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Efficiency and collusion in Dutch real estate brokerage

The case of a twentieth century middlemen's guild*

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Abstract

In this paper we examine the efficiency of Dutch real estate brokerage industry and the question whether this particular service industry is characterized by (tacit) collusion. The Dutch real estate brokerage cartel NVM (Nederlandse Vereniging van Makelaars) restricts competition by means of the multiple listing service (MLS) and by restricting the choice set of consumers. Furthermore, the brokerage fees are non-state contingent and not in accordance with the preferences of buyers and sellers of houses. This setting does not provide enough incentives for real estate brokers to generate more transactions and align the interests of the broker and the customers. The fixed brokerage selling and buying fees shift the risk of the agent to the principal, whereas a true intermediary should bear a larger part of the risk. Furthermore, commission fees as set by the NVM are determined by the cost structure of its weakest members, the small NVM brokerage firms. Fees are set too high with the consequence that buying brokers set their reservation price too high and selling brokers set their reservation price too low. Future antitrust policy should aim at making consumer organizations more centralized so that they can internalize the externalities of collusive bargaining, making the MLS accessible to all consumers and non-organized brokers, and propose state-contingent negotiable commission fees.

JEL Classification: L40, L85

Colofon

Abstract (in Dutch*)

Met het in werking treden van het Besluit horizontale prijsbinding per 1 juli 1993 heeft de oud-staatssecretaris Van Rooy de knuppel in het hoenderhok gegooid. Het doel van het Horizontale prijsbindingsbesluit is om de concurrentie op markten in Nederland te laten toenemen zodat monopoliewinsten afnemen en terugvloeien naar de consument. In de komende jaren zullen bepaalde markten onder de loep worden genomen die gekarakteriseerd worden door kartelvorming. De Nederlandse bemiddelingsmarkt voor onroerend goed is zo'n markt; een markt die gedomineerd wordt door een defensieve opstelling van het NVM-kartel en een progressieve opstelling van de 'kartelbetwister' VBO. De NVM kenmerkt zich door een prijsbeleid dat is afgestemd op de zwakste schakels in haar organisatie - de kleine makelaarskantoren - waardoor grotere makelaarskantoren in de gelegenheid worden gesteld om buitengewone winsten te behalen. Bovendien kent de NVM-organisatie een defensieve houding ten aanzien van nieuwe ontwikkelingen op het terrein van de bemiddeling. De VBO is daarentegen een progressieve instelling die vooruitloopt op de mededingingswetgeving en lagere zoekkosten bereikt in de bemiddeling onroerend goed dan de NVM-makelaar met een vergelijkbare ondernemingsgrootte. De gebrekkige marktwerking in de makelaardij brengt kosten met zich mee die variëren van 207 tot 291 miljoen gulden per jaar. De oorzaak van deze ondoelmatigheid is te traceren tot de makelaarscourtages die niet overeenkomen met de voorkeuren van de klanten en die bovendien niet resultaatafhankelijk zijn. Voorts bezit de NVM met haar marktinformatiesysteem een middel om het prijskartel in stand te houden. De beleidsmogelijkheden om de bemiddelingsmarkt voor onroerend goed open te breken zijn: het aanbieden van resultaatafhankelijke courtages, het afdwingen van één algemeen marktinformatiesysteem dat toegankelijk is voor zowel consumenten als bemiddelaars, het stimuleren van kortlopende zoekcontracten, het aanbieden van deeldiensten, het versterken van de positie van consumentenorganisaties (zoals de Vereniging Eigen Huis (VEH) en de Consumentenbond), het doorzichtiger maken van onroerend goedveilingen en een verhoging van de efficiency van makelaarskantoren, bij voorbeeld door franchisevorming.
Het afkondigen van het Besluit horizontale prijsbinding is een ontwikkeling ten goede in de Nederlandse economische politiek. In het licht van het prijszettingsgedrag van de NVM en recente uitkomsten van een onderzoek van de VEH moet men echter terughoudend zijn met té optimistische verwachtingen van meer marktwerking. Het vrijlaten van de prijzen kan door een stabiel prijzenkartel als de NVM stilzwijgend worden geneutraliseerd. Vorig jaar kwam bijvoorbeeld naar voren dat de NVM-erecode onder andere inhoudt dat individuele leden niet openlijk mogen adverteren met courtages. De zogenaamde 'collegialiteit' komt blijkbaar op de eerste plaats en niet de belangen van de klant. Voorts bleek dat in 1994 tweederde van de NVM-makelaars nog steeds de oude adviestarieven volgt. De NVM gedraagt zich vooralsnog te veel als een kartel en de beste resultaten van een marktwerkingsbeleid zijn te verwachten wanneer de consument opkomt voor zijn recht en het kartel breekt door gebruik te maken van verschillende deeldiensten, korte termijncontracten, door toegang af te dwingen tot één algemeen marktinformatiesysteem en vooral door te onderhandelen met makelaars over courtages.

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1. Introduction

Government regulation of Dutch real estate brokerage has led to a number of policy measures as of February 1, 1994 that are, according to some observers, a step into the dark and, of course, according to the initiators a welfare enhancing policy action. It is part of the initiative of Dutch government to break up cartels that have flourished for so many years in the Netherlands. In 1992 there were approximately 188 cartels[1] in the Netherlands of which the majority of these cartels had price-fixing arrangements (see De Jong, 1992). One of these cartels that has dominated a market for consumer services is clearly visible in the real estate brokerage industry. One of the major changes that has taken place is that real estate brokers may no longer set prices collusively and brokerage fees and tariffs are in principle negotiable and can no longer be fixed. The break with earlier antitrust policy is, however, a policy that might induce brokers to replace explicit collusion by tacit collusion and the chances are that brokers will return to 'business as usual'. The merits of a competitive brokerage industry are theoretically sound: general equilibrium theory would predict that competition, in the absence of externalities, will benefit the consumer and the producer. The challenge at this juncture is first and foremost to make things work better, i.e. design a brokerage market that can effectively break the price-fixing NVM (Nederlandse Vereniging van Makelaars in onroerende goederen) cartel. At this moment the regime change of a stricter antitrust policy cannot be assessed econometrically. However, one can make predictions on the basis of theory by assessing the structural parameters of the Dutch real estate brokerage and based on those 'deep' parameters one can deduce whether, e.g., the design of brokerage contracts, as outlined in the new regime of enhanced competition, are efficient. It is this latter method that will be used throughout the paper in the evaluation of the efficiency of the Dutch brokerage industry. The Dutch real estate brokerage industry offers not only a test case for Dutch antitrust policy; interest for this particular market should also trigger foreign minds because this industry has a richness that one does not come across that often: the diversity of market participants - real estate brokers and intermediaries - offers an interesting comparison between the behaviour of cartel and fringe firms, a rich history of the brokerage industry that might prove worthwhile in interpreting the Dutch stance in tolerating monopolies and cartels, the presence of alternative allocation mechanisms in allocating real estate (auctions, queuing, the use of middlemen or simply privately conducted transactions) and, last but not least, as of today we can make a distinction between two regimes: a monopolistic setting and a competitive setting.

In this paper we will examine three questions relevant for understanding the mechanisms behind real estate brokerage. The first question dealt with in this paper concerns the efficiency of the real estate brokerage contracts: is the structure of commissions fees efficient, i.e. does it induce brokers to tailor their services to their customers' demands? Based on the principal-agent literature one can start reviewing the optimality of the fixed-commission contracts that are most common in real estate brokerage.

The second question examined in this paper focuses on the efficiency of the broker in providing its middlemen services and this question is closely related to the one on contract efficiency. A full-fledged comparison between colluding and fringe brokers is not within reach, since data on the cost-benefit structure of the relevant market participants are scanty. The picture that we draw of the real estate brokerage industry must be seen as impressionistic one, deduced on the basis of indirect, and sometimes revealing data.

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1. Others report the existence of 759 cartels in 1992 as registered in the secret cartel register (see OECD, 1993, Competition and Competition Policy: the Unusual Dutch Case, OECD Economic Surveys, Netherlands, Paris.

The third question is a prospective one, viz. what can we expect of the effects of antitrust regulation on real estate brokerage firms? Based on theories of industrial organization we try to disentangle the effects of breaking the cartel on the prices charged for brokerage services, profitability and real estate equilibrium prices. If explicit collusion is turned in a setting with tacit collusion one can make some general deductions on firm behaviour.

The paper closes with a number of policy options that might improve the workings of the market for real estate brokerage. Before reviewing all these questions we will start with a short introduction on the history and current state of the market for housing and real estate brokerage in the Netherlands (section 2). This section will be followed by a principal-agent model of real estate brokerage in Section 3, which covers competitive and a monopolistic scenarios to evaluate the behaviour of real estate brokers. Section 4 will cover the microeconomic and macroeconomic efficiency of the brokers, followed by a section that deals with the question whether or not Dutch real estate brokers have acted collusively. Section 6 provides some policy options for the Dutch brokerage industry that might be read as an introduction on "How to break a cartel". Finally, Section 6 winds up with some general conclusions.

2. A bird's eye view of dutch real estate brokerage

2.1 History

The origin of real estate brokerage in the Netherlands can be traced back several centuries, although a specialization of real estate brokerage was not known to exist at that time. Brokerage as a profession has been known to exist in the Netherlands as early as 1284. In that year Count Floris V granted the city of Dordrecht the right to appoint brokers. Brokers were however generally seen as quacks ('beunhazen'[2]). The profession was not acknowledged officially by the city council and practising the trade of broker was free for all. From a decree of 1530 it appears that the city council appoints brokers officially. Only Amsterdam lagged behind in the acknowledgement of the broker as a profession and restricted brokerage for a long time. At one point in time (1495) brokers were forbidden to practise their profession in Amsterdam. Brokers had to deal in those days with quacks who had a negative impact upon the image of the broker. In 1531 eleven brokers were appointed officially and two years later this number had grown to 210. It was also made known to brokers that quacks, if discovered, were to be punished for six Carolus guilders or to be banned for 4 years from the city. In order to protect the name and image of broker, the appointed brokers agreed to form a guild ('Gilde'). However, the formation of a brokers' guild did not improve their image or reputation greatly. It was, e.g., known that brokers obtained orders by 'threatening' their principals. In 1599 the punishment for quacks was increased: for a first-time offense one could choose for one year of banishment from the city or 12 Carolus guilders with a flogging. The punishment was doubled for second-time offenses. All fines were paid into a trust fund (a so-called 'bosse'), from which the needy brokers obtained a payment.

In 1563 a new decree was made public: all brokers had to contribute every two weeks their commission fees into a common box, which would be evenly divided among the brokers. If the group of brokers became too large it would be divided into two groups. In 1578 another decree was made known, which greatly enhanced the status of the broker: a broker was not allowed to deal with a case if one of the parties was insolvent. Two years later the article was added that it was forbidden to trade on one's own account. The brokers's guild gained esteem and to become a member of this guild was made increasingly difficult. One had to show receipts of payments of the city's taxes ('recognitiegelden'). Then the guild examined the candidate's record for a history of pettifoggery. If this was the case the candidate lost its recognition payments. Otherwise one was sworn in as a broker and as proof of this appointment the broker was given a broker's stick, which the broker had to show to merchants at the market whenever he made transactions for other merchants. Furthermore, the duties of a guild member were financial as well as physical: one had to pay an entrance fee of 40 guilders and from permanently four Stuivers (i.e. five cents) every week[3]. If called upon, guild members had to assist at funerals and in 1696 it was made obligatory to ware a black cape at funerals with the penalty of being excluded from the receipt a bonus, which was standard in those days.

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2. The term 'beunhazen' is thought to stem from the Amsterdam idiom "die als hazen op de beunen (pakhuizen) afkomen om te onderzoeken, of er ook een koop voor hen moch te sluiten zijn" (Engelsman, 1977, p.8).

3. The Guild became more and more affluent in time and in 1632 they could build a Guild House from their savings for the amount of 9600 guilders. One can still find this building at the N.Z. Voorburgwal 75, where above the entrance the title 't Maeckelaerskantoor is enscribed.

In the Netherlands of the 16th century the brokers specialized in different trades and for the first time one encounters the use of real estate brokers in day-to-day trade. Real estate was auctioned in those days and the arrangement was that brokers had to ask a permit for each and every auction. The poor house in Amsterdam (viz. the 'Aalmoezeniersweeshuis') received 0.5% of the total volume of sales and 0.25% of the houses sold beforehand. Around 1720 the broker's image and importance had deteriorated: they traded like merchants, an aspect that was strictly forbidden and the overall brokers moral to fight pettifoggery was low. The monopoly position of the brokers' guild created the possibility that some brokers were not appointed on account of their skill but on account of the bribes they gave. The Dutch government, in principle in favour of the monopoly position of brokers, tried to correct this dismal situation. They realized that strict fulfilment of the rules was impossible and therefore opted for what they considered a second-best choice: anyone could be a broker. The general feeling was that government could not guarantee a brokerage transaction, free of moral hazard and fraud, and the only rule that applied at that time was 'caveat emptor', in other words 'buyer beware'. Merchants had to discover by their own experience which broker was trustworthy and which broker was not. The French government put an end to the existence of brokers' guilds in 1798. Brokerage was, however, still not a completely competitive industry. Appointments were still made by the city council and candidates were tested by a committee of Commerce and Seafaring. Between 1798 and 1838 the Commerce Law did not recognize the broker officially, although in actual practice city councils still appointed them. In 1838 the Commerce Law is introduced and in article 62 it is stated that "brokers are intermediaries appointed by local government". Local government was however an ambiguous term, which could mean the Mayor and Aldermen ('Burgemeester en Wethouders') or the City Council. The High Court decided in 1851 that the City Council was the appropriate authority. However, the organisation of the individual interests of brokers materialized only in 1877 when in Amsterdam the Society for Brokers was founded, which was later transformed into the MVA (the Brokerage Association Amsterdam). The Dutch Union of Brokers in Real Estate, Mortgages and Insurance (NBM) was founded in 1898.

After the Second World War a number of brokers demanded a selective policy of entry to the NBM, while another group of brokers was firmly against this policy line. The consequence was two organizations: the NBM with a restrictive policy and the Netherlands Association of Brokers and Intermediaries in Real Estate (NVMT) with a permissive policy. Later on the NBM and the NVMT merged and the NBM formed a federation with the MVA: the Netherlands Federation of Brokers (NFM). This organization was mainly meant for taking care of common interests of both associations and the level of education of new brokers. In 1960 the NBM really started taking charge of the market for real estate brokerage: it formulated an code of honour for its members, a uniform fee for appraisals. In 1965 the NBM completed its monopoly position by fixing the commission fees for brokerage services on a national scale. The setting of fees in a monopolistic fashion was not in the least hindered by the Dutch government. The idea of that time was that a monopoly was in the interest of consumers and producers. For instance, in 1955 the Committee Greup was appointed to examine whether the legal status of 'sworn in'-brokers and 'not sworn in'-agents had to be changed. In 1966 this led to changes in the law that had two notable characteristics: (1) the brokerage industry was open to all potential real estate brokers, although the title of 'broker' was still protected; and (2) The official appointment of broker could only be made if the candidate had passed the exams of the Dutch Federation of Real Estate Brokers. The committee Greup was in favour of the monopoly position of brokers. The interests of the consumer were seen as paramount for the regulatory policy of that time. Government thought at that time that consumers were not capable or skilful enough to make real estate transactions themselves. The standardization of brokers would deter the presence of quacks.

During the 1970s, when the value of houses rose rapidly, buyers and sellers were complaining more and more about the functioning of real estate agents. Common practice in those days was to offer brokerage services to both parties by one and the same real estate agent. When a sale was concluded, both the buyer and the seller of a house were billed for services rendered, even though the broker offered only services to just one of the parties trading. Brokers of the NBM even had a standard clause in their contracts that made this action enforceable. The reason why buyers resisted this type of monopolistic price-setting might be that the expected increase in house prices compensated for the unintended brokerage fee.

January 1, 1984, the NBM and the MVA joined forces to form the Dutch Association of Real Estate Brokers (NVM). The NVM is the dominant market party that determines tariffs and conditions of sale, conditions which are followed by the smaller brokerage organizations, like the LVM (National Associaton of Real Estate Brokers). Members of the NVM who do not comply with the conditions set by the NVM are disbarred. However, there are also fringe associations that do not comply with the NVM's leadership, like the VBO (Association of Real Estate Intermediaries). The VBO has been founded mainly as a reaction to the pending decision of the government to grant the brokers the sole right to perform brokerage transactions and exclude real estate intermediaries from the brokerage industry. The VBO and consumer organizations have been quite successful in fighting this decision and as of today they are considered a progressive organization, setting the trend in real estate brokerage. For instance, contrary to the NVM who offer a package of services they have introduced the option to split the brokerage services and let the consumer decide which of the services he/she needs. They offer 34 different services. Another achievement of the VBO has been the introduction of the option to reconsider a transaction for three days. With the preparation of the new Civil Law a few years ago, a bill had been introduced to appoint an 'expert' at every real estate transaction. A stalemate evolved concerning the question of who could be considered an expert. First notaries and later on real estate brokers found themselves suitable as 'experts'. The VBO proposed an alternative to the use of an expert, viz. consumers were granted three days for reconsideration. Although not yet formalised as a law, this option has became the rule and the appointment of an expert has not been considered necessary.

As a countervailing power in Dutch real estate brokerage there are essentially two consumer organizations: (1) the Association of House Owners (Vereniging Eigen Huis) with 430,000 members, and (2) the Consumers Union (Consumentenbond) with 650,000 members. They have argued for more protective measures for buyers and sellers on the housing market. The brokerage organizations, who feared that the dishonest practices of unqualified realtors would hurt their business, argued for more formal rules with respect to entry, the professional skill and rules of brokerage transactions. The Parliamentary Under Secretary, Th.M. Hazekamp, asked the Social Council for Economic Affairs (SER) in 1981 to examine the market for real estate brokerage. At that point in time, two types of real estate agents performed transactions: the real estate broker or realtor, who had a legal status and who had to be sworn in by the district-court in order to call himself 'broker', and the real estate agent or intermediary, who has no legal status and in order to act as such one does not have to satisfy formal skill requirements. The SER came with its policy report in 1985 and advised the government to grant the real estate broker the exclusive right to provide brokerage services. The reasons behind this policy advice can be summed up as that the SER thought this step would protect consumers' interests best and it would offer a regulatory instrument for controlling the brokerage market. The SER was well aware of the potential market power that realtors would obtain if the SER-advice became law. To circumvent the threat of monopoly power they suggested that commission fees should be within a bandwidth, to prevent predatory and monopoly pricing.

Summing up, the history of Dutch real estate brokerage has been characterized an interplay between government and brokers to secure the legal status of real estate broker and prevent the entry of fraudulent quacks. This effort of securing the position of brokers has led to a monopoly position for the brokers' Guilds. Today the guilds seem to prosper more than ever as the NVM takes on the role of the brokers' Guild. There is however a major difference with the economic history of real estate brokerage. First of all, the NVM Guild is challenged by a rival organization the VBO; an organization born out of the disapproval of the SER advice. Secondly, the NVM Guild is also challenged by consumer organizations who are gaining political clout, like the VEH and the Consumers' Union. A third reason for suspecting a break with history is Dutch antitrust policy. As of today we know that the government coalition Lubbers III did not follow the SER advice. The general tendency in Dutch antitrust policy is to deregulate markets that are characterized by (tacit) collusion and/or natural monopolies. The change in attitude was partly induced by the European integration of markets and consequently European antitrust law, and partly by a growing awareness among the public that cartels and monopolies are not necessarily in the best interest of consumers. Dutch commerce law had always been tolerant towards cartels: cartels are allowed until proven socially inefficient. The European commerce law is quite the opposite: cartels are not allowed unless one can prove that they are socially efficient.

Today the opportunities for a competitive brokerage market seem present, but economic history also shows that cartels are more stable and long-lived than one may think at first (see De Jong, 1992) and denouncing cartels may only result in replacing explicit collusion by tacit collusion if one does not change the rules of the game.

2.2 The market for real estate

The market for residential real estate has a pervasive influence on the income and consumption fluctuations of the Dutch economy. For instance, 47 per cent of Dutch physical wealth is embedded in residential real estate and 58 per cent of wealth takes the form of residential and industrial real estate (see Tates and Eichholtz, 1993). Pension funds and insurance companies are increasing the share of real estate in their portfolio, making them more vulnerable than ever for real estate price fluctuations. Over the past decades the value of real estate has shown high volatility. Figure 1a shows how housing prices (for the entire stock of dwellings) have fluctuated in the last 45 years. Clearly visible in the top figure is housing market crash starting in 1978 and coming to a halt in 1982. The deflation of house prices at that time can to a large degree be ascribed to a sudden fall in the demand for (existing) houses. Figure 1b presents a long-run time series for the value of newly constructed houses (1938/39 = 100).

Although the picture of a highly volatile housing price may give the impression that the Dutch population was heavily affected by e.g. a market crash, the risk of these fluctuations was born primarily by a small group. For instance in 1948 28% of the total stock of 2.1 million houses was occupied by owners. In 1993 the total stock of houses has become 6.0 million and the percentage of owner-occupiers has grown to 47%. and is still growing. Despite this growth rate this percentage is still low if we compare it to other European countries. In Belgium 65% of the stock of houses is owned by its occupier, the U.K., Spain and Ireland show even larger numbers, viz. 67%, 76% and 81%. Only Germany is more or less comparable to the Dutch housing market with a percentage of 38%. The demand pressure for owner-occupied housing stems primarily from the divergence in housing expenditure. Renting a house is in general more expensive than buying a house, as Table 1 illustrates, a fact that can be traced back to the Dutch fiscal regime that favours owner-occupied housing and the rate of return one can earn with the purchase of a house. The average net housing expenditure differs across household income and by way of finance. The renters pay on average

Figure 1a: Value and price fluctuations of houses, 1949–1992
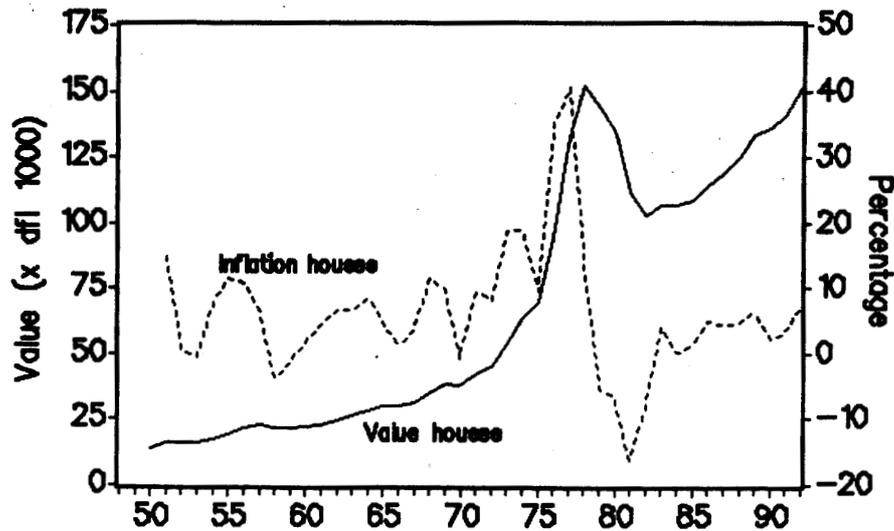
Figure 1b: Value newly constructed houses, 1914–1992
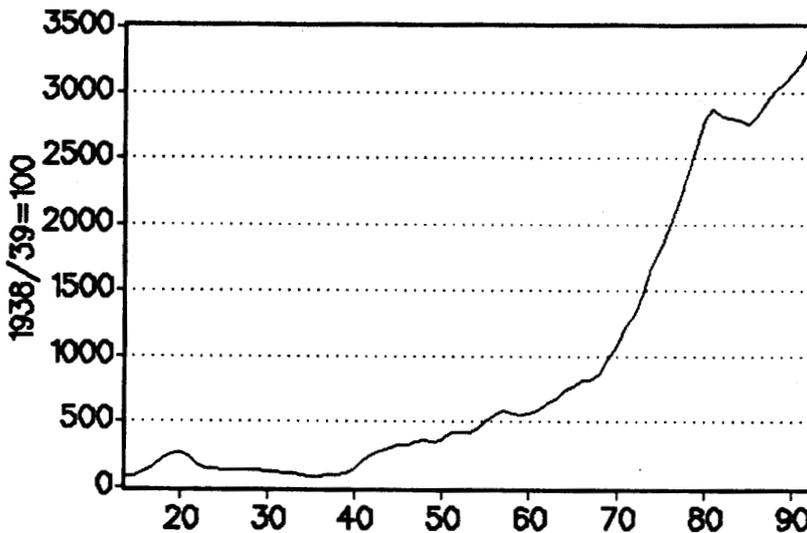
TABLE 1: Net expenditure on housing consumption as a percentage of net household income, The Netherlands, 1989

Net housing expenditure of:	Net yearly income (x dfl 1000a)								
	average	< 15	15-18	18-21	21-26	26-31	31-41	41-51	> 51
Renter	18.2	27.7	21.1	19.9	17.9	17.1	15.8	13.5	11.3
Owner-occupier, without a mortgage	11.2	9.7	9.2	6.4	9.8	12.3	12.4	11.9	10.9
with a mortgage	13.7	32.9	26.8	20.7	16.4	16.1	14.2	13.0	11.7

(a) Note: the value of one Dutch guilder in 1988 was worth U.S. $ 0.51. In the appendix (Table A1) to this paper we present some exchange rates for the Dutch guilder so the reader can translate the stated values in guilders into U.S. dollars for a number of years.

Source: CBS, Woningbehoefte-onderzoek (1991)

18 percent of their net household income for housing consumption whereas owner-occupiers have more favourable expenditure outlay: households who own a house and have no mortgage obligations spend 11 percent of their net income on housing and those who do have mortgage obligations spend slightly more, viz. 14 percent.

In general, real estate is sold through the help of a real estate broker. Estimates suggest that 30% to 40% of residential real estate transactions are executed without the help of a broker, where approximately 30% of the selling of residential real estate is done without a real estate agent; buying without the help of a real estate agent is considered easier: estimates range between 50% and 57% (see Lukkes and Van Rooden, 1986, p. 63). A small percentage of real estate brokerage, approximately 10%, is performed by local housing bureaus who offer their services at a negligible fee. These bureaus mainly deal with rented housing for lower income groups. Comparing the Dutch figures to those of other European countries one encounters a diversity in usage. The total number of real estate agents in the European community (excluding Portugal and Spain) has been estimated by the FIABCI (Féderation Internationale des Professions Immobilières) at 61,000, of which approximately half of those agents have joined some branch organization. Enlisting the services of a broker is not that common in all European countries (see Table 2).

TABLE 2: Number of real estate agents and organisations in Europe, 1988

Country	Number of real estate offices	Number of offices per 100,000 inhabitants	Number of offices per 1000 owner-occupied houses	Use (%) of agents per transaction	Number of real estate organisations	Organisa-tion coverage
Belgium	1,200	12	0.52	60%	n.a.	58.3%
France	12,000	22	0.85	40%	4	75.0%
Greece	4,000	40	1.11	n.a.	10	75.0%
Ireland	2,000	56	2.46	40%	3	60.0%
Denmark	3,100	61	2.58	15%	3	92.3%
Italy	15,000	26	0.96	30%	2	30.0%
Netherlands	3,000	21	1.13	65%	3	70.0%
U.K.	11,000	28	0.70	90%	3	45.4%[a]
West-Germany	10,000	16	0.98	60%	2	46.0%

(a) Only the agents affiliated with the National Association of Estate Agents

Source: EMI (1990), pp. 20-23, VROM (1993).

In Spain and Italy the use of real estate agents is 20% and 30% respectively, whereas it is quite high in the U.K., viz. 90%. The usage percentage of Dutch consumers is comparable to those of Belgium and Germany. The density of real estate agents, as measured by their number per 100,000 inhabitants) is the highest in Denmark, Ireland and Greece. If one measures the density of real estate agents per 1000 owner-occupied houses, the highest agency density can be detected in Ireland and Denmark (approximately 2.5 offices per 1000 houses). Greece and the Netherlands are in the middle range with approximately one real estate office per 1000 owner-occupied houses.

Once a buyer or a seller contracts a real estate broker a number of services are performed by the broker. The services that a broker renders are diverse. The broker acting on behalf of the seller focuses primarily on advice concerning the reservation price. The real estate agent contracted by a

buyer offers a more diverse menu of services, but also here the attention is focused on the price of the property to be bought. Before January 1, 1992, the buyer of a house had to carry the financial risk of potential losses with the purchase of a house with defects. The buyer also had to accept the financial duties tied to the house, even if they were not made known to the buyer at the time of purchase. With the introduction of the new Civil Law the buyer enjoys a more protected status since all defects and charges (like ground-rent, residence permits, long-term leases, pollution of the soil, etc.) tied to the house should be made known to the buyer. The seller of the house is responsible for any problem that arises if these charges and defects have not been made mentioned in the purchase act. The real estate agent can also be made responsible in case he fails to inform buyers accurately. Despite these improvements the number of consumer complaints have almost doubled over the last ten years. Table 3 gives an impression of the most often cited complaints as brought before the supervisory councils of the NVM. The internal regulation of the rules by which NVM

Table 3: Consumer complaints handled by internal NVM regulation, 1983-1993

Consumer complaints brought:	1983	1984	1985	1986	1987	1988	1992	1993
Before the Central Supervisory Council								
Insufficient representation	16	11	14	13	14	16	25	31
Insufficient information	7	13	15	11	16	18	22	24
Bidding order	8	7	10	17	16	17	23	10
Appraisals	5	5	8	16	13	13	10	8
Self interest	2	3	10	9	7	-	4	6
Miscellaneous	9	19	23	48	53	60	16	21
Total	47	58	80	114	119	124	160	133
Before the Commission on Conditions and Tariffs								
Insufficient representation	8	19	13	22	19	20	34	29
Trading after nullifying contract or without the broker during the contract	19	18	11	18	10	10	21	22
Costs of advertisements or withdrawal	10	10	13	19	13	15	11	3
No written contract	-	-	-	6	4	10	-	-
Miscellaneous	47	35	35	25	37	31	34	46
Total	84	82	72	90	82	86	92	87

Source: Vastgoed (1987-1993).

brokers have to abide is characterised by a dual approach in disciplinary jurisdiction and arbitration of complaints. Disciplinary jurisdiction is carried out by twelve Supervisory Councils and if one lodges an appeal one can bring one's complaint before the Central Supervisory Council. These internal councils examine the behaviour of NVM brokers for compatibility with the Code of Honour ('Erecode') and unwritten rules of conduct. Sanctions can vary from a slap on the wrist, a fine of 25,000 guilders, suspension or disfranchisement of NVM membership. Besides the disciplinary jurisdiction customers can appeal to the Advisory Commission on Conditions and Tariffs when complaints are directly related to the written Conditions and Tariffs of the NVM. The percentage of complaints that were seen as legitimate complaints usually lies in the range of 40-50 percent.

The role of the real estate broker on the market for residential real estate will become increasingly more important for a number of reasons. First of all, it is the intention of the Dutch government to stimulate owner-occupied housing so it can stop intervening in the market for housing and eventually cut back on housing subsidies. A second reason why the broker may have a more

prominent role in the future is that the housing market will be characterized by a shortage for housing. If one takes into account the preference for more housing space per person and the aging of populations and the concomitant rise in the demand for housing one can expect a prolonged rise in real estate prices.

2.3 Structure of real estate brokerage industry

The structure of the Dutch real estate brokerage industry lends itself in principle to that of a perfectly competitive market. The number of independent buyers and sellers is large and the product sold - real estate brokerage - is to some extent homogenous. However, in real life the ideal of perfect competition seems to be far off the mark. The producers of brokerage services are not quite independent and they are organized into a number of associations. Table 4 below shows the structure of Dutch real estate brokerage. In 1991 there were approximately 2,100 real estate brokerage offices, offering employment to 7,000 persons. In addition to these realtors, there are approximately 700 real estate intermediary offices, which provide employment to approximately 1,400 people. In the Netherlands that are a number of brokerage organisations, the biggest being the NVM (Netherlands Assocation of Brokers), some smaller organisations (like the LMV), and organisations covering intermediaries that are not officially entitled to call themselves 'real estate brokers', like the Association of Intermediaries Real Estate (VBO) and the Netherlands Association of Land Agents (NVR). In 1991 there were approximately 2,100 brokerage offices offering employment to 7,000 people. The LMV covers among others, the interests of real estate brokers of the RABO-bank (the second largest Dutch commercial bank). The LMV has been founded mainly because the NVM did not allow these brokers to join its ranks: the NVM demands that its members are completely independent. The affiliation with one of the largest Dutch national banks is therefore out of the question. In practice LMV and NVM members behave in more or less the same manner.

TABLE 4: Market structure Dutch real estate brokerage, 1989-1991

Real estate brokers	Number of offices				
	1989		1991		Market share transactions
	Abs.	Perc.	Abs.	Perc.	in 1991
Nederlandse Vereniging van Makelaars[a] (NVM)	1450	48%	1640	59%	63%
Landelijke Makelaars Vereniging (LMV)	85	3%	95	3%	6%
Not organised	665	22%	365	13%	13%
Real estate intermediaries					
Vereniging Bemiddeling Onroerend Goed (VBO)	300	10%	300	11%	12%
Not organised	500	17%	400	14%	6%
Total	3000	100%	2800	100%	100%

(a) The NVM includes the MVA (Makelaars Vereniging Amsterdam).

Source: EIM (1990) and Donkers (1992), and own calculations.

The organization of brokers's interest is high, approximately 82% of the real estate brokers is member of either the NVM or the LMV. Real estate intermediaries are less organized: approximately 40% of the real estate intermediary offices were in 1991 a member of the VBO. The title 'vastgoedadviseur' (i.e. real estate consultant) has recently been registered at the Benelux bureau of trade-marks. A group of agents on the market for real estate brokerage that is left out of the picture is the Netherlands Association of Land Agents (Nederlandse Vereninging van Rentmeesters) with 2,500 members. Land agents perform besides management, brokerage and value assessment of agricultural real estate also residential real estate. The total number of real estate brokerage offices, according to the Dutch Central Bureau of Statistics (CBS) is 4,666 for 1991,

which obviously includes the land agents. More than half of these real estate agencies consists of self-employed agents.

The age at which real estate brokers start practising their profession is rather young. The median age was 29 years in 1972 (see Table 5). An obvious reason why a broker starts his career at a relatively young age is that the educational requirements are not that high compared to those of a notary or an accountant. For instance, only 16 per cent of the real estate agents of the VBO have had a higher education (vocational training or university). However, the age-structure of brokerage offices seems to differ. The median age of the owner/director of the average VBO-office lies in the 40-45 age bracket (see Donkers, 1992).

TABLE 5: Age of practising a profession independently, 1972

	1st Quartile	Median	3rd Quartile	3rd-1st Quartile
Real estate broker	24.9	29.0	32.2	7.3
Tax consultant	27.9	33.1	38.9	11.0
Architect	30.0	32.4	37.2	7.2
Lawyer	25.6	28.7	33.0	7.4
Accountant	34.7	38.4	42.4	7.7
Notary	37.9	42.4	46.6	8.7

Source: CBS (1981, p. 28).

The structure of NVM brokerage firms seems to reveal that is pays to have more offices per firm. The small revenue generating firms are generally firms with one office whereas the high income-generating firms have more than two offices. Research for a panel of NVM firms by Risseeuw (1991) reveals that younger firms tend to grow faster than older ones. To a certain extent this is of course a statistical artifact similar in nature to higher growth rates achieved by developing countries: firms which start with a small initial capital stock will also achieve initially higher growth rates in production. Later on in the lifecycle of the firm it becomes harder to achieve and sustain growth. The age distribution of NVM firms shows that the majority of firms was 'born' between 1970 and 1980. In other words, the housing market boom triggered the entry of new firms. About the structure of other brokerage firms little is known. The VBO consists mainly of small firms with one or two employees.

Most of the residential real estate is transacted through the NVM. In 1989 59 percent of real estate brokered transactions was done by NVM-brokers, 8 percent by VBO and the remaining 33 percent by smaller organisations and independent brokers. In 1991 the market share of NVM brokers increased by to the share of 63 percent. The last few years the market share of the VBO has increased and in 1991 they possessed a 12 percent market share. In 1991 82% of the realtors was affiliated with an organization and 40% of the intermediaries have formed a common agency. In 1992 275,000 real estate transactions took place, of which 171,500 of those transactions concerned residential real estate. The average price of houses sold by NVM brokers in 1992 was dfl 194,800. A shortage of houses is said to exist in the price range between dfl 225,000 and 275,000.

The commission fees structure as each organization gives as a guideline for its members can be seen in Table 7. The NVM has the highest priced brokerage services and the two organizations with a small market share have slightly lower commission fees than the NVM. Another noteworthy feature of the commission structure is that the LMV and the VBO distinguish between buying and selling fees, whereas the NVM simply charges one fee, irrespective the type of activity. We will discuss whether these price structure are optimal in sections 3 and 4.

TABLE 6: Number of establishments per NVM firm, 1993

	Revenue (x dfl 1000)				Total
	< 300	300-600	600-1000	> 1000	
Number of offices	254	336	216	211	1017
Offices with number					
of establishments	100 %	100 %	100 %	100 %	100 %
1	98.8%	98.5%	94.0%	65.4%	90.8%
2	1.2%	1.2%	5.6%	19.9%	6.0%
3	-	0.3%	0.4%	6.2%	1.5%
> 3	-	-	-	8.5%	1.8%
Total number of					
establishments	257	342	230	370	1199

Source: Masurel and Risseeuw (1994), p. 34.

TABLE 7: Commission fees residential real estate by organization, 1994

Real estate price (x dfl 1,000)	NVM	LMV		VBO	
	Buying and selling fees	Buying fee	Selling fee	Buying fee	Selling fee
40	2.25	4.38	5.00	2.81	2.81
80	2.00	1.60	2.50	1.41	2.00
120	2.00	1.60	2.00	1.00	2.00
160	2.00	1.50	1.85	1.00	1.85
200	2.00	1.50	1.85	1.00	1.85
300	1.82	1.30	1.65	1.00	1.82
600	1.73	1.30	1.65	1.00	1.73
2,000	1.60	1.20	1.50	1.00	1.60
3,000	1.55	1.00	1.25	1.00	1.55

Source: NVM, LMV and VBO Conditions and Fees.

Management of real estate is mainly done by brokers for institutional investors (pension funds, insurance companies, banks) who have invested their resources in real estate. Brokers take care of the property and collect the rent. The commission for this type of work is fixed: 4% to 6% of the rent collected (Lukkes and Van Rooden, 1986). In general, one can say that the VBO and the NVM differ with respect to their revenue structure: both, of course, concentrate on the intermediation of the selling and buying of real estate, but in relative terms the NVM generates more revenue with selling and buying, value assessment and administration than the VBO and the VBO generates more revenue with intermediating in mortgages and insurance than the NVM.

Brokerage firms limit their business to one region or one city. As Lukkes and Van Rooden (1986) show the dispersion of real estate brokers over the different regions in the Netherlands is quite high. The Randstad shows a high density of real estate brokers and the market share of NVM-brokers is relatively high in this region of the country. In the large cities (with more than 150,000 citizens), the NVM-brokers have a market share of 74-87%. Real estate brokerage, regional and urban, is often practised in some central large city. Only when the size of a city surpasses the number of 20,000 inhabitants real estate brokers appear on the regional scene. The region that the average broker serves is also quite diverse. In densely populated areas like Haarlem the average Haarlem broker serves an area of 326 square kilometers, whereas a thinly populated like Groningen induces the average broker in Groningen to cover 800 square kilometers. Still, half of the agents remain within a range of 17.5 kilometers (rural areas) or 12 kilometers (urban areas). Risseeuw

(1991, p. 11) states that the median coverage radius in 1988 was 20 kilometers. In addition to the regional specialization of brokers there are a number of elements that make the brokerage industry even less competitive than it appears at first sight:

* Mobility of Dutch households. The mobility of Dutch households is limited. The average Dutch citizen moves approximately five to six times during his/her lifetime. Some researchers point out that 58% of the Dutch households move over their lifetime not more than 10 kilometers away from their place of birth (Harts and Hingstman, 1986), and in some other studies it appears that 50% of the Dutch who buy a new house move at most 5 kilometers (Lukkes and Van Rooden, 1986). This percentage is even higher for those who move to a newly rented apartment or house.
* Local government regulation. The role of local government cannot be neglected in the creation of brokerage monopolies and the subsequent formation of real estate prices. For properties below a rental value of dfl 963,75 or the sales price of dfl 250,000,- one cannot freely move to particular regions. Only if one has social or economic ties with a city can one obtain a housing permit. The main reason for doing this is that one wants to preserve the original habitat of a city or a village. For certain cities with a historical or cultural value, like Volendam, Staphorst or Schiermonnikoog one can understand why one might favour some of the original inhabitants. In other instances, some protection is necessary to prevent villages, like those in Zeeland and the Wadden Isles, turning into ghost towns when the summer season is over. However, this arrangement does not seem to apply to the majority of cities in the Netherlands.

An actor that plays an important role in the trading of real estate is the notary. He/she is an official who, on the recommendation of the Minister of Justice, is appointed by the Queen for life. The notary practices his profession in a specified city or village. For a number of real estate transactions the assistance of a notary is mandatory, such as: the transfer of real estate, the splitting of a house or building in separate apartments, granting and nullifying of mortgages, organizing real estate auctions and he sees to it that transference taxes are paid. The notary is also an agent that has a vested interest in a high real estate turnover. Recent studies (see KPMG, 1994 and De Kemp et al., 1994) show that transactions related to real estate (such as drawing up a deed of sale) account for 72% of the income of the Dutch notary in 1992.

TABLE 8: Price-cost margin of notaries, the Netherlands, 1992 (in guilders)

Acts	Marginal Cost	Price
Transfer of real estate	640	1520
Mortgages	430	900
Miscellaneous real estate transactions	700	1300

Source: De Kemp, Lijesen en De Groot (1994, p. 25)

The profitability of real estate transactions can be easily deduced if we consult Table 8, where the marginal costs and the average of prices charged for notary services are compared. With the introduction of the new Dutch Civil Law the notaries fear that it will become harder to justify their monopoly in drawing up transfer and mortgage acts. As of January 1, 1993 the antitrust measures against horizontal price-fixing also weaken the monopoly position of the notary. The notary therefore wants to present himself more and more as a legal advisor in matters of buying and selling of real estate, thereby becoming a potential threat to real estate brokers.

Summing up, the market for real estate brokerage has the potential to yield competitive outcomes. The number of brokers is large and the product is, due to uniform training requirements of real estate brokers and the accessability of information on the housing market through a multiple listing service, homogenous. There are, however, a number of elements that distort the picture of a

competitive real estate market. First of all the cartelization of brokers' interests in the NVM organization has dominated the market for years now. Secondly, the product sold involves due to specialization on the side of the real estate broker asymmetric information sets, which may be exploited to the fullest extent yielding second-best outcomes. Finally the interplay of a number of factors, such as the limited mobility of the Dutch consumer, stifling local government regulation, and regional specialization of brokers, may decrease the competitive nature of the real estate brokerage industry in addition to the explicit NVM cartel. In the remainder of this paper we will model and concentrate on the first two elements of the market for real estate brokerage and show how one can improve the market mechanism that has been stifled artificially by producers striving for monopolization of the brokerage market.

3. A model of real estate brokerage

The relationship between a buyer or seller of real estate and the real estate agent or broker is in no way different from any other principal-agent relationship. The principal (i.e. the consumer who buys or sells his house) contracts the services of a realtor (i.e. the agent). In the day-to-day practice the principal cannot observe the efforts of the agent perfectly and contracts have therefore to be founded on the observable output. The main difficulty with designing a contract is the presence of moral hazard on the side of the real estate agent. In this section we will deal with the question of moral hazard and the optimal design of realtor contracts. First, we will show how a first-best world might look like if the effort of the agent can be monitored perfectly. An alternative interpretation of a first-best allocation is that the broker sells and buys a house as if it was his own. To facilitate a comparison with earlier findings we will borrow some notation from Anglin and Arnott (1991) who examined the principal-agent relationship between a seller and a real estate agent. Subsequently the design of a contract in the presence of moral hazard will be dealt with. As a third part we will show how collusion, whether tacit or explicit, of buying and selling agents changes the optimality properties of contracts in favour of the agents' interests.

3.1 A first-best world

To simplify the analysis we will shall only consider an economy that encounters two outcomes, good and bad. The analysis is set up so that the model, as developed by Rees (1987) and Anglin and Arnott (1991), can be considered as a special case. Good and bad outcomes are valued differently by buyers and sellers. A low price of real estate is marked as 'good' by the buyer, but as 'bad' by the seller. If the good outcome occurs for the selling party (i.e. principal and agent), the amount to be shared between the principal and the real estate agent is: y_0, and at the same time this event y_0 is termed a 'bad' by the buying party. If the bad selling outcome occurs the amount to be shared is y_1 for the selling party, and at the same time the buying party enjoys a stroke of good luck y_1, where $y_1 < y_0$. The contract specifies the amount to be paid if the good outcome occurs, R_0, and R_1 otherwise for the selling agency. The reverse applies to the buying agency: an amount Q_1 in the event of a good outcome and Q_0 otherwise. The two events are not completely deterministic: if the real estate agent puts more effort into his search he can affect the probability of the two outcomes. The more effort, e_s and e_b (like advertising and showing the property, negotiate the terms of the sale, attracting more listings), the lower the probability, $p_s(.)$ and $p_b(.)$, of the bad outcome. Both the principal and the agent may be risk averse. In the process of buying a house, buyers have to pay a transfer tax rate of τ percent of the real estate value. The expected utility for the two principals as used throughout the analysis is:

$$EU_b = (1 - p_b(e_b))u_b(y_1(1 + \tau) + Q_1) + p_b(e_b)u(y_0(1 + \tau) + Q_0) \qquad (1)$$

$$EU_s = (1 - p_s(e_s))u_s(y_0 - R_0) + p_s(e_s)u(y_1 - R_1) \qquad (2)$$

The main difference between the buying and selling principals is that the seller values high prices as good and the buyer values low prices as good implying the following properties of the utility functions (for i = s, b): $u_s' > 0$, $u_b' < 0$, $u_i'' < 0$

In other words, the buyer minimizes the expected value of the property value and the seller maximizes the value. The commission fee the buyer has to pay is some fixed sum which has to be added to the market value of the house ($y_i(1 + \tau) + Q_i$), whereas the seller has to take account of the commission fee by subtracting the fee from the market value ($y_i - R_i$).

The profit maximization problem for the real estate agents has the following form:

$$EV_b = (1 - p_b(e_b))v(Q_1) + p_b(e_b)v(Q_0) - e_b \qquad (3)$$

$$EV_s = (1 - p_s(e_s))v(R_0) + p_s(e_s)v(R_1) - e_s \qquad (4)$$

When effort of both agents is observable the contracts would specify the commission structure, contingent on the agent's efforts. The buying and selling principals (i = b,s) would offer a contract, stipulating the reward structure (Q_1, Q_0) and (R_0, R_1) in a first-best world which solves the following maximization problem:

$$Max \ EU_i \ \ s.t. \ EV_i \geq \bar{V}_i \qquad (5)$$

The expected utility is maximized with respect to the commission fees subject to the participation constraints $\bar{V}_i$ of the real estate agents. Using λ_i as the Lagrange multiplier on the participation constraint, the first-order conditions are (for i = b,s and j = 0, 1):

$$R_j : u'_{sj} = \lambda_s v'_{sj} \qquad (6)$$

$$Q_j : u'_{bj} = -\lambda_b v'_{bj} \qquad (7)$$

$$e_i : -p'_i(u_0 - u_1 + \lambda_i[v_{i0} - v_{i1}]) = \lambda_i \qquad (8)$$

The Lagrange multiplier is the shadow price to stimulate the real estate brokers to participate. It represents the utility of the resources the principal has to forego in order to provide the agents with the incentives to participate in the business of real estate brokerage. Combining (6) and (7) for j = 0 and 1 yields:

$$\frac{u'_{i1}}{u'_{i0}} = \frac{v'_{i1}}{v'_{i0}} \ \ \text{for } i = s,b \qquad (9)$$

Equation (9) stipulates that the marginal rate of substitution in the two states of nature should be the same for the buying and selling principals and the agents. Equation (8) specifies the efficient levels of effort that the buying and selling real estate agents should show in their daily labour. In the case where the buying and selling principal have utility functions with constant absolute risk aversion (CARA)[4] equation (9) implies:

$$\frac{Q_1 - Q_0}{y_0 - y_1} \approx \frac{A_b}{A_a + A_b}(1 + \tau) \qquad (10)$$

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4. The specific utility functions used are for agents i (i = a,s,b, where a denotes the real estate agent and s and b the selling and buying principals, respectively) with welfare input x: $W(x_i) = 1 - e^{-A_i x_i}$ $W(x_b) = 1 - e^{A_b x_b}$
where A_i is the Arrow-Pratt measure of risk aversion.

$$\frac{R_0 - R_1}{y_0 - y_1} \approx \frac{A_s}{A_a + A_s} \tag{11}$$

where $A_a = -v''/v'$, $A_i = -u_i''/u_i'$ (for $i = b,s$) are the coefficients of absolute risk aversion of the agent and the principals i. Equations (10) and (11) can be interpreted as the marginal remuneration rate of the contractees. Equality of risk aversion between the selling principal and the agent implies that the marginal remuneration should be 50 percent. In other words, the agent and the principal share equally in the dispersion in housing prices. E.g., if a house can be sold in the bad state for 180,000 guilders and the good state for 220,000, the principal will set commission fees in such a manner that a bad outcome is rewarded by, for instance, -10,000 and the good outcome is rewarded by a remuneration rate of 10,000 guilders. The state contingent contract can also take on other forms, like a 'no cure, no pay' contract, but in this example we stick to the symmetric 'bonus-malus' contract. The principal has effectively narrowed down the spread to (190,000; 210,000) instead of the original spread (180,000; 220,000). Noteworthy is that the marginal remuneration rate is (approximately) independent of the risk of the variability of real estate prices and the risk of variability is split between the two individuals. Furthermore it also implies that if buyers and sellers of real estate have different risk preferences then the marginal remuneration rate should be set in accordance with those preferences. If the principal is risk averse and the agent is risk neutral then one can end up with the following reward structure: bad outcome (-20,000) and good outcome (20,000). In this particular case the agent accepts the entire risk of housing price fluctuations and the principal pays 200,000 whatever state materializes. Interesting is that, if all agents have identical risk preferences, the transfer tax drives a wedge between the buyer's and the seller's commission fee. The buying principal will increase the marginal remuneration fee by $(1 + \tau)$, thereby inducing the real estate agent to search harder for a lower price.

3.2 A second-best world

The general intuition behind the economics of hidden actions and information is that there are welfare improvements possible if one could obtain better information about the agent's efforts. The benchmark for this ideal state of information was given above and in this subsection we examine how contracts should be designed when moral hazard is present. In general, second-best contracts deal with the problem of trading off risk versus incentives. The agents now face fixed remuneration rates Q_j and R_j for $j = 0,1$. Given these contractual payments, the agents maximize expected utility with respect to their effort level:

$$e_b : -p_b'(v_1 - v_0) - 1 = 0 \tag{12}$$

$$e_s : -p_s'(v_0 - v_1) - 1 = 0 \tag{13}$$

The individual effort functions for the buying and selling agent implies that the level of effort is less than in the case of perfect observability. With moral hazard, the individual agent ignores the beneficial effect that more effort might have on the principal's level of welfare. Furthermore in the aggregate (12) and (13) also imply that the putting effort into real estate brokerage is a zero-sum game: if a selling agency puts more effort into the search for properties this will exactly offset and decrease the probability of a good outcome for the buying agency. In the remainder of this section we will employ the notion that the principals are assumed to know how the agents will alter their effort in response to the reward structure[5], but they are not able to verify the actions of a real estate

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5. They know the solution to agent's maximization problem: $e_b = e_b(Q_1, Q_0)$ and $e_s = e_s(R_1, R_0)$.

agent in court. The maximization problem of the principals now changes to maximizing the expected utility with respect to the reward structure, R_j and Q_j, and the effort levels, e_s and e_b, subject to the participation constraint and the incentive compatibility constraint of the agent, as given by equations (12) and (13). The problem becomes in terms of the Lagrangean for the selling principal:

$$\mathcal{L}_s = (1 - p_s(e_s))u_s(y_0 - R_0) + p_s(e_s)u(y_1 - R_1) - \bar{U}_s +$$
$$+ \lambda_s[(1 - p_s(e_s))v(R_0) + p_s(e_s)v(R_1) - e_s - \bar{V}_s] + \tag{14}$$
$$+ \mu_s[-p_s'(e_s)((v(R_0) - v(R_1)) - 1]$$

where μ_s denotes the shadow price of the opportunistic behaviour of the real estate agent if he is left to deal unrestricted. In other words the price μ_s represents the moral hazard that a seller will encounter if he delegates the sales activities to an agent. The solution to this problem implies for CARA-utility functions:

$$\frac{R_0 - R_1}{y_0 - y_1} = \frac{A_s}{A_s + A_a} + \frac{1}{A_s + A_a}\frac{\mu_s}{\lambda_s}\left(\frac{-p_s'}{p_s(1 - p_s)}\right)\frac{1}{y_0 - y_1} \tag{15}$$

A similar Lagrangean applies to the maximization problem of the buying principal, with the following reward structure:

$$\frac{Q_1 - Q_0}{y_0 - y_1} = \frac{A_b(1 + \tau)}{A_a + A_b} + \frac{1}{A_a + A_b}\frac{\mu_b}{\lambda_b}\left(\frac{-p_s'}{p_b(1 - p_b)}\right)\frac{1}{y_0 - y_1} \tag{16}$$

The agent will pursue his own goals and the principal has to offer higher commission fees the more severe the moral hazard of the agent (see the second term of the RHS of equations (15) and (16)). The variable λ_s is the shadow price of the participation constraint. In the absence of moral hazard it expresses the fee the principal has to pay to induce to agent to participate in brokerage. In equilibrium it is the marginal utility which the principal has to give up divided by the agent's marginal utility which the agent gains by participating in real estate brokerage. The less willing a broker is in intermediating in real estate transactions (i.e. the lower is λ_s) the higher will be the commission fee.

3.3 Brokerage collusion

3.3.1 Collusion in brokerage effort
The present set-up of the model of real estate brokerage allows us to look at how an organisation of colluding selling and buying brokers affects the terms of the contract and the agents' efforts. For the sake of exposition we will assume that all buyers and sellers contract a real estate broker. There are N_s sellers of houses and N_b buyers of houses. A cartel of colluding brokers is assumed to maximize the following welfare function with respect to the two effort levels, e_s and e_b.

$$EV_c = N_s EV_s + N_b EV_b \tag{17}$$

The Lagrangean for the cartel can now be formalized as:

$$Max\ \mathcal{L}_c = N_s(1 - p_s)v(R_0) + p_s v(R_1) +$$

$$+ N_b(1 - p_b)v(Q_1) + p_b v(Q_0) - e_s N_s - e_b N_b$$

$$- \bar{V}_b N_b - \bar{V}_s N_s +$$

$$+ \varphi_c [(1 - p_s)y_0 + p_s y_1 - (1 - p_b)y_1 - p_b y_0] \tag{18}$$

The restriction which the cartel encounters is the recognition that it can control the expected outcome of the buyers and sellers completely. The brokers' cartel knows that there exists a symmetry of probabilities of bad and good outcomes, viz. $p_s(e_s) + p_b(e_b) = 1$. In other words, colluding brokers are not going to put more effort in bringing about a good outcome if their effort is at the expense of the colluding brokers. The incentive compatible solution to problem (18) is:

$$e_s : N_s(-p_s'[v(R_0) - v(R_1)] - 1) - \varphi_c p_s'(y_0 - y_1) = 0 \tag{19}$$

$$e_b : N_b(-p_b'[v(Q_1) - v(Q_0)] - 1) + \varphi_c p_b'(y_1 - y_0) = 0 \tag{20}$$

Given that the shadow price ψ_c is positive, the colluding brokers decrease their effort level compared to the competitive second-best solution of the previous paragraph. The exact level of effort decided upon can be determined by combining the two equations, yielding the following effort structure:

$$N_b[v(Q_1) - v(Q_0)] - N_s[v(R_0) - v(R_1)] = \left(\frac{N_s}{p_s'} - \frac{N_b}{p_b'}\right) \tag{21}$$

The difference between this solution and the competitive solution is that the collusive real estate agents do not waste resources and simply direct their effort in the direction of the principal who offers a higher fee and the largest group of principals. The Lagrangean for the selling principal facing a collusive agent is identical to the Lagrangean (18) with the exception that the behaviour of the real estate agent is different, as summarized in equation (21), and has to be included in the setting of the commission fee. The reward structure chosen by the buying and selling principals is almost identical to the competitive case since we assume that the principals act atomistically, i.e. they set the fees they want to pay in accordance with their preferences and they do not take into account the effect their reward structure has on the other party's choices. The cartel subsequently chooses the effort level they want to expend on buying and selling activities. This effort depends, however, no longer solely on the commission fees the principals offer, but also on the number of buyers and sellers on the market.

The main difference with equations (15) and (16) is the presence of the market conditions. If we calculate the commission fee set by the selling principal facing a brokerage cartel one obtains the following condition:

$$\frac{R_0 - R_1}{y_0 - y_1} = \frac{A_s}{A_s + A_a} + \frac{1}{A_s + A_a}\frac{\mu_s}{\lambda_s}\frac{N_s}{N_b}\left(\frac{-p_s'}{p_s(1 - p_s)}\right)\frac{1}{y_0 - y_1} \tag{22}$$

In a sellers' market where the number of buyers by far exceeds the number of sellers ($N_s << N_b$) the selling principals will set the commission fee close to the first best optimum. They are in a position to exploit their market power and given the fact that real estate brokers will direct their attention to the buying principals the sellers need not pay the 'moral hazard' premium, the second term on the RHS of equation (22). The need for a real estate broker may seem illusive in such a market, since the broker will not think much of the seller. However, transactions cannot take place without the sellers and the relatively few sellers can set the commission fees for their broker in such a manner that they are compensated for brokers achieving 'bad states' by a lower second-best fee that approaches the first-best fee. In other words, the buyers will 'subsidize' the sellers by paying a relatively high commission fee (i.e. higher than the second-best fee in the absence of collusion). The reverse argument applies, of course, to a buyers's market.

If sellers are more risk averse than buyers and willing to pay a higher price than buyers in order for the broker to bring about a good outcome, the cartel will allocate more effort to the activity of generating a high sales price. Only in the case where buyers and sellers have identical preferences, the transfer tax is zero, ex ante demand and supply are identical, i.e. $N_s = N_b$, and where the probability-effort functions are identical will a cartel select a uniform effort level, $e_c = e_s = e_b$. However, this is also the one and only case where the cartel solution and the competitive solution coincide. In other cases where consumer heterogeneity and/or effort functions differ the cartel solution will yield suboptimal payments and effort levels compared to the competitive solution. The general insight offered by this section is that a brokerage cartel profits from a market disequilibrium and that it exploits (within bounds) the market party that is more numerous. If there are more sellers than buyers the cartel will charge sellers more and buyers less than would have occurred in a more competitive setting. The importance of restricting entry of new competitors or limiting the choice set of consumers to the cartels' listings is also obvious in this set-up since the manipulation of chances on good and bad outcomes breaks down as soon as the market becomes more competitive.

3.3.2 Collusion in bargaining

Other possibilities of (tacit) collusion can be identified in the bidding strategies which real estate agents use. Real estate agents are generally better informed than the principal on market conditions. First of all, in his position as appraiser the realtor knows the true value of a property. When selling a property the agent may be induced by the commission fee structure to restrict the number of bids and establish a 'quick sale'. A general finding in bidding is however that competition in bidding seems desirable. For instance, Wilson (1977) shows that under reasonable assumptions, when the number of bidders increases, the value of the winning bid converges to the true value of the property being auctioned. Second, the agent acting on behalf of the buying principal knows exactly the borrowing constraint and wealth position of his principal and the selling agent knows exactly the reservation price of the principal. In cooperative sales the colluding agents may tend to exploit this knowledge by bargaining for the corner solution of their principals, viz. the maximum amount the buying principal can borrow or the reservation price of the selling principal. Of course, the principal is in the end the person who actually decides to accept an offer or not. There remain, however, numerous possibilities to deceive the principal when collusion is practised.

4. Are contracts efficient?

One of the questions one can ask with respect to the efficiency of real estate brokerage is whether the brokerage contracts are efficient, i.e. can one improve individual welfare by changing the financial terms of the prevailing brokerage contracts? The answer to this question has already been implicitly stated in the previous sections, but it may highlight the issue by examining the characteristics of Dutch real estate brokerage contracts again by adding more realistic detail.

4.1 Fixed non-state contingent fees

As we saw in section 3 brokerage contracts contain state-contingent brokerage fees, which in the absence of perfect monitoring implies that the marginal remuneration rate exceeds the rate set in a first-best world. The more severe the problem of moral hazard is the larger will be the divergence in first-best and second-best commission rates. A characteristic of the Dutch brokerage market is that commission fees are not state-contingent, i.e. the commission fee is independent of the final sales outcome. To examine the consequences of this part of the contract consider the following maximization problem of a selling principal versus his agent in a first-best world:

$$\mathcal{L}_s = (1 - p_s(e_s))u_s(y_0(1 - \pi)) + p_s(e_s)u(y_1(1 - \pi)) +$$
$$+ \lambda_s[(1 - p_s(e_s))v(y_0.\pi) + p_s(e_s)v(y_1.\pi) - e_s - \bar{V}_s] \tag{23}$$

This problem yields the following first-order conditions:

$$e_s^{fb} : \quad -p_s'[(u_0 + \lambda_s v_0) - (u_1 + \lambda_s v_1)] - \lambda_s = 0 \tag{24}$$

$$\pi_s^{fb} : \quad -(1 - p_s)y_0[u_0' - \lambda_s v_0'] - p_s y_1[u_1' - \lambda_s v_1'] = 0 \tag{25}$$

Combining the two equations one arrives at the following first-best solution:

$$-p_s' = \frac{1}{(u_0 - u_1)\dfrac{V}{U} + (v_0 - v_1)} \tag{26}$$

where,

$$V = (1 - p_s)v_0' y_0 + p_s v_1' y_1 \tag{27}$$

$$U = (1 - p_s)u_0' y_0 + p_s u_1' y_1 \tag{28}$$

We can compare this solution to the one in section 3, where state-contingent fees were used, in order to see whether this type of brokerage contract entails a welfare loss. Equation (8) can be compared to the following effort-price combination:

$$-p_s' = \frac{1}{(u_0 - u_1)\dfrac{v_0'}{u_0'} + \left(v_0 - v_1 \dfrac{u_1' v_0'}{v_1' u_0'}\right)} \tag{29}$$

For plausible values of risk aversion of the principal and the agent we can state that the real estate agent expends less effort when the fees are independent of the final outcome (see Appendix A for a formal proof). The reason why the agent puts less effort into bringing about a good result is that the non-state contingent marginal remuneration rate (25) spreads the risk for the agent, whereas the state contingent fee makes it necessary to change the odds with more zeal because the eventual pay-off is positively related to the outcome. An exception to this rule may be found in the case where the principal is risk neutral and the agent is risk averse. In that case the agent will put more effort into changing the odds because in the case of state contingent fees the agent does not share in the risk, i.e. the marginal remuneration rate is zero. In the case of a non-state contingent fee the agent shares, by definition, in the risk of good and bad states and therefore puts more effort into the housing search. The commission fee in this first-best world can be written down as follows:

$$\pi_s^{fb} = \frac{A_s}{A_s + A_a} + \frac{\log \lambda_s + \log A_a - \log A_s}{(A_a + A_s)(y_0 + y_1)} \tag{30}$$

If we compare this fee to the one derived in section 3, viz. equation (11), we can deduce that the non-state contingent fee is higher than the fee contingent on the prevailing state.

In a second-best world things get even worse. The principal not only bears a large part of the risk, he also has to pay more to induce the agent to act in accordance with the principal's interest:

$$\pi_s^{sb} : \quad -(1 - p_s)y_0[u_0' - \lambda_s v_0'] - p_s y_1[u_1' - \lambda_s v_1'] = -\mu_s p_s'(v_0' y_0 - v_1' y_1) \tag{31}$$

In other words, the fee paid in a world with moral hazard is higher than the fee paid in a world without moral hazard. In a somewhat different model Geltner et al. (1992) examine the optimality of the fixed-percentage commission by means of simulation. They shed light on the puzzle why incentive contracts that theoretically mitigate the principal-agent problem are not more widely used in practice. They come to the conclusion that time-incentive contracts, i.e. contracts that minimize the buying and selling time or the number of days a property is on the market, offer negligible gains over the fixed-percentage contract, whereas the price-incentive contract does offer potential benefits if there is symmetric information about the market for the house. However, if the seller feels he has inferior information to that of the broker a move to price-incentive contracts will not be Pareto-optimal. The reason why this is so lies in the reservation price conflict between the broker and the seller: the broker attempts to influence the seller to accept a lower price than is optimal from the seller's perspective. The price-incentive contract induces not the broker to increase her reservation price but to lower the reservation price of the seller thereby enabling the broker to conclude the sale with less effort.

4.2 Uniform fees

The analysis of Section 3 also pointed out that in equilibrium the state-contingent fee should depend on the risk preferences of the different agents. This is, of course, an empirical question and one that has hardly been addressed in the real estate economics literature. One way of measuring the risk preferences of individual agents is by measuring the intertemporal substitution elasticity of distinct groups on the housing market. This so-called Euler-equation approach is easy enough to implement, but for a full-fledged measurement of risk preferences one needs panel data. In this section we will restrict to the use of macroeconomic data for the Netherlands. The model to be estimated is based on the first-order condition of an intertemporal maximization problem a representative consumer and the following constant relative risk aversion (CRRA) utility function,

$U(.) = C_{ht}^{1-\eta}/(1-\eta)$, where C_{ht} denotes per capita consumption on housing and η is the Arrow-Pratt measure of relative risk aversion. We abstract here from the interaction between non-housing and housing consumption. The Euler-equation for owner-occupied housing consumption to be estimated is summarized by equation (32):

$$\Delta \ln C_{ht+1} = \mu_h + \theta_h r_{ht} + \varepsilon_{t+1} \tag{32}$$

where $E(\varepsilon_{t+1}| I_t) = 0$: the residual term, ε_{t+1} is uncorrelated with any variable known at time t. Furthermore, it is assumed that $E((\varepsilon_{t+1})^2| I_t) = \sigma^2$ for all t. $\Delta\ln C_{ht+1}$ denotes the growth rate in per capita consumption, r_{ht} is the expected real interest rate based on the information set It (i.e. $r_{ht} \approx$ log $(1 + R_t)$ - log (p_{ht+1}/p_{ht})), μ_h is the constant element in consumption growth ($\mu_h = (\sigma^2/2) - \rho/\eta$), θ_h is the intertemporal elasticity of substitution in housing consumption (i.e. $\theta_h = 1/\eta$). The anticipated sign of θ_h is positive since "when the real interest rate is expected to be high, the consumer will actively defer consumption to the later period" (Hall, 1988, p. 342). The appropriate method of estimation to stay in line with the rational expectations methodology is a standard instrumental variables (IV) procedure.

A priori, one would expect that the consumers who own a house are more concerned about future real interest rate developments than tenants and are therefore an interesting test-case for the permanent income hypothesis. Table 9 summarizes the findings for the entire sample period, 1972.I-1990.IV.

TABLE 9: Intertemporal substitution in owner-occupied housing, 1972.I-1990.IV:
$\Delta ln C_{ht+1}^{own} = \mu_h + \theta_h r_{ht} + \varepsilon_{t+1}$

Method of estimation and period	adj. R^2	Structural coefficients				
	r_h-eq.	μ_h est.	θ_h est.	MA(1)	D.W.	Model test
1. OLS		-4.762	0.992		2.15	
		(0.621)	(1.905)			
2. IV: A	0.938	-4.987	1.111		2.15	-0.014
	(0.000)	(0.649)	(2.067)			(1.00)
3. IV: B	0.981	-4.931	1.081		2.15	-0.028
	(0.000)	(0.642)	(2.057)			(0.967)
4. IVMA: B	0.981	-4.843	1.060	-0.088	1.99	-0.027
	(0.000)	(0.629)	(2.001)	(0.732)		(0.941)
5. IV: C	0.939	-5.156	1.146		2.15	-0.001
	(0.000)	(0.662)	(2.120)			(0.400)
6. IVMA: C	0.939	-5.051	1.118	-0.089	1.98	-0.005
	(0.000)	(0.646)	(2.053)	(0.734)		(0.458)

Note: Quarterly data used for the estimation are drawn from the data set of the Central Planning Bureau used for the construction of their quarterly model FKSEC. The columns labeled "μ_h estimate" and "θ_h estimate" report the IV-estimate of the intercept, the intertemporal substitution elasticity on consumption of housing. The instrument set A was used in the IV-estimation and it includes one-quarter lagged real mortgage interest rate. Instrument set B consists of one and two-quarters lagged real mortgage interest rate. Instrument set C includes the one-quarter lagged real mortgage rate, the nominal mortgage rate and the consumption growth rate of owner-occupied housing services. Column 2 gives the adjusted R^2 for an OLS regression of the residual from the IV-regression on the instruments. When the number of instruments, K, exceed the number of unobservable variables the structural equation places nonlinear overidentifying restrictions on the general system of equations underlying IV-estimation. One can test the overidentifying restrictions by the following procedure: N times the adjusted R^2 from this regression should have a χ^2 distribution with (K-1) degrees of freedom (where K is the number of instrumental variables) if the model is well specified and the equation error is homoskedastic and serially uncorrelated. There is no evidence against the overidentifying restrictions.

In the cases examined in Table 9, I have used various instrument sets, which are described in full below Table 9. The OLS estimates are given as a benchmark. Columns 2 and 3 give the adjusted R^2 for the first stage OLS regressions of the real mortgage rate on the instruments. In parentheses one can find the probability value for a Wald-test of the hypothesis that all coefficients except the intercept are zero. These first stage regressions are given because the reliability of the IV-estimates depend on the forecasting quality of the instrument set. As Nelson and Startz (1988) point out, IV-procedures can be statistically unreliable when the instruments have only weak forecasting power for the right hand side variable. As one can see the instrument set used are good predictors of future real interest rate developments, but some sets predict future consumption growth unsatisfactory (rows 3 and 4). Columns 4 and 5 give the IV-estimates of the structural coefficients, viz. μ_h, the intercept, and θ_h, the intertemporal substitution elasticity in housing consumption. In parentheses I have reported the absolute t-value. We can see from Table 9 that the intertemporal substitution elasticity is close to one, which is a relatively high value compared to related macroeconomic research on consumption of non-durables. Rows 4 and 6 include the first-order moving average term, MA(1), in the estimation in order to check for serial correlation due to time aggregation of variables.

The market for rental housing is a rather hybrid market since it consists of consumers who are planning to buy a house in the near future, consumers who are liquidity or borrowing constrained (e.g., unskilled workers, elderly, non-tenure track employees) and those who willingly prefer rental housing to owning a house, since tenants do not have to make large investments in the quality and maintenance of a house. Improvements are only made if they constitute an enhancement of utility of housing consumption (like carpeting, putting up wallpaper, or investing in removable investment goods). One should, however, keep in mind that borrowing constraints are to some extent alleviated by government subsidies and loan guarantees made by local government. The consumption of rental housing services, as reflected in the rent one pays for a house or an apartment, is likely to be unaffected by the ex ante real interest rate. The expected housing price deflated by the price of non-housing consumption goods is a priori likely to play a role in this type of housing consumption because fluctuations in the relative price of owner-occupied housing will induce some tenants to switch to owner-occupied housing, thereby decreasing aggregate rental housing consumption and increasing owner-occupied housing consumption. Table 10 presents the results by including besides the expected real interest rate, rc, the relative price of housing in terms of consumption goods, $q_{ht} \approx \log(p_{ht+1}/p_{ht}) - \log(p_{ct+1}/p_{ct})$. The intertemporal substitution elasticity is positive but in general insignificant. Furthermore the intratemporal substitution elasticity with respect to owner-occupied housing is small, viz. -0.01. In other words, an expected increase in the real housing price of 10% will lead to an aggregate decrease in rental housing consumption of 0.1%. For matters of curiosity, we have also stated results of the interest rate elasticity of rental housing consumption with respect to the mortgage rate deflated by housing prices, rh, in the second part of Table 10 (rows 6 to 8). The estimates θ_h yield the conclusion that the intertemporal substitution elasticity is significant and positive but almost zero, viz. 0.02.

4.3 Real estate value-dependent fees

In the previous paragraphs we assumed that the principal sets the commission fee and the agent determines his level of effort. Since our intentions were to analyze the efficiency of the industry of real estate brokerage this assumption sufficed. However, if we want to analyze all aspects of real estate brokerage we will have to fall back on some other partial equilibrium models to understand the mechanisms at work and how reactions of market participants are affected when structural change takes place. One of those stylized facts of the Dutch brokerage industry can be seen in Figure 2 below where the listed NVM brokerage fees (January 1, 1993, including 17.5% VAT) decrease with the value of the property.

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TABLE 10: Intertemporal substitution in rental housing, 1972.I-1990.IV:

$\Delta lnC_{ht+1}^{rent} = \mu_c + \theta_c r_{ct} + \theta_q q_{ht} + \varepsilon_{t+1}$

Method of estimation and period	adj. R^2		Structural coefficients					
	r_c-eq.	q_h-eq.	μ_c est.	θ_c est.	θ_q est.	MA(1)	D.W.	Model test
1. OLS			0.735 (5.604)	0.042 (1.769)	-0.006 (1.087)	0.435 (4.062)	1.81	
2. IVMA: C	0.958 (0.000)	0.932 (0.000)	0.902 (6.429)	0.008 (0.316)	-0.014 (2.214)	0.436 (4.037)	1.81	-0.019 (0.661)
3. IVMA: C(2)	0.915 (0.000)	0.777 (0.000)	0.869 (5.904)	0.017 (0.642)	-0.015 (2.211)	0.437 (4.042)	1.80	0.021 (0.215)
4. IVMA: C	0.958 (0.000)		0.827 (6.186)	0.017 (0.690)		0.439 (4.124)	1.81	0.014 (0.266)
5. IVMA: D	0.916 (0.000)		0.773 (5.602)	0.029 (1.156)		0.439 (4.101)	1.80	-0.001 (0.388)
	r_h-eq.		μ est.	θ_h est.				
6. OLS			0.886 (11.293)	0.009 (1.641)		0.432 (4.069)	1.81	
7. IVMA: E	0.780 (0.000)		0.867 (10.576)	0.019 (3.010)		0.444 (4.166)	1.79	-0.003 (0.432)
8. IVMA: F	0.799 (0.000)		0.872 (10.703)	0.017 (2.640)		0.440 (4.126)	1.80	0.037 (0.130)

Note: The columns labeled "μ_c estimate", "θ_c estimate" and "θ_q estimate" report the IV-estimate of the intercept, the intertemporal substitution elasticity on consumption of rental housing and the intratemporal substitution effect of a relative price increase in housing. Instrument set C includes the one-quarter lagged real mortgage rate (corrected for the inflation of consumption goods), the inflation of housing prices and the consumption growth rate of owner-occupied housing services. C(2) denotes the same instrument set but instead of one-quarter lagged only two-quarter lagged instruments. Instrument set D consists of two-quarter lagged real mortgage interest rates and the two-quarter consumption growth rate in rented housing. Set E includes one and two-quarters lagged nominal mortgage rate and the two-quarter lagged real mortgage rate. Set F includes two-quarter lagged real and nominal mortgage rate and the consumption growth rate.

Figure 2a: Total cost of buying real estate, 1993
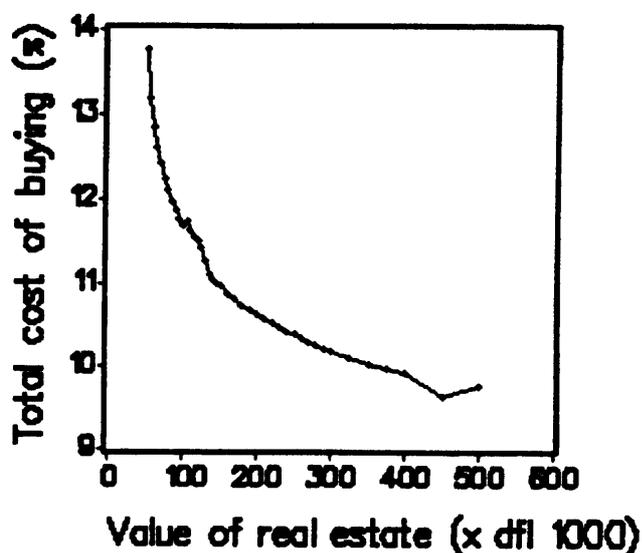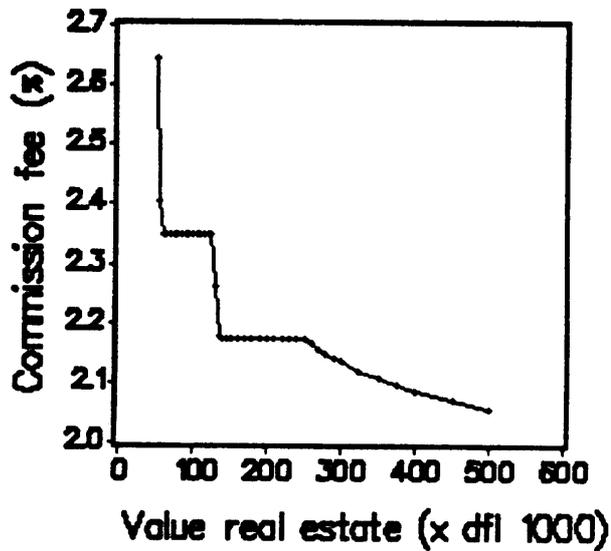
Figure 2c: Notary commission fees, 1993
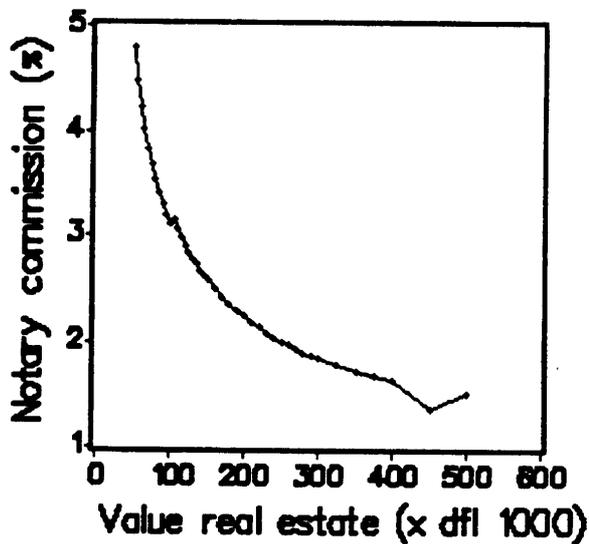
The raison d'être of this tariff structure seems puzzling since it runs counter to economic intuition. For instance, Knoll (1988) argues that owners of expensive houses will contract for a higher level of brokerage services than owners of inexpensive houses and the expected present value of a contingent brokerage fee is increasing in the rental value. Owners of expensive houses will value brokerage services more because the marginal value of an additional level of brokerage services is an increasing function of the rental loss, i.e. the loss from a later sale or the rental value of the house over the period prior to the sale. Commission fees increasing in the rental value seem to be in sharp contrast with the stylized facts. Table 11 shows that brokerage fees are constant or decreasing in the value of houses across countries and as we saw earlier the same phenomenon can be observed for the Netherlands (in Table 7, section 2).

TABLE 11: Commission fees for residential real estate brokerage, 1988

Country	Real estate value		
	25,000 ECU[a]	83,000 ECU	166,000 ECU
Belgium	5.0	4.0	3.0
France	5.0	5.0	5.0
Greece	1.5	1.1	1.1
Ireland[b]	1.5	1.5	1.5
Italy	3.0	2.0	2.0
Netherlands[b]	2.0	1.9	1.8
Spain	5.0	5.0	5.0
Australia	3.4	2.5	2.3
U.S.A.	6.0	6.0	6.0
West-Germany	3.0	3.0	3.0

(a) 1 ECU = dfl 2.30

(b) excluding VAT

Source: EMI (1990, p. 24), Maher (1989) and Knoll (1988).

A number of reasons for the negatively sloped fee-profile, as experienced in the Netherlands, might explain this situation:

1. Credibility of the buying agent. The first reason is the most plausible reason and perhaps the most neglected in the literature on real estate brokerage. The bulk of the literature focuses its attention on the relationship between the seller and the broker. Of course, a stylized fact of real estate brokerage is that brokers earn the largest part of their income from selling activities. A fixed non-state contingent commission fee schedule can never be an efficient payments schedule for the buying real estate agent since it will induce the agent to refrain from any positive action and the reason for this is simple: the bad outcome for the buying principal (y_0) will always yield a higher commission fee for the agent than the good outcome (y_1, where $y_1 < y_0$). The agent will try and achieve a corner solution by putting all effort in the direction of the bad outcome. Perhaps the flat slope of commission fees explains why more buyers than sellers do not use a real estate broker in the purchase of a house. A declining fee schedule may give the realtor some credibility if it satisfies the following conditions: $\pi_1 > \pi_0$ and $\pi_1 y_1 > \pi_0 y_0$ for $y_1 < y_0$).

2. 'Peak-load' pricing. One reason may be that in this manner brokers want to attract a portfolio of houses with a different velocity. Assume, e.g., that houses at the high end of the market (denoted by R) are more difficult to negotiate than middle class houses (denoted by S), i.e. with the same effort level the chance that the broker generates a bad outcome is larger than that for low priced house: $p_{R(e)} > p_{S(e)}$. A broker has a fixed amount of time, E, which he has to allocate to the search for the two different types: $e_R + e_S \leq E$. Both house types have, of course, different values, but more importantly are characterized by different variances: $y_0 - y_1 > x_0 - x_1$. A reason why it is more difficult to negotiate for high priced houses may be because the skewness of the income distribution is such that one simply has not that many customers that can afford a high priced house. On the other hand, high income households may be more inclined to move more frequently than low income households over their lifetime. Also the marginal change in bringing about a good outcome is different for the two houses: $p_R'(e) < p_S'(e)$. If we were to translate this slightly more realistic element into our earlier stated model of brokerage we would arrive at the following Lagrangean for the real estate agent:

$$\mathcal{L}_a = (1 - p_s(e_s))v_s(\pi_R y_0) + p_s(e_s)v(\pi_R y_1) + (1 - p_s(E - e_s))v(\pi_S x_0) +$$
$$+ p_s(E - e_s))v(\pi_S x_1) - E - \bar{V}_s \tag{33}$$

Giving rise to the following division of effort:

$$\frac{p_R'}{p_S'} = \frac{v(\pi_R y_0) - v(\pi_R y_1)}{v(\pi_S x_0) - v(\pi_S x_1)} \tag{34}$$

In other words, the real estate agent allocates his efforts in such a manner that the marginal rate of transformation for both types of houses is equal to the marginal rate of substitution (the RHS of equation 34).

3. Marginal brokerage costs decrease with rental value of houses. The reason for using a declining price structure does not seem to be supported by the brokerage costs to sell or buy a house. On the contrary, one would expect an increasing price schedule, if the number of houses is normally distributed. Matching sellers and buyers of higher priced houses must then be more difficult than matching consumers in the average price range. Bartlett (1981) and Schroeter (1987) in their discussion on the efficiency of real estate brokerage contracts also doubted whether brokerage costs differed by the value of a property. One can only make a case for the task of appraising the value of a house. A larger and more expensive house is more difficult to appraise than a small house. In conclusion, the cost-based argument is not a convincing argument.

4. Cream skimming. Brokers' time is valuable and in order skip the time-intensive, low earning houses brokers set the decreasing 'rental value'-fee structure. This is essentially what the optimal fee condition (15) tells us. In order to induce brokers to participate in real estate transactions one has to pay more to brokers the less willing they are to participate in certain real estate transactions.

5. Risk aversion of principals decreases with income. The last possibility has a plausible ring to it. If we return to the optimal (second-best) commission fees, as summarized in equations (14) and (15), we can derive that the commission fee for a low risk averse consumer (i.e. A_i approaches zero) should be lower than the commission fees set by the highly risk averse consumer (i.e. A_i approaches infinity). Microeconometric research reveals that risk aversion varies with income. Cicchetti and Dubin (1994) show that high income groups are shown to be less risk averse than low income groups.

Summing up, of all the reasons put forward for a negatively sloped fee structure the cream skimming argument may be the most plausible one. One reason for suspecting that this reason lurks behind the fee structure can be deduced from the comparative statics exercise brought about by more competition in Dutch real estate brokerage. More competition in the brokerage market has led NVM brokers to change only slightly their prices. Two-third of the NVM brokers still charged in the first half of 1994 the old (advisory) fees, as set by the NVM organisation. The movement in fees can only be seen in the type of real estate: the fees for high valued properties (dfl 250,000 and more) are slightly lowered and the fees for low valued properties (dfl 100,000 and less) are increased (see Masurel and Risseeuw, 1994). Ironically the few NVM brokers who changed their fees move in the direction of the fees of their fringe organisations LMV and VBO. Those organisations not only differentiate between buying and selling fees but they also have lower fees (see Table 7). More competition has led a minority of NVM brokers to differentiate between buying and selling fees.

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5. Are brokers efficient?

Another set of questions that might be of concern to the benevolent government who cares about individual welfare of the consumers of housing is whether the brokerage industry itself is efficient. Can the search for a house be resolved more quickly if brokers perform more efficiently? Are there increasing returns to scale in running an agency? Real estate brokerage is just like any other service sector a labour-intensive industry. Approximately 60 percent of the total cost of running a real estate agency is for labour, 30% for capital (like office use, computers, and cars) and the remaining 10% is allocated to intermediary inputs (Masurel and Risseeuw, 1992). But it is more than a service industry, it offers middlemen services, which can be beneficial to the principal buyers and sellers of a product (cf. Biglaiser, 1990). In this section we will review the efficiency of Dutch real estate brokers along two lines. The first efficiency question concerns the efficiency of market prices: are commission fees as charged by brokers in the best interest of consumers? This question is closely related to questions raised in the previous sections. Second, we will examine how efficient brokers are in performing their middlemen function. This issue revolves around the question of whether brokers dampen or increase market volatility.

5.1 Microeconomic efficiency

One of the main services that a broker offers to his client is search effort. The conflict of interest that may arise between the principal and the agent is that the broker does not expend enough effort to sell or buy a house. The previous sections have focused on the static principal-agent relationship. This relationship contains, however, also dynamic elements. In order to highlight those elements we will use a principal-agent model, as developed by Arnold (1992). Suppose the seller of a house searches for buyers, whose offers are distributed according to a continuous distribution function F. In each period the seller contacts exactly one buyer at a fixed cost of c guilders. The buyer makes an offer P, where the random variable P has the cumulative distribution function F. The search cost is incurred at the beginning of the period and the offer is received at the end of the period. The owner of the house incurs costs, denoted by Q, from holding the house while attempting to sell it. The problem for the owner is at this time to determine the optimal reservation price strategy in dealing with offers received. With the theory of optimal stopping rules (see Sargent, 1987) one can formulate this problem quite easily as a search problem with no recall of past offers. The functional equation V(p) for a seller with an offer of p and discount factor β is:

$$V(p) = \max \left[p, \ \beta \left(\int_0^\infty V(p') \ dF(p') \right) - c - Q \right] \qquad (35)$$

The seller can accept the offer and end the search process or he can continue searching for offers so long as the discounted value expected offers exceeds the costs of search and the net costs of holding the house. The cut-off price or reservation price ξ^* is found by setting the price ξ such that $\xi = \beta E[v(\xi)] - c - Q$. The reservation price ξ^* is the solution to:

$$c + Q + (1 - \beta)x = \beta H(x) \qquad (36)$$

where $H(x) = \int_x^\infty (p' - x) \ dF(p')$. Because H(x) is decreasing, the reservation price ξ^* is decreasing in the search costs, c, and the waiting costs, N, and increasing in the discount factor, β. In other words, the seller accepts the offer if $x \geq \xi$, and he rejects the offer if $x < \xi$. The problem becomes slightly different if the seller contracts a broker to search for a house. We assume that the broker receives a fixed percentage, π, of the value of the house. In this set-up we have two individuals solving a reservation price problem, viz. the seller:

$$V_s(p) = \max \left[p(1 - \pi), \beta (1 - \pi) \left(\int_0^\infty V(p') \, dF(p') \right) - Q \right] \qquad (37)$$

and the real estate broker, searching for the highest price,

$$V_b(p) = \max \left[p\pi, \beta \pi \left(\int_0^\infty V(p') \, dF(p') \right) - c \right] \qquad (38)$$

By means of these two functional equations one can derive two reservation prices. It turns out that the two reservation prices will coincide and become first-best if and only if the commission fee is: $\pi = c/(c + Q)$. The presence of a transfer tax does not affect this optimal incentive-compatible commission fee, unless one expects that a tax reform will soon take place changing the transfer tax rate. However, if the commission fee set by the broker is higher (lower) than the first-best price this divergence will induce the seller of the property to choose a higher (lower) reservation price while the real estate broker will choose a lower (higher) reservation price. Naturally, such a state of affairs can be described as a conflict of interests par example. Too high a commission fee and the subsequent lower reservation price set by the broker reduces the number of offers solicited before an acceptable offer is received. The seller of the house would have liked a higher reservation price which would have attracted more offers and on average a 'better price'. A similar conflict of interest arises between the broker and the buyer of a house. In setting the reservation price the broker starts with too high a price if the optimal commission fees lies below the actual fee, whereas the buyer of course wants to bid lower than the broker who represents him. The reason for setting the reservation bid too high is quite simple: the broker can close a sale sooner than if he had followed the reservation price policy of his principal. Just like in the case of the seller, the buying broker generates too few selling offers by his initial bid and the final sales prices is bound to diverge from the 'true' price. In a way, this simple search model mimics a collusion in which the buying and selling brokers agree to trade at a price they both prefer but one that is not in agreement with the preferred prices of the principals.

Whether real estate broker set reservation prices in the advertisements too high or too low can therefore be deduced from the calculation of the optimal commission fee vis-a-vis the realized commission fee. Table 12 shows for 1993 how these two commission fees diverge for the different NVM firms. A general observation is that the realised fee for the buyers is slightly higher than that of the sellers, where the fee increases by firm size, i.e. firms with a larger turnover realize higher commission fees. For the largest NVM-firms this is plausible if the average purchase price of industrial real estate exceeds that of residential real estate. For the other firms this explanation is less plausible since their industrial real estate transactions are negligible.

A more important observation to make is that the optimal fee is generally lower than the realised fee, indicating that real estate brokers set the reservation price too low from the seller's perspective and too high from the buyer's perspective. This problem is more severe for the larger firms than for the smaller firms where on average (combining selling and buying fees) the optimal and the realized fees seem to coincide. For 1993 the realized fee for the firms with a turnover less than 300,000 guilders the selling fee is even such that the real estate brokers set the reservation price too high.

TABLE 12: Optimal and realized commission fees in buying and selling, 1993

	Firms with revenue (x dfl 1000)				Total NVM
	< 300	300 - 600	600 - 1000	> 1000	Average
Marginal costs[a] of buying effort					
n = 5	32.9	23.2	22.1	26.1	27.6
n = 10	16.5	11.6	11.0	13.1	13.8
Marginal costs[a] of selling effort					
n = 5	27.8	22.7	20.0	17.7	20.3
n = 10	13.9	11.3	10.0	8.9	10.2
Optimal commission fee, buyer[b]					
n = 5	1.2%	0.8%	0.8%	0.9%	1.0%
n = 10	0.6%	0.4%	0.4%	0.5%	0.5%
Realised buying commission fee[c]	1.5%	1.6%	1.7%	1.6%	1.6%
Optimal commission fee, seller[b]					
n = 5	2.4%	2.0%	1.7%	1.5%	1.8%
n = 10	1.2%	1.0%	0.9%	0.7%	0.9%
Realised selling commission fee[c]	1.6%	1.6%	1.7%	1.6%	1.6%

(a) Costs are calculated on a monthly basis in Dutch guilders (current prices).
(b) The cost of waiting (Q) for the buyer are 2758 guilders and for the seller 1137 guilders. A detailed foundation for these figures is given in appendix B.
(c) As a percentage of the average sales price of houses, sold by NVM brokers.

Source: Masurel and Risseeuw (1994) and own calculations.

This evaluation is, however, restricted to one year. A similar evaluation for the years 1991 and 1992 did not change the conclusion significantly. For years further back than 1991 the NVM does not state the separate buying and selling fees. For those years we had to resort to combining the analysis for buyers and sellers. Table 13 shows the analysis for the years 1986-1993. A striking result is that realised commission fees are more or less constant in these years and at the level of 1.8 percent. The optimal commission fee is at all points in time below the realized commission fee and increases over time, suggesting that the conflict of interest between NVM brokers and consumers has slightly diminished over time.

TABLE 13: Commission fees NVM, 1986-1993

	1986	1987	1988	1989	1990	1991	1992	1993
Marginal search costs[a]								
n = 5	16.4	17.57	17.7	18.2	20.3	21.0	20.8	21.5
n = 10	8.2	8.79	8.9	9.1	10.2	10.5	10.4	10.8
Marginal waiting costs[b]	1660	1670	1694	1693	1670	1696	1782	1948
Optimal commission fee								
n = 5	1.0%	1.0%	1.0%	1.1%	1.2%	1.2%	1.2%	1.1%
n = 10	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%
Realised commission fee[c]	1.8%	1.9%	1.8%	1.8%	1.8%	1.8%	1.7%	1.6%

(a) Costs are calculated on a monthly basis in Dutch guilders (current prices).
(b) Average of the buyer's and seller's waiting costs.
(c) As a percentage of the average sales price of houses, sold by NVM brokers.

Source: Masurel and Risseeuw (1987-1994) and own calculations.

One of the questions one may well ask in comparing the optimal and the actual commission fees is the vintage question of firm management: are the brokerage firms really producing efficiently, i.e. at minimal cost? One way of answering this question is by looking at how competitors fare in providing brokerage services. Table 14 provides some comparable statistics on the cost and fee structure of VBO firms over the years 1989-1991. The most striking difference between the VBO firms and the (small) NVM firms is that their search costs are significantly lower (and thereby their optimal fee) and their realised commission fee is also lower. The argument that the VBO firms generate a higher per capita profit rate is therefore not only caused by the opportunity to trade; an opportunity forbidden for NVM brokers by internal NVM rules.

TABLE 14: Commission fees VBO, 1989-1991

	1989	1990	1991
Marginal search costs[a]			
n = 5	15.4	19.3	19.4
n = 10	7.7	9.7	9.7
Optimal commission fee			
n = 5	0.9%	1.1%	1.1%
n = 10	0.5%	0.6%	0.6%
Realised commission fee[b]	1.7%	1.5%	1.4%

(a) Costs are calculated on a monthly basis in Dutch guilders (current prices).
(b) As a percentage of the average sales price of houses, sold by NVM brokers.
Source: EIM (1990), and Donkers (1992).

The divergence between the optimal and realised fee is on average also smaller for the VBO firms, indicating that the moral hazard problem is less strenuous for consumers employing a VBO agent than for those employing an NVM broker. The real estate agents of the organization VBO provide their services at a much lower cost and in their endeavour they achieve a much higher profit per worker (see Table 15). The VBO is clearly the more competitive organization.

TABLE 15: Dutch real estate associations compared (in dfl), 1991

Average per office	NVM	VBO	Total market
Employment (persons)	4.8	2.3	3.1
Number of transactions	93.4	43.0	58.0
Total revenue	623,000	260,300	537,200
Total cost	554,000	207,600	472,736
Profits	69,000	52,700	64,464
Transactions per worker	19.5	18.7	19.0
Profits per worker	14,375	22,913	20,795
Revenue per man year	131,000	111,200	128,400
Revenue from selling and buying (%)	50.4%	41.5%	n.a.
Average commission per transaction	1.8%	1.4%	n.a.

Source: Masurel and Risseeuw (1992), Rabobank, Cijfers and trends (1993), and Donkers (1992).

As of 1994, the real estate broker's rates per hour for the different organizations are: NVM dfl 225,-, LMV dfl 150,- and the VBO between dfl 80,- and dfl 100,- per hour (all rates exclude VAT). The total revenue per VBO office is significantly lower than other brokerage firms, which is due to the fact that only the sales margin in real estate trading (i.e. value of sale minus the purchase price of a property) is taken account of in the total revenue. The turnover per office is therefore not comparable to the other real estate organizations. The members of the VBO do stand out in their

profitability, measured in per worker terms. This is not just an exceptional case for the year 1991. In earlier years the situation was much the same (see appendix, Table A4, page 66). Furthermore the labour productivity, as expressed by the number of transactions per worker, is more or less the same throughout the brokerage industry. However, a more just comparison between the VBO organization and the NVM would imply a comparison between the VBO firms and the smallest NVM firms. Behind the average NVM firm lurks a rich variety of firms. Table 16 shows for 1993 that the smallest NVM firms are also the least efficient firms.

TABLE 16: Revenue and sales structure of NVM-brokers, 1993

| | Revenue structure of agencies (x dfl 1000) | | | | Total |
	0-300	300-600	600-1000	> 1000	
Number of offices	254	336	216	211	1017
	Averages per office (x dlf 1000)				
Profit (dfl)	10	78	148	420	147
Revenue per worker (dfl)	107	146	160	170	158
Profit per worker (dfl)	5.6	25.2	31.5	31.1	27.7
Sales transactions per worker	14.3	18.7	20.7	18.6	18.3
Commission per sales transaction (dfl)	3365	3424	3597	3490	3490
Buying transactions per worker	3.8	5.0	4.8	3.5	3.7
Commission per buying transaction (dfl)	3246	3373	3565	3483	3455
Employment (persons)	1.8	3.1	4.7	13.5	5.3
Total revenue	190	446	756	2294	832
of which (%):					
buying real estate	13.7%	12.3%	11.5%	10.5%	11.2%
selling real estate	43.2%	45.3%	44.8%	37.8%	40.8%
appraisals	20.2%	15.6%	11.9%	10.3%	12.1%
rentals	2.1%	2.6%	2.6%	7.8%	5.5%
management	4.5%	3.4%	5.6%	14.0%	9.9%
mortgages	7.8%	9.6%	11.0%	9.4%	9.6%
insurance	7.0%	9.1%	10.6%	7.2%	8.2%
miscellaneous	1.5%	2.1%	2.1%	3.0%	2.6%

Source: Masurel and Risseeuw (1994)

In 1993 the firms with a turnover of less than 300,000 guilders the profit is extremely small and before 1992 the smallest firms were constantly making a loss on their brokerage activities. In that respect the divergence in profitability between the VBO and the NVM becomes rather poignant. The higher profitability outside the NVM organization is to some extent easy to explain: NVM members are not allowed to trade in real estate on their own account, whereas members of the VBO are. But at a more elevated level, one can explain the higher profitability of the VBO offices by theories of industrial collusion. Joint profit maximization of NVM members permits a greater number of firms in a market than non-collusive behaviour would allow. Selten (1984) shows that collusive behaviour leads initially to higher industry profits, which induces entry. Entry in turn depresses profits. Collusion thus leads to both lower concentration and to lower profitability. Under reasonable assumptions on demand and cost, industry-wide profit can be increased when collusion is forbidden. The Selten theory seems more plausible than the theory of collusive price leadership by d'Aspremont et al. (1983). D'Aspremont et al. also predict that per-firm profits for members of the competitive fringe are always larger than per-firm profits of cartel members, but they make a second prediction that does not seem to apply to the Dutch situation, viz. the average

cartel profit increases as the cartel size increases. The key to the latter prediction is that because the fringe firms follow the cartel's monopoly price their price will always exceed their marginal cost. The VBO brokers, however, do not follow the NVM price and furthermore they also have a different cost structure. Schmalensee (1987) considers the issue of collusion in the presence of cost differences. He comes to the conclusion that if the leading firms' cost advantage is substantial, the potential gains from collusion are relatively small. Collusion is unlikely to be observed in the presence of substantial competitive advantage, although the observed price may be close to the leader's monopoly level.

The costs of non-competition that come about by collusionary behaviour are, however, not restricted to the excessive monopoly profits brought about by suboptimal brokerage fees but can also be found in the excessive use of brokerage resources allocated to non-price competition. Collusion through the MLS leads to non-price competition because the MLS members have a number of methods of penalizing cheating, ranging from threatening with expulsion to spending less effort to sell homes listed below the fixed rate (Yavas, 1994). Non-price competition in turns results in too many resources vis-à-vis the optimal level being allocated to brokerage. The use of non-price competition is widely recognized. For instance, the NVM brokerage organization focuses on quality standards as a means of competition in stead of the use of brokerage fees (see Masurel and Risseeuw, 1994).

Concluding, the market for real estate brokerage can be characterized by a large cartel of NVM brokers who offer uniform prices with the competitive fringe organization, the VBO, which has a higher (per capita) profitability and significantly lower prices than the NVM cartel. If the markets for real estate and real estate brokerage become more competitive in the Netherlands we can expect: (i) contractual diversity across brokerage firms and across buyers and sellers; (ii) the average profitability of an NVM firm will improve because the less viable NVM firms will exit the market; or (iii) the average profitability remains the same if tacit collusion among NVM brokers rules.

5.2 Macroeconomic efficiency

The macroeconomics of real estate brokerage concerns the question whether the brokers as a group improve the aggregate trading in houses and whether they dampen or increase the volatility of house prices. The market for brokerage services is fraught with the externalities inherent in rendering the services that involve search activities. As we know from search theory the availability of traders affects the trading opportunities of others. In general, equilibrium will not be efficient and one has the possibility of both too much entry and too little entry. In order to evaluate whether brokers have improved aggregate consumer welfare one has to develop an equilibrium bargaining model to highlight the supply and demand side of real estate brokerage. In this section we model price formation on the market for real estate by assuming there are four types of individuals: sellers and buyers of houses and their respective real estate agents. First we will model the housing market without real estate brokers and subsequently we will add the brokerage industry to the housing market and see what type of broker can improve welfare.

Without brokers

In this 'Do-It-Yourself' world of housing search we assume that in this market there is an equal division of gains from trade. All buyers and sellers are identical. For the buyers of a house we assume that utility from the purchase of a house equals a constant u_d minus the price paid. Furthermore, each seller has single house to sell. The utility from a sale (u_s) is the price received less the cost of the good. To divide equally the gains from trade, the differences between the utility

position with the trade and the utility position without it are equalized for the two parties. The value of purchasing a house at price p is u_d - p; expected utility without the trade is V_d, the optimized expected utility from continued search. The value equation at a real interest rate, r, for the buyer of a house is:

$$rV_d = a_d(u_d - p - V_d) - c_d - Q_d \tag{39}$$

where a_d is the arrival rate of offers by sellers of houses, c_d is the cost of searching for an offer and Q_d is the private cost of waiting for another offer. For the sellers of houses, the utility from a sale is p - u_s. The gain from selling now rather than later is p - u_s, less the value of a house for sale, V_s. The value equation for the sellers is:

$$rV_s = a_s(p - u_s - V_s) - c_s - Q_s \tag{40}$$

Suppose that buyer and seller decide on an equal division of the gains from trade[6], then this principle implies:

$$u_d - p - V_d = \frac{r(u_d - p) + Q_d + c_d}{r + a_d} =$$
$$= \frac{r(p - u_s) + Q_s + c_s}{r + a_s} = p - u_s - V_s \tag{41}$$

Now we have a relationship between the equilibrium price, the arrival rates of trading opportunities, the search and waiting costs, and the utility from ownership. Solving equation (41) for the equilibrium we have for the following price of houses:

$$p = \frac{(r + a_s)(ru_d + c_d + Q_d) + (r + a_d)(ru_s - Q_s - c_s)}{r(2r + a_s + a_d)} \tag{42}$$

Without direct search and waiting costs ($c_i = Q_i = 0$), the position of the price between the seller's reservation price, u_s, and the demander's reservation price, u_d, depends on the relative ease of finding alternative trading partners. If one is dealing with a so-called buyers' market, i.e. it is very easy to find sellers of houses (a_d becomes infinite), the price will approach u_s. Conversely, if it is very easy to find buyers (a_s becomes infinite), a so-called sellers' market, the equilibrium price will equal the buyers' reservation price, u_d. If one does assume positive search costs, it becomes clear that an increase in one's search cost pushes the price in an unfavourable direction. If, e.g. the search for buyers' (sellers') offers becomes more difficult, this will increase (decrease) the equilibrium price.

* With brokers

In this world the brokers are assumed to be more efficient in searching for buyers and sellers. They raise the number of offers from which their customers can choose and for this service they are rewarded a fixed percentage (π) of the final sales price. The number of offers received by buyers and sellers are denoted by a superscript 'b'. A real estate broker drives a wedge between the price paid by buyers and the price received by sellers. For the buyers of houses this implies the following change:

$$rV_d = a_d^b(u_d - p(1 + \pi) - V_d) - Q_d \tag{43}$$

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6. In the absence of any empirical evidence on how sellers and buyers divide the gains from trade this seems the most natural way to analyse this situation.

The real estate broker acting on his behalf:

$$rV_d^b = a_d^b(S_d^b - \pi p - V_d^b) - c_d^b \qquad (44)$$

For the sellers of a house the broker changes the decision problem as follows:

$$rV_s = a_s^b(p(1 - \pi) - u_s - V_s) - Q_s \qquad (45)$$

The real estate broker acting on his behalf:

$$rV_s^b = a_s^b(\pi p - S_s^b - V_s^b) - c_s^b \qquad (46)$$

If we assume as in the previous section an equal division of the gains from trade we can again derive the equilibrium price of houses and commission fees. The following prices arise under these circumstances:

$$p = \frac{(r + a_s^b)(ru_d + Q_d) + (r + a_d^b)(ru_s - Q_s)}{r[2r + a_s^b + a_d^b] + \pi[a_s^b(r + a_d^b) - a_d^b(r + a_s^b)]} \qquad (47)$$

and

$$\pi = \frac{(r + a_s^b)(rS_d^b + c_d^b) + (r + a_d^b)(rS_s^b - c_s^b)}{rp(2r + a_s^b + a_d^b)} \qquad (48)$$

If we substitute the equilibrium commission fee (equation 48) into the house price equation one obtains the equilibrium house price in terms of the search technologies of consumers and brokers:

$$p = \frac{(r + a_s^b)(ru_d + Q_d) + (r + a_d^b)(ru_s - Q_s) - B.A^b}{r[2r + a_s^b + a_d^b]} \qquad (49)$$

where

$$A^b = a_s^b(r + a_d^b) - a_d^b(r + a_s^b) \qquad (50)$$

$$B = \frac{(r + a_s^b)(rS_d^b + c_d^b) + (r + a_d^b)(rS_s^b - c_s^b)}{2r + a_s^b + a_d^b} > 0 \qquad (51)$$

With these equilibrium equations we can compare allocations under a regime of fixed and endogenous commission fees. In addition to this type of analysis we also present the incurred loss that consumers have to forego when real estate brokers charge fees that are too high. The loss for the buyers (or gain if the fee set below the equilibrium fee) is defined as (a bar above a variable denotes conditions of price fixing):

$$Loss_b = (u_d - \bar{p}(1 + \bar{\pi})) - (u_d - p(1 + \pi)) \qquad (52)$$

and for the sellers:

$$Loss_s = (\bar{p}(1 - \bar{\pi}) - u_s) - (p(1 - \pi) - u_s) \qquad (53)$$

If we aggregate these two losses we arrive at a rather simple loss equation, viz. $2(\pi p - \bar{\pi}\bar{p})$.
The loss is simply the difference between absolute fee the broker receives under price competition and the fee received under price fixing. The loss, c.q. gain incurred by the real estate broker is by

definition zero in this set-up since we assume that the broker takes on the role of buying and selling agent acting on behalf of the customer with equal probability. Table 17 shows what kind of magnitudes we are talking about when discussing the consequences of price fixing as was practised by Dutch real estate brokers of the NVM. If we take the number of 110,000 of houses that are on average dealt with by real estate brokers then the aggregate consumer's loss of a suboptimal fee of 1.85% ranges from 237 million guilders to 291 million guilders.

TABLE 17: Macroeconomic effects of suboptimal real estate brokerage fees

a_{sb}	a_{db}	Endogenous fees		Fixed fees		
		p	fee	p	fee	Loss
5	2	207,302	1.27%	205,765	1.85%	-2332
10	2	207,659	1.31%	205,260	1.85%	-2154
5	3	207,039	1.25%	206,137	1.85%	-2249
10	3	207,470	1.23%	205,527	1.85%	-2565
5	5	206,667	1.21%	206,667	1.85%	-2647
10	5	207,166	1.26%	205,958	1.85%	-2400

Notes: Parameters used in the calculation are: $a_s = 3$, $a_d = 1$, $r = 0.06$, $c_{db} = c_{sb} = 20$, $c_d = c_s = 100$, $Q_d = 2000$, $Q_s = 1200$, $u_d = 175,000$, $u_s = 225,000$, $S_{db} = S_{sb} = 2500$. The price of real estate without the intermediation of a broker is 208,284.

The practical question is, of course, will the NVM in the end let prices float? As we saw in Table 13 the NVM commission fee has hardly changed the last seven years, in 1994 two-third of the number of NVM brokers still charged the old commission fees as advised by the NVM head office. Until October 27, 1977 one had to pay 1.5% commission fee on houses worth 250,000 guilders or less. Because of the sharp rise in real estate prices from that day on one had to pay at the most 1.23% of the purchase, c.q. sales price. On February 27, 1979 the brokerage fees increased marginally to 1.25%. Although one was uncertain about the housing market bust at that time the NBM raised the brokerage fees six months later to 1.5% of the sales price. The housing market did not recover quickly which spurred a further rise in fees: in February 1983 the commission fee on houses in the price range 100,000 and 250,000 was increased to 1.85%. In 1984 brokerage fees were considered completely free. Government thought that more competition in the brokerage industry would lead to optimal and reasonable prices. Despite this initiative NVM brokerage prices have remained fairly stable. The next question to be answered then is the one concerning the existence of tacit collusion in real estate brokerage. This will be dealt with in the section below.

6. Is there (tacit) collusion?

Detecting collusion when cartels are forbidden is generally seen as a mission impossible. This applies especially to the Dutch market for real estate brokerage services after February 1, 1994. Before that time one can safely say that collusion was the rule. Members of the NVM were, e.g., obliged to charge the centrally set fees. If they did not follow suit they could be disbarred from the NVM. Tacit collusion will, however, be more likely to appear in the brokerage industry, although in the first few months following the denunciation of collusionary practices the consumer organization VEH received numerous complaints of explicit collusion. In this section we will review some of the most common collusionary practices that have arisen in real estate brokerage.

Some observers look upon the fixed and uniform percentage brokerage fee as a sign of collusion with the Multiple Listing Service (MLS) as an enforcement device, whereas others explain this phenomenon as efficient firm behaviour. The practical question in issues of collusion is: how can one detect tacit collusion? A standard approach is to examine how far price deviates from marginal cost. However, a simple deviation may not be proof of collusion, because a number of factors might affect the ease of colluding. Consider the brokerage industry with n firms producing a homogenous product, brokerage services. Let $p = h(\Sigma_i q^i) = h(Q)$ be the inverse demand function, where p is price, q^i is the output of brokerage firm i, and Q is the industry output. Let $C^i(q^i)$ be the total-cost function of firm i. Each firm i chooses q^i to maximize profit, Π_i:

$$Max\ \Pi_i = h(Q)q^i - C^i(q^i) \tag{54}$$

The first-order condition for this problem boils down to:

$$q^i\left(\frac{\partial h}{\partial q^i} + \sum_{j \neq i}\frac{\partial h}{\partial q}\frac{\partial q^j}{\partial q^i}\right) + p - C_i' = 0 \tag{55}$$

Let ε be the industry price elasticity of demand ($\varepsilon = -[\partial Q/\partial p][p/Q]$); s^i be the firm i's market share ($s^i = q^i/Q$); and θ^{ji} be firm i's conjecture about firm j's response to a unit output change initiated by i ($\theta^{ji} = \partial q^j/\partial q^i$. Equation (55) can then be rewritten in more elegant terms:

$$L^i \equiv \frac{p - C_i'}{p} = \left(\frac{s^i}{\varepsilon}\right)(1 + Z^i) \tag{56}$$

where L^i is the Lerner index for firm i and $Z^i = \Sigma_{j\neq i}\theta^{ji}$ is firm i's conjecture about the response of industry output to a unit output change by i. The Lerner index is an elegant summary statistic of the degree of monopoly power of a firm. It shows the relationship between firm's i price-cost margin, its market share, its conjecture about the behaviour of competitors and the industry price elasticity of demand. Equation (56) lends itself to estimation. Given data on prices, quantities and the determinants of costs one can obtain parameter values for Z^i. For reasons of endogeneity this procedure involves estimating a demand equation, n cost functions, and n first-order conditions as a simultaneous system[7]. An estimate of $Z^i = -1$ would imply that we are dealing with a perfectly competitive industry where firms set their prices equal to the marginal cost, and $Z^i = 0$ tests the Cournot assumption, which amounts to the assertion that firms do not expect other firms to react to their output decisions. Under those conditions prices charged are a mark-up over the marginal cost, with the level of mark-up being given as a function of the price elasticity of demand and the market share.

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7. Such an approach was employed by Swank (1994) for measuring the degree of oligopoly in Dutch markets for mortgages and savings

$$p\left(1 - \frac{s^i}{\varepsilon}\right) = C_i'$$

<div align="right">(57)</div>

For $\varepsilon > s^i > 0$, prices in an oligopolistic market are therefore always higher than the competitive market price. For instance, the monopolist will set its price at $p_m = C'(1 - 1/\varepsilon)^{-1}$. Only when the demand elasticity approaches infinity will the monopolist behave as a competitive producer. A full-fledged econometric time series analysis of the brokerage industry will be almost impossible since the data, required to test the theory over a sufficient number of years are simply not available. An alternative route to evaluate the monopolistic nature of the brokerage industry is to examine assumptions that underlie the theory of perfect competition and see how much the present-day brokerage industry deviates from that ideal image. The focus will, of course, be on the horizontal collusionary practices since these will more likely to appear in a middlemen industry such as real estate brokerage[8]. In this section we will review four elements of the brokerage industry: (1) restrictions on competition by preventing competitors to enter the market; (2) limiting the choice set of the consumer of brokerage services; (3) collusionary practices in bargaining; and (4) the issue of uniform price-fixing.

6.1 Restricting entry of competitors

This is perhaps the most common way of protecting monopoly profits. As the history of Dutch real estate brokerage shows, brokerage Guilds have been quite successful in restricting entry by using federal or local law to shield their market from "quacks". Government regulation and the welfare of the Guild seem to move in tandem. The modern-day Guild, the NVM, and the unregulated brokers have for some time enjoyed the protection of Civil Law by granting brokers the exclusionary right to act as broker and to assess properties. With the recent antitrust policy of Dutch government the implicit way of restricting competition is no longer possible.

Just recently, in April 1994, the association NVM was accused of restricting entry of the competing American franchise-organization ERA. Twenty-one NVM-brokers wanted to join ERA and the NVM threatened to disbar those brokers. Besides this incident explicit restriction of entry does not seem to be widespread in the Netherlands. Growth in the number of self-employed brokers has been abundant for a number of years and does not show any signs of a slowdown as Table 18 shows succinctly.

Restriction of the entry competitors used to be of more implicit nature. For a long time, real estate brokers were the only agents allowed to make appraisals. The Ministry of Housing (VROM) decided that as of January 1, 1991 appraisals of houses, necessary for the allowance of a municipal loan security, could only be carried out by real estate brokers. The VBO, acting on behalf of the real estate intermediaries, challenged this decision successfully. As of July 12, 1991 real estate intermediaries may also carry out real estate appraisals.

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8. See Slade (1989) for a comprehensive overview of the issues of horizontal collusion.

TABLE 18: Number and size of brokerage firms, 1978-1993

	Number of employees per real estate brokerage firms						Total average growth rate	Total
	0	1 to 5	5 to 10	10 to 20	20 to 50	≥50		
1978	1105[a]	1390[b]	341	91	37	9	.	2973
1985	1835	1448	139	59	25	8	2.60%[c]	3514
1986	1893	1540	158	61	29	10	5.04%	3691
1987	2041	1511	176	56	30	10	3.60%	3824
1988	2168	1451	173	68	32	11	2.07%	3903
1989	2337	1438	164	78	32	13	4.07%	4062
1990	2561	1494	170	68	35	11	6.82%	4339
1991	2847	1479	215	81	35	9	7.54%	4666
1992	2933	1520	244	79	36	11	3.36%	4823
1993	3141	1632	244	86	45	12	6.66%	5160

(a) This figure applies to firms with zero and one employee; (b) This figure applies to firms with 2 to 4 employees; (c) Average growth rate for the years 1982-1985.

Source: CBS, Statistiek van het ondernemingenbestand, (1985-1993), 4e Algemene bedrijfstelling 1978.

6.2 Restricting choice set consumers

From 1983 onwards it has been forbidden to intermediate for the buying and selling principal at the same time. However, in practice agents can still achieve a double commission from the buyer and the seller of a property as follows: when a potential buyer comes to the office of the selling agency the agent may not deal with this buyer directly. However, by shifting this potential buyer to a colleague-broker of the same organisation he can split the eventual commission that will be effected by the purchase of the property. Lukkes and Van Rooden (1986, p. 86) examined the bias of real estate agents to restrict the market. They approached 65 agents (who were members of the NVM-organization) with the question to inform three hypothetical families (A searching for a house worth at the most dfl 300,000; B a house worth at the most dfl 200,000; and C at the most dfl 120,000) about houses. The realtor had to pick five houses in a particular city, which he thought would satisfy the wishes of these families. Half of the realtors (N = 33) were given an instruction to search for a house and the other half of the group of agents (N = 32) were asked just to give information. The agents with an instruction to search for the buyers presented a menu of potential houses of which 10% were listed at the agent's office. One outlier in this questionnaire affected the outcome rather heavily: an agent from a small village, who advised 12 houses which he had on his own list. Excluding this agent, the menu of houses that are listed at the own agent's office would be 3%. The agents who had to provide information advised buyers a menu of which 31% was listed at the own agent's office. The bias in the real estate agent's behaviour is unambiguous and in line with what one would expect: the system is such that an agent with an instruction to search has the opportunity to obtain two fees, if he establishes that the potential buyer buys a house listed with a colleague-broker. Otherwise, the agent can only charge one customer, viz. the searching buyer. The buyer, has to find in the latter case another real estate agent who may not be affiliated with the same brokerage organization. The agent who was asked to give information has, on the other hand, an incentive to advise the buyer to buy a house listed with the informing agent because this agent will obtain only a fee if he sells one of his listed houses. In 1991 (Masurel and Risseeuw, 1992, p. 8), 63% of the transactions made by NVM-brokers were cooperative (so-called 'co-op sales'), whereas NVM brokers constituted at that time 48% of all Dutch real estate agents.

Other evidence of market restriction practices are of a 'no cure, still pay'-type: once one contracts a NVM or VBO-broker it is forbidden to negotiate or buy independently, i.e. without the help of a

broker. If one still wishes to do so one still has to pay the broker the commission related to the value of the property. If one terminates a contract with a NVM-broker even though real estate properties were shown and offered then one still has to pay 10% of the commission of the last bid. If one buys a house within three months after the withdrawal one still owes the broker the full commission.

Other examples of restricting practices can be detected in the use of the waiting period: the NVM who receives a listing from a seller will not advertise the house for sale for twenty-four hours (the so-called 'waiting period'). After the 24 hours the house will be displayed in the MLS, a facility that only NVM-brokers can consult. There used to be an 'embargo period' rule for NVM-brokers that stipulated that houses for sale could only be sold to other NVM-brokers for a specified period (usually a week). During that time no 'For Sale'-signs may be put in front of the house in question and no public advertising is allowed. This embargo period has been compared by the Ministry of Economic Affairs (July 7, 1992) with the antitrust guidelines and has not been found acceptable. As of today, buyers and sellers of houses have to indicate themselves that they do not want this embargo on their listing. One of the consequences of this policy is that the sales price obtained during this embargo period may differ quite distinctly from the sales price achieved in a fully competitive setting. It is a well-known fact that in questions of auctions and bidding (see McAfee and McMillan, 1987) that the more bidders there are for a good, the closer the price will be to its 'true' value. The embargo period is just one form of restricting the set of bidders.

A third stage in the selling of houses is advertisement in regional and/or national newspapers. The so-called 'lemons' and too highly priced houses are advertised publicly. Some regions, like the area around The Hague, had an extended waiting period: the NVM-broker could restrict the selling market for seven days. In that period the broker could offer the house to one of his own clientele through a colleague broker, in general from the same organisation, viz. the NVM. As of today the extended waiting period may no longer be used by the broker, unless the seller indicates that he or she wants this waiting period.

A different type of market restriction can be found in the mortgage market; a restriction that is often directly linked to the real estate broker's office. The implied restriction is quite straightforward: if one can only buy a house at a real estate agent by a higher than average interest rate on the mortgage offered, the discounted value of lifetime income will be smaller than would have been possible. A richer menu of mortgages would make the choice set of the consumer larger. Commission fees on mortgages are gaining importance and the formation of so-called 'independent' mortgage shops, like the Hypotheker, Huis & Hypotheek, Hypotheekvisie and the NVM-Hypotheekshop have a growing influence on the mortgage market. In 1992 the income generated through the intermediation of mortgages showed the largest revenue growth rate for NVM brokers, viz. 23%. The average commission fee obtained by NVM real estate brokers per mortgage was dfl 2021, a fee that approaches the real estate brokerage fee: the mortgage commission fee is 62% of the real estate sales fee. In 1991 the Hypotheker had 60 members and the NVM-Hypotheekshop 300 members. The RABO-brokers are perhaps the only ones who directly try to establish a link between the market for housing and mortgages. The general structure of these brokers is that one or more RABO-banks share in the profits of these brokers. The RABO-brokers are, however, also a member of the LMV and have to comply with their rules and fees.

6.3 Collusion in bargaining

Another phenomenon of tacit collusion may be collusion in bargaining. The most important difficulty one will encounter in proving collusionary bargaining has been brought forward in

Section 5. If commission fees are set too high, the result will be that buying real estate broker will set his reservation price too high and the selling agent will set the reservation price too low. In short, what might look like collusionary bargaining to the principals may simply be the result of second-best prices. Evidence of actual collusionary bargaining is therefore hard to obtain, although Doiron, Shilling and Sirmans (1985), and Jud and Frew (1986) noted that buyers effectively pay one-third to one-half of the commission because of a higher sale price. Of course, this type of argument hinges on the reputation of an agency for assessing the market value of real estate. None of the agents wants to damage its reputation as a reliable appraiser, although this particular line of reasoning is not that important since house buyers and sellers transact infrequently and the possibility for a 'hit-and-run' strategy is always present. Brokers are far more concerned with their reputation as being a loyal member of a cartel.

6.4 Uniform prices and price fixing

There is some considerable confusion about the question whether brokerage prices should be uniform (see Miller and Shedd, 1979). The confusion arises in large part because of the vague definition of the uniformity of prices: does it apply to time, brokerage firms, consumers or the property itself? Economic theory yields some answers, viz. that uniformity is less likely to occur if housing prices are non-stationary, if the risk preferences and the time value of (heterogenous) consumers and real estate agents differ and if brokerage firms differ in their efficiency in handling listings. All of these elements seem to be present in the Dutch real estate market. Section 2 showed the non-stationary character of Dutch housing prices, Section 4 the difference in consumer preferences and in Section 5 we presented some evidence suggesting that the smaller NVM firms are less efficient in handling transactions than the larger brokerage firms, i.e. those offices with 4 or more employees. Nevertheless all NVM offices charged the same brokerage fees and anyone deviating from this regime could be disbarred. As of February 1, 1994 the prices set by the NVM head office are said to be merely of an 'advisory' nature, i.e. individual members may deviate from them. As became apparent later in the year, the NVM brokers are restricted in their discretionary power to set prices: the NVM Code of Honor seems to dictate that "members are not allowed to advertise publicly with brokerage prices"[9]. Recently, the NVM has given in to the consumer organization VEH who brought this case to court and members are now free to advertise with commission fees. The VBO also sets prices for its members but it explicitly states that they are maximum prices. The general conclusion about the uniformity of prices is that it is an artificial construct and generally the result of price-fixing. The judicial stance on price-fixing has always been rather lax in the Netherlands, in contrast to the United States where price-fixing has always been considered illegal, compare the following statement of the U.S. Supreme Court in 1950 (Miller and Shedd, 1979, p. 319):

"Price-fixing is per se an unreasonable restraint of trade. It is not for the courts to determine whether in particular settings price-fixing serves an honorable or worthy end. An agreement, shown either by adherence to a price schedule or by proof of consensual action fixing the uniform or minimum price, is itself illegal under the Sherman Act, no matter what end it was designed to serve"

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9. See De Volkskrant, Makelaarsvereniging in geweer tegen reclameborden, September 14, 1994.

7. Policy options

Thus far we have concerned ourselves with analyzing the market for real estate brokerage, pinpointing the most notable characteristics of this market for services. In this section we will focus on policy options that might increase consumer welfare. Policy options that attain this goal are directed at alleviating a number of the inefficiencies and market failures. The issue whether or not the market is dominated by the NVM cartel is, of course, a question that will return in a number of policy options. A number of policy options is, however, independent of the issue of collusion. The structure of prices, the dissemination of information, and the design of the dominant allocation mechanism are fields of interest that surpass the issue of collusion. Antitrust action against cartels is also the most difficult action to undertake since the very essence of the principal-agent relationship is that moral hazard will generally be present and the assertion that members of a cartel are more prone to moral hazard than the independent broker is hard to prove in court and would make more monitoring necessary; a policy option which carries perhaps more costs than benefits. One can better resort to other indirect means, such as improving the conditions of the contract or increase the bargaining power of the principals. Consecutively we will deal with the design of the structure of brokerage fees, centralization of the consumer organizations, the optimal use of the MLS, alternative structures of brokerage intermediation and alternative allocation mechanisms in trading residential real estate. Since most of the options have been dealt with to the fullest extent we will only some short comments on each of the options.

7.1 State contingent brokerage fees

The most straightforward policy option one can think of is to make the commission fee of the broker, first of all, dependent on the final outcome of the bargaining process and, secondly, dependent on the risk aversion and time preference of the buyers and sellers of real estate. At present, buyers and sellers face fixed-percentage non-state contingent fees. Only the small Dutch brokerage organisation LMV offers state contingent fees. The base for calculating the commission fee for buying real estate is twice the asking price minus the actual buying price. Evidence on the effectiveness of this type of commission fees is sadly lacking[10].

One reason for opting for state contingent price formation is that the present fixed-percentage commission fee offers the real estate agent the means to spread risks instead of the principals. As has been proven, the fixed-percentage fee induces the broker to expend less effort in intermediating for the principal and under quite general circumstances the fee is higher than the state contingent brokerage fee.

Of course, the key issue here is to answer the ultimate question: how risk averse are the principals (buyers and sellers) and the agents? As we have shown in Section 4 Dutch owner-occupiers are less risk averse than the consumers who rent an apartment or a house. This in addition to the presence of a transfer tax that has to be paid by the buyer of real estate makes it more appropriate to use different commission fees.

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10. It should, however, be noted that constructing a state-contingent fee such as the one by the LMV can be seen as 'a safe bet' since evidence with respect to the asking price of the seller and the actual selling price shows that the asking price is almost never realised (see Tryvos, 1981).

7.2 Finite duration listing contracts

The broker's objective can be described as producing the highest possible selling price or lowest possible buying price, as well as minimizing the amount of time needed to obtain a pre-agreed (reservation) price for a property. Of course, both objectives are related: setting the reservation price too high will lead to a longer than needed time-till-sale. The general conclusion in the literature is that with an open-ended listing contract, brokers will find it advantageous to provide too little selling effort will prefer a property price that is too low. The use of a finite-duration listing contract increases the brokers' effort, thereby aligning the seller's and the broker's interests in the effort dimension. Geltner et al. (1991) show that the use of finite duration listing contracts induces the broker to increase his effort over time, becoming greater as the listing contract expiration time draws nearer. The conflicts of interests regarding the level of broker's effort are minor near the end of the contract but potentially important near the beginning. The conflict of interest regarding the reservation price is more severe near the end of the listing contract and this conflict is exacerbated by the use of finite duration contracts.

7.3 Centralization of consumers' interest

One recommendation that one can think of that might alleviate the negative effects of colluding brokers is to counteract the negative consequences of a producers' cartel and form a cartel of consumers. The main reason why centralization of consumers' interests can be beneficial to economic welfare is because a consumer cartel can internalize the opportunistic behaviour of brokers by negotiating commission fees which the brokers' cartel cannot refuse[11]. Put differently, by forming a union of consumers one closes down the distortionary effect of non-competitive pricing. In day-to-day practice this can mean, e.g. the publication of book with information concerning the reputation, prices and services offered by real estate firms in the Netherlands. Especially the reputation of real estate may prevent real estate agents to use a 'hit-and-run' strategy. By using a customer-search strategy firms are not likely to cheat because customers can always turn to another firm for a second opinion about, for instance, a selling price (Wolinsky, 1993). Furthermore, it is generally thought that the adverse selection problem amongst brokers can be circumvented by signalling quality through prices. However, Arnold (1993) shows that such signals are not going to be effective for middlemen such as real estate brokers. Measuring quality of brokers and disseminating this information to the general public is of prime importance.

7.4 The essential facility: multiple listing service

There has been as early as 1960 a regional exchange of information amongst brokers. In 1973 the NBM founded the Brokers Computer Center (MCC). In 1974 500 real estate offices made use of this system. In 1980 the MCC was connected to the NBM exclusively and changed its name into Brokers Service Center (MDC): each member of the NBM (and today, NVM) was obliged to make use of the MDC. The system has the following rules: each NVM-member has to make information public within 24 hours after obtaining a contract to sell a house. The total of all offers listed at NVM-brokers forms the pool of supply. Each member can, but is not obliged to, subscribe to this Multiple Listing Service (MLS). Each office selects the region it wants to serve and for that particular part of the Netherlands it will receive information of houses listed at NVM-brokers and

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11. The reasoning behind this argument is similar to the circumvention of the distortionary effects of income taxation by the centralization of consumers or producers (see Rodrik, 1993).

pay the subscription in accordance with the amount of information received. The smallest so-called 'information-unit' is a part of a large city. Most brokers subscribe to a province supplemented with one or two adjoining provinces. The broker can also make a choice within the regional market he serves with respect to the type of real estate, like dwellings, shops, offices, agricultural properties, industrial real estate. The organization VBO has recently established a MLS (viz. the V.I.S.), although the scale on which it operates is, of course, smaller than that of the NVM. The main difference between the VBO and the NVM with respect to the MLS is that the VBO makes its services accessible to the general public through consumer organizations, government, and notaries.

However, the main difficulty at this point is the diversity of information systems and the exclusionary character of most of these systems. The VBO, the NVM, the Register of Real Property ('Kadaster') have an information system that functions as a club good, whereas it should function as a public good. A possible policy option is to separate the public good from the different organizations and form a new organization that sells the multiple listing services to the original users and the general public. Of course, this option cannot prevent the brokerage firms of 'hiding' their listings from the MLS, but this option is also present in the current MLSs (see Frew, 1987). However, evidence from Sirmans, Turnbull and Benjamin (1991) indicates that the problem of holding back listings from the MLS is not that serious a problem. They show that larger U.S. firms tend to sell houses faster than smaller firms, a finding consistent with Yinger's (1981) search model. Such a production difference would generate a greater demand for listing with a large firm and consequently a higher commission fee. They find no convincing evidence that larger firms command higher listing fees than smaller firms. The statistics with respect to the Dutch NVM brokerage organisation presented in section 5 show otherwise: larger firms charge higher fees than smaller firms. Sirmans et al. (1991) also find no significant differences in premiums across firms which, in their opinion, is evidence that the MLS system effectively levels the playing field for real estate brokers competing for listings. Turnbull and Sirmans (1993) present some further evidence that buyers with different levels of information and search costs did not pay significantly different prices for comparable houses. Turnbull and Sirmans (1991, p. 557) interpret this finding as an indication that institutions in the housing market such as the MLS "successfully ameliorate many of the potential price effects of asymmetric information and costly search". The success of the MLS in providing equal access to the brokerage market may have been the result of earlier antitrust action. Under the Sherman Act, competitors cannot exclude other members of the industry from participating in "essential facilities" that are required for effective competition. Denying other competitors the access to a MLS is tantamount to placing competing brokers at a significant competitive advantage because "knowledge of available properties is the broker's chief stock in trade"[12]. The general consensus is that restricting access to a MLS is an action restricting competition, thereby making it applicable to antitrust laws (see Miller and Shedd, 1979).

7.5 The broker as a used-house dealer

One option that has received little attention is the possibility that the broker of second-hand houses does not match buyers and sellers directly but only indirectly, by acting as an arbitrageur. For a long time this has been forbidden in the Netherlands. As early as 1580 brokers were forbidden to trade on their own account. In essence, the broker becomes a trader, similar in nature to the used-car salesman, and no longer an intermediary. The Dutch real estate intermediary, notably the VBO,

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12. Quotes are taken from Erxleben (1981, p. 195), who makes a case eliminating exclusionary membership requirements for a MLS.

does in effect follow this policy, which is fiercely dismissed by the NVM-brokers as "unethical". Also consumer organizations denounce the practice of trading in real estate and see trading as incompatible with the profession of broker. The VBO has formulated a policy guideline for its members with respect to trading and government has also formulated its stance. A general prohibition on trading in real estate is not found to be in line the initiative to enhance competition in real estate brokerage[13]. Blatant abuse of the option to trade in real estate is not the rule in Dutch real estate brokerage and therefore does not justify a ban on trading. As Anglin and Arnott (1991) point out, the option of trading is far from unethical since it comes close to the optimal solution where the broker becomes the residual claimant and carries the risk of price volatility. If real estate agents are risk-neutral, competitive equilibrium in the real estate market entails an agent purchasing the house from the seller and then reselling it. The practice of VBO agents in the Netherlands to trade in houses seems to contradict the conjectures Anglin and Arnott put forward as explanations for its non-existence: like the assumption that agents are not risk neutral, house price risk is larger than that of used cars and the risk is to a large extent undiversifiable, high inventory costs, trust in the dealer, or collusion of real estate brokers. None of these conjectures can explain why trading in houses is not the rule in the brokerage industry.

7.6 Franchising

In the U.K. 25% of real estate offices are part of a franchise-organization, usually owned by banks and insurance companies. In Germany were in 1990 about 180 offices affiliated with a franchise organization. Banks and organizations are setting up their own franchise organizations. In the Netherlands there are only a few small franchise organizations. As Jud et al. (1994) show the viability and profitability of franchise organizations is significantly better than the individual brokerage firm. Their empirical results for U.S. brokerage firms show that franchisees sell more properties than non-affiliates, although the average franchise sale results in less revenue. The net benefit of a franchise affiliation is a 9 percent increase in net revenue, or $70,827 (1987 dollars) annually for the average firm. Furthermore they show that the up-front fees charged by the franchiser are well below the discounted present value of the expected stream of incremental franchise profits. The average franchise organization[14] charges approximately $ 11,500 as an initial fee, thereby remaining well below the extra income generated by franchise affiliation. Compared to the Dutch fees that have to be paid by Dutch brokerage organizations like the NVM (dfl. 15,000 approximately $ 9,400) and the VBO (dfl. 3,500 approximately $ 2,200) these franchise fees are quite substantial.

7.7 Alternative allocation mechanisms

7.7.1 Do-it-yourself

The option to do-it-yourself was always in the back of our mind while discussing the pros and cons of using a real estate broker. Indeed, some elements of real estate brokerage can be dealt with by the more knowledgeable consumers or consumers who have time on their hand. The pragmatic approach to buying and selling of a house would be to do part of the job yourself and part of it can be delegated to a real estate broker. The threat to handle affairs oneself can be an effective device to push real estate brokers to do their utmost best. Of course, with respect to the actual selling and

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13. The SER (1985), however, advised the government to denounce trading in real estate by the real estate broker completely.
14. Large U.S. franchise organizations like Century 21 and ERA charge an initial fee of $12,000 and $15,000 respectively.

buying this leaves the question open when one exactly should retain a broker if things do not turn out that well and how one should set the reservation price. Salant (1991) has examined this question to some extent with a non-stationary search model. The non-stationarity arises in his view because sellers have only a fixed period during which they can move and, if no sale occurs, renting becomes the preferred option in the remaining period. Brokers are better equipped to sample more buyers per period than the individual seller. He shows that, although the asking price declines over time, both before and after the introduction of a broker, the asking price should be raised above what would have been the asking price in the absence of a broker when the broker is first enlisted. This increase covers only part of the commission.

The broker offers, of course, facilities (MLS) and some expertise that a client may not be able to master in short time. A viable policy option is to let brokers offer a service package that is completely divisible. For instance, house buyers may be quite able to search for houses of their choice. But assessing the true value of the house and negotiating the terms of contract may fall outside his/her capabilities. Renting a broker for a specified task gives the consumers freedom of choice. In the day-to-day practice the VBO and the LMV offer such services, in particular the VBO firms offers 34 different services to customers. The LMV advises its members to charge 1% of the property value (with a minimum of dfl 1500,-). The NVM is the only organization that offers only a standard buying contract, thereby providing the consumer services he/she does not need.

7.7.2 Auctions
Real estate is sometimes sold at auctions where investors and brokers are the bidding parties, individual consumers who are 'bargain hunting' are extremely rare. The rules of auctioning real estate differ from region to region[15]. In general, auctions are a mixture of so-called English (or ascending auctions) and Dutch (or descending) auctions and they are held in two sessions. There are also regions, like Limburg, where only the English auction is used. In order to set the starting value of the second session of the auction as high as possible a bonus (1% or 2% of the final sale price) can be earned by the bidder who makes the highest bid during the first session, the English auction. If this closing offer is superseded by a higher bid during the second session the first bidder earns the bonus (better known as 'strijkgeld', 'plokgeld', 'bodgeld', 'trekgeld' or 'blokpenning'). If this first bid is not superseded by a higher bid, the last bidder of the first session has to buy the property. Sometimes, the notary publishes the winning first bid and starting value for the second session in the newspapers and one or two weeks later the second session will be held. The second session of this auction is better known as a Dutch auction, i.e. the auctioneer will state prices in descending order until a buyer says "mine". Most auctions will first increase the bid of the first session with some mark-up ('ophoging') then start the 'mining' process. The 'mining' price is then the final sales price. Only the Amsterdam auction is an exception to this rule: the total sales price is not this last bid of the second session, but the sum of the closing bid of the first session and the bid of the second session. Sometimes properties are auctioned separately or in combination with other properties. If the sum of two separate offers is higher than the bid of a combination of properties one has two buyers and otherwise just one buyer. Sometimes the English and Dutch auctions are held at one and the same evening. It happens occasionally that a buyer makes a bid before the auction is actually held. If the seller excepts this bid the auction will be cancelled ('opgehouden'). One of the statutory conditions of many auctions is that the seller of a property

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15. Auctions held in 's Hertogenbosch have the peculiar habit to restrict the duration of the bidding until a wax candle has been burnt dead. In Friesland bidders have to write down their bid on a slate. See for some habits at the beginning of this century: Gebruiken bij openbare veiling van onroerend goed in Nederland, 1915, edited by Broederschap van Candidaat-notarissen, Den Haag.

has the right ('recht van gunning') to state after the auction has been held whether he agrees with the final sales price or the buyer. It is common knowledge that the 'bounty hunters' are only interested in the bonus to be earned in the English auction and not so much the house on sale. It happens, of course, that from time to time the winning bidders are left 'stuck with the house'. Auctions are not that popular with individual consumers because house prices are more volatile than on the regular housing market and transaction costs of buying a house at an auction are significantly higher than the regular transaction costs. The volatility is readily assessed by looking at Figure 3 below, which shows the fluctuations in the average sales price of houses[16] on the Amsterdam auction over the period 1876-1993[17]. One of the most well-known real estate auctions is held in Amsterdam since the year 1701. The Amsterdam real estate auction is one of the few that allows only brokers to bid.

Figure 3a: Real and nominal value houses auctioned, 1877–1992
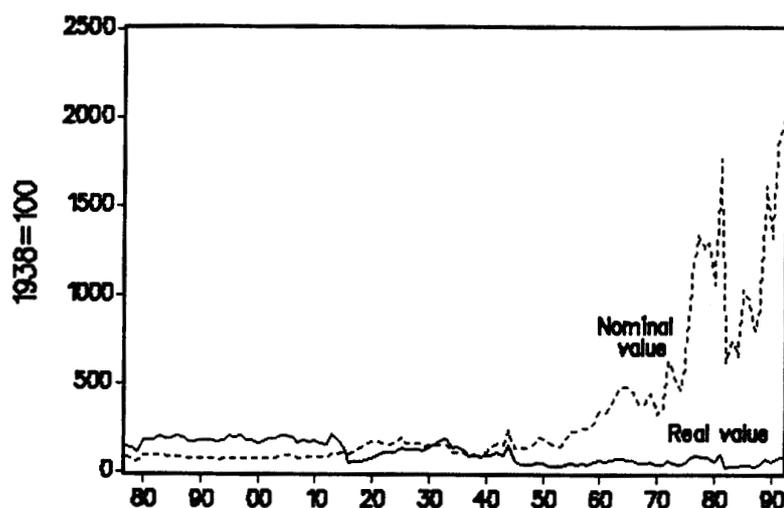
Figure 3b: Fluctuations in average auction value, 1877–1992

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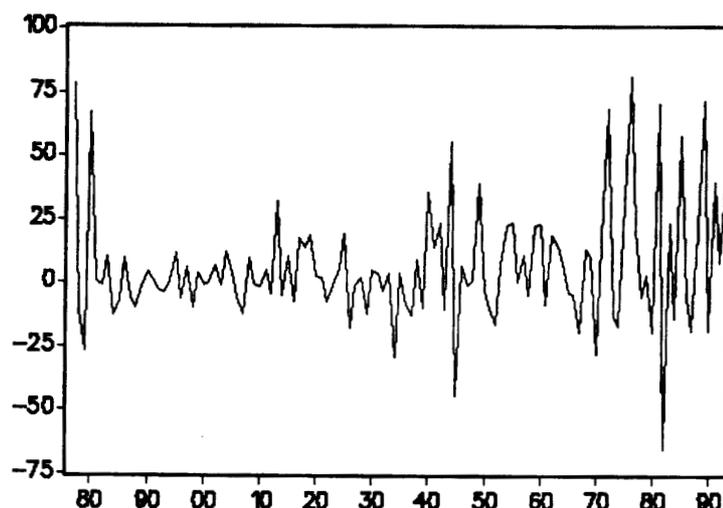
16. One should however be cautious with these figures, since they refer only to auctioned houses that had a variety of different qualities. Controlling for quality might yield a different picture (see Eichholtz and Opsteeg, 1994).

17. Data were kindly provided by the MVA and B. Kruijt as used in his article on the Amsterdam auction (see Kruijt, 1977). The price deflators were taken from Stuijvenberg en De vrijer (1982) and the CBS Historical Statistics.

Although the use of real estate auctions in the Netherlands is negligible at present, there are examples of countries where real estate auctions flourish[18]. For instance, one-third of the houses on sale in the urban housing market of the city of Melbourne, Australia, are being auctioned. However, there are some anomalies in auctions that might make it an unsuitable allocation mechanism. As Ashenfelter and Genesove (1992) show for a 'pooled' or 'right-to-choose' auction of condominiums that auction prices for identical units were 13 percent higher than for units subsequently sold in face-to-face bargaining. The 'right-to-choose' auction is an auction where all the units are combined together. When the bidding stops, the highest bidder may choose the unit desired. The bidding is then restarted and continues until all the units in a pool are sold. Ashenfelter and Genesove (1992) discovered that 31 percent of the auction sales 'fell through' and were sold a few weeks later in face-to-face bargaining: bidders reneged on its sale and unsuccessful bidders were contacted to negotiate a sale. Of course, the unsuccessful bidders could bargain and achieve for a lower sales price. It appears that the early bidders paid the highest premium. The most surprising fact of this case study is that the auctioneer has an informational advantage to generate profits at the expense of buyers who are not aware of the option to renege on a auction sale.

In the Netherlands the option of buying and selling at a real estate auction is not employed that often, perhaps because the process of bidding is not transparent. Especially the mixture of an English auction and a Dutch auction seems to serve as an income generating mechanism, where most of the participants are real estate brokers.

7.7.3 Queuing

A last option in allocating real estate might be the option to simply queue buyers and sellers with respect to their time of entrance on the market. Given the fact that buyers and sellers turn to real estate agents to avoid this option, which is quite common in social housing, we will discard this option as a realistic alternative. We should however mention that real estate brokers may, of course, be using queuing implicitly, by ranking consumers with respect to their profitability (from the broker's perspective).

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18. For a more elaborate discussion of real estate auctions, see Quan (1994).

8. Conclusions

The theory of industrial organization has yielded a number of predictions that have proven to be right with respect to the economic effects of deregulation and increased competition (see Winston, 1993). The status of industrial organization is however ambiguous. On the one hand, the real world is never as smooth and well-behaved as the abstract world of microeconomics. Deviations from points of optimality will be more common than coincidence of the two worlds. In evaluating economic policy options it is very tempting to conclude that at present the real estate brokers are acting collusively and thereby create deadweight losses. On the other hand, microeconomics has generated such a host of models that might explain various settings that one has to be extremely careful in assessing a particular allocation. Observational equivalence plagues the applied economist. Economic history and comparative economics might alleviate this stalemate in the evaluation of allocations. For instance, the market structure of many a market in the Netherlands has led some observers to call the Netherlands a cartel's paradise[19]. History of industrial organization shows that the incentive to form cartels seems to come quite naturally in the Netherlands. The cartels that dominate many a market are merely the modern-day variant of the Golden Age Guilds. The NVM is in that respect the ultimate twentieth century Guild. Like the Golden Age Guilds it has a Code of Honour ('Erecode') by which it members have to abide and it denounces the practices of 'quacks': real estate intermediaries like the VBO members, who not only match buyers and sellers in the housing market but who actually trade in real estate. Furthermore, the Code of Honour prevented NVM members from advertising the brokerage fees and despite the market reform two-third of the NVM brokerage offices charged in 1994 the relatively high fees set by the NVM head office.

The main issue for the future of the market for real estate brokerage is to "devise a better mousetrap" or, stated more formally, designing brokerage contracts that enhance individual welfare. Opportunistic behaviour of brokers will always exist and can only be decreased if the trading principals, i.e. the buyers and sellers of houses, increase their information set and insist on better contracts. At present brokerage contracts are of a third-best nature, i.e. commission fees do not induce brokers to bring about a better outcome because the brokerage fee is a fixed percentage, is uniform across firms and it is independent of the final sales price. Furthermore, in 1994 the majority of NVM-real estate brokers still charged the old, fixed commission fees and do not seem to feel an urge to change their business. A policy option that might bring about more effort on the side of the realtors is by deciding ex ante what the principal considers a good and a bad outcome. Deciding on the true value of a property independently makes it necessary for real estate brokers to offer their services, like appraising, separately and not, as is common practice among NVM brokers, to offer a bundle of services, some of which the consumer did not ask for. Another option is to break the NVM cartel by making the MLS a public good, provided by an independent organization. This is essentially a step towards decreasing the use of real estate brokers as intermediaries and making consumers independent traders. There are signs that such initiatives are in the making, helped by new technological developments such as making use of Internet and virtual reality techniques. It is not higly unlikely that a cartel such as the NVM will dissipate not because of price competition but simply by their conservative attitude in adopting new brokerage techniques.

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19. Van Bergeijk et al. (1993) show what the macroeconomic costs of a cartel's paradise like the Netherlands can amount to in terms of employment loss and economic growth.

Despite the inefficiencies discussed in this policy review one should not forget that the deadweight losses induced by brokerage collusive behaviour can at some instances be dwarfed by the collusive practices of notaries (see KPMG, 1994), the deadweight losses induced by transfer taxes, the market restrictions produced by local governments, or the financial linkages of brokers with particular insurance companies and mortgage banks. Especially Dutch notaries were found to be practising market restriction and monopoly pricing. The only difference between notaries and mortgage suppliers on the one hand and brokers on the other hand, is that brokers are in principle able to manipulate the sales price of a house and thereby all related commissions on brokerage fees and fees related, like insurance and mortgage and side payments from notaries. In other words, the inefficienies caused by the brokerage industry are magnified by the inefficiencies in other industries because those service industries stand on the shoulders of the brokers.

Proof to proposition in section 4.1

Proof: Effort levels under state-contingent (denoted by subscript 'sc') and non-state contingent fees

(denoted by subscript 'nc'): $e_{nc} < e_{sc}$ if $-p'_{nc} > -p'_{sc} \Leftrightarrow \dfrac{V}{U} < \dfrac{v'_0}{u'_0}$ and $v_0 + v_1 < v_0 + v_1\left(\dfrac{u'_1 \, v'_0}{v'_1 \, u'_0}\right)$ (or $\dfrac{u'_1}{v'_1} < \dfrac{u'_0}{v'_0}$).

For the specified constant absolute risk aversion (CARA) utility function, i.e. for agent i with welfare input x:

$$U(x_i) = 1 - e^{-x_i A_i}$$

we can calculate the following inequalities:

$$\frac{v'_1}{u'_1} < \frac{v'_0}{u'_0} \Leftrightarrow \exp((y_0 - y_1)[(1 - \pi)A_s - \pi A_a]) > 1 \qquad (1)$$

$$\frac{V}{U} < \frac{v'_0}{u'_0} \Leftrightarrow (1 - p_s)y_0 + p_s\frac{v'_1}{v'_0}y_1 < (1 - p_s)y_0 + p_s\frac{u'_1}{u'_0}y_1 \qquad (2)$$

$$\Leftrightarrow e^{(y_0 - y_1)[\pi A_a - (1 - \pi)A_s]} < 1$$

Given the fact that $y_0 > y_1$ the first statement concerning differences in brokerage effort is true if $A_s > A_a > 0$. If, however, principals are risk neutral the inequality may be reversed and the real estate agent will exert more effort than in the case of the risk aversion. Under those conditions, one can question why middlemen exist anyway.

Calculation of marginal waiting costs

TABLE B1: Marginal waiting costs buyers and sellers (on a monthly basis), 1993

Costs/benefits(-) seller		Costs/benefits(-) buyer	
+ Real estate taxes	100	+ Income tax disadvantage, absence interest deductibility	205
+ Maintenance costs	354	- Interest costs	- 1092
+ Interest costs	1143	+ Costs higher rate of return on owner-occupied housing	333
+ Decrease in property value	not applicable	+ Increase in property value	1467
+ Costs of logistics	820	- Decrease in property value	not applicable
+ Opportunity costs	1025	+ Opportunity costs	1025
- Increase in property value	-1467	+ Costs logistics	820
- Imputed rent	-820		
Total net waiting costs	1155	Total net waiting costs	2758

Waiting costs seller:
* The real estate tax for owners ('OZ-belasting') differs per city, but is set in this example at 100 guilders a month, which is approximately the tax one has to pay in the largest Dutch cities.
* Maintenance costs are calculated as the depreciation rate necessary to maintain a building, c.q. house of 212,400 guilders with a lifetime of 50 years, i.e. 354 guilders.
* Interest costs for a seller represent in this example the alternative rate of return one can achieve by investing the value of 212,400 minus the remaining mortgage value (assumed to be 60,000 guilders) at a rate of return of 9% (on an annual basis): 1143 guilders.
* The costs of logistics are calculated as the extra costs one has to incur with respect to the travelling expenses between work and home or the extra costs a firm has to incur to tend to its customer from suboptimal location. These are assumed to be 800 guilders.
* The opportunity costs can be substantial by foregoing alternative labour market possibilities (promotion) and in case of industrial real estate the opportunity costs can even more substantial by loss of 'growth potential' customers. These costs are assumed to be 1,025 guilders a month.
* The decrease in property value for 1992 was (212,400 - 194,800)/12 months = 1467 guilders.

Waiting costs buyer:
* As long as a buyer has not found a house he/she does not have to pay interest charges on a mortgage to be arranged in the case of a purchase (we assume that the buyer has saved 40,000 guilders). For the average house price of 212,400 the interest costs are therefore (for a nominal interest rate on mortgages of 7.6%) 1092 guilders.
* As long as the buyer does not have to negotiate a loan the buyer cannot make use of the opportunity to deduct the interest payments from its gross income. This disadvantage is estimated to be 205 guilders.
* The difference between owning and renting a house is estimated to be 7% of the net household disposable income (see CBS, Woningbehoefteonderzoek, 1991). The average disposable income of owner-occupiers was 56,000 in 1992 (see Pelsers, 1992). The average cost difference is therefore 325 guilders, or by taking account of inflation 333 guilders in 1993.
For the years 1986-1992 we have done similar calculations by imputing the relevant interest rates and house prices and by deflating certain variables by the consumption price index.

The search costs implied by selling and buying activities of real estate brokers is calculated by dividing the sum of the personnel costs of brokers and their assistants, the promotion costs and the costs of motorcars by the number of transactions made by each real estate office times the number of bids (n) times 12 (to derive a monthly figure). The costs of each selling and buying activity is approximated by taking the share of buying and selling real estate in the total revenue.

References

Adams, P.D., B.D. Kluger and S.B. Watt, 1992, Integrating Auction and Search Markets: The Slow Dutch Auction, Journal of Real Estate Finance and Economics, 5, 239-253.

Anglin, P.M., 1994, Contracts for the Sale of Residential Real Estate, Journal of Real Estate Finance and Economics, 8, 195-211.

Anglin, P.M., and R. Arnott, 1991, Residential Real Estate Brokerage as a Principal-Agent Problem, Journal of Real Estate Finance and Economics, 4, 99-125.

Arnold, M.A., 1992, The Principal-Agent Relationship in Real Estate Brokerage Services, Journal of the American Real Estate and Urban Economics Association, 20, 89-106.

Arnold, M.A., 1993, Signalling by Middlemen, Economics Letters, 42, 189-194.

Ashenfelter, O., and D. Genesove, 1992, Testing for Price Anomalies in Real-Estate Auctions, American Economic Review, Papers and Proceedings, 82, 501-505.

d'Aspremont, C., A. Jacquemin, and J.J. Gabszewicz, 1983, On the Stability of Collusive Price Leadership, Canadian Journal of Economics, 16, 17-25.

Bartlett, R., 1981, Property Rights and the Pricing of Real Estate Brokerage, Journal of Industrial Economics, 30, 79-94.

Bergeijk, P.A.G. van, R.C.G. Haffner, and P.M. Waasdorp, Measuring the Speed of the Invisible Hand: The Macroeconomic Costs of Price Rigidity, Kyklos, 46, 529-544.

Biglaiser, G., 1993, Middlemen as Experts, Rand Journal of Economics, 24, 212-223.

Carroll, W., 1989, Fixed-Percentage Commissions and Moral Hazard in Residential Real Estate Brokerage, Journal of Real Estate Finance and Economics, 2, 349-365.

CBS, 1981, Inkomens vrije beroepsbeoefenaren, 1972 (transl. Income of Self-Employed Professional Persons, 1972), Statistische Onderzoekingen, M13, Den Haag.

Cicchetti, C.J., and J.A. Dubin, 1994, A Microeconometric Analysis of Risk Aversion and the Decision to Self-Insure, Journal of Political Economy, 102, 169-186.

Doiron, J., J. Shilling and C. Sirmans, 1985, Owner versus Broker Sales: Evidence on the Amount of the Brokerage Commissions Capitalized, Real Estate Appraiser and Analyst, 51, 44-48.

Donkers, J.J.J., 1992, De Vereniging Bemiddeling Onroerend Goed (VBO) op weg naar 1995 (transl. The Association of Real Estate Agents en route to 1995), EIM, Zoetermeer.

Eichholtz, P.M.A., and G. Opsteeg, 1994, Vastgoed op de lange termijn, 1630-1974 (Transl. Real Estate in the long-run, 1630-1974), Economisch Statistische Berichten, 79, 816-819.

EIM, 1990, Bemiddeling in onroerend goed na 1992 (transl. Real Estate Brokerage after 1992), Economisch Instituut voor Midden- en Kleinbedrijf, Zoetermeer.

Engelsman, S.G. Jr., 1977, Geschiedenis van de makelaardij in onroerende goederen in Nederland (transl. 'History of Real Estate Brokerage in the Netherlands'), in: G. Bolle and C.A. Snepvangers (eds.), Spiegel van onroerend goed, Kluwer, Deventer.

Erxleben, W.C., 1981, In Search of Price and Service Competition in Residential Real Estate Brokerage: Breaking the Cartel, Washington Law Review, 56, 179-215.

Frew, J.R., 1987, Multiple Listing Service Participation in the Real Estate Brokerage Industry: Cooperation or Competition, Journal of Urban Economics, 21, 272-286.

Geltner, D.M., B.D. Kluger, and N.G. Miller, 1991, Optimal Price and Selling Effort from the Perspective of the Broker and Seller, Journal of the American Real Estate and Urban Economics Association, 19, 1-24.

Geltner, D.M., B.D. Kluger, and N.G. Miller, 1992, Incentive Commissions in Residential Real Estate Brokerage, Journal of Housing Economics, 2, 139-158.

Hall, R.E., 1988, Intertemporal Substitution in Consumption, Journal of Political Economy, 96, 983-1004.

Harts, J.J., and L. Hingstman, 1986, Verhuizingen op een rij. Een analyse van individuele verhuisgeschiedenissen, (transl. 'Moves Lined Up. An Analysis of Individual Move Histories'), Nederlandse Geografische Studies, no. 13, University of Utrecht.

Jacquemin, A., and M.E. Slade, 1989, Cartels, Collusion and Horizontal Merger, in: R. Schmalensee and R.D. Willig (eds.), Handbook of Industrial Organization, vol. I, North-Holland, Amsterdam.

Jong, H.W. de, 1992, Het kartelparadijs: de punten van bezwaar (transl. The Cartel Paradise: Points of Objection), Economisch Statistische Berichten, 77, 921-927.

Jud, G.D., and J.R. Frew, 1986, Real Estate Brokers, Housing Prices and the Demand for Housing, Urban Studies, 23, 21-31.

Jud, G.D., R.C. Rogers, and G.E. Crellin, 1994, Franchising and Real Estate Brokerage, Journal of Real Estate Finance and Economics, 8, 87-93.

Kemp, A.A.M. de, M.G. Lijesen, and H. de Groot, 1994, Kosten en opbrengsten van notariële akten (transl. Costs and Benefits of Notarial Acts), IOO, Den Haag.

Knoll, M.S., 1988, Uncertainty, Efficiency and the Brokerage Industry, Journal of Law and Economics, 31, 249-263.

KPMG, 1994, Kosten en opbrengsten van het notariaat, (transl. Costs and Benefits of the Notary), Amstelveen.

Kruijt, B., 1977, Veilingen van onroerend goed in Amsterdam (1877-1976), (trans. Auctions of Real Estate in Amsterdam), in: G. Bolle and C.A. Snepvangers (eds.), Spiegel van onroerend goed, Kluwer, Deventer.

Levmore, S., 1993, Commissions and Conflicts in Agency Arrangements: Lawyers, Real Estate Brokers, Underwriters and Other Agents' Rewards, Journal of Law and Economics, 36, 503-539.

Loon, F.A.P.M. van, 1992, Veranderingen op de bemiddelingsmarkt voor koopwoningen, (transl. Changes in the Market for Residential Real Estate Brokerage), Tijdschrift voor consumentenrecht, 3, 162-170.

Lukkes, P., and J.H.M. van Rooden, 1986, De makelaardij in onroerende goederen in Nederland, (transl. The Real Estate Brokerage Industry in the Netherlands), Netherlands Geographical Studies, no. 6, Groningen.

Maher, C., 1989, Information, Intermediaries and Sales Strategy in an Urban Housing Market: The Implications of Real Estate Auctions in Melbourne, Urban Studies, 26, 495-509.

Masurel, E., and P.A. Risseeuw, 1987-1994, Brancheverkenning makelaardij onroerend goed (transl. Branche Report Real Estate Brokerage), Economic and Social Institute of the Free University, Free University Press, Amsterdam.

McAfee, R.P., and J. McMillan, 1987, Auctions and Bidding, Journal of Economic Literature, 25, 699-738.

Miceli, T.J., 1989, The Optimal Duration of Real Estate Listing Contracts, Journal of the American Real Estate and Urban Economics Association, 17, 267-277.

Miceli, T.J., 1991, The Multiple Listing Service, Commission Splits, and Broker Effort, Journal of the American Real Estate and Urban Economics Association, 19, 548-566.

Miceli, T.J., 1992, The Welfare Effects of Non-Price Competition Among Real Estate Brokers, Journal of the American Real Estate and Urban Economics Association, 20, 519-532.

Miller, N.G., and P.J. Shedd, 1979, Do Antitrust Laws Apply to the Real Estate Brokerage Industry?, American Business Law Journal, 17, 313-339.

Mills, E.S., 1988, Are Real Estate Markets Becoming More Efficient?, Journal of Real Estate Finance and Economics, 1, 75-83.

Ministerie VROM, 1993, Eigen woningbezit in cijfers 1993, (transl. Owner-occupied Housing in Numbers 1993), Den Haag.

Needham, D.B., B. Kruijt, and P. Koenders, 1993, Urban Land and Property Markets in the Netherlands, University College London Press, London.

Nelson, C.R., and R. Startz, 1990, The Distribution of the Instrumental Variables Estimator and its t-Ratio When the Instrument is a Poor One, Journal of Business, 63, S125-S140.

Pelsers J., 1994, Bestedingen van huishoudens naar huurders en eigenaren (transl. "Expenditures of households with respect to rental and owner-occupied housing'), 1992, CBS Sociaal-economische Maandstatistiek, 5, 14.

Quan, D.C., 1994, Real Estate Auctions: A Survey of Theory and Practice, Journal of Real Estate Finance and Economics, 9, 23-49.

Rees, R., 1987, The Theory of Principal and Agent, Parts I and II, in: J.D. Hey and P.J. Lambert (eds.), Surveys in the Economics of Uncertainty, Basil Blackwell, Oxford.

Risseeuw, P., 1991, Modelling Growth for Small Business Organizations, Research Memorandum No. 1991-110, Free University, Amsterdam.

Rodrik, D., 1993, Redistributive Taxation without Excess Burden, Economics and Politics, 5, 53-60.

Salant, S.W., 1991, For Sale by Owner: When to Use a Broker and How to Price the House, Journal of Real Estate Finance and Economics, 4, 157-173.

Sargent, T.J., 1987, Dynamic Macroeconomic Theory, Harvard University Press, Cambridge, Mass.

Schmalensee, R., 1987, Competitive Advantage and Collusive Optima, International Journal of Industrial Organization, 5, 351-367.

Schroeter, J.R., 1987, Competition and Value-of-Service Pricing in the Residential Real Estate Brokerage Market, Quarterly Review of Economics and Business, 27, 29-40.

Selten, R., 1984, Are Cartel Laws Bad for Business?, in: H. Hauptmann, W. Krelle, and K.C. Mosler (eds.), Operations Research and Economic Theory, Springer, Berlin.

SER, 1985, Advies bemiddeling onroerend goed, (transl. Policy Report on Real Estate Brokerage), SER-advies no. 85/01, Den Haag.

Sirmans, C.F., G.K. Turnbull, and J.D. Benjamin, 1991, The Markets for Housing and Real Estate Broker Services, Journal of Housing Economics, 1, 207-217.

Sirmans, C.F., and G.K. Turnbull, 1993, Real Estate Brokerage Market Structure and Price Competition, Working Paper #9322-99, Center for Real Estate and Urban Economic Studies, University of Connecticut.

Stuijvenberg, J.H. van, and J.E.J. de Vrijer, 1982, Prices, Population, and National Income in the Netherlands, 1620-1978, Journal of European Economic History, 699-711.

Swank, J., 1994, Bank Behaviour and Monetary Policy in the Netherlands, Theory and Evidence, PhD. Thesis, Free University, Amsterdam.

Tates, N., and P.M.A. Eichholtz, 1993, Beleggen in Vastgoed, Ontwikkeling in Perspectief (transl. Investing in Real Estate, Development in Perspective), Wolters-Noordhoff, Groningen.

Tryfos, P., 1981, On the Estimation of Bid Distributions in Real Estate Markets, Management Science, 27, 587-601.

Turnbull, G.K., and C.F. Sirmans, 1993, Information, Search, and House Prices, Regional Science and Urban Economics, 23, 545-557.

Wilson, R., 1977, A Bidding Model of 'Perfect' Competition, Review of Economic Studies, 44, 511-518.

Winston, C., 1993, Economic Deregulation: Days of Reckoning for Microeconomists, Journal of Economic Literature, 31, 1263-1289.

Wolinsky, A., 1993, Competition in a Market for Informed Experts' Services, RAND Journal of Economics, 24, 380-398.

Yavas, A., 1994, Economics of Brokerage: An Overview, Journal of Real Estate Literature, 2, 169-195.

Yinger, J., 1981, A Search Model of Real Estate Broker Behavior, American Economic Review, 71, 591-605.

Descriptive data Dutch real estate brokerage

Table A1: Key figures NVM brokers and the real estate market, 1986-1993

	1986	1987	1988	1989	1990	1991	1992	1993
Number of offices reporting	921	959	907	914	995	968	996	1017
Averages per office (x dfl 1000)								
Employment	3.8	4.0	4.5	4.6	4.7	4.8	5.0	5.3
Number of transactions	91.5	89.9	94.8	94.8	91.7	93.4	104.6	116.7
Total revenue	460	476	549	593	600	623	693	832
Total cost	395	417	468	500	535	554	605	685
Profit	65	59	80	93	65	69	87	147
Revenue per worker	122	120	123	123	127	131	139	158
Profit per worker	17.1	14.8	17.8	20.2	13.8	14.4	17.4	27.7
Transactions per employee	24.1	22.5	21.1	20.1	19.5	19.5	20.1	22.0
Commission (dfl)	2701	2847	2860	3017	3111	3233	3360	3484
Commission (% of average house price)	1.84%	1.85%	1.78%	1.76%	1.78%	1.79%	1.72%	1.64%
Average number of days on the market of houses	149	127	113	101	102	103	81	n.a.
Stock of residential real estate (x 1000)	5,384	5,483	5,588	5,699	5,802	5,892	5,965	6,044
Share of owner-occupied housing	43.3%	43.7%	44.3%	44.9%	45.2%	46.1%	46.8%	47.4%
Newly build houses	48,668	58,379	66,930	65,516	59,986	53,848	54,574	n.a.
Mortgage interest rate	7.0%	7.0%	6.9%	7.6%	8.7%	9.2%	8.9%	7.6%
Average price of houses sold (x dfl 1000)	147.0	154.0	161.0	171.6	174.5	180.4	194.8	212.4
Exchange rate U.S. dollar in Dutch guilders	2.450	2.025	1.976	2.121	1.821	1.870	1.758	1.857
Percentage change in rent paid for housing	3.2	3.3	4.1	4.0	3.9	6.3	6.5	5.7

Source: ESIVU (1986-1994), Min. VROM (1993), CPB (1994), Macroeconomische Verkenning 1995.

Table A2: Revenue structure NVM brokers, 1984-1993 (at current prices)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Number of offices	812	812	921	959	907	914	995	968	996	1017
Total revenue per office (x dfl 1000)	361	412	460	476	549	593	600	623	693	832
of which (%):	100	100	100	100	100	100	100	100	100	100
buying real estate (%)	50.4	51.9	54.0	53.8	51.3	49.5	49.1	10.3	10.8	11.2
selling real estate (%)								40.1	40.5	40.8
appraisals (%)	13.4	12.5	12.1	12.1	11.1	10.9	10.3	10.3	10.8	12.1
renting (%)	5.5	5.7	5.0	5.7	5.3	4.6	6.0	6.0	5.4	5.5
management (%)	18.7	17.4	16.3	15.5	13.7	14.1	13.1	13.1	12.2	9.9
mortgage intermediation (%)	3.4	3.6	4.4	4.5	4.5	4.9	7.8	7.8	8.8	9.6
insurance intermediation (%)	6.2	6.0	4.6	5.1	11.2	13.4	10.0	10.0	9.1	8.2
miscellaneous (%)	2.5	5.6	3.6	3.3	3.0	2.6	2.5	2.5	2.4	2.6

Table A3: Type of real estate traded by NVM brokers, 1984-1993

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Number of offices reporting	812	812	921	738	825	939	939	968	837	768
Total revenue (%)	100	100	100	100	100	100	100	100	100	100
Used dwellings	76.6	76.3	76.1	77.8	74.2	74.3	73.0	76.3	76.7	76.9
New dwellings	11.2	11.2	11.0	10.7	12.2	12.1	10.9	16.9	17.1	16.7
Total dwellings	87.8	87.5	87.1	88.5	86.4	86.4	83.9	93.2	93.8	93.6
Used business buildings	6.7	6.9	6.6	6.8	7.5	7.5	7.5	3.0	2.9	2.9
New business buildings	-	0.8	0.7	0.3	0.6	0.7	0.9	0.3	0.1	0.1
Agricultural property	-	-	-	1.6	2.1	1.9	2.1	1.3	1.1	1.2
Investment property	2.6	2.3	2.7	1.7	2.1	2.1	3.9	0.8	0.6	0.6
Miscellaneous	3.0	2.5	2.9	1.2	1.2	1.5	1.7	1.4	1.5	1.6

Table A4: Comparing cost and revenue structure NVM versus VBO, 1989-1991

Organization	1989		1990		1991	
	NVM	VBO	NVM	VBO	NVM	VBO
Cost structure	100%	100%	100%	100%	100%	100%
Personel	62.0	61.0	62.3	61.4	63.0	62.2
Travelling/ representation	2.6	3.8	2.2	3.7	2.2	3.4
Car expenses	6.2	7.2	5.9	6.3	5.8	6.2
Housing	6.4	5.2	6.5	5.7	6.9	5.7
Computers	2.1	2.0	2.1	1.9	2.4	2.1
Advertising	6.0	8.8	6.4	8.5	5.9	8.5
Office and general expenses	14.5	12.0	14.4	12.5	13.7	11.8
Revenue structure	100%	100%	100%	100%	100%	100%
Brokerage buying/selling	51.0	43.9	49.1	40.8	50.4	41.5
Brokerage rentals	5.1	4.6	6.2	7.3	6.0	6.8
Management of real estate	12.6	2.3	13.6	4.0	13.1	4.2
Trading real estate	.	7.2	.	10.1	.	11.0
Appraisals	11.0	3.3	10.3	2.0	10.3	2.0
Brokerage mortgages	7.7	9.5	7.9	8.1	7.8	7.5
Brokerage insurance	10.1	23.2	10.0	22.6	10.0	21.9
Miscellaneous	2.5	6.0	2.8	5.2	2.5	5.2

Table A5: Buying and selling types of real estate intermediation by NVM brokers, 1991-1993

	1991		1992		1993	
Number of offices reporting	765	777	793	837	768	800
Type of transaction	Selling	Buying	Selling	Buying	Selling	Buying
Used dwellings	73.4%	90.7%	73.8%	90.4%	73.9%	91.8%
New dwellings	20.2%	0.9%	20.1%	2.6%	19.6%	2.2%
Total dwellings	93.6%	91.6%	93.9%	93.0%	93.5%	93.0%
Used business buildings	2.8%	4.1%	2.6%	4.3%	2.8%	3.5%
New business buildings	0.2%	0.5%	0.1%	0.1%	0.1%	0.1%
Vacant land	0.5%	0.5%	0.6%	0.2%	0.5%	0.2%
Recreational sites	0.5%	0.1%	0.6%	0.1%	0.9%	0.0%
Agricultural property	1.4%	0.8%	1.2%	0.9%	1.4%	0.6%
Investment property	0.6%	2.0%	0.5%	1.1%	0.5%	1.3%
Miscellaneous	0.4%	0.3%	0.4%	0.2%	0.4%	0.2%

Table A6: Development of complaints, NVM, 1983-1993

Year	Complaints before Supervisory Council	Commission on Conditions and Tariffs	Total
1983	47	84	131
1984	58	82	140
1985	80	72	152
1986	114	90	204
1987	119	82	201
1988	124	86	210
1989	104	91	195
1990	152	84	236
1991	163	108	271
1992	160	92	256
1993	133	87	220