try to induce intermediaries to select primarily good risks for contract conclusion by selecting low-risk customers. Besides, in order to induce strong sales efforts while at the same time preventing free riding behavior among intermediaries, insurance companies use different components to reward different activities like advertising and marketing efforts or efforts to build long-term customer-relationships. The higher commissions for new customers are, the less efforts intermediaries will spend to retain customers and to build long-term customer relationships, which allow for repeated transactions.

Depending on the design of insurance contracts, customers may be "locked-in", once they have concluded a contract with a particular insurance company. For example, in the United States, it is customary that renewal premiums for life insurance are lower than premiums for newly concluded contracts, so that customers are "locked-in" if they decide to switch contracts and turn to another insurance company once they had concluded a life insurance contract. In Germany, life insurance contracts also usually involve large losses for customers if they prematurely terminate an insurance contract. Besides, if they decide to switch to another insurer, this may result in higher risk rating and, thus, in higher premiums due to age or illness for the consumer. The existence of substantial switching costs gives insurance companies a degree of monopoly power (Schlesinger and von der Schulenburg 1991, 1993). Since consumers are locked-in, from an insurer's point of view it is more profitable that insurance intermediaries spend more efforts on generating new business. Be-

sides, in saturated markets additional profits can be realized primarily by concluding contracts with "old" customers or by convincing consumers to twist policies, that is, to switch to another insurance company. Because the latter usually involves high switching costs for consumers, compensation schemes that primarily stress the sales volume also set incentives for intermediaries to provide incomplete, false or misleading information to customers. On the contrary, compensation schemes, which emphasize long-term customer relationships, should lead to higher information quality provided by intermediaries. Building up a good reputation with its customers over time requires insurance companies not only to gain high customer satisfaction through its products, but also with its intermediaries' services.

To summarize, distribution channels are the most important parameter for competition among profit-maximizing insurance companies. To keep control over insurance intermediaries' behavior while at the same time benefiting from their local knowledge, insurance companies should prefer insurance agents to a company-owned sales force. In contrast, insurance brokers are preferable for specialized market segments. Through contract design and remuneration schemes insurance companies try to direct the behavior of their intermediaries, be they independent or not. Since insurance companies and consumers have differing objectives, vertical restraints and compensation schemes put into place by insurance companies do not necessarily benefit consumers as well. Quite the contrary, market solutions, which have developed to reduce information asymmetries and solve agency problems among insurance companies and insurance intermediaries, partly set wrong incentives from the consumers' point of view. The latter can expect to get the more objective information and advisory services, the more independent insurance intermediaries are from insurance companies and the less outcome-oriented compensation schemes are.

3.3.4 Competition from Outside Intermediaries

The previous sections showed that only weak incentives exist for competition to lead to the provision of high quality services in markets for insurance intermediation. Signaling incentives only work poorly for high quality insurance intermediaries. Besides, insurance companies have incentives to induce intermediaries to sell insurance coverage without regarding consumers' preferences and needs in the first place. Thus, market forces work insufficiently in reducing asymmetric information between consumers and insurance intermediaries. Hence, rational consumers, who are well aware that they are not able to correctly distinguish between the various informa-

tion quality levels, may perceive the services offered by insurance intermediaries as being primarily horizontally differentiated.

However, as the discussion in *section 1.4* has shown, there are a number of different information and transaction intermediaries, who offer additional intermediary services. Taken all together, these various types of intermediaries constitute the market microstructure. The information rents resulting from the ubiquitous information asymmetries between consumers and insurance intermediaries attract outside intermediaries to enter the market.[47] Outside intermediaries can reap part of these information rents by reducing the underlying information asymmetries. To analyze the impact of such outside intermediaries on the market for insurance intermediaries, we apply Salop's circle model (Salop 1979). After a short presentation of the relevant aspects of the model, we discuss its main implications for the insurance market microstructure.

Salop's model extends locational models in the Hotelling tradition by assuming that firms, which provide differentiated brands, are located around a circle with unit-circumference[48] and by explicitly taking into account the existence of an undifferentiated outside good. This outside good is competitively provided. In the differentiated industry each of the n firms in the market produces a particular brand. Consumers view only the two "nearest" brands (in terms of product characteristics) as close substitutes. Thus, this market is monopolistically competitive. L consumers are uniformly distributed around the circle. They buy either one or no unit of the differentiated product, spending their remaining income on the outside good. A customer's most preferred product specification is l^* with u being the resulting utility. Any other brand specification l results in lower utility with

$$U\left(l_i, l^*\right) = u - a \cdot \left| l_i - l^* \right| \tag{3.24}$$

where a is consumers' identical valuation of product differentiation. $\left| l_i - l^* \right|$ shows the distance of the i-th brand l from a consumer's most preferred product specification l^* for which the consumer must pay the price p_i.

A consumer is assumed to maximize her net utility (or consumer surplus). She chooses that brand l_i for a price p_i so that the resulting utility

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[47] See *section 3.3.1* for information rents which accrue to insurance intermediaries due to information asymmetries on the side of consumers.

[48] This avoids technical problems of the pure Hotelling model like the non-existence of an equilibrium, see Salop (1979, 142).

minus the price for this brand exceeds the net surplus $\bar{s}$, which she can realize by buying the outside good:

$$\max_i \left[U\left(l_i, l^*\right) - p_i \right] \geq \bar{s} \,. \tag{3.25}$$

By inserting Eq. 3.24 this leads to

$$\max_i \left[v - a \cdot \left| l_i - l^* \right| - p_i \right] \geq 0 \tag{3.26}$$

where $v = u - \bar{s} > 0$ is the reservation price. This is the highest price a consumer is willing to pay for the differentiated good when the outside good provides her a net surplus of $\bar{s}$.

Since it is assumed that consumers only choose among the products of the nearest competitors, firms maximize their market power by locating as far away (in terms of product differentiation) from one another as possible. Because all *n* firms in the market behave in the same way, the distance between each of them is the same, that is, *1/n* (due to the unit circumference of the circle). When setting their prices firms must take into account whether their markets overlap with those of their neighbors or not to maximize their profits. Accordingly, their demand curve shows a monopoly and/ or a competitive region.

All *n* firms are equidistantly distributed around the circle with the representative firm demanding p and each competitor charging a price $\bar{p}$ (Fig. 3.9a).

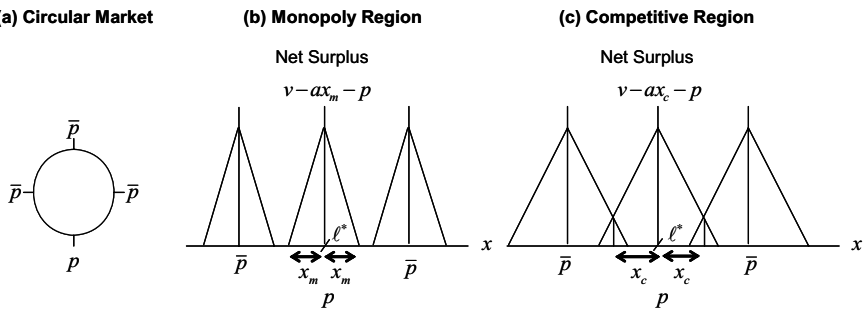

Fig. 3.9. Circular Market and a Monopoly Region Respectively a Competitive Region (Following Carlton and Perloff 2005, 226, Fig. 7.7; 227, Fig. 7.8)

If there are only few firms in the market, each might have a local monopoly so that they do not compete with one another for the same consumers. The representative firm, thus, captures all consumers who gain a positive net surplus from buying its product, that is, those consumers for whom

inequality (3.25) is satisfied. Thus, the monopoly demand $q_m = 2 \cdot x_m L$ is given by all consumers, who are within the maximum distance of $x_m = \left| l - l^* \right|$ on both sides from l^* (Fig. 3.9b). Inserting x_m in Eq.3.26 results in the monopoly demand

$$q_m = \frac{2 \cdot L}{a} \cdot (v - p). \tag{3.27}$$

However, if the number of firms is larger, local markets may overlap so that neighboring firms directly compete for consumers. In this case, they must take into account the price charged by their competitors (Bertrand competition). Consumers will be indifferent between purchasing from one of two neighboring firms when their resulting net surplus is the same (Fig. 3.9c), so that

$$v - a \cdot x_c - p = v - a \cdot \left(\frac{1}{n} - x_c \right) - \overline{p} \tag{3.28}$$

with $x_c = \left| l - l^* \right|$. A consumer who is located at a distance $x_c = \left| l - l^* \right|$ from her most preferred brand l^* is at a distance of $\left(\frac{1}{n} - x_c \right)$ from the neighboring firm. Solving Eq.3.28 for x_c results in

$$x_c = \frac{1}{2 \cdot a} \cdot \left(\overline{p} + \frac{a}{n} - p \right). \tag{3.29}$$

The competitive demand is again given by those consumers that are located at both sides from the representative firm, such that $q_c = 2 \cdot x_c \cdot L$. Accordingly, it results in

$$q_c = \frac{L}{a} \cdot \left(\overline{p} + \frac{a}{n} - p \right). \tag{3.30}$$

The demand curve of the representative firm, thus, reveals a kink where the monopoly and competitive regions touch (Fig. 3.10). The monopoly demand curve sets the upper bound, while the competitive demand curve shifts according to the number of brands in the market. Where monopoly demand equals competitive demand, so that $q_{kink} = (q_m = q_c)$, there is a kink with its price being $p_{kink} = 2 \cdot v - \overline{p} - \frac{a}{n}$. With a larger number of brands *n* in the market, the kink shifts to the left and *vice versa*. Thus, the

kink is endogenously determined by the optimal number of firms in the market, which result from firms profit-maximizing behavior.[49]

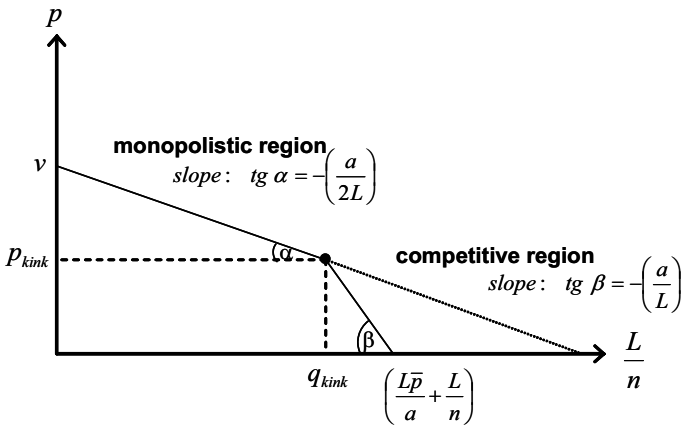

Fig. 3.10. Typical Demand Curve for a Representative Firm (Following Salop 1979, 143, Fig. 1)

Besides, demand in the monopoly region is twice as steep as demand in the competitive region and thus more elastic. This results from the outside good, which sets an upper limit to the monopoly price through *v*. If there is an increase in prices, in case of a monopoly this partly leads to a higher demand for the outside good for which the monopoly brand is substituted. By contrast, neighboring brand specifications of the differentiated inside good profit in case of a price increase within the competitive region.

Salop (1979, 145–148) derives a symmetric zero profit equilibrium. Given identical cost functions with constant marginal costs *c* and fixed costs C_{fix} the equilibrium conditions are

$$p + q \cdot \frac{dp}{dq} \leq c\,, \tag{3.31}$$

$$p = c + \frac{C_{fix}}{q} \text{ and} \tag{3.32}$$

[49] Given market size *L* and valuation *a* of product differentiation by consumers, the optimal number of brands n^* is negatively related to the fixed costs C_{fix}, see Table 3.4.

$$q = \frac{L}{n}. \tag{3.33}$$

In equilibrium marginal revenue is less than or equal to marginal costs (Eq. 3.31), price equals average costs (Eq. 3.32) and the equilibrium has no gaps (Eq. 3.33). Solving these equations results in the profit-maximizing number of brands, price and quantity for the monopoly respectively the competitive region (Table 3.4).[50]

Table 3.4. Profit-maximizing Values for the Monopoly and Competitive Region

Monopoly Region	Competitive Region
Number of Brands	
$n_m^* = \sqrt{\frac{a \cdot L}{2 \cdot C_{fix}}}$	$n_c^* = \sqrt{\frac{a \cdot L}{C_{fix}}}$
Price	
$p_m^* = c + \frac{a}{2 \cdot n_m^*} = c + \sqrt{\frac{a \cdot C_{fix}}{2 \cdot L}}$	$p_c^* = c + \frac{a}{n_c^*} = c + \sqrt{\frac{a \cdot C_{fix}}{L}}$
Quantity	
$q_m^* = \frac{2 \cdot L}{a}(v - c) - \sqrt{\frac{2 \cdot L \cdot C_{fix}}{a}}$	$q_c^* = \frac{L}{a}(\overline{p} - c) = \sqrt{\frac{L \cdot C_{fix}}{a}}$ (1)

(1) Since p_c^* stands for a representative firm, in equilibrium each of its competitors charges the same profit-maximizing price, so that $\overline{p} = p_c^* = c + \sqrt{\frac{a \cdot C_{fix}}{L}}$.

Source: Own calculation following Salop (1979, 147).

Given the market size L and the valuation of product differentiation a by consumers, the equilibrium price and number of firms vary with the fixed costs C_{fix}. Higher fixed costs C_{fix} result in a lower number of firms and, thus, in lower product differentiation. Since the monopoly demand curve sets the upper bound for demand, the kink always lies on it. However, it shifts according to the locations and optimal prices of neighboring brands. Thus, with high enough fixed costs C_{fix}, each firm is a local monopolist

[50] For the optimal values for the kinked equilibrium and the necessary conditions for a zero profit equilibrium, see Salop (1979, 148).

(Fig. 3.11a). Comparatively, lower fixed costs C_{fix} enable a larger number of competing brands to cover their costs and, thus, there are overlapping markets. Due to the larger number of firms, the kink as well as the competitive part of the demand curve shift to the left. Accordingly, the profit maximizing equilibrium occurs in the competitive region (Fig. 3.11b).

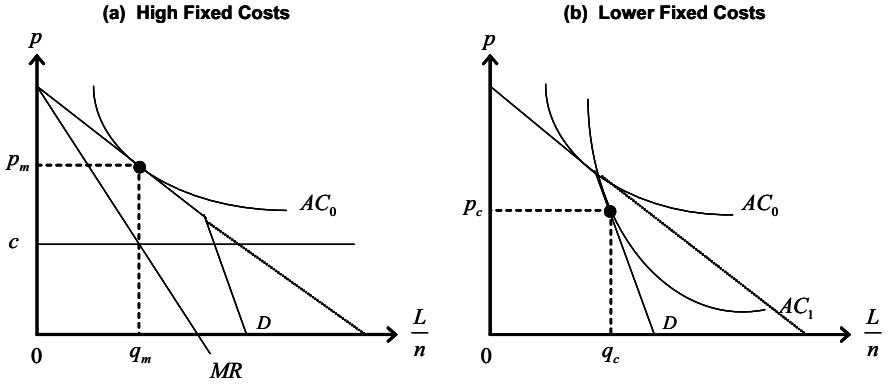

Fig. 3.11. Equilibrium Configurations with Different Fixed Costs (Following Salop 1979, 146, Fig. 6)

Generally, changes in any of the exogenous technological or demand parameters C_{fix}, *c, v, L, a* imply a change of the optimal equilibrium price-variety pair (Salop 1979, 148–149).

Salop's model contributes to the analysis of the insurance market microstructure (Fig. 1.3, Sect. 1.4). Assume that exclusive and independent insurance agents and insurance brokers produce the inside good. The outside good may be intermediary services like *e*-insurance or bank assurance or additional information on insurance companies and their products in the form of ratings and rankings published in the media, for example. Such outside intermediary services influence the reservation price $v = u - \bar{s} > 0$ for the inside good. Because of technological changes (like the introduction of *e*-insurance through the internet) or changes in demand (like higher demand for bank assurance), the net surplus of the outside good may increase to $\bar{s}'$. Besides, the outside good can also influence consumers' valuation *u* of the inside good. Given asymmetric information about the true quality of inside intermediaries' services, an outside intermediary may credibly offer additional information about insurance products in the form of ratings or rankings, published in print media or on the internet. If consumers, who are aware of their incomplete information, use this outside good information, they might become more critical about the information

services provided by inside intermediaries. This may result in a lower valuation of the inside good *u'*. In the first case, the reservation price decreases to $\left(v' = u - \bar{s}'\right) < \left(v = u - \bar{s}\right)$ if $\bar{s}' > \bar{s}$, while in the second case it decreases to $\left(v' = u' - \bar{s}\right) < \left(v = u - \bar{s}\right)$ if $u' < u$.

The outside good sets an upper price limit for the market of inside intermediaries' services. A decrease in the reservation price from v_0 to v_1 shifts the monopoly demand curve to the left (Fig. 3.12a). From satisfying the profit-maximizing conditions the new optimal price-variety pair results. Given that the original equilibrium $\left(p_c^0, q_c^0\right)$ resulting from the average cost curve AC_0 was initially in the competitive region, comparative-static analysis shows that inside intermediaries will realize a loss with a lower reservation price for the inside good. Because they can no longer cover their average costs given consumers' lower willingness to pay p_c^1, some competitors will leave the market. This allows the remaining firms to produce more. Consequently, they realize economies of scale, which enable them to cover their average costs. Finally, a new equilibrium is reached at $\left(p_m^1, q_m^1\right)$ with a lower number of firms in the market and thus a lower degree of product differentiation. However, although they are local monopolies, they produce at lower prices than under local competition.

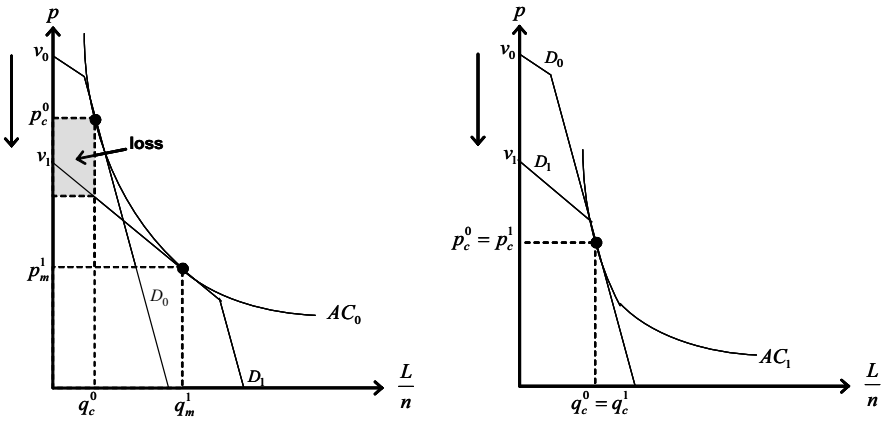

Fig. 3.12. The Impact of Outside Intermediaries

Nevertheless, note that the final equilibrium may also lie in the competitive region of the shifted demand curve. If inside intermediaries are able to reduce their fixed costs *F* so that the average cost curve shifts to the left from AC_0 to AC_1, local competition can prevail despite the decrease in

the reservation price. Moreover, given the average cost curve AC_1 in Figure 3.12 which implies lower costs, a decrease in the reservation price for the inside good resulting from the outside good has no impact at all.

The analysis of *section 3.3.2* and *3.3.3* showed that market forces work poorly in reducing information asymmetries. Due to the experience and credence good characteristics of intermediary services, high quality insurance intermediaries can only insufficiently signal their true quality to consumers. Thus, given that consumers pay for an average quality, low quality intermediaries can realize information rents. Besides, by setting incentives so as to strengthen insurance intermediaries' sales efforts, insurance companies increase this tendency. Accordingly, also in case of a competitive equilibrium, inside intermediaries should realize information rents which stem from consumers' incomplete and asymmetric information both about insurance products and the service quality provided by insurance intermediaries. These rents are not competed away in the inside market. However, they should set incentives for outside intermediaries to skim at least part of these rents by offering additional products and services. This may well lead to an increase in consumers' knowledge and information about insurance products. Consequently, inside insurance intermediaries must improve their service quality as well. Otherwise consumers' willingness to pay for their services would further decrease. Besides, with a higher share of better informed consumers, the overall quality of insurance intermediary services should also rise as has been shown in *section 3.2*.

However, for outside intermediaries to successfully compete with inside intermediaries requires a relatively large number of potential customers L and a relatively high willingness to pay for their additional services. Otherwise, they have no impact on the inside markets as has been already shown. As long as most of the risks of old-age, inability and illness are covered by mandatory insurance schemes, the relevant market size and consumers' average willingness to pay is rather low. Nevertheless, with the current tendency to shift part of these risks to private insurance, this should change. Thus, although Salop's circle model is inherently static, it opens a way to study the relationship between different types of intermediaries in more detail. In particular, it allows to analyze the interdependency between competition form outside goods and changes in market structure, conduct and performance of the inside good.

3.3.5 Summary

In this section we discussed the impact of asymmetric information on the conduct of insurance intermediaries and on market outcomes. In *section*

3.3.1 we analyzed the consequences of asymmetric information on the quality of the information services provided by insurance intermediaries. It was shown that both honest and dishonest intermediaries can coexist. However, their impact on the information quality provided depends on their expected revenues, the extent of cheating and on dishonesty costs. *Section 3.3.2* discussed the incentives for high quality insurance intermediaries to use signaling instruments to communicate their true quality to consumers. Reputation might work better as a credible signal than advertising, certificates, voluntary property liability insurance, or guarantees. Nevertheless, because of the experience and credence goods characteristics of intermediary services, market incentives are rather weak in adopting such signaling devices. *Section 3.3.3* analyzed the impact of insurance companies on the performance of the market for insurance intermediation. It was shown that there is a conflict between insurance companies' interest in intermediaries with strong sales efforts and consumers' interest in intermediaries, who provide high quality information services. Finally, *section 3.3.4* showed that information rents resulting from asymmetric information attract outside intermediaries. By providing additional services that reduce the underlying information asymmetries, outside intermediaries reap part of these information rents. As a consequence, also consumers' demand on the service quality provided by insurance intermediaries rises. In the end, this leads to an increase in the information quality provided by insurance intermediaries.

3.4 Summary

In this section we analyzed market conduct and performance in more detail. Markets of insurance intermediation show the main characteristics of monopolistically competitive markets. Assuming complete information about the information services provided, in *section 3.1* we discussed the resulting extent of horizontal product differentiation. Fixed costs limit the number of intermediaries and, thus, the number of horizontally differentiated services in the market.

In *section 3.2* we extended the analysis to account for incomplete information on consumers' side about the intermediaries' service qualities. Because consumers are not fully informed, they are forced to spend search costs to find high quality intermediaries. Positive search costs allow intermediaries to provide low quality services in equilibrium. Even with a larger number of intermediaries in the market, competition will not lead to higher quality. However, better informed consumers have lower search

costs. Hence, the higher the proportion of such consumers is, the higher the overall information quality in the market will be.

Section 3.3 included asymmetric information on consumers' side about the true quality of the information provided by insurance intermediaries. We showed that insurance intermediaries have incentives to provide incorrect, false or misleading information about insurance products to consumers because they can earn information rents. Due to the experience and credence goods characteristics of information services, the different instruments discussed are shown to work only poorly in credibly signaling high quality services. Because insurance companies have an interest in strong sales efforts by insurance intermediaries, they set incentives, which also induce intermediaries to provide low information quality. However, if information rents are large enough, outside intermediaries may offer additional information services in order to grasp part of these rents. All in all, market forces set only weak incentives for insurance intermediaries to provide high quality services.

4 The Market for Insurance Intermediation in Germany

In the following we test some of the implications on market conduct and performance, which we have discussed so far for the largely unregulated German market for insurance intermediation. *Section 4.1* presents the main findings of the empirical studies on this issue. In *section 4.2* we state the hypotheses to be tested, the data and the methodology applied. In *section 4.3* the results of our estimations are discussed.

4.1 Overview of the Empirical Literature

There is only a small strand of empirical literature, which explicitly concerns conduct and performance in markets for insurance intermediation (Regan and Tennyson 2000). Studies differ both with respect to the methods applied and the countries they concentrate on. In the following, we first discuss descriptive studies for Germany, before we turn to econometric studies that mainly focus on the United States (US).

For Germany, there are a number of *descriptive studies on the information and counseling quality of different types of insurance intermediaries* (Cap Gemini Ernst & Young 2002; Evers and Habschick 2000; Ökotest 2004). They mostly concern personal insurance lines, in particular, provision for old-age income. Such studies are usually carried out by consumer protection associations or business consulting firms. Typically, these surveys are scenario-based interviews where the participants are questioned by trained interviewees, who pretend to be customers interested in insurance purchase (so-called 'mystery shopping'). The supposed customers present the same stylized scenario to the various interviewed intermediaries. For example, they pretend to demand insurance protection for old-age income, while giving the same information as to age, income, household status and composition and future financial planning to all interviewed intermediaries. For such a scenario benchmarks are constructed in advance. Based on the information and advice given by the tested intermediaries, their actual performance in terms of the information quality provided and

the advice given is evaluated relative to these benchmarks. This methodology allows assessing as objectively as possible the information quality provided by the interviewed intermediaries.

The different studies are quite consistent in their results. Most intermediaries fall short of attaining the benchmark; information quality is usually rather low. However, there are differences among different types of intermediaries with insurance brokers usually showing better performance. Due to the high costs of carrying out such personal interviews with specially trained interviewers, normally only a rather small number of such scenario-based interviews are carried out. This severely limits the explanatory power of the results obtained. Normally no econometric tests are presented, so that no statements are possible as to how representative and how significant these findings are. Besides, since the interviewed intermediaries are not aware of being tested, there is no additional information about related activities, which precede or follow a counseling interview. Thus, the impact of information acquisition and procession on the information quality provided and advice given cannot be assessed. Usually there is also neither additional information on firm characteristics of the interviewed intermediary nor on competitive behavior among intermediaries. Despite these limitations, however, the findings of these studies quite uniformly indicate strong deficiencies in the information and advice given by the interviewed intermediaries.

Studies which analyze *ethical problems of insurance intermediaries in the US* point in the same direction. Based on surveys, insurance intermediaries and other insurance industry professionals are asked what ethical dilemmas they face or what they hold relevant for their profession. Howe, Hoffman and Hardigree (1994) use a survey to study the ethical behavior of personal line insurance intermediaries. Based on a questionnaire they measure agents' participation in and perception of unethical behavior. Although the intermediaries in the sample largely deny to actively engaging in unethical behavior, they perceive false or misleading information about a competitor's products and the replacement of policies without providing information about the consequences to consumers as the major ethical problems in the industry. Another scenario-based survey shows evidence that insurance agents "are more likely to engage in unethical behavior in order to benefit professionally than in a personal setting" (Eastman, Eastman and Eastman 1996, 951). Cooper and Frank (2002) find that both in the US life insurance business and in the US property-liability insurance business the main issues deemed relevant are false or misleading information about insurance products, failure to correctly identify and recommend matching insurance products for consumers needs, and lack of knowledge or skills on the side of the intermediaries. High competitive pressure both

to the intermediaries and to insurance companies is seen as a major factor, which prevents ethical behavior. These results are confirmed in follow-up surveys (Cooper, Frank and Williams 2003). Although these studies may be burdened with non-response and social desirability bias, their results are in accordance with the findings of the 'mystery shopping' interviews reported above. They indicate that the provision of incomplete, misleading or false information to consumers by intermediaries seems to be a widespread practice in insurance markets.

Some *econometric studies* analyze the *services provided by insurance intermediaries* more comprehensively. They explicitly distinguish between exclusive agents and independent agents or insurance brokers. Based on a sample of 116 exclusive and independent agents from California, Etgar (1976) finds that independent agents are significantly more active in claims settlement, but that there is mixed evidence on their service quality regarding assistance in risk analysis and in placing insurance applications. The evidence reported does not support the hypothesis that independent agents provide overall better service quality than exclusive agents. Cummins and Weisbart (1977) obtain similar results in a study among nearly 700 insurance intermediaries, which operate in three different US states in personal insurance lines. Again, independent agents are found to provide better claims settlement services and to review coverage more often, while they provide less service quality than exclusive agents in other dimensions.

Eckardt (2002a) provides a study based on a sample of 927 German exclusive agents and insurance brokers, who are mainly engaged in personal lines.[51] Mean differences parametric tests reveal a number of highly significant differences in both quantitative and qualitative variables (Table A.1 in the *Appendix*). Insurance brokers devote a significantly larger share of their total time budget to information acquisition, while exclusive agents spend more time with counseling interviews. However, in absolute terms counseling interviews of insurance brokers take significantly longer. Besides, in counseling interviews insurance brokers put significantly more weight on information about products for risk provision and on contract design as well as on product design. Overall, they realize a significantly higher contract conclusion rate and experience significantly less competitive pressure than exclusive agents. There are no significant differences in the share of the time budget spent on claims settlement. Exclusive agents even put significantly more weight on informing their customers about claims settlement issues than insurance brokers. This is in contrast to the findings of Etgar (1976) and Cummins and Weisbart (1977). However,

[51] For a detailed description of the underlying sample and the questionnaire see sec. 4.2.2.

these studies use a more detailed qualitative specification to measure engagement in claims settlement services than the time share spent on it. Therefore, it may well be the case that independent agents and brokers are simply more productive in claims settlement services than exclusive agents.

Several studies use *complaint data to regulatory bodies* as an indicator for the service quality provided by insurance intermediaries. They test the hypothesis that the more complaints there are, the less an insurance policy sold lives up to customers' performance expectations. Consequently, the insurance intermediary, who had sold this insurance policy, has provided inadequate information and advice. This may be due to the fact that the intermediary has raised expectations too high on the side of the policyholder by providing incomplete, false or misleading information about the insurance product sold. Doerpinghaus (1991) and Barrese, Doerpinghaus and Nelson (1995) use complaints to regulators about insurers with either exclusive or independent agency distribution systems as a proxy for service quality. They assume that better consumer service should lead to lower complaint ratios. Thus, if there are differences in the complaint ratios that can be attributed to different distribution systems, conclusions about the overall service quality of different types of intermediaries can be drawn. However, Doerpinghaus (1991) finds no statistically significant differences between the complaint ratios of direct writers and of independent agent insurers. In contrast, Barrese, Doerpinghaus and Nelson (1995), who use a larger data set and a more comprehensive model, find evidence that independent agent insurers receive fewer complaints and, thus, provide better service quality compared to direct writers. Nevertheless, with increasing firm size this service advantage erodes. By directly questioning consumers who have filed a complaint Wells and Stafford (1995) show that there is a statistically significant positive relationship between insurers' service quality as perceived by consumers[52] and service quality as indicated by complaints to regulators. They provide evidence that the lower the complaint ratios are, the higher the perceived service quality by consumers is. Although they do not control for the distribution systems used, their results indicate that complaint ratios are a reliable proxy for consumer satisfaction with insurance companies and, thus, also for the service quality provided by different distribution systems.

[52] In the marketing literature it is assumed that the higher the consumers' perceived service attitude is, the lower the gap between consumers' expectations and their perception of actual performance. See Parasuraman, Zeithaml and Berry (1988); Zeithaml and Bitner (2003).

Some empirical studies analyze the *impact of compensation schemes* on the information provision of insurance intermediaries. Based on a sample of 144 financial service agents Kurland (1995, 1996) analyzes the impact of the commission compensation system on the disclosure of all relevant information to a consumer before recommending a particular insurance product. A scenario is presented to the interviewed intermediaries, who then are asked what kind of information they would reveal to customers given they had to distribute the insurance product presented in the scenario. Besides, they are asked to reveal the percentage of their income earned in commission. A regression analysis shows that there is no significant negative relationship between commission and the information provided to consumers. Thus, these data do not support the hypothesis that outcome-oriented compensation schemes have a negative impact on information provision about unfavorable product characteristics. Cupach and Carson (2002) provide similar results. They present a more sophisticated scenario that better accounts for non-response and social desirability bias to a larger sample of 336 insurance agents. They also find that the commission system has no significant influence on insurance agents' recommendations.[53]

The application of scenarios to analyze the impact of compensation schemes on insurance intermediaries' conduct has severe limitations since these reveal only the intermediaries' intended behavior, not their actual behavior. Therefore, distortions of the results due to social desirability bias cannot be ruled out. However, the findings of Zweifel and Ghermi (1990), whose analysis is based on data from a Swiss insurance company, point in a similar direction. They examine the impact of differences in contract design on cost control and performance orientation among exclusive and independent agents. In contrast to the studies above, they have data about compensation structure and performance of both types of intermediaries and, thus, about actual behavior. They find no significant differences in growth orientation between exclusive and independent agents, although compensation schemes of exclusive agents are hypothesized to set such incentives. Laslett, Wilsdon and Malcolm (2002) analyze the impact of remunerations schemes for the British market by using commercial data on the level and the structure of commissions and by additionally conducting

[53] In contrast to that, Howe, Hoffman and Hardigree (1994) find that top producing insurance agents show a higher level of unethical behavioral intent. They hypothesize that this "behavior is … reinforced by the greater levels of sales commissions resulting from higher sales levels" (Howe, Hoffmann and Hardigree 1994, 504). However, they do not explicitly test for the impact of commission on behavioral intent.

250 scenario-based interviews in the form of 'mystery shopping'. They also find no statistically significant evidence that compensation levels or structures generally lead to the provision of incorrect information and advice. However, their data suggests that there is some bias with respect to certain product segments. All in all, these results are in accordance with the findings of Kurland (1995, 1996) and Cupach and Carson (2002) that commission schemes have no clear-cut impact on information provision.

Beyond that, Zweifel and Ghermi (1990) find that independent agents attain a significantly lower expense ratio, while there are no statistically significant differences in terms of their loss ratio. Accordingly, lower costs cannot be attributed to better risk selection by independent agents. This latter finding is in contrast to most empirical studies which analyze *differences between insurance companies that use different distribution systems*. In contrast to most of the studies presented so far, in these studies the units of analysis are not intermediaries but insurance companies. The impact of exclusive versus independent agencies on insurance companies' performance is analyzed by including a dummy variable which accounts for the main distribution system used. Thus, these studies do not allow making statements about quality differences between single intermediaries. Most studies show a clear cost advantage of direct writers compared to independent agent insurers. This has provoked a vivid discussion as to whether the persistence of independent agent distribution systems results from profound inefficiencies on the insurance market (*market imperfection hypothesis*) or whether it is based on particular services provided exclusively by independent agents (*product quality hypothesis*) (Berger, Cummins and Weiss 1997).

Adherents to the market imperfection hypothesis argue that the coexistence of multiple distribution systems is due to rate regulation (Joskow 1973, Cummins and VanDerhei 1979, Weiss 1990, Blair and Herndon 1994), slow diffusion of information (Berger, Kleindorfer and Kunreuther 1989, Seog 1999, 2005) and search cost differences among consumers, so that inefficient distribution systems can survive (Mathewson and Winter 1983, Dahlby and West 1986).[54] The product quality hypothesis states that independent agents provide advantages in different environments which outweigh their higher costs. Berger, Cummins and Weiss (1997) and Ward (2002) find that cost inefficiencies do not completely translate into profit

[54] Chidambaran, Pugel and Saunders (1997) show that the existence of different distribution systems positively influences competition in the US property-liability insurance market. They argue that consequently inefficient distribution systems can survive, if there are barriers to mobility between insurance lines with distribution systems of different efficiency properties.

inefficiencies. They conclude that independent agent insurers provide better product quality and/ or higher service intensity when this is valued by consumers, so that they obtain higher revenues (see also Kim, Mayers and Smith 1996; Pauly, Kleindorfer and Kunreuther 1986; Schlesinger and von der Schulenburg 1993).

There is also some empirical evidence that shows that service intensity is higher in commercial insurance lines, where independent agents are more prevalent (Mayers and Smith 1981, Barrese, Doerpinghaus and Nelson 1995). Independent agents seem to be better suited for tailoring insurance coverage to consumers' needs than exclusive agents. Using a transactions cost approach, Regan (1997) finds that independent agents are more often used in market segments with more complex products. Some studies examine whether independent agents help to mitigate incentive conflicts among insurers and consumers. Regan and Tennyson (1996) and Regan and Tzeng (1999) show that independent agents better assist in sorting consumers according to their risk profile, thus, being of advantage both for insurers and for high risk consumers.

Besides, it is argued that independent agents also help in mitigating agency problems resulting from the organizational form of insurance companies. There is profound evidence for the US insurance industry that *agency problems between shareholders and policyholders* are more dominant for stock companies than for mutuals (Baranoff and Sager 2003; Kim, Mayers and Smith 1996, Mayers and Smith 1981).[55] In contrast, Ward (2003) shows that in the UK life insurance industry mutuals rely more on independent distribution systems than stock insurers. Since independent agents are more prevalent in market segments with more complex insurance products, this may indicate that they are as effective in controlling managerial discretion as demutualization. Other authors study the impact of *incentive conflicts between insurance companies and intermediaries* on the choice of the predominant distribution system (Berger, Cummins and Weiss 1997, Sass and Gisser 1989). They find that exclusive agencies are related to larger insurance firms and market sizes and, thus, to increased concentration of a particular insurer's products. It is argued that a larger firm and market size and thus rather standardized insurance products are necessary, so that the agents can generate the same amount of income despite the lower commission rates paid. Moreover, such standardized products are primarily found in personal insurance lines. Evidence suggests that exclusive agents are beneficial when long-term relations are valued and relation-specific investment is more important, be it with respect to advertis-

[55] This seems to hold true also for the Spanish insurance market, see Azofra-Palenzuela, Castrillo-Lara and Vallelado (2002).

ing, service provisions or human capital (Anderson 1985, Grossman and Hart 1986, Hosely 1996, John and Weitz 1989, Marvel 1982, Regan and Tennyson 1996, Regan 1997, Regan and Tzeng 1999).[56] However, Cather and Howe (1989) find no evidence that there are more explicit conflicts between insurance companies and independent agents than between insurance companies and exclusive agents.

To summarize, the empirical studies which analyze the co-existence of different distribution systems provide a lot of arguments that attempt to explain their persistence. However, these studies focus primarily on the US insurance market, in particular for property-liability insurance. To what degree these findings can be generalized remains an open question until more empirical research for different countries and different lines of insurance is available. Nevertheless, empirical evidence suggests that different distribution systems provide different services with respect to shareholders, insurance companies and policyholders. This is in line with the few econometric studies, which explicitly use insurance intermediaries as the unit of analysis. Many of the studies, which analyze intermediaries' service provision, are descriptive in nature and/ or focus on a rather narrow set of behavior. We are not aware of any comprehensive industrial organization studies. In particular, detailed empirical analyses of the factors which influence the information services provided by insurance intermediaries on market conduct and performance are missing.

4.2 Hypotheses, Data and Estimation Methods

4.2.1 Hypotheses

Based on the theoretical discussion in *chapters 2* and *3*, a number of hypotheses regarding the performance of insurance intermediaries are tested in the following. The focus is on the quality of the information services provided, but we also test for the impact of independent factors on the overall economic success of insurance intermediaries. Based on the above theories, the information quality provided is assumed to result from the interaction of supply-side and demand-side factors, while being constrained by the underlying information asymmetries and the intensity of competition in the market.

[56] For an empirical analysis of building long-term relationships through mutual commitment between insurance companies and independent agents, see Anderson, Ross and Weitz (1998).

Supply Side

The search theoretic approach to insurance intermediation developed in *section 2.2* states that the quality level of the information services provided by an intermediary depends to a large extent on the costs spent for producing it. Insurance intermediaries spend time and resources to gather, process and assess information relevant for consumers (Sects. 2.2.1 and 2.2.2.2). Search for information about insurance products requires first and foremost time and human capital. That is, an intermediary must know what information to search for, where to find it and how to process it, so that it becomes relevant for a specific customer. Generally, *hypothesis 1* states that the information quality provided by an intermediary is higher the more effort is spent to produce it. More precisely, it is contended that the higher investment in human capital is and the more time is spent searching and processing information as well as for counseling customers, the higher the information quality provided is. Although this seems to be a rather trivial hypothesis, note that for the provision of high quality services there exists no such technical relationship like for the production of material goods. The performance of an intermediary not only depends on the inputs used, but can also be influenced by self-interested behavior on his side. Due to information asymmetries, the provision of different information qualities is possible for him, although he uses the same investment in human capital and time for each customer.[57]

Hypothesis 1: The more efforts an intermediary spends on the production of information services, the higher the information quality provided.

Hypothesis 2 takes into account that the underlying information distribution from which an intermediary gains his information also influences the quality of the information services (Sects. 2.2.1 and 2.2.2.1). The more the sources to which an intermediary has access contain relevant information, the lower are the costs of producing a certain quality level. Accordingly, *hypothesis 2* states that the better the information sources are, the higher the information quality provided is.

Hypothesis 2: The better the information sources used by an intermediary are, the higher the information quality provided.

The quality of the information services does not only depend on input factors like the efforts spent and the information sources used, but also on the content of the information provided in counseling interviews. Thus, ac-

[57] This consideration holds also for hypothesis 2 below.

cording to *hypothesis 3* the more information about relevant subjects is provided, the higher the information quality is (Sects. 1.1 and 2.2.1).

Hypothesis 3: The more information about relevant subjects an intermediary provides in counseling interviews, the higher the information quality provided.

Division of labor, specialization on particular insurance lines and on additionally offered products and services can also positively influence the information quality since they reduce search costs for producing a particular quality level of information services (Sect. 2.2.2.2). Depending on firm size it is assumed that the higher the number of employees, the more each intermediary can specialize on his original tasks and, thus, realize gains from specialization and division of labor. Besides, there might be positive spill-overs due to information sharing among the intermediaries of the same firm. Accordingly, *hypothesis 4a* states that larger intermediation firms provide better information quality. There should also be a positive relationship between specialization on certain insurance lines and the information quality provided (*hypothesis 4b*). In this case, a specialized insurance intermediary gains more product-specific information than a less specialized one, assuming all other things being equal. Furthermore, the supply of additional services by an intermediary may yield economies of scope. That is, by providing additional services an insurance intermediary may gain additional information, which increases the quality level of the information on insurance issues (*hypothesis 4c*).

Hypothesis 4: Division of labor (*a*), specialization on particular insurance lines (*b*) or economies of scope resulting from the provision of additional services (*c*) lead to higher information quality.

Insurance companies try to induce intermediaries by vertical restraints as well as through their compensation schemes to distribute mainly their products, no matter whether these are the best matching ones for a particular customer. *Hypothesis 5* states that the more independent an insurance intermediary is from a particular insurance company, the higher the information quality he provides. Economic and legal independence of insurance intermediaries depend primarily on the distribution channels in which they are engaged (Sect. 3.3.3).

Hypothesis 5: The more independent an insurance intermediary is from a particular insurance company, the higher the information quality provided.

Above that, the duration of the relationship between an insurance intermediary and his clients should positively influence this information quality (Sects. 3.3.2 and 3.3.3) (*hypothesis 6*). The duration of the customer relationship reflects the customer satisfaction with the intermediary services. Since the costs for consumers to switch to another intermediary are quite low, insurance intermediaries must provide their clients with high quality information about insurance products to ensure long-term relationships.

Hypothesis 6: Long-term customer relationships imply the provision of high quality information services.

Demand Side

The search theoretic approach to insurance intermediation showed that the higher the demand for high quality information is, the higher the information level provided by insurance intermediaries (Sects. 2.2.1 and 3.2.2) (*hypothesis 7*).

Hypothesis 7: The higher the level of demand for information is, the higher the information quality an insurance intermediary provides.

Within the search theoretic model we also analyzed the effect of heterogeneous preferences on the information quality provided (Sect. 2.2.2.4). Accordingly, insurance intermediaries, who are specialized on market segments where consumers have more preference for high quality services, should provide a higher information level. Since consumers' preferences cannot be directly observed, we will use the importance of private insurance coverage as a proxy. It is assumed that the more a consumer depends on private insurance protection for health, disability or old-age in contrast to protection by public insurance schemes, the higher her preference for high quality information by an intermediary is. Thus, insurance intermediaries specialized on target markets where consumers rely more on private insurance provide more high quality information (*hypothesis 8*).

Hypothesis 8: If an insurance intermediary specializes on customer segments with strong demand for private insurance coverage, he provides high quality information services.

As has been discussed in *section 3.2*, insurance intermediary markets are characterized by consumers having incomplete information on insurance intermediaries' service quality. With only uninformed consumers it does not pay for intermediaries to provide costly high quality information. However, this is not the case if at least part of the consumers is informed.

In this case intermediaries, who have better informed clients, provide better information quality (*hypothesis 9*).

Hypothesis 9: The larger consumers' level of knowledge on insurance relevant topics is, the higher the information quality an insurance intermediary provides.

Asymmetric Information

Markets of insurance intermediaries are characterized by profound information asymmetries as has been discussed in *section 3.3.2*. The principal-agent literature discusses a number of signaling instruments (like certificates, membership in a professional association, reputation, advertising), which may enable agents to credibly signal consumers their quality and, thus, limit the scope of adverse selection. To test whether these signaling instruments work in the market of insurance intermediaries, we hypothesize that an insurance intermediary using signaling instruments provides high quality information services.

Hypothesis 10: If an insurance intermediary uses signaling instruments, he provides high quality information services.

Competition

Additionally, the intensity and kind of competition in the market of insurance intermediaries influences its outcomes in terms of the information quality provided. The discussion in *section 3.2.1* of incomplete information on consumers' side about the information quality provided by intermediaries suggests that due to consumers' positive search costs an increase in competition does not lead to the provision of higher information quality by insurance intermediaries (*hypothesis 11*).

Hypothesis 11: Intensity of competition among insurance intermediaries does not influence the information quality provided.

However, by differentiating his products by providing more high quality information services or by other competitive strategies, an insurance intermediary may realize a monopolistic position where competition is less intense (Sects. 2.2.4.1, 3.1 and 3.3.4). Therefore, we test *hypothesis 12* that a particular competitive strategy (like improving information quality or specializing on particular customer segments) leads to the provision of more high quality information services.

Hypothesis 12: If an insurance intermediary uses a particular competitive strategy to lessen competitive pressure, then he provides high information quality.

Because of consumers' incomplete and asymmetric information, there is only low competition among insurance intermediaries. This results in the provision of low information quality and allows insurance intermediaries to earn information rents (Sects. 2.2.3, 2.2.4.2, 3.2 and 3.3). This might induce outside intermediaries to enter the market to grasp part of these information rents (Sect. 3.3.4). Hence, competition from outside intermediaries indicates that insurance intermediaries (= inside intermediaries) provide only a low level of information quality (*hypothesis 13*).

Hypothesis 13: Strong competition from outside intermediaries indicates low information quality provided by an insurance intermediary.

Table 4.1 summarizes the hypotheses to be tested, the independent variables and the expected relationships. Hypotheses H 1 to H 6 refer to supply-side aspects, hypotheses H 7 to H 9 to demand-side specificities, while hypotheses H 10 to H 13 concern competitive behavior under asymmetric information.

Table 4.1. Hypotheses

		Expected Sign of Dependent Variables	
Hypotheses	Independent Variables [1)]	*Information Index*	*Contract Conclusion Rate*
H 1: The more efforts an intermediary spends on the production of information services, the higher the information quality provided.	*formal education*	+	+
	(additional) training	+	+
	university degree	+	+
	work experience	+	+
	further training	+	+
	time budget	+	+
	duration_interviews		
H 2: The better the information sources used by an intermediary are, the higher the information quality provided.	*information source*	+	+
H 3: The more information about relevant subjects an intermediary provides in counseling interviews, the higher the information quality provided.	*information content*	not tested	+
H 4: Division of labor, specialization on particular insurance lines or economies of scope resulting from the provision of additional services lead to higher information quality.	*employees_number*	+	+
	insurance line	+	+
	additional services	+	+
H 5: The more independent an insurance intermediary is from a particular insurance company, the higher the information quality provided.	*intermediary type*	+	+
	product range	+	+
	choice		
H 6: Long-term customer relationships imply the provision of high quality information services.	*Revenue_type*	+ / -	+ / -
H 7: The higher the level of demand for information is, the higher the information quality an insurance intermediary provides.	*customers' demand*	+	+

Table 4.1. (cont.)

Hypotheses	Independent Variables [1)]	Expected Sign of Dependent Variables	
		Information Index	*Contract Conclusion Rate*
H 8: If an insurance intermediary specializes on customer segments with strong demand for private insurance coverage, he provides high quality information services.	*customer specialization*	+ / -	+ / -
H 9: The larger consumers' level of knowledge on insurance relevant topics is, the higher the information quality an insurance intermediary provides.	*customers' knowledge*	+	+
H 10: If an insurance intermediary uses signaling instruments, he provides high quality information services.	*reputation*	+	+
	signaling instruments	+	+
	membership	+	+
	membership_reasons	+	+
H 11: Intensity of competition among insurance intermediaries does not influence the information quality provided.	*competitive pressure*	0	0 / -
H 12: If an insurance intermediary uses a particular competitive strategy to lessen competitive pressure, then he provides high information quality.	*competitive strategies*	+	+
H 13: Strong competition from outside intermediaries indicates low information quality provided by an insurance intermediary.	*competitor_type*	+ / -	+ / -

1) For definition and coding of variables see Table 4.7 below.

4.2.2 Data and Estimation Methods

Data is obtained from a survey among 4,687 self-employed German insurance intermediaries, which was carried out in autumn 2001. As there is no legal duty to register for insurance intermediaries in Germany the total population is unknown. Thus, the addresses of the interviewees were randomly chosen from online directories[58] and from the yellow pages according to the share of the population of the German federal states (*Bundesländer*).

927 insurance intermediaries answered the questionnaire, implying a response rate of 20%. Among the respondents 423 are self-employed exclusive insurance agents, 67 are independent insurance agents and 437 are insurance brokers.

The sample represents the regional demographic distribution of the German population well. In 2001, 79% of the German population lived in West Germany and 21% in East Germany and Berlin (Fig. 4.1). In comparison, 84% of the participants in the survey resided in West Germany and 14% in East Germany, while 2% did not indicate their place of residence.

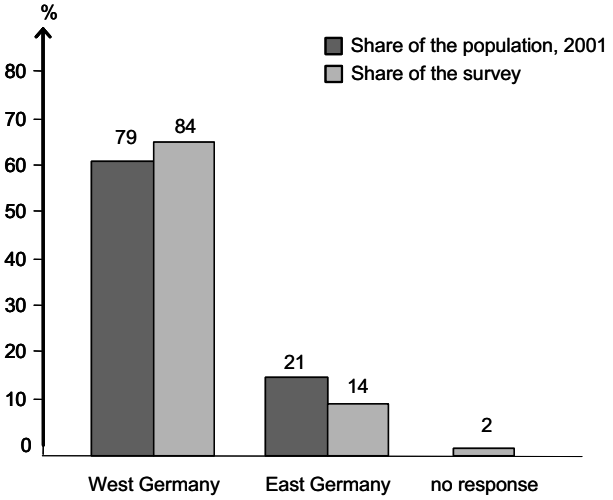

Fig. 4.1. Regional Distribution (Data from Federal Statistical Office 2004, 26)

[58] We used addresses from the internet portal *www.versicherungsmarkt.de GmbH* and from online directories of the following insurance intermediary associations: *Bundesverband deutscher Versicherungskaufleute e.V.*, *Bundesverband deutscher Versicherungsmakler e.V.*, *Fairbund e.V.*, *Institut der Versicherungsmakler e.V.* and *Versicherungsmakler-Verband e.V.* (status: 2001).

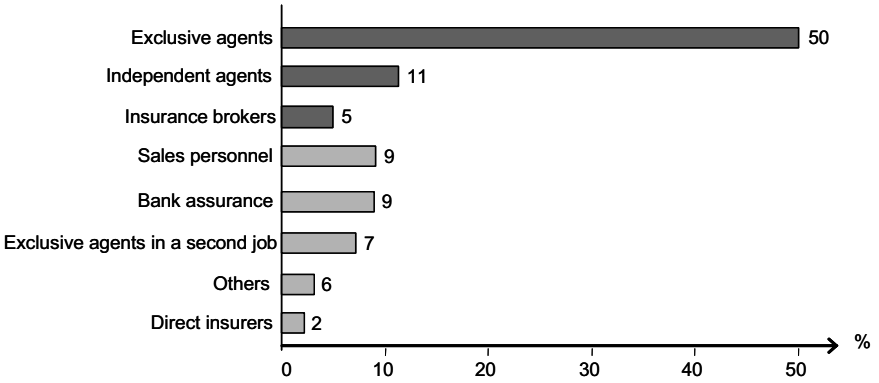

Fig. 4.2. Share of Different Distribution Channels on Total Premium Income, 1999/2000 (Data from GDV 2002)

Our data does not include tied insurance agents in a second job. Although this group of intermediaries amounts to nearly 80% of all German insurance intermediaries (GDV 2004, 143), their share in distributing insurance products is much lower. According to a survey among German insurance companies, in 1999/2000 tied insurance agents in a second job accounted only for 7% of the total insurance portfolio, while self-employed exclusive agents generated 50%, independent agents 11% and insurance brokers 5% of the insurance portfolio (GDV 2002) (Fig. 4.2). Thus, our survey captures the main distribution channels, which account for two thirds of the total premium income gained in the German insurance market.

Data was collected about individual and firm characteristics of the interviewed insurance intermediary, the services offered, the intermediation process and general market conditions.[59]

Dependent Variables

We estimate two different performance measures in markets for insurance intermediation. To explain the information quality provided, we use an *information index* as the dependent variable (Sect. 4.3.1). To analyze economic success more generally, we use the *contract conclusion rate* as a proxy since we have no data on profits or revenues (Sect. 4.3.2).

The quality of the information services cannot be measured directly. Therefore, we use the variable *information index* as an input-oriented

[59] As the pretest showed a very low willingness to answer questions to remuneration patterns, costs, turnovers, and profits, they were omitted from the survey.

summary indicator. It captures the weight that an insurance intermediary attaches to 27 subjects about a customer's need for insurance protection, insurance products and coverage, policy design and contract terms.[60] Half the items deal with the particularities of private old-age insurance. This is justified by the fact that this insurance line makes for the largest share of insurance intermediaries' income. For each item the interviewee is asked how much importance he gives to it in his counseling interviews. Answers are measured on a five-point Likert scale with *1 = totally unimportant* to *5 = very important*. Then, for each intermediary the mean value is calculated after summing up all 27 items. The higher the mean value of the variable *information index* is, the higher the information quality provided. Although this input-oriented variable is concerned with the content of the information provided, it makes neither statements about the actual information provided, nor whether the information provided is accurate from an objective point of view since participants may overstate their service quality. However, response bias can be reasonably assumed to occur similarly for all interviewees. Thus, focus should be on the sign of the coefficients reported in the regressions, which indicate whether the independent variables lead to an increase or to a decrease of the service quality provided, not on their absolute values.[61]

A second measure is the *contract conclusion rate* variable that we use as a proxy for market performance. It indicates the percentage of counseling interviews an intermediary conducts that on average result in consumers actually concluding an insurance contract. Note that this success rate is not a profitability measure since the *contract conclusion rate* provides no information on the premiums of the contracts concluded or the revenues gained by them. However, this output-oriented variable can be also interpreted as a more subjective indicator of the information quality provided. It indicates that customers are satisfied with the information and advice given by an intermediary during a counseling interview. Accordingly, the higher an intermediary's contract conclusion rate is, the better his information quality as it is subjectively perceived by consumers. In this sense, a higher share of content customers indicates better market performance.

[60] These items result *inter alia* from interviews with experts on consumer protection in personal insurance. For more details on the single items, see the variables underlying the factor analysis in Tables 4.2 and 4.3 below.

[61] See also Etgar (1977).

Independent Variables

Socio-economic variables (*sex*, *region*, *age*) were asked as well as the *intermediary type* to which an interviewee belongs. The German market for insurance intermediaries is widely unregulated (Mauntel, 2004; Rehberg 2003, 178–215).[62] There are no formal entry restrictions other than having a trading license. To get such a license from the *Gewerbeaufsichtsamt* requires only having a certificate issued by the police stating that the holder has no criminal record. No registration, financial skills or financial guarantees are mandatory. Conduct regulation is also very weak. For exclusive and independent insurance agents the respective insurance companies are held responsible in case an agent provides false or misleading information about policy benefits, terms and conditions, dividends or premiums. To insurance brokers more strict liability rules in case of professional negligence apply. Nevertheless, professional indemnity insurance is not compulsory. Disclosure regulations are of a rather general nature as well. It is neither prescribed in detail what information has to be passed to consumers nor in what form has this to be done. Finally, there is a general ban on rebating commissions both for insurance agents and brokers. That is, for insurance intermediaries, resale price maintenance is legally sanctioned. Thus, exclusive and independent agents differ from insurance brokers regarding the legal responsibilities in case of the kind and amount of information provided to consumers.

The questionnaire inquired about the inputs used for producing information services. Besides investment in human capital (*formal education*, *(additional) training*, *university degree*, *work experience, further training*), the participants were asked which percentage of their total time budget they spend on different activities (*information acquisition*, *counseling interviews*, *further training*, *claims settlement*, *sales efforts*). The larger the proportion of time devoted to information acquisition or to counseling interviews is, the more information about insurance products and their characteristics as well as about the specific needs of the clients can be gathered and the higher the information quality would be. Besides, the average duration of counseling interviews in absolute terms is used to account for the quantitative input to information production (*duration_interviews*).

The quality of the information provided depends also on the quality of the information sources used. To gain information about this aspect, we calculated the variable *information source* as the product of the importance

[62] With the implementation of the EU Directive on Insurance Mediation there will be stricter regulations also for German insurance intermediaries, see Schönleiter (2005).

of a certain information provider (like an insurance company or a rating agency) to an intermediary and the objectivity the latter attaches to it. The more important and the more credible a certain information provider is for an intermediary, the higher the value of the independent variable *information source*. For further trainings there is no variable that shows the credibility attached to it as a reliable information source. Therefore, *source_ further training* indicates only the importance of this information source without making statements about its perceived objectivity by an intermediary. We expect that intermediaries, who rely strongly on more credible information sources, provide better information quality for their customers.

To account for the *information content* provided, the interviewees were asked which weight they give to 27 different aspects in counseling interviews that are relevant from an objective point of view for consumers to decide rationally about insurance coverage (see above *information index*).[63] It is assumed that an intermediary informs his customers more extensively about those aspects to which he attaches more weight. Together with general information, product information and information on contract design, the interviewees were questioned about particular topics relevant for old-age insurance. Furthermore, as the participation in surplus is an important sales argument for life assurances, different items were asked about this subject to see how much weight intermediaries put on informing consumers about the components of the calculations normally used. The 27 items were measured on a five-point Likert scale. By performing a factor analysis, seven factors were extracted which are used as independent variables to account for the information content provided (Table 4.2 and Table 4.3).[64] They comprehend information on *general aspects*, *insurance products*, *contract design*, *old-age insurance*, and *calculation of participation rates*. According to the coding, the higher the factor scores are, the higher the weight attached to the respective items by the interviewee in his counseling interviews, thus, the better his market performance is likely to be.

[63] Since the dependent variable *information index* is based on the same 27 items, the following variables are only used as regressors on the *contract conclusion rate,* see *section 4.3.2*.

[64] Although factor analysis assumes interval data, Jaccard and Wan (1996, 4) summarize in a recent review of the literature on this topic that with ordinal Likert scale items "for many statistical tests, rather severe departures (from intervalness) do not seem to affect Type I and Type II errors dramatically."

Table 4.2. Factor Analysis *Information Content* – Rotated Component Matrix

	Components						
Variables	1 Old-age Security in General	2 Calculation of Participation Rates	3 Contract Design	4 Personal Risk Profile and Security Options	5 Policy Design	6 Private Old-age Insurance Products	7 Contract Execution
Tax advantages	.809						
Occupational pension schemes vs. private old-age insurance	.708						
Taxation and social policy regulation	.686						
Performance of insurance companies	.525						
Investment funds	.499						
Disadvantages of Zillmering	.417						
Surplus and interest rate changes		.782					
Non commitment		.709					
Guaranteed performance		.702					
Surplus determinants		.619					
Past effective surplus		.615					
Termination options			.845				
Contract period			.789				
Procedures of contract modification			.658				
Costs of contract modification			.585				
Type and coverage of the insured risks				.725			
Individual security gaps				.695			
Insurance and product types				.609			
(Dis-) advantages of different security options				.533			
Premium design					.778		
Price-performance tests					.762		
Cost components					.593		

Table 4.2. (cont.)

	Components						
Variables	1 Old-age Security in General	2 Calculation of Participation Rates	3 Contract Design	4 Personal Risk Profile and Security Options	5 Policy Design	6 Private Old-age Insurance Products	7 Contract Execution
Capital sum life insurance vs. Riester policy						.776	
Cost calculation by change of policy						.774	
Specific rest life insurance vs. capital sum life insurance						.606	
Claims settlement							.710
Conflict settlement							.602

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser-normalization.

To capture the impact of specialization effects in producing information services, we included a number of variables, which account for firm size (*employees_number*) and the specialization on the distribution of certain insurance lines, like *disability insurance* or *liability insurance*, for example. To control differences in the complexity of various insurance lines, the participants were asked whether insurance lines differ in the amount of explication necessary for consumers to understand their main characteristics (*product_complexity*). In order to take into account potential economies of scope resulting from other business activities, we also asked what *additional services* an intermediary offers, like *risk analysis*, *insurance analysis* or *assets management*. Finally, we included variables which indicate whether an intermediary can autonomously decide on his product range (*product range choice*) and if so, what the reasons are for specializing on certain products (*choice_reasons*).

In order to capture the impact of customer relationships, the participants were asked whether their largest share in turnover stems from commissions or brokerage gained from new customers, from already existing customer relationships, from counseling fees or from other sources (*revenue_type*). The more important long-term customer relationships are, the less weight may be put on new customers. In this case, information quality may be higher, since otherwise an intermediary would loose discontent clients.

Table 4.3. Factor Analysis *Information Content* – Sampling Adequacy and Total Variance Explained

Measure of sampling adequacy by the Kaiser-Meyer-Olkin (KMO) statistics 0.889

Total variance explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.658	28.361	28.361	7.658	28.361	28.361	2.876	10.654	10.654
2	1.884	6.976	35.337	1.884	6.976	35.337	2.758	10.215	20.868
3	1.754	6.496	41.834	1.754	6.496	41.834	2.652	9.823	30.691
4	1.513	5.605	47.439	1.513	5.605	47.439	2.374	8.792	39.483
5	1.415	5.242	52.681	1.415	5.242	52.681	2.209	8.181	47.664
6	1.252	4.638	57.319	1.252	4.638	57.319	2.004	7.421	55.085
7	1.076	3.985	61.304	1.076	3.985	61.304	1.679	6.219	61.304
8	.795	2.944	64.248						
9	.781	2.891	67.139						
10	.754	2.791	69.930						
11	.729	2.702	72.632						
12	.697	2.580	75.212						
13	.648	2.399	77.611						
14	.620	2.297	79.909						
15	.573	2.121	82.029						
16	.549	2.034	84.064						
17	.505	1.870	85.934						
18	.491	1.817	87.751						
19	.459	1.700	89.451						
20	.430	1.593	91.044						
21	.420	1.558	92.601						
22	.397	1.470	94.072						
23	.373	1.370	95.451						
24	.350	1.298	96.749						
25	.319	1.180	97.930						
26	.301	1.116	99.046						
27	.258	.954	100.000						

Extraction Method: Principal Component Analysis.

Since the quality of the information provided also depends on consumers' preferences, we also include a number of demand side variables. Customers' preferences for high quality information can vary depending on the customer segment in which an intermediary is specialized. Generally, self-employed persons, who rely more on private insurance since they are usually not members of public protection schemes, should have stronger

preferences for high quality information services about insurance coverage. Thus, we asked what target markets an insurance intermediary focuses on (*customer segments*). Above that, differences in consumers' own knowledge about insurance matters can also lead to differences in the information quality provided. Generally, the more knowledge consumers have about the relevant subjects, the higher the information quality of an intermediary is likely to be. Otherwise, customers would be dissatisfied and turn to another intermediary. The same holds true for differences in the demand for information and other services. Again, we expect a positive relationship between the level of demand and the information quality. *Customers' knowledge* and *customers' demand* are both measured on five-point Likert scales with higher values indicating higher levels of knowledge respectively demand.

In order to capture the impact of insurance intermediaries' behavior under asymmetric information, we include a number of signaling variables. To see whether signaling instruments are credible in that they indicate higher information quality, the participants were asked what *signaling instruments* they use, like *advertising campaigns*, *customer specialization* or *membership in a professional association*. Since being member of a professional association might also be due to interest group representation we controlled for the reasons of being member of such an association (*membership_reasons*).

The pretest showed that insurance intermediaries nearly unanimously held reputation to be of relevance for signaling high quality services. Therefore, we dropped this item from our survey. Instead we asked what impact different factors had for acquiring a positive reputation. For eleven activities the participants in the survey indicated how important they perceive them for building a good reputation. Each item is measured on a five-point Likert scale with *1=unimportant* to *5= very important*. According to the factor analysis we performed, the most important factor comprehends activities which concern the provision of high *information* quality (Table 4.4 and Table 4.5). By contrast, items that load high on the *service* provided by an intermediary or on his *sales efforts* are of less importance.

Given that high reputation is seen as an important signaling instrument of their service performance by all interviewees, those intermediaries who state that high information quality is important to gain high reputation should indeed provide high information quality.

Table 4.4. Factor Analysis *Reputation* – Rotated Component Matrix

	Components		
Variables	1 Information	2 Good Service	3 Sales Efforts
Objective information on products	.733		
Information on more favorable alternatives	.675		
Product quality	.653		
Qualification	.615		
Regular Information about tax law and social law	.570		
Reliable and kind service		.768	
Empathy		.720	
Reliable and quick claims settlement		.653	
Frequent and regular customer contacts		.564	
Advertising efforts			.785
Reputation of the insurance company			.641

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser-normalization.

Table 4.5. Factor Analysis *Reputation* – Sampling Adequacy and Total Variance Explained

Measure of sampling adequacy by the Kaiser-Meyer-Olkin (KMO) statistics 0.742

Total variance explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.996	27.238	27.238	2.996	27.238	27.238	2.254	20.493	20.493
2	1.534	13.946	41.184	1.534	13.946	41.184	1.942	17.651	38.144
3	1.190	10.820	52.004	1.190	10.820	52.004	1.525	13.859	52.004
4	1.023	9.302	61.306						
5	.779	7.082	68.388						
6	.715	6.501	74.889						
7	.655	5.958	80.847						
8	.607	5.522	86.369						
9	.555	5.043	91.411						
10	.506	4.599	96.010						
11	.439	3.990	100.00						

Extraction Method: Principal Component Analysis

Finally, to test the impact of competition we asked about the *competitive pressure* perceived by an intermediary. Since no data concerning the number of competitors, market shares or profits for the intermediation market are available, we use this as a proxy. The higher the subjectively perceived competitive pressure is, the more an intermediary will act as facing intense competition. Thus, whether this perception is true or not plays no role with respect to the consequences in terms of market conduct it has for the respective intermediary. Moreover, in order to analyze the impact of different reactions to strong competitive pressure on market performance, we asked what *competitive strategies* an intermediary follows. Finally, we also asked for the main types of competitors (*competitor_type*) to account for the influence of outside intermediaries. For way of convenience, we assume that inside intermediaries are exclusive agents, independent agents and insurance brokers while all other types of intermediaries are outside intermediaries. If outside intermediaries are the main competitors, low information quality is likely to be provided by the inside intermediary.

The main descriptive statistics of the variables included in the following estimations are given in Table 4.6.[65] The definition of the variables is summarized in Table 4.7.

The hypotheses are tested by using OLS-estimations.[66] As there is imperfect and asymmetric information on consumers' side about the true information quality provided by intermediaries, the feedback mechanism between insurance intermediaries' service quality and the number of consumers using them is strongly weakened. Given the complexity and long-term nature of most personal insurance against the risks of longevity, illness or disability, it is quite reasonable to assume that the number of consumers using intermediaries' services is inelastic with respect to the information quality provided by insurance intermediaries. In this case then the number of customers and the information quality provided are no longer simultaneously determined. Accordingly, we can use OLS instead of, for example, Two-Stage-Least-Squares (2SLS) estimations, which should be otherwise applied to avoid simultaneous equation bias.

In addition, there are also methodological reasons for using OLS. Most importantly, we are not aware of any meaningful variable which could be used as an instrument in 2SLS or other related estimation methods. For this, a variable should affect only consumers' demand for information quality, but have no impact on intermediaries' decisions on their quality supply, that is it should be both relevant and exogenous (Stock and Watson

[65] For descriptive statistics, see in detail Eckardt (2002b; 2002c).

[66] For the assumptions of the linear OLS regression, see Greene (2000, 210-264). The estimations are corrected for heteroscedasticity where necessary.

2003, 331-372). But information services are intangible goods which are produced by interaction. The information quality provided by an intermediary depends to a large degree on gaining information of his or her customers' preferences, needs, and risks through communication. Such information is an input factor in producing high quality information services. Thus, during a counseling interview an intermediary can obtain information about variables that affect his customers' demand for information quality. Because of the prevalent information asymmetries, the intermediary can use this information to his own advantage in supplying his profit-maximizing quality level. Because all variables that affect consumers' demand for information quality can be communicated in counseling interviews, therefore they also affect the service quality supplied by intermediaries. Thus, they are not exogenous and therefore cannot be used as an instrument in 2SLS, for example.

Besides, we are not concerned with the absolute values of the estimated coefficients, but only with their signs. Although OLS violates the assumption of no correlation between the error term and each explanatory variable in simultaneous systems, while implying a bias which overestimates the coefficients, it does not change their signs.[67] Finally, we have no information on the number of consumers or the sales volume of the single intermediaries. Thus, form a quite practical point of view we are not able to carry out simultaneous estimations which account both for information quality and the number of costumers.

The hypotheses are tested by using OLS-estimation. For the dependent variable *information index* we perform linear OLS-estimations (Sect. 4.3.1). Since the *contract conclusion rate* as dependent variable is a proportion of all counseling interviews, which actually lead to a contract conclusion, it ranges from 0% to 100%. We assume that when starting from a low level, increases in inputs first result in disproportionately high and then in disproportionately low increases in the contract conclusion rate. Accordingly we apply a logistic function, which is transformed to linearity by *log(contract conclusion rate/(1-contract conclusion rate))*. This allows us to perform linear OLS-estimations also for the *contract conclusion rate* as regressand (Cooper and Nakanishi 1988) (Sect. 4.3.2).

To see whether independent variables are interdependent, we proceed sequentially and observe coefficient reactions to additionally included groups of variables. All in all, we perform five specifications. Equation 1

[67] Moreover, compared to other estimation methods OLS is less sensitive and thus avoids some of the problems of more sophisticated methods. See Maddala (1992, 383-387); Intriligator, Bodkin and Hsiao (1996, 353-356); Kennedy (1998, 157-182); Studenmund (2006, 474-510).

concerns input variables (efforts spent and information sources used). Equation 2 includes specialization variables and insurance intermediaries' dependence from insurance companies. Equation 3 also accounts for demand-side variables (specialization on target markets, consumer knowledge and demand), while equation 4 and equation 5 capture signaling behavior and competition variables. The results are summarized and discussed in the following *section 4.3*.

Table 4.6. Main Descriptive Statistics for Selected Variables

	Mean	Median	Minimum	Maximum
Information index	3.72	3.70	1.41	5.00
Contract conclusion rate	0.65	0.70	0.05	1.00
Intermediary type				
Exclusive insurance agent	0.46	0.00	0.00	1.00
Independent insurance agent	0.08	0.00	0.00	1.00
Insurance broker	0.46	0.00	0.00	1.00
Age	42.17	41.00	20.00	64.00
University degree	0.25	0.00	0.00	1.00
Work experience	15.43	14.00	1.00	45.00
Time budget				
Information acquisition and processing	0.21	0.20	0.00	0.70
Counseling interviews	0.37	0.35	0.05	0.85
Further training	0.12	0.10	0.00	0.35
Claims settlement	0.11	0.10	0.00	0.50
Sales efforts	0.06	0.05	0.00	0.50
Duration_interviews	56.59	60.00	10.00	180.00
Information source				
Insurance companies	11.10	10.00	1.00	25.00
Professional associations	12.11	12.00	1.00	25.00
Rating agencies	11.24	12.00	1.00	25.00
Consumers' associations	7.56	6.00	1.00	25.00
Science	9.14	9.00	1.00	25.00
Specialist publications	13.77	12.00	1.00	25.00
General media	6.49	6.00	1.00	20.00

Table 4.6. (cont.)

	Mean	Median	Minimum	Maximum
Employees_number	3.85	3.00	1.00	30.00
Additional Services				
Risk analysis	0.70	1.00	0.00	1.00
Insurance analysis	0.91	1.00	0.00	1.00
Pension calculation and counseling	0.74	1.00	0.00	1.00
Occupational pensions	0.86	1.00	0.00	1.00
Building loan business	0.63	1.00	0.00	1.00
Wealthy households	0.26	0.00	0.00	1.00
Job beginners	0.17	0.00	0.00	1.00
Young families	0.21	0.00	0.00	1.00
Customers' knowledge				
Risk profile	2.64	3.00	1.00	5.00
Old-age protection provisions	2.75	3.00	1.00	5.00
(Dis-) advantages of insurance products	2.30	2.00	1.00	5.00
Signaling instruments				
Advertising campaigns	0.04	0.00	0.00	1.00
Customer specialization	0.25	0.00	0.00	1.00
Good Service	0.87	1.00	0.00	1.00
Professional lectures, seminars	0.27	0.00	0.00	1.00
Qualification	0.94	0.00	0.00	1.00
Objective information	0.88	1.00	0.00	1.00
Specialization on insurer	0.08	0.00	0.00	1.00
Membership	0.76	1.00	0.00	1.00
Competitive pressure	3.33	3.00	1.00	5.00
Competitive strategies				
More advertising campaigns	0.22	0.00	0.00	1.00
Better counseling quality	0.81	1.00	0.00	1.00
Cost reductions	0.09	0.00	0.00	1.00
Consultation time savings	0.01	0.00	0.00	1.00
Customer specialization	0.47	0.00	0.00	1.00
Additional services for a fee	0.10	0.00	0.00	1.00
Additional services for free	0.58	1.00	0.00	1.00

Table 4.7. Definition and Measurement of Variables

	Variable	Explanation and Measurement
Dependent	Information index	Continuous variable measuring the mean value of 27 items[68] about the importance attached to different aspects in counseling interviews by the intermediary ranging from 1 = very low quality ... 5 = very high quality
	Contract conclusion rate	Continuous variable measuring the proportion of the average number of counseling interviews on all interviews that lead to contract conclusion
Independent		
Socio-economic Variables	Sex	Dummy variable with 1 = male, 0 = female
	Region	Dummy variable with 1 = West Germany, 0 = East Germany
	Age	Continuous variable measuring the age of the interviewed intermediary in years
	Intermediary type	Set of dummy variables with 1 = intermediary type, 0 = other: insurance agent; independent insurance agent; insurance broker; other reference class: insurance broker
Human Capital Variables	Formal education	Set of dummy variables with 1 = highest degree of formal education, 0 = other: lower secondary school; intermediate leaving certificate; certificate of aptitude for specialized short-course higher education; general certificate of aptitude for higher education (Hauptschule; Mittlere Reife/ Polytechnische Oberschule; Fachhochschulreife; Allgemeine Hochschulreife/ Erweiterte Oberschule) reference class: general certificate of aptitude for higher education (Allgemeine Hochschulreife/ Erweiterte Oberschule)
	(Additional) Training	Dummy variable with 1 = (additional) training, 0 = none
	University degree	Dummy variable with 1 = university degree, 0 = none
	Work experience	Continuous variable measuring work experience in years

[68] For the single items see Table 4.2 above.

Table 4.7. (cont.)

	Variable	Explanation and Measurement
	Further training_number	Continuous variable measuring the number of further training courses, conferences etc. frequented during the last 12 months
Information Production Variables	Time budget	5 continuous variables measuring the share of the time spent for a certain activity on the total time budget: information acquisition and procession; counseling interviews; further training; claims settlement; sales efforts
	Duration_interviews	Continuous variable measuring the average duration of general counseling interviews in minutes
	Information source	7 continuous variables measuring the importance of an information source used by an intermediary with its attached objectivity on a 25-point rating scale with 1 = very subjective and not at all important source … 25 = very credible and very important source: insurance companies; professional associations; rating agencies; consumers' associations; science; specialist publications; general media
	Source_further training	Ordinal variable measuring the importance attached to further training as an information source measured on a five-point Likert scale with 1 = not at all important … 5 = very important
	Information content	7 continuous variables measuring the factor scores extracted by a factor analysis from 27 items which indicate the importance attached to different aspects in counseling interviews by the intermediary:[69] old-age security in general; calculation of participation rates; contract design; personal risk profile and needs; policy design; private old-age insurance products; claims settlement
Specialization Variables	Employees_number	Continuous variable measuring the number of employees in an intermediary's firm

[69] For more details see Tables 4.2 and 4.3 above.

Table 4.7. (cont.)

Variable	Explanation and Measurement
Insurance line	8 dichotomous variables with 1= main insurance line sold, 0 = other: commercial insurance; disability insurance; liability insurance; automobile insurance; health insurance; life and annuity insurance; property (non-life) insurance; accident insurance
Prouct_complexity	8 ordinal variables measuring the complexity of a product in terms of the explication necessary on a five-point Likert scale with 1 = very weak demand for explication and information … 5 = very strong demand for explication and information: capital sum life insurance; term life insurance; specific rest-life insurance; unit-linked life insurance; annuity insurance; health insurance; nursing care insurance; disability insurance
Additional services	16 dichotomous variables with 1 = service is offered, 0 = not offered: none; risk analysis; insurance analysis; financial consulting; financing counseling; investment fund business; old-age pension calculation and advice; occupational pensions; assets management; building loan business; real estate management; legal advice; risk management counseling; technical damage prevention; management consultancy; miscellaneous
Product range choice	Dummy variable with 1 = no free choice of product range, 0 = free choice of product range
Choice_reasons	8 dichotomous variables with 1 = reason for the choice of product range, 0 = other: price performance ratio; rate of commission / brokerage; risks covered; claims settlement; information and advertising material; further training; sales contests; miscellaneous
Revenue_type	Set of dummy variables with 1 = largest share of turnover stems from this customer or revenue type, 0 = other: revenues from new customers; revenues from long-term customers; counseling fees; others reference class: revenues from long-term customers

Table 4.7. (cont.)

	Variable	Explanation and Measurement
Customer Characteristic	Customers' demand	2 ordinal variables measuring consumers' demand on a five-point Likert scale with 1 = more modest … 5 = more demanding about: information provision; additional services for free
	Customer segments	11 dichotomous variables with 1 = specialization on this customer segment, 0 = no specialization: None; industrial enterprises; small and medium-sized firms; professionals; public officials; public service employees; wealthy households; job beginners; young families; senior citizens; miscellaneous
	Customers' knowledge	3 ordinal variables indicating customers' knowledge on a five-point Likert scale with 1 = very bad knowledge … 5 = very good knowledge: risk profile; old-age protection provisions; (dis-)advantages of insurance products
Signaling Variables	Reputation	3 continuous variables measuring the factor scores extracted by a factor analysis from 11 items indicating the importance attached to different aspects to gain high reputation:[70] information; good service; sales efforts
	Signaling instruments	10 dichotomous variables with 1 = signaling instrument is used, 0 = not used: none; advertising campaigns; customer specialization; good service; public lectures, seminars; qualification, specialized knowledge; objective information and counseling; specialization on certain insurance companies; membership in a professional association; miscellaneous
	Membeship_reasons	6 dichotomous variables with 1 = reason for membership in a professional association, 0 = no reason: legal representation; interest representation; marketing activities; quality standards; policy outlines; miscellaneous

[70] For more details see Tables 4.4 and 4.5 above.

Table 4.7. (cont.)

	Variable	Explanation and Measurement
Competition Variables	Competitive pressure	Ordinary variable measuring the extent of competitive pressure on a five-point Likert scale with 1 = none … 5 = very strong
	Competitive strategies	8 dichotomous variables with 1 = competitive strategy pursued by an intermediary, 0 = not pursued: more advertising campaigns; better counseling quality; cost reduction; consultation time savings; customer specialization; additional services for a fee; additional services for free; miscellaneous
	Competitor_type	10 dichotomous variables with 1 = intermediary type is among the strongest competitors, 0 = none of the strongest competitors: exclusive agents in a second job; self-employed exclusive agents; independent insurance agents; insurance brokers; insurance consultants; direct insurers; financial service firms; banks; associations /clubs /unions; miscellaneous

4.3 Empirical Results and Discussion

4.3.1 Performance Indicator I: Information Quality

The empirical results of the estimated linear OLS regression equations are summarized at the end of this section in Table 4.8, where the dependent variable *information index* serves as a proxy for the quality of the information provided.

Hypothesis 1 – Efforts Spent

The coefficient estimates for the *formal education* variables are positive and some are statistically significant.[71] This indicates that insurance intermediaries with a lower educational level provide better information quality than intermediaries of our reference class, who have the general certificate of aptitude for higher education. In contrast to hypothesis 1, long-term investment in human capital does not improve the information quality of in-

[71] Since none of the socio-economic variables (*sex*, *region*, *age*) showed any significant influence on the information quality provided, no matter what specification was tested, these variables are omitted.

surance intermediaries. This shows also in the mixed evidence for having a *university degree*. This result may be in part due to a selection bias among insurance intermediaries, who have attained the general certificate of aptitude for higher education or a university degree. In the German market for insurance intermediation there are no (formal) qualification requirements. Accordingly, insurance intermediaries with an academic education level might show characteristics which make them unable to achieve an adequate occupational position. These underlying characteristics might also be the reason that they provide lower information quality compared to intermediaries with a lower educational level.

The *work experience* variable shows a positive but not statistically significant impact on the information quality provided. Thus, this variable was dropped in equations 2 to 5 because it does not qualitatively change any major result.

The coefficient estimates for the percentage of time spent on *further training*, *claims settlement* and *counseling interviews* are positive (with one exception) for all specifications, with the estimates for claims settlements being significant across nearly all equations. These results are consistent with hypothesis 1 that more efforts spent on activities, which are related to the production of information services, increase the quality provided. However, the coefficient estimates for the time spent on *information acquisition and procession* and on *sales efforts* have a negative impact on the information quality provided. Obviously, insurance intermediaries gain specific knowledge about what topics and what information is relevant for consumers mainly through investment in further trainings and by claims settlement. These two activities exhibit large fixed costs. Besides, information about claims settlement is highly specific. It entails consumer-specific information about the likelihood of damage and insurance company-specific information about the consequences of specific contract terms for claims settlement as well as insurance companies' handling in case of loss. Thus, these results also support the hypothesis that intermediated search has advantages, which cannot be attained through personal search by consumers (Sect. 2.2). For a single consumer neither the high costs of attending insurance intermediaries' further trainings would pay off, nor does she have the chance to acquire the activity-specific knowledge resulting from claims settlement.

Across all five estimations, the sign of the estimated coefficient for the *duration_interviews* variable also confirms hypothesis 1. The information quality provided depends on the absolute time spent by an intermediary on counseling interviews. However, the coefficient estimate becomes insignificant when variables are included that control product complexity.

Hypothesis 2 – Information Sources

The estimation results indicate that intermediaries, who rely strongly on *insurance companies*, *consumers associations*, the *science* and *specialist publications* as sources of credible information, provide significantly higher information quality across all equations. In comparison, estimation results suggest that intermediaries for whom the *general media* are very important and credible information sources produce lower information quality. Information in the general media is published for a broad audience. Thus, it is necessary for them to simplify matters, so that the information thus disseminated is of a rather unspecific nature. Therefore, the general media usually is merely an insufficient source for acquiring the highly specialized information needed to give profound advice on insurance coverage (Sect. 1.2). *Rating agencies* have also a positive, but mostly insignificant impact, as long as it is not controlled for competition. All in all, our evidence supports hypothesis 2 that the information quality provided depends on the underlying information sources.

Hypothesis 4 (a–c) – Division of Labor, Specialization, Economies of Scope

With equation 2, we include variables that control for specialization and take the independence of insurance intermediaries from insurance companies into account. These variables contribute significantly to the explanatory power of our estimation because the adjusted R^2 rises by 11 percentage points.

However, the coefficient estimate for firm size measured by the *employees_number* variable shows no significant impact on the information quality provided. Since this holds true for all other specifications, we drop this variable from the reported regressions (equations 3 to 5). This does not qualitatively change any of our major results. These findings do not confirm hypothesis 4a that division of labor has a positive impact on the information quality provided. Acquiring and processing information about topics relevant for concluding an insurance contract seem to exhibit indivisibilities among members of the same agency.

After being asked in what *insurance line* they are specialized in, the participants named 14 different lines. From these we include only four in the reported regressions. The omitted ones show no statistically significant coefficient estimates when included in the various specifications. For the included lines of *commercial insurance*, *liability insurance* and *health insurance* most of the coefficient estimates are positive. If an intermediary specializes in any of these insurance lines, this is only a weak indicator for

consumers that he provides high quality services. The negative coefficient estimate for specialization in *automobile insurance*, which indicates the provision of low information quality, might be in large parts due to the fact that 13 of the 27 items summarized in the dependent variable *information index* concern topics relevant for personal insurance lines like old-age or health. Accordingly, intermediaries who mainly distribute automobile insurance will of course give little weight to these aspects. However, this does not necessarily imply that they provide low quality information in regard to automobile insurance.

When controlling for *product complexity*, the results suggest that intermediaries, who hold *annuity insurance* and *disability insurance* are very complex and, thus, make extensive explanations necessary, provide better overall information quality. These findings are statistically significant for most of the estimation coefficients across all estimations. Again, we omit all insurance lines that show no statistically significant impact across the different regression specifications. Thus, the data suggest only a weak confirmation of hypothesis 4 b according to which information quality should be positively influenced by specialization.

With respect to the provision of additional services the data also suggests mixed evidence that economies of scope can be realized. From 16 possible *additional services* stated in the questionnaire we include only six in the reported regressions, since again the remaining ones show no significant impact. The coefficient estimates for the supply of *insurance analysis*, *old-age pension calculation and consultancy*, *occupational pensions*, *technical damage prevention* and *management consultancy* are positive and some are statistically significant. This is consistent with hypothesis 4c that intermediaries, who offer these additional services, provide better information services. Quite the contrary is the case if an intermediary is active in the *building loan business*. According to our data, supplying this service has a negative impact on the information quality provided. This result is only statistically significant as long as it is not controlled for signaling and competition variables. However, this finding is in line with widespread criticism by consumers' associations about business practice in this area. According to that, life insurance products are frequently recommended to private customers in order to redeem loans without correctly informing consumers about the potential risks of this type of financing.

Hypothesis 5 – Independence from Insurance Companies

When controlling for the *intermediary type* of an interviewee in equation 1, our data suggests that exclusive agents provide significantly lower information quality than insurance brokers (our reference class). However,

when including variables that indicate whether intermediaries can autonomously select the products they distribute, the coefficient estimate for *exclusive agents* is no longer significant. Because this holds also in equations 3 to 5 we drop the variable *intermediary type* from the reported regressions.

Those intermediaries, who can autonomously decide on the products they distribute, were asked what guides them in selecting their product range. The coefficient estimates for the following *choice_reasons* variables are positive and some are statistically significant: the *price performance ratio* of an insurance product, the *risks covered* by a policy, the *claims settlement* behavior of an insurance company and the *information and advertising material* provided by an insurance company. This is consistent with providing higher information quality. In contrast, coefficient estimates for the *rate of commission/ brokerage*, *further training* offered by an insurance company, and *sales contests* are negative, thus, indicating the provision of lower information quality. However, the coefficient estimates of those intermediaries who have no product range choice are positive, although not statistically significant. All in all, this also indicates that information quality does not depend on the specialization of intermediaries.

Moreover, insurance intermediaries, who realize their income mainly from other activities than from selling insurance policies, provide significantly higher information quality than those intermediaries, who rely primarily on commission or brokerage from long-term customers (our reference class) (*revenue_type*, equations 3 to 5). Thus, our evidence supports hypothesis 5 that the more independent an insurance intermediary is from insurance companies, the higher the information quality he provides is. As the variable *intermediary type* becomes insignificant when including more specific variables that control an insurance intermediary's independence we conclude that differences in legal regulations, which apply to insurance agents and brokers have no impact on the information quality provided.

Hypothesis 6 – Customer Relationship

The coefficient estimates for the *revenue_type* variable are positive if commission or brokerage from new compared to long-term customers is the main source of income for an intermediary. This is consistent with him providing higher information quality to generate new business than when putting most weight on retaining business. This does not confirm hypothesis 6, which states a positive impact of long-term customer relationships on the information quality provided. Rather, it seems to be the case that insurance intermediaries use high quality information as a competitive instrument to gain new customers.

Hypothesis 7 – Customers' Demand

We find a positive relationship between *customers' demand* for *information* provision and the information quality actually provided by an intermediary. Interestingly, the same holds true with respect to customers' demand for *additional services*. As long as we do not include variables in the regression (equations 4 and 5) that account for signaling behavior, the coefficient estimates for *additional services* are statistically significant. Thus, all in all, our findings confirm hypothesis 7.

Hypothesis 8 – Specialization on Customer Segments

Our data provides no evidence that specialization on certain *customer segments* generally has a significant influence on the information quality provided. Therefore, our data does not confirm hypothesis 8. However, across equations 3 to 5 the coefficient estimates for specialization in *industrial enterprises*, *small and medium enterprises*, *professional* and *public officials* indicate a positive relationship. For *young families* and *senior citizens* the coefficient estimates are even statistically significant as long as we do not control for signaling behavior and competition. In contrast to that, for *wealthy households*, the coefficient estimate suggests that insurance intermediaries specialized on this segment provide rather low quality information services.

Hypothesis 9 – Customers' Knowledge

The evidence on the impact of *customers' knowledge* on the information quality provided is somehow mixed. The coefficient estimates for customers' knowledge about their *risk profile* and about the *(dis-)advantages of insurance products* compared to other financial assets are positive, with the latter being also statistically significant in all equations. Thus, the data confirms hypothesis 9 that the higher (lower) consumers' knowledge is, the higher (lower) the quality of the information provided by an intermediary is. In contrast, the coefficient estimate for customers' knowledge about *old-age protection provisions* is negative and statistically significant across all specifications. This suggests that intermediaries provide significantly higher information quality, if their customers have a low level of knowledge about insurance protection for old-age. There are two possible answers to this finding. On the one hand, this seems to be a quite straightforward result since half of the items summarized in the dependent variable *information index* concern old-age protection. It would be rather superfluous for an intermediary to put much weight on such topics if his customers already have a high level of knowledge about them. On the

other hand, insurance intermediaries rely strongly on income from selling life insurance policies and other products concerning old-age security. Accordingly, they should have an interest in increasing consumers' knowledge about exactly such insurance products. This is in line with the finding that insurance intermediaries do not provide high quality information to customers with low knowledge on other financial assets which can be used as substitutes for insurance or products.

Thus, taken together, these two seemingly contradictory findings show that our data is consistent with hypothesis 9. Insurance intermediaries put only more emphasis on providing high quality information to customers with low knowledge if it is necessary to induce them to conclude an insurance contract.

Hypothesis 10 – Signaling Activities

The inclusion of the demand-side variables in equation 3 increases the overall quality of our regression only to a very low degree. In comparison, adding the variables that account for the impact of reputation and other signaling activities on the information quality raises the adjusted R^2 of the specification estimated in equation 4 by nearly 16 percentage points. Thus, signaling activities seem to be relevant for differences in the information quality provided.

A look at the coefficient estimates shows that only *reputation*, which is based on *information* quality and on *service* quality, reveals a significantly positive impact on the information quality provided. Most other *signaling instruments* show a positive coefficient estimate, which indicate a positive impact on the information quality provided. However, they are not significant. By contrast, *specialization on customer segments* and *membership in a professional association* have a statistically significant negative impact on the information quality provided. The former finding is in line with the rejection of hypothesis 8 above according to which targeting particular markets does not result in the provision of high quality information. Consequently, specialization on particular customer segments is also no credible signal.

Somewhat astonishing is the finding that being member in a professional association, which usually requires having certain qualifications, to keep certain standards and/ or to have a voluntary property liability insurance, has a negative impact on the information quality provided. Quite contrary to the theoretical reasoning in *section 3.3.2* such membership seems to serve rather as a substitute than as a signal for the provision of high service quality. As regards the reasons stated by the interviewees for membership in such an association only *interest representation* of its

members against insurance companies and *policy outlines* developed by the association correlate positively with high information quality. The latter is even statistically significant when controlling for competition variables.

All in all, our data shows that only reputation works as a credible signal. Like theory suggests the main reason for this seems to be that in contrast to the other signaling instruments included in the specifications reputation is costly to acquire and difficult to copy. Therefore, it does not matter whether reputation is based on the provision of high quality information, on service activities or on sales efforts as long as additional costs are spent. These pay only for intermediaries who provide high quality services in the long run, like theory predicts (Sect. 3.3.2).

Hypotheses 11 to 13 – Competition

Equation 5 includes variables, which concern competition and competitive behavior in markets for insurance intermediaries. By adding this set of variables, the overall explanatory power of our model declines slightly since the adjusted R^2 decreases by 0.6 percentage points. None of the coefficient estimates is statistically significant. This holds also true for the estimate of the *competitive pressure* variable. This is consistent with hypothesis 11 according to which there is no relationship between competitive pressure an insurance intermediary faces and the level of information quality he provides. Even when competitive pressure is mainly exerted by the same type of intermediary (exclusive agent, independent agent, insurance broker), this does not affect the service quality provided by inside intermediaries. Thus, our data confirms the main statement of the price quality-dispersion model in *section 3.2.1*.

Our data does not confirm hypotheses 12 and 13. There is neither evidence of a significant relationship between certain *competitive strategies* and the information quality provided, nor of a significant impact of particular types of intermediaries (*competitor_type*). Accordingly, outside intermediaries do not affect the information quality provide by inside intermediaries.

Table 4.8. Regression Results *Information Index*[a]

[a] Dependent variable: *Information index* (White heteroskedasticity-consistent *t*-values in parentheses)

*, **, *** 10%, 5 % and 1% level of significance

	Equ. 1 (N =648)	**Equ.2** (N =649)	**Equ. 3** (N =543)	**Equ. 4** (N =510)	**Equ. 5** (N =498)
F-Statistics	**5.680*** **	**6.446*** **	**4.736*** **	**6.210*** **	**4.984*** **
adj R^2	0.153	0.261	0.282	0.441	0.435
Constant	**2.548*** **	**1.545*** **	**1.320*** **	**2.291*** **	**2.352*** **
	(11.705)	(5.334)	(3.798)	(7.909)	(7.494)
Sex	**0.065**				
	(0.779)				
Age	**0.003**				
	(0.828)				
Formal education					
Lower secondary school	**0.102**	**0.096**	**0.143***	**0.094**	**0.094**
	(1.287)	(1.240)	(1.772)	(1.287)	(1.235)
Intermediate leaving certificate	**0.053**	**0.049**	**0.007**	**0.033**	**0.039**
	(1.002)	(1.034)	(0.137)	(0.664)	(0.760)
Certificate of aptitude for specialized short-course higher education	**0.055**	**0.083**	**0.032**	**0.045**	**0.049**
	(1.002)	(1.523)	(0.572)	(0.852)	(0.887)
University degree	**-0.028**	**0.001**	**-0.026**	**-0.006**	**0.001**
	(-0.544)	(0.024)	(-0.501)	(-0.136)	(0.018)
(Additional) Training	**0.035**				
	(0.530)				
Work experience	**-0.001**				
	(-0.304)				
Further training_number	**0.001**				
	(0.380)				
Time budget					
Information acquisition and procession	**-0.001**	**-0.001**	**-0.002**	**-0.002**	**-0.003**
	(-0.593)	(-0.914)	(-1.008)	(-1.488)	(-1.557)
Counseling interviews	**0.002**	**0.001**	**0.000**	**0.000**	**-0.001**
	(1.405)	(1.331)	(0.358)	(0.113)	(-0.122)

Table 4.8. (cont.)

	Equ. 1	**Equ.2**	**Equ. 3**	**Equ. 4**	**Equ. 5**
Further training	**0.007****	**0.005**	**0.005**	**0.005**	**0.004**
	(2.159)	(1.623)	(1.460)	(1.610)	(1.405)
Claims settlement	**0.007*****	**0.005****	**0.006****	**0.005***	**0.004**
	(2.784)	(1.985)	(2.187)	(1.773)	(1.468)
Sales efforts	**-0.001**	**-0.003**	**-0.005**	**-0.004**	**-0.005**
	(-0.375)	(-1.137)	(-1.306)	(-1.124)	(-1.226)
Duration_interviews	**0.002*****	**0.001**	**0.001**	**0.000**	**0.000**
	(3.123)	(1.260)	(1.248)	(0.787)	(0.667)
Information source					
Insurance companies	**0.009****	**0.008****	**0.009****	**0.011*****	**0.012*****
	(2.279)	(2.166)	(2.268)	(2.991)	(3.067)
Professional associations	**0.005**	**0.002**	**0.000**	**-0.002**	**-0.001**
	(1.269)	(0.478)	(0.010)	(-0.467)	(-0.399)
Rating agencies	**0.009****	**0.004**	**0.003**	**0.001**	**0.000**
	(2.537)	(1.357)	(0.718)	(0.265)	(-0.143)
Consumers' associations	**0.011*****	**0.013*****	**0.012*****	**0.008***	**0.009****
	(2.916)	(3.476)	(2.952)	(1.924)	(2.104)
Science	**0.014*****	**0.015*****	**0.015*****	**0.012*****	**0.012*****
	3.457	(4.185)	(3.589)	(3.135)	(3.031)
Specialist publications	**0.011*****	**0.006**	**0.011*****	**0.010****	**0.010****
	(2.652)	(1.601)	(2.555)	(2.464)	(2.279)
General media	**-0.007**	**-0.004**	**-0.007**	**-0.005**	**-0.007**
	(-1.474)	(-0.928)	(-1.365)	(-1.176)	(-1.450)
Source_further training	**0.030**	**0.006**	**0.005**	**-0.038***	**-0.035***
	(1.404)	(0.303)	(0.255)	(-1.895)	(-1.704)
Employees_number		**-0.001**			
		(-0.188)			
Insurance line					
Commercial insurance		**0.061**	**0.096**	**0.083**	**-0.018**
		(0.607)	(0.827)	(0.825)	(-0.157)
Liability insurance		**0.102**	**0.102**	**0.098**	**0.097**
		(1.631)	(1.484)	(1.579)	(1.499)
Automobile insurance		**-0.085**	**-0.011**	**-0.075**	**-0.083**
		(-1.298)	(-0.162)	(-1.059)	(-1.135)

Table 4.8. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Health insurance		**0.097**	**0.119***	**0.040**	**0.002**
		(1.497)	(1.681)	(0.665)	(0.025)
Product complexity					
Annuity insurance		**0.079*****	**0.076*****	**0.077*****	**0.066*****
		(3.5561)	(3.193)	(3.745)	(3.018)
Disability insurance		**0.155*****	**0.139****	**0.052**	**0.053**
		(3.394)	(2.515)	(1.522)	(1.516)
Additional services					
None		**0.078**	**0.248**	**0.100**	**0.086**
		(0.192)	(0.705)	(0.495)	(0.413)
Insurance analysis		**0.105**	**0.015**	**-0.003**	**0.028**
		(1.497)	(0.208)	(-0.040)	(0.385)
Old-age pension calculation and advice		**0.087****	**0.074**	**0.028**	**0.017**
		(2.017)	(1.547)	(0.623)	(0.374)
Occupational pensions		**0.081**	**0.091**	**0.088**	**0.091**
		(1.487)	(1.548)	(1.510)	(1.501)
Building loan business		**-0.093****	**-0.082***	**-0.060**	**-0.052**
		(-2.210)	(-1.904)	(-1.321)	(-1.101)
Technical damage prevention		**0.053**	**0.037**	**-0.057**	**-0.051**
		(0.907)	(0.638)	(-0.944)	(-0.804)
Management consultancy		**0.070**	**0.098**	**0.143*****	**0.123****
		(1.213)	(1.630)	(2.603)	(2.149)
Intermediary type					
Exclusive insurance agent	**-0.159*****	**-0.050**			
	(-3.457)	(-0.671)			
Independent insurance agent	**-0.013**	**0.053**			
	(-0.185)	(0.751)			
No product range choice		**0.171**	**0.144**	**0.060**	**0.043**
		(1.510)	(1.055)	(0.446)	(0.292)
Choice_reasons					
Price-performance ratio		**0.131**	**0.101**	**0.107**	**0.118**
		(1.236)	(0.810)	(0.814)	(0.840)
Rate of commission / brokerage		**-0.072**	**-0.061**	**-0.016**	**-0.014**
		(-1.339)	(-1.130)	(-0.310)	(-0.259)

Table 4.8. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Risks covered		**0.104***	**0.111***	**0.062**	**0.052**
		(1.722)	(1.667)	(0.887)	(0.719)
Claims settlement		**0.089***	**0.085**	**0.044**	**0.040**
		(1.622)	(1.506)	(0.786)	(0.688)
Information and advertising		**0.030**	**0.061**	**0.060**	**0.052**
material		(0.392)	(0.742)	(0.835)	(0.690)
Further training		**0.039**	**-0.049**	**-0.094**	**-0.124***
		(0.654)	(-0.807)	(-1.531)	(-1.932)
Sales contests		**-0.291****	**-0.175**	**-0.023**	**0.020**
		(-2.149)	(-1.164)	(-0.160)	(0.127)
Revenue_type					
New customers			**0.078**	**0.071**	**0.055**
			(1.631)	(1.539)	(1.129)
Counseling fees			**-0.001**	**-0.080**	**-0.044**
			(-0.004)	(-0.596)	(-0.317)
Other revenues			**0.324*****	**0.275*****	**0.185***
			(3.546)	(2.648)	(1.644)
Customers' demand					
Information provision			**0.038**	**0.023**	**0.032**
			(1.152)	(0.825)	(1.055)
Additional services for free			**0.050****	**0.011**	**0.002**
			(2.027)	(0.489)	(0.106)
Customer segments					
No specialization			**0.070**	**-0.022**	**-0.007**
			(1.088)	(-0.311)	(-0.092)
Industrial enterprises			**0.062**	**-0.006**	**0.042**
			(0.692)	(-0.074)	(0.481)
Small and medium-sized firms			**0.073**	**0.047**	**0.040**
			(1.150)	(0.733)	(0.602)
Professionals			**0.063**	**0.056**	**0.036**
			(1.141)	(1.053)	(0.655)
Public officials			**0.095**	**0.145**	**0.146**
			(0.831)	(1.284)	(1.221)
Public service employees			**0.047**	**-0.046**	**-0.031**
			(0.506)	(-0.515)	(-0.329)

Table 4.8. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Wealthy households			**-0.048**	**-0.023**	**-0.037**
			(-0.932)	(-0.461)	(-0.725)
Job beginners			**-0.033**	**-0.040**	**-0.033**
			(-0.522)	(-0.640)	(-0.500)
Young families			**0.097***	**0.032**	**0.025**
			(1.692)	(0.532)	(0.399)
Senior citizens			**0.146***	**0.054**	**0.060**
			(1.889)	(0.704)	(0.737)
Customers' knowledge					
Risk profile			**0.021**	**0.005**	**0.013**
			(0.732)	(0.197)	(0.437)
Old-age protection provisions			**-0.062****	**-0.053***	**-0.063****
			(-2.016)	(-1.876)	(-2.071)
(Dis-) Advantages of insurance			**0.048***	**0.059****	**0.053***
products			(1.716)	(2.229)	(1.948)
Signaling activities					
Reputation					
Information				**0.195*****	**0.192*****
				(8.889)	(8.212)
Good service				**0.121*****	**0.121*****
				(5.589)	(5.252)
Sales efforts				**0.017**	**0.025**
				(0.790)	(1.047)
Signaling instruments					
Advertising campaigns				**0.041**	**0.062**
				(0.456)	(0.669)
Customer specialization				**-0.091***	**-0.107****
				(-1.927)	(-2.096)
Good service				**0.054**	**0.068**
				(0.886)	(1.078)
Professional lectures, seminars				**-0.032**	**-0.041**
				(-0.751)	(-0.939)
Qualification				**0.145**	**0.116**
				(1.607)	(1.223)

Table 4.8. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Objective information and				**0.042**	**0.033**
Counseling				(0.702)	(0.531)
Specialization on insurer				**0.036**	**0.031**
				(0.554)	(0.439)
Membership				**-0.127***	**-0.155****
				(-1.708)	(-2.001)
Miscellaneous				**0.059**	**0.075**
				(1.087)	(1.298)
Membership_reasons					
Legal representation				**-0.026**	**-0.019**
				(-0.544)	(-0.381)
Interest representation				**0.055**	**0.069**
				(0.930)	(1.117)
Marketing activities				**-0.008**	**-0.004**
				(-0.145)	(-0.071)
Quality standards				**-0.019**	**-0.030**
				(-0.432)	(-0.656)
Policy outlines				**0.085**	**0.109****
				(1.621)	(1.969)
Information exchange				**-0.034**	**-0.048**
				(-0.434)	(-0.593)
Lobbying				**-0.075**	**-0.091**
				(-0.482)	(-0.552)
Miscellaneous				**-0.099**	**-0.083**
				(-1.144)	(-0.929)
Competition					
Competitive pressure					**-0.005**
					(-0.241)
Competitive strategies					
More advertising campaigns					**0.017**
					(0.349)
Better counseling quality					**0.001**
					(0.012)

Table 4.8. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Cost reductions					**-0.067**
					(-0.961)
Consultation time savings					**-0.188**
					(-0.652)
Customer specialization					**0.073**
					(1.631)
Additional services for a fee					**0.122****
					(2.023)
Additional services for free					**0.045**
					(1.102)
Miscellaneous					**0.016**
					(0.234)
Competitor_type					
Exclusive agents in a second job					**0.072**
					(0.956)
Self-employed exclusive agents					**-0.011**
					(-0.253)
Independent agents					**0.024**
					(0.378)
Insurance brokers					**-0.017**
					(-0.398)
Insurance consultants					**-0.042**
					(-0.329)
Direct insurers					**-0.064**
					(-1.350)
Financial services firms					**0.012**
					(0.273)
Banks					**0.017**
					(0.378)
Associations/ clubs/ unions					**0.084**
					(1.147)
Miscellaneous					**-0.014**
					(-0.154)

4.3.2 Performance Indicator II: Contract Conclusion Rate

Testing the hypotheses for the *contract conclusion rate* variable, which is a more output-oriented performance indicator, reveals some interesting differences compared to the more objective input-oriented dependent variable *information index*. The results are reported in Table 4.9 at the end of this section.

Hypothesis 1 – Efforts Spent

In contrast to the estimations in *section 4.3.1*, the coefficient estimates for the socio-economic variables *sex* and *age* show a negative and mostly significant impact on the *contract conclusion rate*. A male insurance intermediary is more likely to encounter a reduction in the likelihood that consumers will actually conclude a contract at the end of a counseling interview. Besides, the older an intermediary is, the lower his market performance is in terms of the contracts concluded. However, the negative impact of age seems to be lessened to some extent since the coefficient estimate for *work experience* is positive and statistically significant for most specifications, however, at a lower level. In contrast to hypotheses 1, *(additional) training* has a significantly negative impact on the contract conclusion rate. Since the variables on *formal education*, *(additional) training* and *university degree* showed no statistically significant impact across the various specifications, we dropped them from the regressions reported.

With regard to the activities performed by an intermediary, the coefficient estimates of nearly all *time budget* variables show a negative impact on the contract conclusion rate with the coefficient estimate for the percentage of time spent on *sales efforts* being statistically significant across all equations. Additionally, the coefficient estimate for the *further training_number* variable has a statistically negative impact on the contract conclusion rate. In contrast, the coefficient estimate for the percentage of time spent on counseling interviews shows a positive impact. This is confirmed by the estimate for the *duration_interviews* variable, which is statistically significant across all equations. Compared to the findings in *section 4.3.1* for the *information index* variable, time spent on further trainings and on claims settlement has a negative impact on the contract conclusion rate. All in all, our data provides no evidence that investment in human capital and most other activities necessary to provide intermediary services have a positive impact on an intermediary's market performance in terms of the contracts concluded. Therefore, our evidence does not confirm hypothesis 1 with the duration of counseling interviews being the exception.

Hypothesis 2 – Information Sources

This is in line with the finding that the coefficient estimates of the *information source* variables show no significant impact across all equations, so that we omit them in equations 2 to 5. Thus, for the *contract conclusion rate* as dependent variable hypothesis 2 is not consistent with our data, which is also in contrast to the findings in *section 4.3.1*.

Hypothesis 3 – Information Content

To test hypothesis 3 we include variables on the *information content* of counseling interviews. Our data reveals a mostly statistically significant positive impact on the contract conclusion rate if an intermediary puts weight on informing his customers on their *personal risk profile and security options*, on the *calculation of participation rates*, on the particularities of *life insurance products* for old-age protection and on *claims settlement*. In contrast to that, providing information about *old-age security in general*, *contract design* and *policy design* results in a lower contract conclusion rate, however, the coefficient estimates are insignificant. Nevertheless, there seems to be a conflict for intermediaries between economic success as measured by the contract conclusion rate and the provision of high quality information. Thus, our evidence suggests only mixed support for hypothesis 3.

Hypothesis 4 (a–c) – Division of Labor, Specialization, Economies of Scope

We find no statistically significant evidence for specialization effects either from division of labor or from concentrating on the distribution of certain insurance lines.[72] Accordingly, hypotheses 4a and 4b are not consistent with our data. However, for the coefficient estimates of *additional services* we mostly find a significantly positive impact for *risk analysis* and *financing counseling* on the contract conclusion rate. In contrast to these services, the coefficient estimate of *insurance analysis* is significantly negative. On the one hand, this can be interpreted as a sign of high information quality provided by an intermediary, since the result of an insurance analysis may be that there is no need for concluding additional insurance contracts. On the other hand, it can also be argued that insurance analysis is offered, in particular, by intermediaries, who face an already low contract

[72] We omit the variables *employees_number* and *insurance line* from equations 3 to 5 in the reported regressions since they do not change qualitatively our major results.

conclusion rate. All in all, hypothesis 4c is supported only with respect to the provision of some additional services. Interestingly, the additional services with a significantly positive impact on the dependent variable do not correspond with those discussed in *section 4.3.1*.

Hypothesis 5 – Independence from Insurance Companies

Contrastingly, the results referring to hypothesis 5 are in line with the findings in *section 4.3.1*. Being an exclusive or independent insurance agent and, thus, more dependent from insurance companies has a negative impact on the contract conclusion rate compared to being an insurance broker. The coefficient estimates for the *intermediary type* variables are negative. For exclusive agents the estimates are statistically significant until variables are included in the specification, which control signaling activities and competition (equations 4 and 5). Independence also shows in the ability of an intermediary to autonomously decide on his product range. Here the coefficient estimates are positive if the following reasons guide an intermediary's product choice: the *price performance ratio,* the *risks covered* by a policy, the *claims settlement* behavior of an insurance company and the *information and advertising material* provided by an insurance company. The estimates are statistically significant for the last variable as long as it is not controlled for competition. Opposed to that, if the product choice depends on the *further training* provided by an insurance company, then the coefficient estimates show a significantly negative impact on the contract conclusion rate. This result is in line with the negative coefficient estimate of the *further trainings_number* variable. Obviously, such training measures do not provide the information and skills necessary for insurance intermediaries to attain a high contract conclusion rate. To summarize, all in all our evidence supports hypothesis 5 that more independent intermediaries show better market performance.

Hypothesis 6 – Customer Relationship

Since the variables on the *revenue_type* show no significant impact in any of the tested specifications, we omit these variables from the reported regressions. Accordingly, our data does not confirm hypothesis 6 that there is a positive relationship between long-term customer relationships and market performance.

Hypothesis 7 – Customers' Demand

The variable *customers' demand for information* shows a negative but insignificant influence on the contract conclusion rate. Thus, it is not consistent with hypothesis 7. It is also contradictory to the finding in *section 4.3.1*.

Hypothesis 8 – Specialization on Customer Segments

Also in contrast to the findings in *section 4.3.1* are the coefficient estimates for intermediaries, who are specialized in *industrial enterprises* or *small and medium sized companies*. They show a negative impact on the contract conclusion rate. This does not confirm hypothesis 8 according to which intermediaries specialized in persons, who rely more heavily on private insurance coverage like proprietors of firms, should show a better market performance. However, this finding might also result from the negative business cycle of the last years and of general increases in premiums for commercial insurance. Taken together, commercial consumers had to cut costs over the last years. This should have had a negative impact on the insurance business in these market segments. Besides, the coefficient estimate for targeting *wealthy households* is significantly positive, in contrast to the insignificantly negative impact on the information quality provided to this consumer segment in *section 4.3.1*. Accordingly, the higher contract conclusion rate in this target market seems to be due primarily to the higher demand for insurance coverage and not because of the provision of better information services. Accordingly, consumers would be wrong if they believed that intermediaries, who are specialized in this market segment, provide better information services. For *young families*, intermediaries do not only provide higher information quality (Sect. 4.3.1), but realize also higher contract conclusion rates. These are statistically significant as long as signaling behavior and competition is not controlled.

Hypothesis 9 – Customers' Knowledge

While the impact of consumers' knowledge about their *risk profile* and about *old-age protection provisions* is positive, the influence for knowledge about the *(dis-) advantages of insurance products* is negative. Although these estimates are not significant, they are consistent with hypothesis 9. Evidence suggests that consumers' knowledge level indeed guides their decisions on insurance protection in the hypothesized way.

Hypothesis 10 – Signaling Activities

In *section 4.3.1* our data supports hypothesis 10 that intermediaries, who believe that providing high quality information services and other services is relevant for gaining a positive reputation, actually do provide better information quality. The coefficient estimates in equations 4 and 5 confirm this hypothesis for the contract conclusion rate as well. Thus, reputation again proves to be a credible signaling instrument for market performance. All other signaling instruments show no significant impact on the contract conclusion rate with the exception of giving *public lectures or seminars* on insurance coverage or related subjects. Its coefficient estimate is statistically significant. However, such activities have no positive impact on the *information index* (Sect. 4.3.1). This might result from the fact that the respective intermediaries treat many of the items summarized in the *information index* variable already in their lectures, so that they do not have to repeat them in their counseling interviews. Besides, it might also be the case that public lectures and seminars by insurance intermediaries lead to a preselection of potential clients. Only in case that consumers are content with the lecture given, they will contact the respective intermediary for a personal counseling interview. Although the coefficient estimate of the *membership in a professional association* dummy is negative but not statistically significant, the estimate for those intermediaries, who state that the reason for being a member in such an association are the *policy outlines* developed by this association, is significantly positive. Obviously, they offer superior insurance products to their customers, which results in a higher contract conclusion rate. This is also in line with our findings in *section 4.3.1*.

Hypotheses 11 to 13 – Competition

In contrast to our findings in *section 4.3.1* controlling for competition raises strongly the quality of our estimated model. The adjusted R^2 increases by 5 percentage points.

The variable *competitive pressure* has a strong statistically significant negative impact on the contract conclusion rate.[73] It indicates a plausible relationship between the intensity of competitive pressure and individual market performance. This is not consistent with hypothesis 11. Note, however, that hypothesis 11 concerns the relationship between competitive

[73] Note that according to the coding of the variable *competitive pressure* positive (negative) coefficient estimates indicate a negative (positive) impact on the contract conclusion rate.

pressure and product quality with the contract conclusion rate being only a very indirect measure for the quality of the information services provided.

Our data does not confirm hypothesis 12. Only the coefficient estimate for *consultation time savings* shows a strong significant positive impact on the contract conclusion rate. Thus, given strong competitive pressure to improve market performance it pays for insurance intermediaries to follow a high turnover strategy. Our data suggests that there is no single strategy, which proves successful in reducing competitive pressure for insurance intermediaries.

The data also provides only weak support for hypothesis 13. The coefficient estimate for *independent agents* is significantly negative. If they are the main competitors of an insurance intermediary, this leads to a lower contract conclusion rate. Independent agents are close competitors to exclusive agents and insurance brokers. Accordingly, they are engaged in the same markets, so that they indicate a low degree of monopolistic specialization. Again, our data shows no statistically significant impact from competition by outside intermediaries.

Table 4.9. Regression Results *Contract Conclusion Rate*[a]

[a] Dependent variable: log(*contract conclusion rate*/(1- *contract conclusion rate*)) (*t*-values in parentheses)

*. **. *** 10%. 5 % and 1% level of significance

	Equ. 1 (N =554)	**Equ.2** (N =608)	**Equ. 3** (N =647)	**Equ. 4** (N =603)	**Equ. 5** (N =586)
F-Statistics	**4.066*** **	**4.014*** **	**4.452*** **	**3.585*** **	**3.632*** **
adj R^2	**0.151**	**0.199**	**0.236**	**0.253**	**0.306**
Constant	**2.479*** **	**1.583** **	**1.157**	**1.229**	**1.857** **
	(4.321)	(2.086)	(1.517)	(1.457)	(2.189)
Sex	**-0.309**	**-0.297**	**-0.372** **	**-0.247**	**-0.234**
	(-1.487)	(-1.521)	(-2.030)	(-1.287)	(-1.228)
Age	**-0.027*** **	**-0.024*** **	**-0.025*** **	**-0.026** **	**-0.022** **
	(-3.146)	(-3.084)	(-3.454)	(-3.286)	(-2.770)
Formal education					
Lower secondary school	**-0.035**				
	(-0.181)				
Intermediate leaving	**0.100**				
certificate	(0.768)				

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Certificate of aptitude for specialized short-course	**0.178**				
higher education	(1.236)				
(Additional) Training	**-0.297***	**0.008**			
	(-1.664)	(0.049)			
University degree	**-0.066**				
	(-0.505)				
Work experience	**0.009**	**0.010**	**0.018****	**0.016***	**0.017****
	(0.971)	(1.256)	(2.249)	(1.874)	(1.982)
Time budget					
Information acquisition	**-0.003**	**-0.007***	**-0.002**	**-0.003**	**-0.003**
and procession	(-0.807)	(-1.665)	(-0.669)	(-0.894)	(-0.754)
Counseling interviews	**0.003**	**0.000**	**0.001**	**0.001**	**0.002**
	(0.998)	(-0.005)	(0.493)	(0.456)	(0.602)
Further training	**-0.002**	**0.001**	**-0.003**	**-0.003**	**-0.005**
	(-0.243)	(0.156)	(-0.418)	(-0.401)	(-0.740)
Claims settlement	**-0.002**	**-0.006**	**0.000**	**-0.002**	**-0.004**
	(-0.374)	(-0.898)	(-0.018)	(-0.280)	(-0.657)
Sales efforts	**-0.038*****	**-0.038*****	**-0.044*****	**-0.037*****	**-0.026****
	(-3.812)	(-4.012)	(-4.981)	(-3.775)	(2.680)
Duration_interviews	**0.004****	**0.004*****	**0.004*****	**0.004****	**0.003****
	(2.555)	(2.812)	(3.204)	(2.497)	(2.028)
Further training_	**-0.021****	**-0.019****	**-0.019****	**-0.022****	**-0.013**
number	(-2.280)	(-2.076)	(-2.186)	(-2.427)	(-1.502)
Information source					
Insurance companies	**0.003**				
	(0.321)				
Professional associations	**-0.004**				
	(-0.467)				
Rating agencies	**0.007**				
	(0.849)				
Consumers' associations	**0.015**				
	(1.403)				

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Science	**-0.011**				
	(-1.067)				
Specialist publications	**-0.009**				
	(-0.852)				
General media	**-0.003**				
	(-0.263)				
Source_further training	**0.091***	**0.057**			
	(1.842)	(1.284)			
Information content					
Old-age security in general	**0.022**	**-0.033**	**-0.025**	**-0.082**	**-0.065**
	(0.430)	(-0.687)	(-0.524)	(-1.553)	(-1.256)
Calculation of	**0.101****	**0.047**	**0.122****	**0.040**	**-0.008**
participation rates	(2.033)	(1.013)	(2.667)	(0.757)	(-0.145)
Contract design	**-0.041**	**0.002**	**-0.038**	**-0.065**	**-0.071**
	(-0.801)	(0.040)	(-0.789)	(-1.359)	(-1.489)
Personal risk profile	**0.133*****	**0.126*****	**0.128****	**0.107****	**0.140****
and security options	(2.763)	(2.631)	(2.774)	(2.108)	(2.766)
Policy design	**-0.018**	**-0.048**	**-0.024**	**-0.052**	**-0.050**
	(-0.332)	(-0.954)	(-0.496)	(-0.964)	(-0.924)
Private old-age	**0.035**	**0.075***	**0.086****	**0.068**	**0.079***
insurance products	(0.709)	(1.698)	(1.979)	(1.503)	(1.740)
Contract execution	**0.039**	**0.080***	**0.044**	**0.053**	**0.039**
	(0.772)	(1.713)	(0.981)	(1.102)	(0.830)
Employees_number		**0.015**			
		(1.204)			
Insurance line					
Commercial insurance		**-0.144**			
		(-0.622)			
Liability insurance		**-0.009**			
		(-0.058)			
Automobile insurance		**-0.068**			
		(-0.398)			
Health insurance		**-0.051**			
		(-0.350)			

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Product complexity					
Term life insurance		**0.061**	**0.087***	**0.094***	**0.063**
		(1.290)	(1.912)	(1.954)	(1.313)
Unit-linked life insurance		**0.098**	**0.079**	**0.086**	**0.064**
		(1.372)	(1.146)	(1.208)	(0.908)
Annuity insurance		**-0.130****	**-0.129****	**-0.086**	**-0.076**
		(-2.239)	(-2.272)	(-1.412)	(-1.267)
Nursing care insurance		**-0.067**	**-0.066**	**-0.073***	**-0.061**
		(-1.604)	(-1.599)	(-1.703)	(-1.412)
Disability insurance		**0.122**	**0.199****	**0.141**	**0.156***
		(1.374)	(2.334)	(1.563)	(1.751)
Additional services					
None		**0.295**	**-0.046**	**-0.130**	**-0.155**
		(0.559)	(-0.096)	(-0.267)	(-0.325)
Risk analysis		**0.227****	**0.238****	**0.243****	**0.224****
		(2.020)	(2.233)	(2.144)	(2.022)
Insurance analysis		**-0.381****	**-0.442****	**-0.435****	**-0.388****
		(-2.086)	(-2.676)	(-2.519)	(-2.288)
Financing counselling		**0.220****	**0.160**	**0.122**	**0.001**
		(2.078)	(1.583)	(1.145)	(0.011)
Old-age pension		**-0.070**	**-0.037**	**-0.055**	**0.012**
calculation and advice		(-0.625)	(-0.347)	(-0.486)	(0.096)
Occupational pensions		**-0.170**	**-0.090**	**-0.042**	**-0.021**
		(-1.200)	(-0.642)	(-0.284)	(-0.147)
Assets management		**0.151**	**0.264***	**0.234**	**0.165**
		(1.011)	(1.850)	(1.566)	(1.126)
Building loan business		**-0.014**	**-0.024**	**0.000**	**0.006**
		(-0.132)	(-0.224)	(0.004)	(-0.048)
Real estate management		**0.143**	**0.087**	**0.084**	**0.064**
		(1.265)	(0.802)	(0.723)	(0.561)
Technical damage		**0.076**	**0.173**	**0.135**	**0.122**
prevention		(0.548)	(1.294)	(0.931)	(0.845)
Management consultancy		**-0.112**	**-0.026**	**-0.042**	**0.105**
		(-0.815)	(0.200)	(-0.303)	(0.756)

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Intermediary type					
Exclusive insurance agent	**-0,668*** **	**-0.416** **	**-0.333***	**-0.232**	**-0.092**
	(-4,892)	(-2.207)	(-1.829)	(-1.145)	(-0.463)
Independent insurance	**-0,259**	**-0.234**	**-0.349** **	**-0.260**	**-0.176**
agent	(-1,421)	(-1.312)	(-2.044)	(-1.404)	(-0.965)
No product range choice		**0.113**	**0.090**	**0.113**	**0.192**
		(0.403)	(0.326)	(0.382)	(0.636)
Choice_reasons					
Price-performance ratio		**0.226**	**0.245**	**0.266**	**0.356**
		(0.823)	(0.901)	(0.913)	(1.207)
Rate of commission /		**-0.149**	**-0.042**	**0.047**	**0.071**
brokerage		(-1.129)	(-0.333)	(0.355)	(0.538)
Risks covered		**0.181**	**0.114**	**0.162**	**0.155**
		(1.088)	(0.721)	(0.960)	(0.937)
Claims settlement		**0.213**	**0.251***	**0.187**	**0.111**
		(1.447)	(1.780)	(1.271)	(0.760)
Information and		**0.510*** **	**0.355** **	**0.289**	**0.197**
advertising material		(2.834)	(2.068)	(1.592)	(1.085)
Further training		**-0.297** **	**-0.249***	**-0.261***	**-0.235**
		(-2.010)	(-1.739)	(-1.710)	(-1.552)
Sales contests		**-0.031**	**-0.039**	**-0.013**	**-0.154**
		(-0.089)	(-0.123)	(-0.036)	(-0.431)
Customers' demand					
Information provision			**-0.044**	**-0.034**	**-0.030**
			(-0.664)	(-0.499)	(-0.441)
Additional services for			**-0.033**	**-0.009**	**0.017**
free			(-0.650)	(-0.172)	(0.322)
Customer segments					
No specialization			**0.092**	**0.020**	**-0.087**
			(0.568)	(0.110)	(-0.448)
Industrial enterprises			**-0.333***	**-0.367***	**-0.306**
			(-1.726)	(-1.768)	(-1.484)
Small and medium-sized			**-0.182**	**-0.236**	**-0.296***
firms			(-1.222)	(-1.490)	(-1.877)

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Professionals			**0.010**	**0.025**	**-0.032**
			(0.080)	(0.194)	(0.249)
Public officials			**0.131**	**0.283**	**0.368**
			(0.540)	(1.141)	(1.451)
Public service employees			**0.290**	**0.172**	**0.060**
			(1.381)	(0.790)	(0.275)
Wealthy households			**0.347****	**0.355****	**0.271****
			(2.870)	(2.734)	(2.166)
Job beginners			**0.144**	**0.172**	**0.164**
			(0.988)	(1.105)	(1.059)
Young families			**0.238***	**0.183**	**0.143**
			(1.643)	(1.209)	(0.950)
Senior citizens			**-0.094**	**-0.123**	**-0.193**
			(-0.498)	(-0.628)	(-0.981)
Customers' knowledge					
Risk profile			**0.064**	**0.039**	**0.031**
			(1.015)	(0.584)	(0.475)
Old-age protection			**0.092**	**0.124***	**0.102**
provisions			(1.367)	(1.743)	(1.423)
(Dis-) Advantages of			**-0.047**	**-0.036**	**-0.033**
insurance products			(-0.784)	(-0.571)	(-0.519)
Signaling activities					
Reputation					
Information				**0.118****	**0.114****
				(2.017)	(1.965)
Good service				**0.138****	**0.171****
				(2.491)	(3.094)
Sales efforts				**-0.028**	**0.019**
				(-0.539)	(0.367)
Signaling instruments					
None				**0.092**	**-1.693**
				(0.075)	(-1.248)
Advertising campaigns				**-0.222**	**-0.263**
				(-1.064)	(-1.250)

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Customer specialization				**-0.094**	**-0.094**
				(-0.799)	(-0.783)
Good service				**-0.208**	**-0.136**
				(-1.373)	(-0.898)
Professional lectures,				**0.311****	**0.304****
seminars				(2.988)	(2.926)
Qualification				**0.151**	**0.180**
				(0.661)	(0.806)
Objective information and				**0.061**	**0.102**
counselling				(0.411)	(0.706)
Specialization on insurer				**-0.056**	**-0.036**
				(-0.344)	(-0.217)
Membership				**-0.243**	**-0.285**
				(-1.300)	(-1.555)
Miscellaneous				**-0.102**	**-0.150**
				(-0.777)	(-1.128)
Membership_reasons					
Legal representation				**-0.130**	**-0.055**
				(-1.105)	(-0.477)
Interest representation				**-0.077**	**-0.112**
				(-0.512)	(-0.760)
Marketing activities				**-0.026**	**0.049**
				(-0.200)	(0.387)
Quality standards				**0.035**	**0.037**
				(0.330)	(0.345)
Policy outlines				**0.298****	**0.296****
				(2.258)	(2.260)
Information exchange				**-0.110**	**-0.027**
				(-0.554)	(-0.138)
Lobbying				**-0.078**	**-0.056**
				(-0.209)	(-0.153)
Miscellaneous				**-0.197**	**-0.331***
				(-1.002)	(-1.702)

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Competition					
Competitive pressure					**-0.308*** **
					(-6.000)
Competitive strategies					
More advertising					**-0.036**
campaigns					(-0.305)
Better counseling quality					**-0.091**
					(-0.737)
Cost reductions					**0.003**
					(0.017)
Consultation time savings					**1.980** **
					(3.122)
Customer specialization					**0.011**
					(0.109)
Additional services for a					**0.033**
fee					(0.226)
Additional services for					**0.042**
free					(0.426)
Miscellaneous					**0.255**
					(1.579)
Competitor_type					
Exclusive agents in a s					**0.248**
econd job					(1.441)
Self-employed exclusive					**0.027**
agents					(0.254)
Independent agents					**-0.255**
					(-1.641)
Insurance brokers					**0.007**
					(0.073)
Insurance consultants					**0.221**
					(0.820)
Direct insurers					**-0.095**
					(-0.884)
Financial services firms					**-0.126**
					(-1.201)

Table 4.9. (cont.)

	Equ. 1	Equ.2	Equ. 3	Equ. 4	Equ. 5
Banks					**0.060**
					(0.583)
Associations/ clubs/					**0.112**
unions					(0.756)
Miscellaneous					**0.020**
					(0.096)

4.3.3 Summary

The results of the estimations in *section 4.3.1* suggest that the information quality provided by insurance intermediaries depends mainly on supply-side factors, in particular on the time spent by an insurance intermediary on further training, claims settlement or counseling interviews and on the quality of the information sources used. Although insurance intermediaries are only weakly regulated, nevertheless, insurance brokers have stronger legal responsibilities in providing information to their clients than insurance agents. However, our evidence suggests that information quality depends mainly on the freedom to autonomously decide on the product range distributed and not on differences in legal obligations. We also find that reputation seems to be the only credible instrument to signal high quality information services for an insurance intermediary. An increase in competition has no positive impact on market outcomes in terms of the information quality provided. However, a higher level of consumers' knowledge about insurance specific topics, that is, financial literacy among consumers and a stronger demand for high information quality might improve overall market performance.

In contrast to these findings, supply-side factors have no significant impact on the contract conclusion rate as reported in *section 4.3.2*. Obviously, there is no direct positive relationship between the quality of the information services provided by an insurance intermediary and his economic success. However, again it holds true that positive reputation proves to increase market performance. All in all, our finding that different variables have a significant impact on the dependent variables suggests that the contract conclusion rate is only an insufficient measure for information quality. Using the *contract conclusion rate* as dependent variable reduces the explanatory power of our estimations. It results in a lower adjusted R^2 than using the *information index* variable. This indicates that economic performance is influenced by other factors omitted in our estimations. In par-

ticular, selling skills and psychological abilities should influence the success rate of an intermediary in direct personal contact with customers.

5 Conclusions

Adequate private insurance becomes more important for consumers due to the demographic changes ahead, reductions in public insurance coverage and de-regulation of insurance markets. To have the 'right' insurance protection requires consumers to make well-informed purchase decisions. By providing comprehensive information on insurance-related issues, insurance intermediaries can help consumers to economize on information and transaction costs, which tend to be high for these complex goods due to incomplete and asymmetric information. However, the market for insurance mediation is itself characterized by incomplete and asymmetric information about the quality of the services provided by insurance agents and brokers. Hence, the objective of this study was to provide more profound insights into the contribution of insurance intermediaries in enhancing transparency in insurance markets both from a theoretical and empirical perspective.

In *chapter 2* we examined the potential benefits from intermediated search and analyzed the working of insurance intermediary markets from a theoretical point of view. In *section 2.2* we developed a search theoretical model to insurance intermediation. It showed that intermediated transactions result in net gains when compared to unmediated transactions because insurance intermediaries can realize economies of scale and scope. Specialization in acquiring and processing information leads to further cost reductions, so that intermediated search becomes even more beneficial for consumers. Given consumers with heterogeneous preferences for information service quality, insurance intermediaries, who provide information services of different quality levels, are economically viable. This result holds true even in the more realistic case of asymmetric information among consumers about the true quality of the information content provided by insurance intermediaries.

In *chapter 3* we analyzed market conduct and performance in more detail. Given free market entry, the number of insurance intermediaries and, thus, the degree of horizontal product differentiation is limited by the fixed costs of providing information services. However, a larger number of intermediaries in the market and therefore more intense competition does not necessarily lead to the provision of better information quality. Incomplete

information about the information quality provided by insurance intermediaries results in positive search costs for consumers. This allows intermediaries to earn monopolistic profits. However, the higher the proportion of consumers with low search costs due to better knowledge is, the higher the overall quality in the market is and the lower the information rents realized from consumers' incomplete information are. Finally, we extended our analysis to account for asymmetric information on consumers' side. Because of the experience and credence goods characteristics of information services, signaling instruments work only poorly in credibly indicating the provision of high quality information. Moreover, insurance companies apply vertical restraints and remuneration schemes to increase the sales efforts of their intermediaries. These enforce further potential bias in the advice given by insurance intermediaries and, thus, intensify the tendency towards low information quality. However, the resulting information rents may attract outside intermediaries to enter the market. By offering additional services, which reduce consumers' incomplete and asymmetric information, overall information quality may improve. All in all, the theoretical analysis led to a somewhat mixed result. On the one hand, insurance intermediaries enable consumers to realize gains from intermediated trade. On the other hand, due to incomplete and asymmetric information about the services provided, competition results only in rather low overall information quality.

In *chapter 4* we tested the main implications of the theories discussed so far. Based on a survey among exclusive insurance agents, independent agents and insurance brokers, we performed OLS estimations. The econometric results confirmed the main theoretical findings. Supply-side factors show the strongest impact on the information quality provided. Besides, consumers' knowledge also has a positive influence on market outcomes in terms of the information quality offered. By contrast, only reputation works as a credible signal, while competitive pressure and competitive strategies do not lead to the provision of higher information quality.

Since the German market for insurance intermediaries is largely unregulated up until now, it provides an appropriate test case for the working of unrestricted quality competition. Our empirical findings confirm the theoretical expectations in that competition works poorly in inducing intermediaries to provide high quality information servicse when consumers have only incomplete and asymmetric information. This raises the question as to the proper regulation of insurance intermediaries from a consumer protection point of view.

In 2002, the EU directive on insurance mediation was introduced. Its implementation requires stricter regulations in the German market as well. The directive covers the scope of persons to whom it applies, the introduc-

tion of a "European passport" for insurance intermediaries which requires them to be registered, and the disclosure of minimum information to customers prior to contract conclusion. Besides, intermediaries are obliged to document customers' demands and needs along with the reasons for the advice given. For insurance brokers property liability insurance now becomes compulsory. Moreover, the directive states various sanctions in case there are violations.

Thus, with the implementation of the EU directive within the next months changes in the restrictions guiding competition are to be expected. In general, disclosure requirements increase transparency on whether there are potential conflicts of interests for an intermediary between the provision of high quality information to his customers and the sales efforts for the insurance company he represents. Documentation requirements and compulsory property liability insurance for brokers may improve consumers' chances in case that there is a legal conflict years after contract conclusion. However, given the low level of knowledge, which most consumers have on insurance issues, it is doubtful whether documenting why a certain insurance product has been recommended will prevent intermediaries from providing unsound information and advice.

All in all, so far it remains an open question whether the EU directive will actually increase the information quality provided by insurance intermediaries without improving consumers' financial literacy and strengthening their demand for high quality services. However, the information rents to be earned due to incomplete and asymmetric information may attract additional outside intermediaries who provide innovative services. Taken together with consumers' growing awareness of the necessity of possessing proper insurance coverage this may lead to better market performance in terms of the information quality provided.

Appendix

Table A.1. Quality Differences between Exclusive Agents and Insurance Brokers

Method: Parametric test (Student's *t*)

Variable	Mean value		t-test
	Exclusive agents	Insurance brokers	Level of significance
Structural variables			
Firm size and employment structure			
Employees	3.18	5.05	***
Insurance intermediaries	1.86	2.76	***
Other staff	1.42	2.16	
Specialization			
Turnover in private customers (in %)	72.13	56.09	***
Customer variables			
Level of information			
Own risks	3.37	3.31	
Options for private old age security	3.21	3.29	
Insurance services vs. other types of investment	3.61	3.73	
Demand for information			
Capital sum life insurance	2.05	2.41	***
Specific rest-life life insurance	2.82	3.17	***
Unit-linked life insurance	1.55	1.60	
Annuity insurance	1.96	2.24	***
Health insurance	1.41	1.30	
Nursing care insurance	2.38	2.62	
Disability insurance	1.29	1.19	
Quantitative input indicators			
Time budget(in %)			
Acquisition of information	17.61	24.65	***
Counseling interviews	40.79	32.95	***
Further training	11.13	12.24	
Claim settlement	11.52	11.01	
Advertising efforts	6.39	6.04	
Administration	4.33	6.08	
Other	8.63	7.10	
Further training and conferences (number)	5.74	7.76	***
Duration of counseling (minutes)			
General counseling interviews	47.94	67.14	***
Counseling on private old-age security	75.79	89.71	***

Table A.1. (cont.)

Variable	Mean value		t-test
	Exclusive agents	Insurance brokers	Level of significance
Qualitative input indicators			
General information[1]			
Individual security gaps	1.35	1.42	
(Dis-) Advantages of different security options	2.10	1.86	***
Taxation and social policy regulation	2.47	2.30	
Product information[1]			
Insurance and product types	2.05	1.98	
Type and coverage of the insured risks	1.65	1.61	
Price-performance tests	2.55	1.75	***
Premium design	2.72	2.34	***
Cost components	3.77	3.22	***
Claim settlement	2.06	2.38	***
Information on contract design[1]			
Contract period	2.52	2.29	
Termination options	3.06	2.68	***
Procedures of contract modification	2.11	2.25	
Costs of contract modification	2.73	2.38	***
Conflict settlement	2.55	2.48	
Information on old-age security[1]			
Specific rest life insurance vs. capital sum life insurance	2.16	2.16	
Capital sum life insurance vs. Riester policy	1.80	2.21	***
Occupational pension schemes vs. private old-age insurance	2.12	1.71	***
Investment funds	2.48	2.08	***
Tax advantages	2.28	2.02	***
Cost calculation by change of policy	3.01	2.90	
Performance of insurance companies	2.52	1.76	***
Disadvantages of zillmering	3.41	3.00	***
Information on surplus calculations[1]			
Guaranteed performance	1.74	1.63	
Past effective surplus	2.18	2.14	
Surplus determinants	3.08	2.79	***
Surplus and interest rate changes	2.22	2.12	
Non commitment	1.84	1.70	

Table A.1. (cont.)

Variable	Mean value		t-test
	Exclusive agents	Insurance brokers	Level of significance
Qualitative subscales[1]			
Security demand and options	1.79	1.72	
Products for risk provision	2.38	1.97	***
Private old-age insurance	2.39	2.42	
Contract design	2.61	2.40	***
Product design	3.01	2.44	***
Contract execution	2.30	2.43	
Information on calculations for participation in profits	2.21	2.08	
Qualitative overall index[1]	2.39	2.18	***
Output indicators			
Success rate (in %)			
General interviews	57.06	71.66	***
Old-age counseling interviews	46.35	65.17	***
Competitive pressure	2.37	2.97	***

*** 0.1 % level of significance

[1] five-point rating scale with 1 = strongly agree (resp. very important) ... 5 = strongly disagree (resp. totally unimportant).

Source: Eckardt (2002a, 20-21).

List of Figures

List of Tables

List of Used Symbols

Section 1.3

C	Opportunity costs
Con	Consumer
C^D	Insurance company's opportunity costs under direct exchange
C^I	Insurance company's opportunity costs under intermediated exchange
D	Direct exchange
I	Intermediated exchange
Ins	Insurance company
T	Transaction costs
T_{Con}^D	Consumer's transaction costs under direct exchange
T_{Ins}^D	Insurance company's transaction costs under direct exchange
T_{Con}^I	Consumer's transaction costs under intermediated exchange
T_{Ins}^I	Insurance company's transaction costs under intermediated exchange
V	Willingness to pay
V^D	Consumer's willingness to pay under direct exchange
V^I	Consumer's willingness to pay under intermediated exchange

Section 2.1

β_j	j^{th} consumer's willingness to pay for a certain attribute value
$\left[\beta_1(.), \beta_2(.)\right]$	Willingness to pay of consumers who are indifferent between searching individually and consulting an intermediary (= boundaries of the integration which define the market segment served by an intermediary)
$\left[\beta_1^{I_i}(.), \beta_2^{I_i}(.)\right]$	Boundaries of integration which define the market segment served by intermediary i with i = 1,2
λ	Parameter of the exponential distribution for objects' quality
σ_β	Standard deviation of the normal distribution $h(\beta)$ (= heterogeneity of consumers' preferences)
μ_β	Mean value of the normal distribution $h(\beta)$ (= consumers' mean willingness to pay)
c	Search costs for a single step in the search process

c_i	Search costs of intermediary i with i = 1,2 for a single observation
C^I	Total search costs of an intermediary
C_i^I	Total search costs of intermediary i with i = 1,2
$E[n]$	Expected number of observations
$E[N]$	Expected number of clients of the information intermediary
$f(X)$	Probability density function of X
F^I	Fee charged by an information intermediary
F_{high}^I	High fee charged by an intermediary
F_i^I	Fee charged by intermediary i with i = 1,2
$F_{i:high}^I$	High fee charged by intermediary i with i = 1,2
$F_{i:low}^I$	Low fee charged by intermediary i with i = 1,2
F_{low}^I	Low fee charged by an intermediary
$F_{\min}^I$	Minimum fee charged
$F(X)$	Cumulative density function of X
$G(X_m)$	Expected additional net reward from one further observation X_m
$h(\beta)$	Probability density function of β
$H(\beta)$	Cumulative density function of β
i	Specific object or observation made
I	Intermediary
I_i	Intermediary i with i = 1,2
j	j[th] consumer
n	Number of observations
N	Number of customers (= market size)
P^I	Expected profit of an intermediary
P_i^I	Expected profit of intermediary i with i = 1,2
R^I	Expected revenue of an intermediary
R_i^I	Expected revenues of intermediary i with i = 1,2
U_i^I	Utility (= expected net reward) of the consumer from using the services of intermediary i with i = 1,2
U_j^I	Utility (= expected net reward) of the j[th] consumer from using the services of an intermediary I
$U_j(x^*)$	Utility (= expected net reward) of the j[th] consumer from personal search
$U_j(X_i)$	Utility of the j[th] consumer for a certain attribute value X_i
x^*	Reservation value of the optimal personal search strategy of the j[th] consumer
X	Random variable of the product attribute

X_i	Single observation of the random variable X
X_m	A further observation made in the search process
X^I	Information level offered by an information intermediary
$\overline{X}^I$	Fixed information level offered by an information intermediary
X_i^I	Information level provided by intermediary i with i = 1,2
X_{high}^I	High information level offered by an intermediary
$X_{i:high}^I$	High information level offered by intermediary i with i = 1,2
$X_{i:low}^I$	Low information level offered by intermediary i with i = 1,2
X_{low}^I	Low information level offered by an intermediary
$X_{\max}^I$	Maximum information level offered

Section 2.2

β	Consumer's willingness to pay for a certain information level
β_j	j^{th} consumer's willingness to pay for a certain information level
$\left[\beta_1^{I_i}(.), \beta_2^{I_i}(.)\right]$	Boundaries of the integral which define the market segment served by intermediary i with i = 1,2
$\left[\beta_1^{I}(.), \beta_2^{I}(.)\right]$	Boundaries of the integral which define the market segment served by an intermediary
ε	Disturbance parameter
ε_λ	Degree of incorrect information about the underlying information distribution (= noise about the correct information distribution)
ε_λ^1	Degree of incorrect information about the underlying information distribution as perceived by intermediary 1
ε_{agent}	Degree of incorrect information about the information level Y provided by an insurance agent as perceived by consumers
ε_{broker}	Degree of incorrect information about the information level Y provided by an insurance broker as perceived by consumers
ε_Y	Degree of incorrect information about the information level Y provided by an intermediary as perceived by consumers
ε_{Yi}	Degree of incorrect information about the information level Y provided by intermediary i with i = 1,2 as perceived by consumers
λ	Parameter of the exponential distribution for information about Y
λ_{agent}	Parameter of the exponential distribution for information about Y to which an insurance agent has access
λ_{broker}	Parameter of the exponential distribution for information about Y to which an insurance broker has access
λ^I	Parameter of the exponential distribution for information about Y to which an intermediary has access
λ_i^I	Parameter of the exponential distribution for information about Y to which intermediary i has access with i = 1,2
λ^{pers}	Parameter of the exponential distribution for information about Y to

	which consumers have access
σ_β	Standard deviation of the normal distribution $h(\beta)$ (= heterogeneity of consumers' preferences)
σ_{inf}	Standard deviation of the information distribution $f(Y)$
μ_β	Mean value of the normal distribution $h(\beta)$ (= consumers' mean willingness to pay)
μ_{inf}	Mean value of the information distribution $f(Y)$
μ_{inf}^{pers}	Mean value of the information distribution $f(Y)$ to which consumers have access
μ_{inf}^{I}	Mean value of the information distribution $f(Y)$ to which an intermediary has access
A	Alternative variant
c^I	Search costs of an intermediary for a single observation
c^{pers}	Personal search costs for a single observation
C^I	Total search costs of an intermediary
C_{asym}^I	Total search costs spent by an intermediary under asymmetric information
C_{fix}^I	An intermediary's fixed search costs
C_i^I	Total search costs of intermediary i with i = 1,2
C_{sym}^I	Total search costs spent by an intermediary under symmetric information
C_{fix}^{pers}	Consumer's fixed costs of personal search
$C(O)$	Transaction costs of a consumer when using the services of an intermediary
$C(O^I)$	Marketing costs spent by an intermediary
$E[n]$	Expected number of observations
$E[N]$	Expected number of customers (= expected market size)
$f(Y)$	Probability density function of the random variable Y
F^I	Fee charged by an intermediary
F_i^I	Fee charged by intermediary i with I = 1,2
$F(Y)$	Cumulative density function of the random variable Y
$g(X)$	Probability density function of the random variable X
$G(X)$	Cumulative density function of the random variable X
$h(\beta)$	Probability density function of β
I_i	Intermediary i with I = 1,2
n	Number of observations
N	Number of customers (= market size)
O	Efforts incurred by a consumer when using the services of an inter-

	mediary
O_{agent}	Marketing efforts spent by an insurance agent
$O_{bro\,\mathrm{ker}}$	Marketing efforts spent by an insurance broker
O^I	Marketing efforts spent by an intermediary
$\overline{O}^I$	Fixed level of marketing efforts spent by an intermediary
O^I_{high}	High marketing efforts spent by an intermediary
O^I_i	Marketing efforts spent by intermediary i with i = 1,2
$O^I_{i:high}$	High marketing efforts spent by intermediary i with i = 1,2
$O^I_{i:low}$	Low marketing efforts spent by intermediary i with i = 1,2
O^I_{low}	Low marketing efforts spent by an intermediary
P^I	Expected profit of an intermediary
P^I_i	Expected profit of intermediary i with i = 1,2
R^I	Expected revenues of an intermediary
R^I_{asym}	Expected revenues of an intermediary under asymmetric information
R^I_i	Expected revenues of intermediary i with i = 1,2
R^I_{sym}	Expected revenues of an intermediary under symmetric information
u	Market penetration rate of an intermediary
U^I	Utility (= expected net reward) of consumers from using the services of an intermediary
U^I_i	Utility (= expected net reward) of consumers from using the services of intermediary i with i = 1,2
$U(y^*)$	Consumer's utility (= expected net reward) from personal search
X_i	Single observation of an insurance product variant i with i = 1…m
X_{ij}	Attribute value of an insurance product variant i in relation to a particular consumer j with j = 1 …n
y^*	Reservation value of the optimal personal search strategy for the j^{th} consumer
Y	Random variable which indicates the attribute value of the information about the usefulness of an insurance product for a certain consumer
Y_{agent}	Information level provided by an insurance agent
$Y_{bro\,\mathrm{ker}}$	Information level provided by an insurance broker
Y^I	Information level provided by an intermediary
$\overline{Y}^I$	Fixed information level provided by an intermediary
Y^I_{asym}	Information level provided by an intermediary under asymmetric information

Y_{cons}^{I}	Information level provided by an intermediary as perceived by consumers
Y_{i}^{I}	Information level provided by intermediary i with i = 1,2
Y_{high}^{I}	High information level provided by an intermediary
$Y_{i:high}^{I}$	High information level provided by intermediary i with i = 1,2
$Y_{i:low}^{I}$	Low information level provided by intermediary i with i = 1,2
Y_{low}^{I}	Low information level provided by an intermediary
Y_{sym}^{I}	Information level provided by an intermediary under symmetric information

Section 3.1

π_k	Total price paid by a consumer
a	Vertical market size
AC	Average cost curve
b_k	Direct price elasticity of demand
b_j	Cross price elasticity of demand
$c(q_k)$	Unit costs of providing q_k
$C(q_k)$	Total costs of providing q_k
$C'(q_k)$	Marginal costs of providing q_k
C_{fix}	Fixed costs
D	Demand curve
e	Costs for a unit of marketing efforts
E_k	Marketing efforts spent by intermediary k
K_{ki}	Level of knowledge of consumer i about insurance products and the services provided by intermediary k
MC	Marginal cost curve
MR	Marginal revenue curve
n	Number of intermediaries in the market
p_k	Price charged by the representative intermediary k
p_0	Short-run equilibrium price
p_1	Long-run equilibrium price
q_k	Quantity offered by the representative intermediary k
q_j	Quantity offered by intermediary j with j=1…n
q_0	Short-run equilibrium quantity
q_1	Long-run equilibrium quantity
t_{ki}	Time spent by consumer i for using the services of intermediary k
T	Total costs including search costs and marketing costs

w_i	Wage rate of consumer i

Section 3.2

α	Rate of informed consumers
ε	Mark up in the competitive price
AC	Average cost curve
AC^u	Average costs given q^u
c	Consumer's search costs about an intermediary's service quality s
D	Demand curve
L	Number of consumers in the market
n	Number of intermediaries
p	Implicit price per unit service quality s
p^c	Competitive price
p^m	Monopolistic price
p^u	Consumer's maximum willingness to pay
q^u	Residual demand given p^u
s	Service quality
s^c	Competitive service quality
s^m	Monopolistic service quality
t	Time spent by a consumer for using the services of an intermediary
w	Wage rate of a consumer

Section 3.3.1

β	Consumer's perceived benefits of an insurance product
δ	Dishonesty costs
θ	Proportion of dishonest intermediaries with identical dishonesty costs δ
ρ	The true benefits of the marginal misled consumer
b	True benefit of an insurance product
c	Marginal costs of the insurance product
$F(b)$	Distribution of benefits
k	Commission
k^e	Maximum expected commission
$K(n)$	Acquisition costs
$K'(n)$	Marginal acquisition costs depending on the number of intermediaries
l	Amount of incomplete, false or misleading information
MR	Marginal revenue
n	Number of intermediaries in the market
$n[r(p,k),w]$	Intermediary supply function
n^e	Optimal number of intermediaries

n_i	Supply function of (dis-)honest intermediaries with i=0,1
n_0	Number of honest intermediaries in the market
n_1	Number of dishonest intermediaries in the market
p	Price
p^*	Revenue maximizing price
r	Expected revenue of an intermediary
r_0	Expected revenue of an honest intermediary
r_1	Expected revenue of a dishonest intermediary
w	Reservation wage of an intermediary
w_0	Reservation wage of an honest intermediary
w_1	Reservation wage of a dishonest intermediary

Section 3.3.4

a	Consumers' valuation of product differentiation
AC	Average cost curve
c	Marginal costs
C_{fix}	Fixed costs
l	Brand specification
l_i	i-th brand specification
l^*	Product specification most preferred by a consumer
L	Number of consumers in the market
MR	Marginal revenue curve
n	Number of firms in the market
n_c^*	Profit-maximizing number of brands in the competitive region
n_m^*	Profit-maximizing number of brands in the monopoly region
p	Price demanded by the representative firm
p_i	Price for the i^{th} brand specification
$\overline{p}$	Price charged by the competing firms
p_{kink}	Price at the kink demand q_{kink}
p_c^*	Profit-maximizing price in the competitive region
p_m^*	Profit-maximizing price in the monopoly region
q_c	Competitive demand
q_{kink}	Quantity where monopoly demand equals competitive demand
q_m	Monopoly demand
q_m^*	Profit-maximizing quantity in the monopoly region
q_c^*	Profit-maximizing quantity in the competitive region
$\overline{s}$	Net surplus resulting from buying the outside good
u	Utility obtained from the consumption of the most preferred product specification l^*

U	Utility
v	Reservation price of the differentiated good
x_c	Maximum distance between the most preferred product specification l^* and the next brand l in the competitive region
x_m	Maximum distance between the most preferred product specification l^* and the next brand l in the monopoly region

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