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Vertical foreclosure: a policy framework

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Abstract in English

Whenever you phone your mother, switch on the light, or buy health insurance you purchase a service or product from a chain of vertically related industries. Providers of these products or services need access to a telecommunications network, an electricity network or to health care services. In such industries, integration and exclusive contracts between vertically related firms may have important welfare enhancing effects, but can also deny or limit rivals' access to input or customers, leading to foreclosure. Foreclosure can harm welfare if it reduces competition.

This document provides policymakers with a framework to assess the potential for welfare reducing foreclosure of vertical integration and vertical restraints and describes possible remedies. The framework consists of four steps. Each step requires its own detailed analysis.

First, market power should exist either upstream or downstream. Second, a theory of foreclosure should be formulated that explains why foreclosure is a profitable equilibrium strategy. Third, the existence and magnitude of potential welfare enhancing effects of the vertical restrains or vertical integration should be assessed. Fourth, suitable policies to address foreclosure should be found.

Key words: Vertical foreclosure, Competition policy, Network industries
JEL code: L13, L42, L51

Abstract in Dutch

Als je naar huis belt, het licht aandoet, of een zorgverzekering koopt, neem je een product af van een verticale keten van toeleveranciers en verkopende bedrijven. Aanbieders van deze producten hebben toegang nodig tot een telecommunicatienetwerk, een elektriciteitsnetwerk en zorgdiensten. Integratie en exclusieve contracten tussen bedrijven in zo'n verticale keten kunnen belangrijke welvaartsverhogende effecten hebben, maar ook de toegang van concurrenten tot input of klanten beperken. In het laatste geval leiden ze tot uitsluiting. Uitsluiting kan schadelijk zijn voor de welvaart als dit de concurrentie vermindert.

Dit document biedt beleidsmakers een raamwerk om het risico te bepalen van welvaartverlagende uitsluiting door integratie of exclusieve contracten en beschrijft mogelijke oplossingen. Het raamwerk bestaat uit vier stappen, die elk een gedetailleerde analyse vereisen.

Ten eerste moet er bovenstrooms of benedenstrooms markmacht bestaan. Ten tweede moet uitsluiting een winstgevende evenwichtsstrategie zijn. Ten derde is van belang welke welvaartsverhogende effecten bestaan en hoe groot deze zijn. Ten vierde moeten er geschikte beleidsmaatregelen gevonden worden om uitsluiting tegen te gaan.

Steekwoorden: Verticale uitsluiting, Mededingingsbeleid, Netwerk industrieën.

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Preface

In recently deregulated markets, such as the telecommunications, the electricity, and the health care sector foreclosure features prominently on the policy agenda. Foreclosure also plays an important role in the assessment of mergers and the application of antitrust law. Policymakers wonder whether there is a risk of welfare reducing foreclosure and what measures may address this problem.

However, a priori foreclosure neither lowers nor raises welfare. In addition, there are various strategies that can lead to foreclosure. It is therefore often challenging to assess the potential for welfare reducing foreclosure and to find suitable remedies. This document provides a policy framework rooted in theory and empirics to assist policymakers in their decisions.

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C.N. Teulings
Director

Summary

Whenever you phone your mother, switch on the light, buy health insurance, connect to the Internet or turn on the television you are part of a chain of vertically related industries. Your telephony, television or internet provider needs access to a telecommunications network to reach you. Your electricity producers can only supply electricity to your doorstep through an electricity transport network. Your health care insurer needs to contract health care services with the hospital you visit.

In such industries, integration and exclusive contracts between vertically related firms can have important welfare enhancing effects relating to the alignment of pricing or investment incentives. However, these strategies may also affect rivals' abilities to compete by denying or limiting access to the market, i.e., they may lead to foreclosure. Foreclosure can harm welfare if it reduces competition. An assessment of these strategies' potential for welfare reducing foreclosure is challenging for three reasons. First, a priori foreclosure is neither good nor bad for welfare. Second, it can be the result of different commercial strategies. Third, the analysis and effects of foreclosure are sensitive to the prevailing market structure.

The potential for welfare reducing foreclosure continues to play an important role in the policy debate on recently liberalised sectors, antitrust enforcement and merger control. Policymakers worry that vertical integration and vertical restraints can lead to welfare reducing foreclosure and try to find policy measures to address this problem. This document aims to provide policymakers with a framework rooted in theory and empirics to assess the potential for welfare reducing foreclosure of vertical integration and vertical restraints and describes possible remedies.

An assessment of the potential for welfare reducing vertical foreclosure should consist of four steps. First, foreclosure should have the potential to reduce competition. Both theory and empirics show that vertical foreclosure is not very likely to be welfare reducing when there is fierce competition both upstream and downstream. If exclusive contracts or vertical integration occur in such markets (and they do in reality), it will be to increase efficiency by eliminating double marginalisation, free rider effects or hold up problems.

Second, if welfare reducing foreclosure is possible in principle, we should assess whether it is also likely to happen in practise. The theory presented in chapter 2 provides guidance in finding circumstances that make anticompetitive foreclosure profitable market equilibrium. We distinguish between two types of foreclosure: input foreclosure and customer foreclosure. Input foreclosure means that downstream retailers are foreclosed from buying from a particular upstream supplier. Customer foreclosure means that an upstream supplier is foreclosed from selling to a particular retailer. The theory predicts that the likeliness and type of welfare reducing vertical foreclosure differs between markets with and without vertical integration. In addition, markets with competing vertically integrated combinations differ from markets with a

single vertically integrated entity. In the absence of vertical integration, the following three cases can be distinguished

1. If a monopoly exists upstream while the downstream industry is potentially competitive, there is a danger of input foreclosure. Customer foreclosure is not an issue here, because there is only one upstream firm.
2. If a monopoly exists downstream while the upstream industry is potentially competitive there is little probability of customer foreclosure. Input foreclosure is not an issue because there is only one downstream firm.
3. If both the upstream as well as the downstream market are oligopolistic, while economies of scale or network effects are important upstream, customer foreclosure may occur. Entry in the upstream market then requires a particular scale and may be prohibited by signing exclusive contracts with a sufficient number of downstream retailers. However, fierce downstream competition may reduce the number of contracted retailers necessary to achieve sufficient scale for entry.

In the presence of vertical integration, the following three cases can be distinguished

1. If a monopoly exists upstream while the downstream industry is competitive, then some degree of foreclosure is likely without the need for explicit exclusion. By vertically integrating, the monopolist can credibly limit supplies to non-integrated retailers.
2. However, exclusion is less likely if there are (non-integrated) upstream rivals that are efficient. The integrated firm is limited in its possibility to extracts rents from the retailer by the retailer's option of sourcing from the upstream rival.
3. If upstream competition is less fierce (for example because upstream rivals are less efficient): firms may choose to physically commit (e.g. by choosing incompatibility) to exclusive practices.

If multiple competing vertically integrated combinations exist, the following two cases can be distinguished.

1. Foreclosure of downstream entrants becomes less likely as they are more likely to win market share from integrated competitors (e.g. if upstream products are close substitutes).
2. Foreclosure of downstream entrants becomes more likely if their retail products are closer substitutes to the provider's own retail products than to those of the provider's vertically integrated rivals (e.g. if upstream products are very differentiated).

Third, if a theory of foreclosure is formulated, we should assess whether there exist welfare enhancing effects of the vertical restraints or vertical integration that can outweigh the

detrimental effects. The empirical literature suggests that such effects are almost always present, but does not distinguish between different effects. On the basis of economic theory it is often possible to argue that some effects are more likely than others to be present. However, assessing the magnitude of the various effects is a challenging exercise in practice to which we offer no guidance.

Fourth, if foreclosure is likely and the welfare decreasing effects outweigh the welfare enhancing effects, we should assess what policies are suitable to address foreclosure. Here it is important to realize that there are several ways of achieving foreclosure and banning one of them will lead firms to substitute another. In addition, different policy instruments differ in intrusiveness and complexity. Finally, although there is no straightforward answer to this question, it is important to think about the consequences of false positives and false negatives. What is worse for welfare: prohibiting a contract or merger for which the welfare enhancing effects outweigh the welfare reducing effects or allowing a contract or merger for which the welfare reducing effects outweigh the welfare enhancing effects? If the former is worse that the latter, policymakers should be lenient on foreclosure. If the opposite is the case, they should be tough on foreclosure. We stress that there is no unambiguous answer to this question because the answer depends in part on the relation between innovation and competition, which can be either increasing or decreasing.

1 Introduction

Whenever you phone your mother, switch on the light, buy health insurance, connect to the Internet or turn on the television you are part of a chain of vertically related industries. Your telephony, television or internet provider needs access to a telecommunications network to reach you. Your electricity producers can only supply electricity to your doorstep through an electricity transport network. Your health care insurer needs to contract health care services with the hospital you visit.

Firms operating at different levels in vertically related markets have to decide individually on strategic variables (for example prices and investments) that affect their joint profits. This can lead to conflicting incentives and decisions that are inefficient from a joint perspective. For example, given the price for the transport of electricity, your energy provider wants to raise the price you pay as high as possible to increase its profits. At the same time, however, the transport network wants the energy retailer to lower its price as far as possible, so that it can transport more electricity and increase its profit. Your health insurer may want to invest in preventive measures implemented by health care providers, thereby lowering its future expenses. However, if you decide to switch to another insurer afterwards, the latter will free ride on these investments. This reduces your insurer's incentives to invest in your health.

Firms can often align their incentives and (partially) restore joint efficiency by using vertical restraints or by vertically integrating. Examples of such strategies abound. Microsoft signed a variety of exclusionary contracts involving browser use and promotion with computer manufacturers, Internet access providers, Internet content providers and software vendors (Whinston (2001)). In Germany, ice-cream producers Langnese-Iglo and Schöller used exclusive purchasing agreements that required retail outlets to exclusively carry ice-cream. Exclusive contracts are usual in the beer market, where brewers require exclusivity from pubs, sometimes in return providing financing for interior decoration of the pub. The Dutch health care insurer Menzis recently acquired local general practitioners in the cities of Tiel and Houten.[1] In the telecommunications market, vertical integration between retailers and network providers is a key feature of the market.

A central concern of policymakers is that these strategies may harm welfare by denying or limiting competitors' access to the market. This potentially harmful effect, commonly called foreclosure, forms a rationale for ex ante sector regulation, plays a role in the assessment of mergers, and may lead to ex post intervention under competition law. It has played an important role in the formation of sector-specific regulators such as the Onafhankelijke Post en Telecom Autoriteit (OPTA) for the telecommunications sector, the Dienst Toezicht energie (DTe) for the energy sector and the Vervoerskamer for the public transport sector. Examples of antitrust cases

[1] Alleen huisartszorg Menzis in Tiel, NRC, 20 November 2007.

where foreclosure featured prominently are Langnese-Iglo / Schöller, Toys 'R' Us, and the famous Microsoft case mentioned previously.

Apart from its ongoing relevance for regulation and competition law enforcement, the issue of foreclosure features prominently in several current policy debates. The Dutch telecommunications sector is moving from a market where television and telephony were tied to a specific network, to a market the two networks can offer both services. This changes the potential for network owners to foreclose access and affects the need for regulation of access to these networks. At the same time, at the European level the necessity of vertical separation in telecommunications markets, a reality in the UK (the Openreach initiative), is being debated. In the Dutch healthcare market, some insurers have the intention to vertically integration with health care providers. Policymakers worry that this might create the ability for insurers or health care providers to engage in welfare reducing behaviour. In the energy sector, the emergence of dominant international gas suppliers such as Gazprom, has led policy makers to think about the effects of vertical integration of such suppliers with various national gas retailers. Does such integration influence the ability of Gazprom to exercise market power? Alternatively, do long term supply contracts with such firms constitute an attempt to foreclose new entrants? In a market for green certificates for renewable energy production (currently being debated in the Netherlands and introduced in the UK) wholesale producers of renewable energy receive a green certificate for every unit of renewable electricity produced. In addition, a certain percentages of the electricity sold by every retail supplier should be produced from renewable sources. Suppliers have to acquire these green certificates in order to meet their renewable obligation. If only a small number of energy producers have green energy production capacity, foreclosure is a potential problem in such a market.

Whether or not strategies such as vertical restraints or vertical integration that may lead to foreclosure actually harm welfare is ambiguous. In essence, the argument why the concerns of policymakers might not be warranted was formulated originally by proponents of the Chicago school, associated with University of Chicago (see e.g. Bork (1978) or Posner (1976)). According to this school of thought, contracts with vertical restraints can not be used to sustain market power in the face of efficient entry and vertical integration can not be used to extract monopoly profits. Even though an exclusive contract prohibits a supplier to sell to other retailer or a retailer to buy from other suppliers, such contracts are motivated by efficiency considerations and lead to lower costs and higher output.

Following the advent of game theory, the Chicago arguments were revisited and it was shown that under specific circumstances, vertical restraints and vertical integration can serve anti-competitive purposes. However, the theory is complex and fragmented. It is difficult for policymakers to distil general insights from this literature. In addition, empirical work on foreclosure has lagged behind, especially for markets with substantial market power where the issue might be most relevant, and answers provided are partial and preliminary.

In general, it is therefore not straightforward to judge ex ante (1) whether foreclosure will occur after a merger or due to a particular contract with vertical restraints (2) whether the overall effect of strategies that may lead to foreclosure are detrimental to welfare or not, and (3) that banning a particular strategy eliminates the potential to foreclose access to intermediate markets.

The aim of this document is threefold. First, to provide policy makers with a framework rooted in the theoretical and empirical literature to assess the potential for anti-competitive foreclosure. This boils down to asking the right questions in the right order. A relevant question, which we feel does not receive sufficient attention in current policy oriented documents, is whether foreclosure can be an equilibrium strategy. This question is especially important in market with an oligopoly both downstream and upstream. Second, we want to illustrate how to apply the framework in practise by discussing three policy relevant case studies. Third, we aim to provide a basis for further in-depth research in some of these cases.

There exist several papers that review (part of) the literature on foreclosure, most notably Rey and Tirole (2003), Riordan (2005), Rey and Vergé (2005) and Church (2004). These papers are more theoretical in nature and aimed at an expert economic audience. Our contribution focuses on vertical foreclosure by means of general (pricing) contracts. We combine a comprehensive overview of the literature with a policy oriented framework, which is applied to practical cases.

This document is structured as follows. In chapter 2, we review the theory of foreclosure. It starts with a discussion of possible welfare enhancing and welfare reducing effects, and continues with the possibility of welfare reducing foreclosure in market with upstream or downstream monopoly and bilateral oligopolies. Policymakers might want to skip this section and read only the summary of the theory (section 2.6). In chapter 3, we review the empirical literature. In chapter 4, based on the theory, a policy framework is laid out. Finally, in chapter 5, the policy framework is applied to two antitrust cases, Langnese-Schöller and Toys 'R' Us, and three case studies, the electricity, the health care and the telecommunications market.

1.1 Scope

In the economic literature, various definitions of foreclosure can be found.[2] Some definitions take the behaviour of firms as their starting point, whereas others define foreclosure according to the effect this behaviour can have. According to the former, a firm engages in foreclosure if it stops transacting with other firms in the intermediate goods market or if it simply increases its intermediate good price level for certain firms.[3] According to the latter, foreclosure only arises if a rival firm is actually forced to exit the market completely or if the ability of rival firms to compete is harmed (but they are not forced to exit the market).

We focus on foreclosure in vertically related markets, where the intermediate input is not directly provided to consumers. Markets are vertically related when an intermediary good sold to firms in the one market ('the upstream market') is used as an input for a good sold to final consumers in the other market ('the downstream market'). Markets are horizontally related if the goods in both markets are sold to final consumers. We do not consider horizontal foreclosure, which may occur in horizontally related markets. An example of behaviour that may lead to horizontal foreclosure is bundling or tying of software and hardware.

We do not consider strategies such as predatory pricing (or limit pricing in vertically related markets) that may cause rivals to exit. These do not involve denying or limiting access to an input. Instead, firms deterring entrants by pricing aggressively, leading to an initial loss which they can later recoup due to increased market power. Finally, we do not consider exclusionary practises where a several firms coordinate their behaviour, thereby in effect forming a cartel, nor do we discuss the possibility of foreclosure through non pricing instruments, such as sabotage. These would broaden the scope of the document too much.

For the purpose of this document, we therefore define foreclosure as *behaviour in one of two vertically related markets where an individual firm in one of these markets directly or indirectly denies or limits access to its input.*

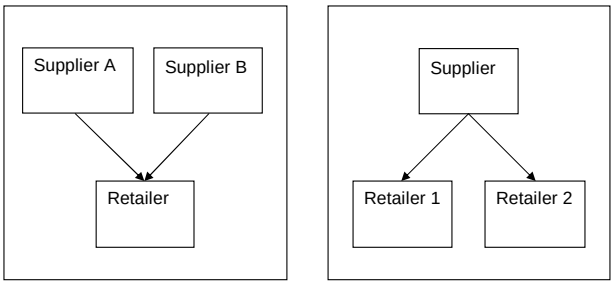
The theory of foreclosure is complex for three reasons. First, there are many different market structures in which foreclosure might arise. The archetypical foreclosure arises in market with a downstream or upstream monopoly, as depicted in figure 1.1 below. The upstream supplier can be either vertically integrated with a retailer or not. The gas market is an example of a market with a vertically separated upstream monopolist. The market for specialized health care provided by a local hospital can be viewed as a market with a vertically

[2] For example: 'Input foreclosure occurs when the integrated firm no longer sells, or sells at a higher price to downstream rivals. Customer foreclosure occurs when the vertically integrated firm no longer buys from upstream rivals', OECD (2007). 'A situation in which (i) a firm dominates one market (bottleneck good); and (ii) uses its market power in the bottleneck good market to restrict output in another market, perhaps but not necessarily by discouraging the entry or encouraging the exit of rivals', Rey and Tirole (2006). 'Strategic behaviour by a firm or group of firms to restrict market access possibilities of potential competitors either upstream or downstream', EC, glossary of terms used in competition related matters, http://ec.europa.eu/comm/competition/general_info/glossary_en.html, accessed November 2007.

[3] Note that this intermediate good or intermediate input can denote both upstream services (for example access to a telecommunication network) as well as downstream services (for example shelf space at a supermarket).

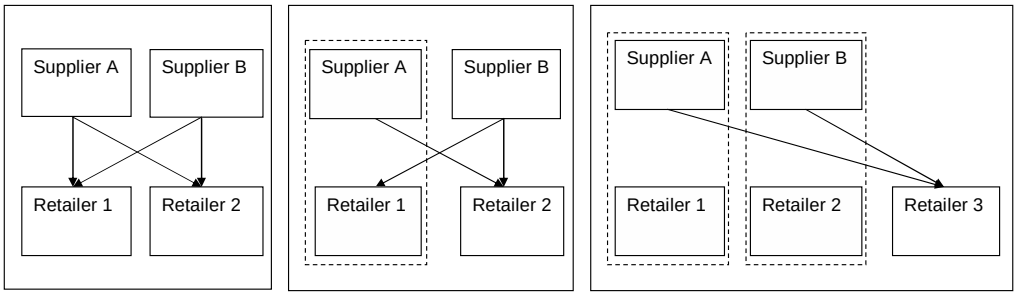
separated downstream monopolist.[4] In the beginning of the 1990's, when telephony markets in the Netherlands were first privatized, the owner of the telephony network was an example of a vertically integrated upstream monopolist.

Figure 1.1 downstream or upstream monopoly



In addition, foreclosure may also arise in markets with a bilateral oligopoly and any degree of vertical integration between the downstream and upstream markets as depicted in figure 1.2 below. An example of a market with multiple vertically integrated firms is the current market for electronic telecommunication. In the Netherlands there are two competing network infrastructures: the one originating in the former national telephony provider and the other originating in the former regional cable television provider. The beer market in the UK is an example of a market with partial vertical integration. Some brewers have their own pubs, whereas others do not. Supermarkets and their wholesale suppliers are an example of a market with vertical separation and upstream as well as downstream oligopoly.

Figure 1.2 bilateral oligopoly



Second, there are various strategies by which a firm can deny or limit access to its input for upstream or downstream competitors. Foreclosure of competitors is a direct consequence of exclusive contracts or a refusal to deal.[5] These contracts restrict the rights of one or both parties signing such an agreement to engage in businesses with other parties, leading to a complete denial of access to a certain facility or products produced by these firms. The main types of

[4] If the nearest other hospital is located sufficiently far away, and for medical treatments for which patients are reluctant to travel.

[5] We view refusal to deal as a contract with zero quantity or a prohibitively high price.

exclusive contracts are exclusive dealing, exclusive purchasing and exclusive territories. An exclusive dealing agreement between a producer and a retailer requires the retailer not to engage in other businesses that compete with activities of the producer (or sometimes in any businesses). An exclusive purchasing agreement requires the retailer to buy exclusively from this producer. An exclusive territory agreement restricts the 'territory' of the retailer's activities. At the same time, the producer commits not to supply to another retailer in this territory. Here the territory can be defined either geographically, or as a specific market segment or a customer group.

However, other commercial strategies may lead to foreclosure in an indirect way. Examples are vertical integration, most favoured nation clauses, limitation of productive capacity or installing a firm-specific technology.[6] These strategies can be seen as ways to credibly commit not to supply downstream rivals other than a limited number of firms (possibly one firm only). For example, vertical integration internalises the effect of upstream pricing on downstream profits, which can make the commitment to foreclose credible.

Last but not least, the practises that lead to foreclosure can have welfare enhancing effects as well as welfare reducing effects. Welfare enhancing effects include preventing eliminating double marginalisation, eliminating free-riding incentives and reducing hold up problems that arise due to incomplete contracts. These are all examples where externalities are internalized. Welfare reducing effects other than maintaining monopoly power by foreclosing access are reducing inter-brand competition and facilitating collusion. Different effects can occur simultaneously (for example exclusion and solving double marginalisation) and have the same origin (for example network or scale effects). An assessment of the overall welfare effects of a particular strategy needs to take these effects into account.

[6] Most Favoured Nation clauses (MFN clauses) are vertical contractual agreements in which the seller (producer) agrees not to charge the buyer (retailer) more than the lowest price it charges any other buyer. If the seller sells the product to another buyer at a lower price, then he must offer the same price to the buyer who signed the contract with the MFN clause.

2 Theory

2.1 Introduction

Until the 1970's, the U.S. courts were suspicious of vertical restraints such as exclusive contracts and vertical integration and prohibited vertical mergers that lead to relatively small market shares on the ground that these would exclude potential entrants thereby reducing competition.[7] These views were attacked by proponents of the Chicago school who argued that a monopolist cannot use exclusive contracts to sustain monopoly profit in the face of efficient entry and that vertical integration is not needed to extract the monopoly profit. The argument is presented in more detail in textbox 'The Chicago arguments' below. They concluded that exclusive contracts and vertical integration do not occur for anti-competitive reasons. Instead, pointing at potential efficiency gains, they claimed these practises realize efficiencies that cannot be achieved otherwise.

Indeed, when firms are vertically related decisions on commercial strategies that affect the joint profits of the whole vertical structure are decentralized. Decisions may therefore be inefficient from the viewpoint of the whole vertical structure. Prices may be too high or investment in service quality to low. The effect of such inefficiencies may be to lower welfare. Internalization of these externalities by means of vertical restraint or vertical integration can therefore be beneficial from a welfare point of view.

Following the advent of game theory, the Chicago arguments were revisited and it was shown that under specific circumstances, vertical restraints and vertical integration could serve an anti-competitive purpose. In this document, we are mainly interested in an assessment of these strategies' potential to reduce competition or restore market power by foreclosing market access. However, when determining the overall effect on welfare of a particular merger or vertical constraint, both pro-competitive and anti-competitive effects need to be taken into account. First we therefore discuss the different welfare enhancing and welfare reducing effects of vertical restraints and vertical integration.[8]

[7] For example *Brown Shoe Co. v. United States*, 370 US 294 (1962), and *Ford Motor Co. v. United States*, 286 F. Supp. 407 (E.D. Mich. 1968)

[8] Bishop et al. (2005) provide an extensive overview of efficiency enhancing effects of vertical integration.

The Chicago arguments

For exclusive contracts the Chicago argument runs as follows. An exclusive contract between a downstream retailer and an upstream supplier is entered into voluntarily by both parties. The retailer should therefore be compensated for any lost opportunities, including buying from a more efficient supplier. The maximum compensation the upstream supplier can offer equals the monopoly profit. However, monopoly pricing leads to a restriction of quantity and a deadweight loss relative to a price below the monopoly price. The maximum compensation the upstream supplier can offer is therefore less than the surplus gained if exclusive contracts are absent. The supplier is therefore not able to compensate the retailer for his lost surplus and the retailer will not sign an exclusive contract if offered. Profitable compensation is only possible if exclusive dealing leads to (sufficiently large) efficiency gains.

The Chicago argument for vertical integration claims that a monopolist supplier does not need to integrate in order to extract all the product is worth. There is only one monopoly profit to be had and the supplier can already earn it by charging an appropriate price in the upstream market. There are no additional profits to be gained by vertical integration. Therefore, proponents of the Chicago school again claim, integration is driven by efficiencies that cannot be achieved otherwise.

The Chicago argument on exclusive contracts may fail if so-called contracting externalities exist. Such externalities arise if the terms of a contract affect the utility of firms that are not a party to the contract. For example, when a supplier and a retailer bargain over prices, they do not consider the effect of their agreement on other retailers' profits. Because of this, an upstream monopolist is not able to commit to charging the monopoly price to downstream retailers.

The literature on vertical integration mentions several reasons why the Chicago argument may fail in this case, see Church (2004). First, if nonlinear contracts are not feasible, downstream market power leads to double marginalisation which prohibits the appropriation of monopoly profits upstream. Second, firms might be able to substitute away from the key input when its supplier tries to exercise market power (for example because downstream production involves variable proportions), which prohibits the appropriation of monopoly profits by the supplier. Third, the input might be used in a variety of different downstream products with varying elasticities. If the supplier is unable to engage in price discrimination it cannot charge each user its (user specific) monopoly price. Integration might be a way around this problem. Finally, regulation of access to the suppliers' key input might lead to incentives to vertically integrate or to foreclose by means of other anticompetitive strategies such as quality degradation in order to extract monopoly profits.

2.2 Welfare enhancing effects

2.2.1 Double marginalization

Double marginalization is a vertical externality that arises because a downstream retailer or an upstream supplier's individually chooses prices that are inefficient from the point of view of a vertically integrated entity. This may lead to other inefficiencies, such as inefficient input substitution and inefficient investment decisions .

Double marginalisation occurs when two vertically related firms both have market power. In this case the downstream retailer optimizes profits given its marginal costs, which are determined by the wholesale price its upstream supplier charges. The supplier in turn optimizes profits taking into account that the retailer will charge a mark-up over marginal costs. The

resulting consumer price exceeds the monopoly price. Eliminating double marginalisation reduces consumer prices and increases welfare while at the same time raising the combined profit of the supplier and the retailer.

Double marginalisation will not occur if there is fierce competition either downstream or upstream. In that case, either the retailer or the supplier cannot charge a mark-up over costs, which eliminates double marginalisation. Also if the downstream firm is a durable goods monopoly, the effect of double marginalisation is lessened, since the downstream monopolist competes with itself.

Double marginalisation may lead to inefficient input substitution and inefficient investment decisions. Inefficient input substitution arises when a mark-up charged by an upstream firm causes downstream firms to switch to an alternative input which is produced less efficiently but sold with a lower mark-up (Riordan and Salop (1995)). If products are sold in fixed proportions, if they are perfect substitutes, or if the level of competition in the different markets is uniform, inefficient input substitution will not occur.

If firms are not vertically integrated, the benefits of investments made by a firm at one level in the vertical chain may accrue to a firm at another level. This lowers the incentive to invest and leads to an inefficient level of investment from the point of view of a vertically integrated entity. Suppose an upstream firm can invest to lower its marginal costs. If double marginalization exists, it can not appropriate the entire surplus its investment generates. The level of investment will therefore be lower than under vertical integration.

Sufficiently powerful contracts, such as two-part tariffs, resale price maintenance (RPM) and quantity forcing, can allow firms to price efficiently and eliminate double marginalisation. Two-part tariffs allow the monopolist to fully appropriate the profit of the combined retailer and supplier. By using RPM the monopolist can set the retail prices equal to the monopoly price. Quantity forcing allows the monopolist to force the retailer to produce the monopoly quantity.

Different types of contracts are not always substitutable if retailers have different risk appetites. Two-part tariffs cause the retailer to price optimally by making it the residual claimant, but it also bears all the risk of fluctuations in demand. RPM guarantees a price independent of demand, but require a mark-up which depends directly on distribution costs. If retailers are risk averse, RPM is preferred under demand uncertainty, whereas two-part tariffs are preferred under distribution cost uncertainty (Rey and Tirole (1996)).

If resale is possible nonlinear contracts enable arbitrage and a supplier is restricted to linear contracts. Vertical integration may then still internalise the vertical externality. It may also not be possible to fully eliminate inefficiencies if private information exists about costs or demand, leading to adverse selection, or about actions such as promotional activities, resulting in moral hazard. A contracts then has to address two inefficiencies due to inefficient pricing and private information. In general, it will not be possible to fully solve both (see e.g. Martimort and Stole (2003)).

2.2.2 Incomplete contracts and hold-up

Vertical integration and exclusive contracts can solve hold-up problems. A hold-up problem may arise when one of the parties to a contract has to make relation a relation specific investment that loses its value when the relation is terminated. The possibility of ex post opportunistic can then lead to underinvestment.

Suppose two firms can trade at some future date. Ex ante one of the firms can make a relation specific investment that increases the value generated by a future transaction, but the terms of this transaction cannot be fixed. Ex post the investments are sunk and bargaining leads to a sharing of the surplus generated by the investment. The investing firm can therefore not fully appropriate this surplus. Because the firm anticipates ex post opportunism, underinvestment results. This is the hold up problem that plays an important role in the property-rights theory of the firm (Grossman and Hart (1986), Bolton and Dewatripont, (2005)).

Vertical integration solves the hold-up problem because an integrated firm appropriates the entire surplus generated by its investment. Exclusive territories and exclusive dealing may also help avoiding opportunistic behaviour by protecting firm specific investments. However, for exclusivity to influence investment incentives, noncontractible investments must affect the value of trade with parties outside of the contract (Whinston (2006)). Because the investments are assumed to be noncontractible by nature, exclusive contracts can only alter the retailer's and supplier's disagreement payoff. If the investment only affects the value of the supplier's and the retailer's trade, exclusive contracts will not affects the incentives to invest.

2.2.3 Horizontal externalities

Horizontal externalities occur when free rider opportunities exist between competing retailers or producers. If such opportunities exist, the benefits of an investment made by one agent partly accrue to another agent, leading to a suboptimal level of investment. In contrast to vertical externalities, horizontal externalities exist only if upstream or downstream competition is present.

Spillovers across downstream retailers

Retailers often provide services that affect the demand for their products: pre-sale advice by specially trained personnel, parking facilities, advertising for a specific product etc. If the benefits of these services cannot be fully appropriated and spill over to other retailers, provision of such services likens the provision of a public good and underinvestment may result. For example, if a customer, who has just received extensive advice from a retailer that has invested in extensively training personnel, subsequently buys the product more cheaply from a retailer who has not invested in such services (and therefore has lower costs), the incentives for making such investments are reduced. Vertical restraints, such as exclusive territories or resale price

maintenance, or vertical integration may reduce spillover effects, thereby allowing the retailer to appropriate a larger fraction of the benefits generated by the provision of addition services.

Vertical restraints can either reduce competition between different brands (inter-brand competition) or competition between different retailers selling the same brand (intra-brand competition). If there is sufficient inter-brand competition, vertical restraints that reduce intra-brand competition will most likely not harm welfare but enhance firm specific investments.

Spillovers across upstream suppliers

A supplier often invests in a retailer in order to increase the sales or lower the distributions costs of its brand. Suppliers can for example provide information about potential customers, technical support for advertising and promotion, financing to build a retail outlet, sales training for retail managers and employees or equipment for servicing and repair (Marvel, (1982)). To the extent that these investments also benefit competing brands sold by the same retailer, other suppliers can free ride on them. This induces an externalities between brands sold by the same retailer. Exclusive dealing may prohibit this kind of free-riding by excluding other brands from the retailer's outlet.

Besanko and Perry (1993) formalize this idea and study the effect and adoption of exclusive dealing in a differentiated products oligopoly with vertical externalities. They identify two opposing effects when there is an oligopoly both upstream and downstream. On the one hand, exclusive dealing eliminates spillovers and allows individual suppliers to appropriate the benefits of their investments. On the other hand, promotional investments are a form of competition between suppliers. Eliminating spillovers might therefore reduce profits by leading to more fierce competition in promotional investments. As a consequence in equilibrium exclusive dealing is not necessarily adopted. Suppliers may find it beneficial to maintain the externality, because it softens competition. Besanko and Perry find that due to exclusive dealing, investments and wholesale prices increase. Also, as exclusive dealing becomes more prevalent, industry output increases whereas retail prices decrease. Consumers therefore prefer more exclusive dealing to less.

2.2.4 Competition and investment

A firm engaging in anticompetitive vertical foreclosure increases its market power and reduces competition. Market power and competition affect firms' incentives to invest. The effect of reduced competition and increased market power on investment is, however, ambiguous.

On the one hand, a firm with market power can appropriate a larger fraction of the surplus its investments, (through new products or lower costs) generate for consumers than firms without market power. This is called the surplus appropriation or Schumpeterian effect. As an example, consider a market with a non-integrated firm owning a network and many downstream retailers.

Assume the monopolist can increase demand by significant investments in its network. If the monopolist cannot restrict access, it faces a commitment problem with many downstream retailers. This then leads to an access price close to marginal costs. Profits will be too low to recoup the initial investment. If the monopolist cannot (partially) restore its market power, the investment will not take place. Exclusive contracts or vertical integration are a way to restore market power and the profitability of the investment.

On the other hand incumbents have less of an incentive to innovate than entrants, because new products eat into its existing profits from old products. This is known as the Arrow replacement effect. In addition, competition selects the most efficient companies and creates incentives to increase productivity (Boone (2000)). These effects cause an increase in competition to increase investment or innovation.

Generally, the relation between competition and innovation is expected to be an inverted-U shape (Aghion et al. (2005)). Depending on the level of competition, the relation between competition and innovation may be positive or negative. Restoring market power through foreclosure (thereby reducing competition) may therefore either increase or decrease a firm's incentives to invest or to innovate. For example, in the famous Microsoft case, the effect of restricting the use of exclusionary practises on investment is an important point of discussion (Schmalensee (2000)). Although the short run effects of such a restriction might be to expand choice for consumers, in the long run it 'may make entry easier, but the reward to success smaller.' (Whinston (2001)).

Based on theoretical arguments, a negative relationship between competition and innovation may be expected in markets with several of the following characteristics: low marginal and high fixed costs, intensive use of labour and human capital, network effects, competition for the market (winner-takes-all-race) and very profitable market leaders (Evans and Schmalensee (2000), Canton (2002)).

2.2.5 Too much entry

If entry involves fixed costs, competition can result in too much entry. On the one hand, if new firms enter the market, increased competition will lower prices and increase consumer welfare. On the other hand this gain has come at a cost: the fixed cost of entry. Entry is socially optimal if the gains from entry are larger than the costs. However, a firm will enter the market if its expected profits are larger than the costs of entry. Part of its profit will be generated by customers that switch away from other firms (the so-called business stealing effect). Thus, entry may be privately profitable even though it is socially wasteful because the fixed costs of entry outweigh the subsequent increase in total welfare (Mankiw and Whinston (1986), Rey and Tirole (2003)). Foreclosure can prevent this welfare lowering effect by limiting entry, even though entry is profitable from an entrant's perspective. However, nothing guarantees that a firm with market power will restrict entry to the socially optimal level.

2.3 Welfare reducing effects

For completeness sake, we briefly discuss two anticompetitive effects of vertical restraints and vertical integration other than welfare reducing foreclosure: reducing inter-brand competition and facilitating collusion. Inter-brand competition occurs when different brands compete. Intra-brand competition occurs when different retailers selling the same brand compete.

2.3.1 Softening competition

Upstream suppliers can reduce inter-brand competition by means of vertical restraints if these allow the supplier to delegate strategic decisions to downstream agents, thereby committing the upstream supplier not to compete fiercely.

As an example, consider two suppliers that both sell to two retailers. The retailers compete in prices and the two products are differentiated. Without exclusive contracts, both retailers sell both products. Due to intra-brand competition downstream the retail price for each product equals the retailer's marginal costs. Suppliers then compete more or less directly with each other, as if they were vertically integrated.

Exclusive contracts (for example exclusive territories) eliminate intra-brand competition. The retailer selling the one supplier's product will now compete with the retailer selling the other supplier's product. If the one supplier now raises it prices, this will only indirectly affect the other supplier's profits. Downstream retailers now function more or less as a cushion, softening competition between the upstream suppliers (Rey and Stiglitz (1995), Caillaud and Rey (1995)).[9]

2.3.2 Facilitating collusion

Successful explicit or tacit collusion requires that colluding firms can agree on a collusive strategy, that deviations from this strategy can be detected and that deviators can be punished. If any one of these conditions is not satisfied, unilaterally deviating from the collusive equilibrium is profitable and collusion unsustainable. Resale price maintenance (RPM) has been suggested to facilitate collusion by allowing deviations to be detected more easily, by leading to more uniform retail prices (Mathewson and Winter (1998), Julien and Rey (2000)).

Vertical integration has been argued to facilitate collusion. If vertical integration leads to customer foreclosure, it reduces the incentives of upstream rivals to defect from the cartel agreement because their potential market share is reduced. This means there is less to gain for deviators. In addition, a vertically integrated firm does not have to renegotiate supply contracts before punishing deviations from the collusive strategy (Nocke and White (2005)).

[9] This effect is not robust to the type of downstream competition. If retailers compete à la Cournot, suppliers delegating their sales to independent retailers intensify competition. Delegating retail activities has no commitment effect if contracts are unobservable and the retailer and the supplier face no contracting restrictions and have symmetric information.

Common agency can also facilitate collusion. In particular, if upstream suppliers choose a common downstream retailer, they will be able to charge joint profit maximizing prices at equilibrium, even when they do not delegate pricing decisions to downstream retailers but use RPM to set downstream prices (Bernheim and Whinston (1985)). Rey and Vergé (2002) show that this result may also holds in case of a bilateral duopoly.

2.4 Foreclosure and monopoly

We now turn to foreclosure and its potential to reduce competition or restore market power. Foreclosure is a direct consequence of an exclusive contract. As a natural starting point for our discussion we therefore focus on such contracts. Nevertheless, other types of vertical restraints may also lead to foreclosure, such as using a specific instead of a generic technology, or nonexclusive vertical contracts that change upstream pricing incentives such as RPM or Most favoured nation (MFN) clauses.

Whinston (2006) defines an exclusive contract as follows: 'An exclusive contract states that one party to the contract will only deal with the other party for some set of transactions'. For example, a wholesale supplier and a retailer might enter into a contract excluding other suppliers from selling through that particular retailer. Consequently, these suppliers are foreclosed from serving the market through this particular retailer. Alternatively, a retailer might enter into a contract with a supplier excluding other retailers from selling goods manufactured by that supplier. These retailers are then foreclosed from serving that particular supplier's goods to the market.

Starting from the premise that market power exists either upstream or downstream, a theory of foreclosure should show that foreclosure is an equilibrium strategy. Of course the next question should be: what are the welfare consequences of foreclosure? [10] In this chapter, we will concern ourselves with the first question. Answering the second question requires an assessment of the presence and magnitude of both welfare decreasing and welfare increasing effects.

[10] These are similar to the three steps proposed by the EC in their draft guidelines on the assessment of non-horizontal mergers, (1) ability to foreclose (2) incentive to foreclose and (3) impact on effective competition.

Input foreclosure versus customer foreclosure

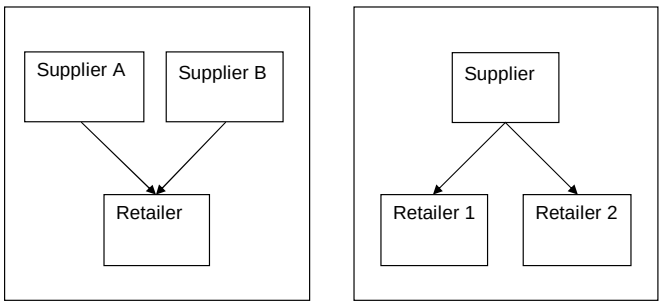
It is common (see e.g. EC, 2007) to distinguish two types of vertical foreclosure: input foreclosure and customer foreclosure. *Input foreclosure* arises when an upstream firm (also called 'producer' or 'supplier' or 'manufacturer') either refuses to supply a downstream firm (also called 'retailer' or 'seller') or raises the price of its input, while a competing retailer is supplied or provided input at a lower price. This increases the profit of the competing retailer. The producer might engage in this type of exclusionary behaviour if it expects that it can appropriate some of the additional gains resulting from the increased profits of the advantaged retailer. Input foreclosure might for instance occur through a vertical (exclusive) contract between the producer and the retailer, or because the producer vertically integrates with this retailer (in which case the advantaged retailer is a subsidiary of the producer itself).

While input foreclosure involves harming a downstream competitor, *customer foreclosure* amounts to a downstream retailer buying from one producer, but refusing to buy supplies from competing upstream producers. This reduces the demand for the upstream competitor's products. Under the assumption that this increases the competitor's marginal costs or induces exit, customer foreclosure reduces the competitive pressure on the upstream producer. The downstream retailer may benefit from such a strategy if it can appropriate some of the upstream producer's additional gains.

The simplest situation

We can illustrate the various types of foreclosure, and analyse the conditions in which they might occur, by focussing first on the simplest, 'triangular' situation in which there are three firms, either two producers and one retailer, or two retailers and one producer (see figure 1). In first instance, we assume that the retailer has all the market power and makes take-it-or-leave-it offers to the suppliers A and B.

Figure 2.1 downstream and upstream monopoly



Downstream monopoly

To see the Chicago argument at work, consider a situation where a monopolist retailer buys an upstream good from two symmetric competitive manufacturers, depicted in the panel on the left

hand side in figure 2.1. The central question is whether the retailer has an incentive to engage in customer foreclosure of one of the manufacturers, in order to reduce upstream competition (i.e. to engage in customer foreclosure). The answer is clearly no: the retailer can control the quantities it buys from either manufacturer, and restrict them to supply the monopoly quantity. If the upstream goods are homogeneous and marginal production costs are constant, this implies that the monopolist would conclude contracts with both manufacturers that in aggregate add up to the monopoly quantity. In this case any distribution of this aggregate quantity would do. All rents would be appropriated by the monopolist.[11]

This argument remains valid if we look at it from the point of view of the manufacturers, where these two make take-it-or-leave-it offers to the monopoly retailer (Bernheim and Whinston, 1998). In this case, Bernheim and Whinston show that the monopoly profit can be realised using a simple two-part tariff consisting of a wholesale price and a fixed fee. Again, customer foreclosure would appear to give the exclusive manufacturer monopoly leverage over the retailer (since his upstream competitor has been excluded from the market). However, since the upstream manufacturers A and B compete over being the exclusive supplier, these rents are dissipated (i.e. left to the retailer), and the manufacturer can only extract a profit insofar as his product has higher value (or lower cost) than his rival's, as claimed by the Chicago School critics. If optimal supplies (in terms of the aggregate profits of retailer and manufacturers) involve supplies from both manufacturers to the retailer – which would be the case for instance if the upstream goods are differentiated, or if there are diseconomies of scale in production – then both manufacturers can do strictly better if they do not resort to exclusivity, but instead supply their share of the optimal quantities. For homogeneous goods and constant marginal production costs, on the other hand, the monopolist would appropriate all rents and conclude contracts with both manufacturers that in aggregate add up to the monopoly quantity.

Upstream monopoly

The story changes – and the Chicago argument breaks down – if we consider the reverse industry structure: the case of a monopolist producer, and a retail duopoly, depicted in the panel on the right hand side in figure 2.1. In this case input foreclosure might take place, in which the monopoly producer only supplies one of the retailers, say retailer 1 (or, more generally, supplies the other retailer, i.e. retailer 2, at less favourable conditions), in order to decrease competition in the downstream market. The rationale for this would be to increase total downstream profits, which the monopolist could appropriate through its contract with retailer 1.

A valid question is whether exclusion is necessary to achieve this goal: again, at first sight, the Chicago argument suggests it is not. Since the monopolist controls all (upstream) production, it could be expected to distribute exactly that output that maximises total industry profits (e.g. the

[11] The indeterminacy results from the assumption of constant marginal costs. In contrast, if marginal costs are increasing, the retailer would prefer to buy exactly half of the monopoly quantity from either manufacturer, in order to minimise production costs. With decreasing marginal costs, the monopolist would buy from one producer only.

monopoly output if the retailers' final goods are homogeneous). Given its monopoly position it would then, through its supply contracts, extract these profits from the competing retailers. Whether it singles out one retailer for serving consumers, or makes use of the services of both, should not matter in the homogeneous good case.

However, as pointed out by Hart and Tirole (1999), see also Rey and Tirole (2006), the monopolist may fail to maximise total industry profits, in spite of its pivotal position in the industry, as a consequence of a commitment problem. While bargaining with either retailer, the monopolist would recognise that it can increase its joint profits with that retailer *at the expense of the other retailer*. In a hypothetical equilibrium in which the monopolist supplies half the monopoly quantity to the one retailers, the other retailer and the supplier can increase their combined profit by selling an additional quantity. While this decreases total industry profits (since these are maximised for the monopoly quantity), it would be the other retailer bearing the costs (as a result of lower final market prices). The manufacturer and the deviating retailer jointly increase their earnings (and can distribute these gains through the contract they conclude).[12]

Of course, either retailer would anticipate such opportunistic behaviour by the manufacturer and would not be willing to sign the initial contract. Instead, optimal contracts in this case turn out to involve duopoly quantities and prices, even though production is controlled by a monopolist. To see this, note that the monopolist optimizes joint profit with each retailer separately. Therefore, for a given quantity produced by retailer 1 (retailer 2), it will react by contracting the optimal quantity with retailer 2 (retailer 1). In equilibrium, the optimal reaction to its contract with retailer 1 (retailer 2) should be the contract with retailer 2 (retailer 1). This is exactly the equilibrium condition in a Cournot duopoly.

Explicit foreclosure through an exclusive sales contract in this case does provide additional value for the monopolist[13]: the contract allows it to commit not to sell (opportunistically) to the retailer's rival. Unlike in the above example of customer foreclosure, here the Chicago School argument breaks down, and exclusive contracts are means to effectively monopolise the consumer market. Vertical integration is another means of committing not to deliver. If the upstream monopolist integrates with one of the downstream retailers, it effectively internalises the effects of any opportunistic behaviour. Other vertical restraints such as RPM can be interpreted analogously.

[12] Note that this requires that the contract offers are not publicly observable. If contracts are publicly observable, whether or not the Chicago result holds depends on the distribution of bargaining power. If the supplier makes a take-it-or-leave-it offer the monopoly profit can still be realized and the Chicago result remains valid. If the retailers make take-it-or-leave-it, the Chicago result fails because each retailer has an incentive to free-ride on the other retailers' revenues, see Rey et al. (2006).

[13] Provided the downstream market is sufficiently homogeneous.

Passive, active and wary beliefs

When the upstream monopolist makes secret offers to competing retailers, the equilibrium outcome depends on retailers' conjectures or beliefs about the contract offered to its rivals. These are the beliefs of retailers when they receive an offer from the supplier about the offer received by other retailers. Hart and Tirole (1990) assume so-called passive beliefs: the retailer receiving a deviating offer believes that the other retailers are still being offered their equilibrium contracts. The supplier is then faced with the commitment problem described above. McAfee and Schwartz (1994) point out that under so-called active beliefs the commitment problem disappears. Under active beliefs a retailer receiving an out-of-equilibrium offer assumes that its competitors receive the same deviating offer. In this case, the supplier can credibly commit to charging the monopoly price. Rey and Verge (2004) consider a third variant and assume so-called wary beliefs. These imply that retailers' beliefs are consistent with the suppliers' incentives. A retailer offered a particular contract believes that given the out-of-equilibrium offer received the supplier offers optimal contracts to the other retailers. Under wary beliefs, the commitment problem survives, but is less severe.

Allowing the monopolist to offer a menu of contracts, Segal and Whinston (2003) derive general conditions, independent of the beliefs held by retailers, for an equilibrium of the bidding game of retailers and suppliers to exist. They show that this equilibrium converges to the competitive outcome if the number of firms becomes large. Thus, if there are many retailers, the commitment problem leads to a competitive equilibrium, no matter what beliefs retailers hold.

Contracting externalities

The underlying reason for the difference between the two scenarios was analysed by Bernheim and Whinston (1998). They conclude that a necessary condition for exclusive contracts to be optimal when exercising market power is that the profits of at least one of the duopolists, given the contract it has concluded with the monopolist, should depend directly on the contract the monopolist concludes with its rival. Such dependence is referred to as a contracting externality.

In the example of customer foreclosure (i.e. two upstream retailers and one downstream monopolist), given the contract a retailer has concluded with the monopolist, either manufacturer will be indifferent to the contract written with its rival. Total profits are only decided by the price structure agreed upon in the contract, its own production costs, and the quantity it chooses to sell. In contrast, in the second case of input foreclosure, either retailer's profits depend not only on its own costs and contract with the manufacturer, but also on the price in the downstream market. This price is affected in turn by the (contracted) sales of the manufacturer to the rival retailer. The dependence of one retailer's profits on the contract between the manufacturer and the other retailer is a contracting externality, and opens the possibility that an exclusive contract is profitable.

The firm's response to externalities

Contracting externalities lead to scope for opportunism on the part of the monopolist: it has an incentive to extract profits from one contract party when bargaining with a competitor. In effect, the monopolist treats the retailers as if they were active in separate markets, even if the retailers experience a strong interdependency. In response, the firm's contracting parties, anticipating

such opportunistic behaviour, will behave more cautiously, preventing optimal (from the point of view of an integrated structure) exercise of market power.

Various strategies are available to the monopolist to resolve this problem and restore its market power. Clearly, such strategies should aim at reducing the scope for opportunism on the part of the monopolist, and allow it to commit not to expropriate its contracting partner instead.

One form of commitment is through contracts: the monopolist may contractually bind itself to certain behaviour regarding its sales to the competing agent. One simple such contract is an exclusive sales contract, which specifies that no sales at all are made to the competitor (but no pricing structure is specified). In this case foreclosure is complete. In some cases the monopolist may sacrifice some efficiency by writing such simple exclusive contracts. For example, if both downstream retailers are differentiated, then the highest total industry profits would involve some sales through both retailers, and exclusion leads to strictly lower aggregate profits. In this case it would be preferable if parties could specify total sales to both retailers more precisely (such contractual terms may prove harder to verify however).

A second, in some way more flexible, solution already mentioned above would be vertical integration. If the monopolist integrates with one of the agents, it will internalise any externalities vis-a-vis this agent in its contracting behaviour with the competitor. Take again the example of the two competing retailers: vertical integration with retailer 1 would take away its incentives to oversell the market through retailer 2. It would then cut in its own profits through its downstream subsidiary. In case of differentiated downstream goods, the monopolist could even sell positive quantity (though not necessary the optimal quantity) to retailer 2.

Vertical agreements such as RPM and MFN-clauses can also be viewed as means of committing not to deliver opportunistically to a retailer's downstream rivals at lower prices. For example, RPM (whereby the retail price for all retailers is set by the manufacturer instead of the retailer) allows the manufacturer to set the retail price close to the wholesale price, thereby internalising effects of selling additional quantities through other retailers.

Finally, as discussed by Rey and Tirole (2006), regulation may help the monopolist to commit. For example, if regulation forces the monopolist to make non-discriminatory offers, it can use this restraint on its behaviour to commit to refraining from disadvantaging either retailer. In this case, the agents' observation of any offer they receive gives them, by the non-discrimination requirement, the information on their competitor's offer. Thus in a way non-discrimination clauses force so-called active beliefs (discussed in the textbox 'Passive, active and wary beliefs' above) upon the retailers. In this situation, the monopolist could for instance offer half the monopoly quantity to either player, and extract full monopoly rents from them.

Downstream Bertrand competition

The commitment problem discussed above was first identified by Hart and Tirole (1990) for downstream Cournot competition. Under downstream Bertrand competition with differentiated

products the commitment problem persists, but with an additional twist (O'Brien and Shaffer (1992), Rey and Vergé (2004)). Consider an upstream supplier contracting with two downstream retailers. For simplicity we restrict ourselves to a two part tariff consisting of a fixed and a variable part. The upstream supplier chooses the variable part to optimize its joint profit with retailer 1, assuming the contract with retailer 2 to be fixed.[14] Under Cournot competition a change in the variable price charged to retailer 1 affects the bilateral profit of retailer 1 and the upstream supplier in the usual way: the total quantity sold changes and the price-cost mark-up changes. If these were the only effects on bilateral profits under Bertrand competition, the results from Cournot competition would straightforwardly carry over to the Bertrand case. In equilibrium the supplier would charge a variable fee equal to its upstream marginal costs and both firms would charge duopoly prices (instead of producing the duopoly quantities). However, a change in the wholesale price charged to the one retailer also affects the market share of the other retailer. Under Cournot competition, retailer 1 and the supplier optimize their joint profits assuming that the quantity produced by retailer 2 is fixed. Therefore under Cournot competition this indirect effect does not influence the variable price set by the upstream supplier. Under Bertrand competition prices instead of quantities are the strategic variables and the indirect effect on the quantity produced by retailer 2 is taken into account when optimizing the variable fee.[15]

To identify a possible equilibrium, note that for the quantity sold to retailer 2 the supplier earns the variable fee minus the supplier's marginal costs. If the variable fee equals the suppliers' marginal costs, the indirect effect disappears: changes in retailer 2's market share then do not affect the bilateral profit because the profit margin on an extra unit sold to retailer 2 is zero. Therefore, the equilibrium in the absence of this effect (with the upstream transfer price equal to marginal costs and downstream prices equal to the Bertrand duopoly prices) is still a candidate for the equilibrium in the case of Bertrand competition (O'Brien and Shaffer (1992)).

In some cases, this is indeed the equilibrium. However, for passive beliefs, it turns out that the candidate equilibrium is not a maximum if the cross-price elasticity is at least half the own price elasticity. In this case, profitable deviations that involve changing both contracts at the same time are possible and an equilibrium does not exist. Rey and Vergé (2004) address this problem by assuming so-called wary beliefs (discussed in textbox 'Passive, active and wary beliefs' above). These imply that a retailer's beliefs are consistent with the supplier's incentives. If one retailer is offered a particular contract, it believes that the producer offers the other retailers' optimal contracts given this particular offer.[16] They show that under wary beliefs, an equilibrium always exists. It shows that the commitment problem is robust and does not critically depend on particular beliefs held by retailers or the type of competition.

[14] The retailers have passive beliefs.

[15] This indirect effect is similar to the 'collusive' effect identified by Chen (2001) and the 'accommodation' effect identified by Bourreau et al. (2007) in oligopolistic markets. These papers will be discussed below.

[16] Under Cournot competition and unobservability of contracts, wary and passive beliefs are equivalent.

Linear contracts

Nonlinear contracts specify a specific transfer for every quantity sold. In general, the relation between quantity and transfer is nonlinear, as for example in the case of a two part tariff. Linear contracts specify a constant price per unit quantity. For these contracts the relation between transfer and quantity is linear.

In some situations, general nonlinear contracts may not be feasible. If goods are (easily) tradable, nonlinear contracts give rise to arbitrage opportunities and will therefore not be used. Suppliers will instead write linear contracts. Also, in the presence of information asymmetry fully general non-linear contracts might not be feasible. Incentive compatibility constraints then restrict the contracts that can be offered (see Martimort and Stole (2003)).

If foreclosure is not optimal when non-linear contracts can be written, it can still be profitable if the available contracts are constrained, in particular when only linear contract are available. If contracts are constrained to be linear, a manufacturer cannot extract all that its product is worth and it might not be possible to optimize joint profit. For example, in the case of downstream and upstream market power double marginalisation prevents the monopoly profit to be realised. Matthewson and Winters (1987) find that exclusion can be profitable if contracts are restricted to be linear, in sharp contrast with findings by for example O'Brien and Shaffer (1997) or Bernheim and Whinston (1998). However in Matthewson and Winters (1987), foreclosure will often not be credible, as noted by Church (2004). In most cases, it will be profit-maximizing for the integrated firm to sell the product of its non-integrated upstream competitor.

2.5 Foreclosure and bilateral oligopoly

Up to now, we have been mainly concerned with foreclosure by a single upstream or downstream monopolist. However, in many markets where upstream or downstream market power exists, both upstream and downstream markets are oligopolistic (a so-called bilateral oligopoly). In these markets, in addition to downstream retailers also upstream suppliers may be foreclosed. This so-called customer foreclosure is qualitatively different from input foreclosure.

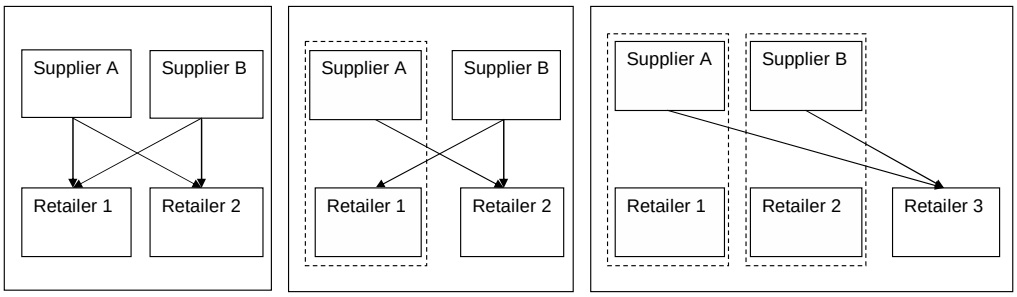
The question is how the analysis of foreclosure in markets with an upstream or downstream monopoly generalizes to bilateral oligopolies. In addition to the ones already mentioned in paragraph 2.4, the following additional issue now arise: (3) If foreclosure is an equilibrium strategy, to what extent are the exclusive contract's terms affected by upstream competition?

An important feature in bilateral oligopolies is their level of vertical integration. As argued in the previous section, if there exists a monopoly upstream or downstream, vertical integration can be a strategy to protect monopoly power from the commitment problem that arises in the face of downstream competition.

We consider three broad types of market structures differing in their level of vertical integration. The first type, depicted on the left hand side in figure 2.2 below, consists of an oligopoly both upstream and downstream and no vertical integration. The second market structure, depicted in the middle of figure 2.2, is similar to the first except that one of both vertical pairs has integrated into one vertical entity, consisting of an upstream and a downstream division. How does vertical integration influence the integrated firm's incentive to supply non-integrated downstream rivals? In particular, does the integrated firm have an

incentive to foreclose access or "raise its downstream rival's costs"? The final configuration, depicted on the right hand side in figure 2.2, has three firms at the downstream level and two firms at the upstream level that are vertically integrated with two of the downstream firms.[17] When is it optimal for the vertically integrated firms to exclude the downstream retailer?

Figure 2.2 Three market structures with bilateral oligopoly, and vertical integration



2.5.1 Bilateral oligopoly without vertical integration

We first focus on the first panel in figure 2.1, the case of oligopoly up- and downstream, without vertical ownership ties. Here the theoretical literature is much less systematically developed than in the previously considered 'triangular' market structures. Although full understanding of this (practically relevant) case is lacking, some insights about the general picture may be gleaned from specific case analyses. In discussing such insights we again distinguish two types of foreclosure through exclusive contracts, input foreclosure (where a supplier refuses to deal with a particular retailer) and customer foreclosure (where a retailer commits not to buy from a particular supplier).

Input foreclosure

The case of input foreclosure is not substantially different from the upstream monopoly case. For that market structure, we found that input foreclosure is a response to a commitment problem by a supplier wishing to use his market power. By contractually excluding sales to a rival retailer, the supplier solves the problem that his sales to this rival would damage the first retailer's profits.

Clearly, if upstream suppliers have significant market power (e.g. because their products are substantially differentiated, or because one supplier has a significant cost advantage over his upstream rivals), the same argument as in the monopoly case continues to hold and exclusive contracts remain an equilibrium.

[17] Of course there also exist market structures with partial integration. Supermarkets and their suppliers are an example with more than two upstream and downstream firms that are not vertically integrated. Cement production and building activities, brewers and pubs in the UK are examples with more than two upstream and downstream firms and partial vertical integration.

In contrast, without significant market power there is no reason for exclusion. Bertrand competition among upstream suppliers leads to the lowest (marginal) cost firm supplying the retailers at a price equal to the runner-up supplier's costs (see e.g. Ordover et al., 1990, or Chen, 2001, Hart and Tirole, 1990). Foreclosure is in such cases not an issue.

To see this switch from no foreclosure to foreclosure as market power increases, consider the case where one supplier has a cost advantage over his rival supplier, and both may sell their goods to a Cournot retailer duopoly. Can an exclusive contract be optimal for the efficient supplier if there is a bypass opportunity through the less efficient supplier? In this case, the excluded downstream firm and the inefficient supplier would jointly produce the best response to the (low-cost) exclusive combination's supplies, and the market outcome would be the asymmetric cost Cournot equilibrium. If as we assumed, upstream firms make the offers, they will appropriate the profits. For the efficient supplier, the trade-off is therefore between producing twice the symmetric Cournot quantities if it writes a common contract, and compensating the retailers for their outside options (which is buying from the inefficient supplier), as shown by Hart and Tirole (1990), or producing the asymmetric Cournot quantity if it writes an exclusive contract (and again compensating the exclusive retailer for not buying from the inefficient supplier). Clearly, in the limit that the bypass supplier is very inefficient an exclusive contract is optimal. The presence of the inefficient supplier then does not limit the terms of contract the efficient supplier can offer. If both suppliers are equally efficient, they will be indifferent between the two types of contract. Both exclusive as well as common contracts then yield zero profit. For a small efficiency gap a common contract is optimal. The common profit is then roughly twice the exclusive profit.

We saw in the monopoly case that banning price discrimination might be welfare reducing, since it allows the monopolist to commit not to behave opportunistically and sell only the monopoly quantity through both retailers, rather than the duopoly quantity. Interestingly, in the presence of the inefficient bypass opportunity this result need not hold anymore (Caprice, 2006). In bargaining with the efficient supplier, retailers have the outside option of accepting the inefficient supplier's offer. A lower variable price reduces the value from this outside option, allowing the supplier to extract more bargaining surplus through a fixed fee. In equilibrium this leads the efficient supplier to reduce its variable price component below marginal costs (thereby increasing output). While in this way total industry profits are reduced, the share that the monopolist receives will be larger.

Customer foreclosure

For the case of customer foreclosure, there is a qualitatively new aspect compared to the retailer monopoly situation analysed in the previous section. For a monopoly retailer, customer foreclosure is no equilibrium since the single retailer can perfectly coordinate sales from all

competing suppliers, achieving the joint profit maximising outcome for the whole sector. There are no contracting externalities, in short.

This is no longer true for the case of multiple up and downstream players. If the contracting choices of a retailer impact intensity of competition between suppliers, one retailer's contracting choices affects his rival's opportunities: a contracting externality is introduced.

To illustrate this effect, we start the analysis with a situation which is close to the upstream monopoly case studied in the previous sector. Assume now that in addition to the upstream monopolist, there is a second upstream firm that may enter the industry. We might say that upstream, there is 'almost a duopoly'. Following Rasmusen et al. (1991) and Segal and Whinston (2000), in this situation the monopolist, having a first mover advantage, may use exclusive contracting with its downstream customers to deter entry of its upstream rival (see also Whinston, 2006, for a discussion).

Downstream customers of the upstream firm would all benefit from the entry of the second upstream firm, as this would introduce fiercer competition upstream (and hence higher downstream rents). If they expect the second upstream firm to enter they would not be easily enticed to sign an exclusive agreement, except at a price which reflects the higher upstream competition.

Suppose now, however, that there are economies of scale: the upstream firm can only enter profitably if it succeeds in contracting with multiple downstream firms. This may for instance be the result of fixed entry costs. If all but one downstream firms sign an exclusive contract with the incumbent, entry would not take place. In this case, clearly it would be beneficial to downstream firms to coordinate and avoid ending up with monopoly. There is however now a contracting externality between firms: any firm not signing up to an exclusive contract with the incumbent creates positive benefit for the other downstream firms. If contracting occurs bilaterally between the monopolist and the downstream firms, individual retailers do not take this externality into account in when accepting or rejecting a contract. The monopolist can then use the externality and exclusive contracts may result.

To see this result, more clearly suppose the benefit of upstream entry to each downstream firm is b. The upstream firm may now offer (slightly more than) b to all but one firm (which they would accept) and extract the monopoly price from the last firm (who cannot on its own induce upstream entry). It can even do better than that by approaching the downstream firms sequentially: if the first firm approached declines the offer of (slightly less than) the monopoly price, the incumbent may threaten to offer all following downstream firms a contract including payment b, making the initial firm worse off. In equilibrium, all downstream firms accept the contract at negligible cost to the incumbent[18]

[18] Conditions under which this costless (to the incumbent) exclusion can occur in general are derived by Segal and Whinston (2003).

The results of this model are modified if all downstream agents compete as retailers in the same market. If downstream competition is fierce, a firm achieving lower input costs can attract large volumes of final sales. Because market demand is diverted to low cost retailers, economies of scale are realised through contracting with one individual retailer. In the extreme case, contracting with even a single retailer can be enough for an entrant to profitably enter the market. The first mover advantage will then be less relevant (Fumagalli and Motta, 2002). However, if retailers can pass on the higher costs of monopoly to their customers, their incentives to contract with the entrant may be reduced.

Exclusive contracting may therefore occur as a strategy to prevent entry by rivals. It requires that the entrant needs contracts with multiple customers as a result of economies of scale. In this case the incumbent's strategy is to make sure that at no moment in time enough contracts to make entry possible are up for renewal.

Although formally less well analysed, it may be imagined that a similar strategy continuous to be viable if there is no first-mover advantage by the incumbent, so that both suppliers are present in the (first) contracting stage (Whinston, 2006). The basic requirement is that one supplier can benefit from a lack of coordination on the part of retailers, and execute a strategy of 'divide and conquer' (Inderst and Mazzarotta, 2006).

Linear contracts

Some models look specifically at situations where suppliers can only conclude linear contracts. Besanko and Perry (1994) study the effects of exclusive dealing in a model with multiple manufacturers and multiple retailers, where two symmetric manufacturers sell differentiated brands to retailers (charging linear prices) and the retailers are spatially differentiated (a Hotelling type of model with consumers on a circle). There is free entry by symmetric retailers. Without exclusive dealing, retailers carry both brands. With exclusive dealing, they carry only one brand. By assumption, manufacturers cannot sign exclusive contracts with all sellers. Therefore, neither manufacturer is ever excluded from the market. They find that under exclusive dealing manufacturer profits are higher, providing an incentive to insist on exclusive contracts. Exclusive dealing also leads to higher prices and higher transportation costs for consumers. In the case of exclusivity, increased retail entry due to higher prices and lower fixed costs (inventory and store space) result in ambiguous welfare effects.

2.5.2 Bilateral oligopoly with vertical integration

In this section, we consider the incentive to foreclose in markets with a bilateral oligopoly and partial vertical integration. Vertical integration changes the incentives of a firm producing a key input, by internalizing the effects of its wholesale price setting on the profits of its downstream affiliate. The literature on the potential pro- and anti-competitive effects of vertical integration has been discussed extensively in recent review papers by Church (2004) and Bishop et al. (2005). We will focus on the implications for theories of foreclosure.

Again, it is common to distinguish between two different types of foreclosure. Input foreclosure arises when post-merger the integrated firm raises the price for its product in the upstream market, or completely withdraws from this market. Customer foreclosure arises when

post-merger the integrated firm no longer buys input from upstream competitors. However, with bilateral oligopoly, the two can not easily be separated. If post-merger a vertically integrated firm withdraws from the wholesale market, it no longer sells in the upstream market, which implies input foreclosure, but at the same time it also no longer buys in the upstream market, which implies customer foreclosure.

Consider a market with two upstream supplier, where the one supplier is more efficient (lower marginal costs) than the other, and two downstream retailers. We saw in section 2.4 that without integration and in the absence of exclusive contracts, the efficient upstream firm in aggregate supplies the Cournot duopoly quantity divided between both retail channels. In contrast, if exclusion is optimal, outcomes would involve some production by the inefficient supplier who then supplies the remaining unintegrated downstream retailer (Hart and Tirole,1990).

Vertical integration changes that picture. If the efficiency gap between the efficient and the inefficient supplier is not too big exclusion of a downstream firm is never optimal. It is then always more profitable for the integrated efficient firm to also supply the rival retailer a quantity corresponding to what it would supply if it contracted with the inefficient supplier. If the vertically integrated firm would not supply its non-integrated downstream rival, its inefficient upstream competitor would. Therefore, the vertically integrated firm is better off earning some extra profit by supplying its downstream rival. In equilibrium then, the market outcome is that of an asymmetric Cournot equilibrium, where the integrated firm sells the (lower) quantity to the rival supplier at a price equal to the inefficient supplier's cost. In the presence of less efficient bypass, vertical integration can thus lead to a more efficient outcome than exclusive dealing. In the latter case, the downstream firm that is excluded from contracting with the efficient supplier would be forced to buy from the less efficient alternative supplier. This entails a welfare loss compared to the situation where this firm is supplied by the more efficient supplier. However, if the efficiency gap between the efficient and the inefficient supplier becomes too large, the monopoly outcome obtains, and the rival retailer is fully excluded from the market (i.e. produces zero quantity). Exclusion might then be socially optimal because the alternative would be production by an inefficient supplier.

Explaining when firms find it profit maximizing not to supply downstream competitors, or to supply them at high prices, is the core of a theory of foreclosure. If foreclosure arises due to a merger, it should be an equilibrium strategy in the post-merger market structure. Viewed in this light, some core papers on the foreclosure effects of mergers (Salinger (1988), who considers strategic substitutes and Ordover et al. (1990) who considers strategic complements) are more relevant in assessing the potential impact of mergers on competition *under the assumption that foreclosure arises*, than in assessing under what circumstances we should expect foreclosure to occur. In essence, these papers simply assume that post merger a firm can commit not to buy or

sell in the upstream market (Reiffen (1992)).[19] While this assumption may seem intuitive (as the resulting act of foreclosure 'raises the downstream rival's costs', it improves the vertically integrated firm's profit in the downstream market), it has been demonstrated that in simple models, such foreclosure is not an equilibrium strategy. (In addition, the results seem to rely on an assumption of linear contracts between up- and downstream rivals.) Without additional commitment mechanisms, foreclosure is no longer an equilibrium and participating in the upstream market is profitable (Gaudet and Long (1996) and Higgins (1999)). To assess the question whether or not a risk of foreclosure exists due to a particular merger, an assessment of the credibility of this commitment is required.

One approach to resolving the commitment problems, put forward by the original authors in response to criticisms along these lines (Ordover et al., 1992), relies on introducing a specific dynamic contracting game. This approach has led to some controversy as well, see church (2004) for a summary. Some alternative mechanisms have been proposed that allow vertically merged firms to credibly commit to foreclose. Choi and Yi (2002) and Avenel and Barlet (2000) introduce commitment by allowing vertically integrated firms to choose for specific instead of generic technologies. If a vertically integrated pair of upstream and downstream firms chooses a specific technology (which requires making an ex ante investment), they can no longer participate in the upstream market. Such an investment then creates the commitment not to participate in the upstream market for the intermediary good (which would require the generic technology). Non-integrated firms can also choose to invest in such technologies, but will not do so due to the risk of ex post appropriation (hold-up problem). Although this does provide a way in which credible commitment (not to supply) can be achieved, it still has to be verified that making this commitment is in fact desirable for the integrated firm. In Choi and Yi, the gains of such a strategy are a result of assumptions on differences in profitability between specialised versus general technology markets.

Chen (2001) introduces efficiency differences upstream (asymmetric marginal costs) and a switching cost if a downstream firm wants to change supplier. In this setup, if a merged firm supplies a downstream rival it has an incentive to raise its downstream prices, since higher downstream prices increase the demand for the unintegrated downstream firm's product. This in turn increases upstream demand for the intermediate product, which increases profits for the integrated firm's upstream division. The softening of downstream competition as a result of supplies to a rival influences this rival's choice of input supplier. In the upstream market, the integrated firm can charge a mark-up as a result of its higher efficiency compared to upstream (non-integrated) rivals. There is no incentive for a counter merger. On the one hand a counter

[19] Ordover et al. (1990) assume that the vertically integrated firm can commit either not to participate in the upstream market, or to supply the non-integrated firm downstream firm if the price charged by the remaining upstream firm becomes too high. How this commitment is achieved is not explained. Salinger (1988) makes strong assumptions which ensure that the vertically integrated firm do not supply non-integrated downstream competitors (i.e. they do not participate in the intermediate good market). In particular, his model assumes that downstream firms are quantity setters in the retail market, but price takers when demanding a fixed proportions input in the wholesale market.

merger would increase downstream competition, lowering downstream prices (which lowers profit), on the other hand it would increase the market share of the unintegrated upstream firm because it is no longer excluded (which increases profit). Chen shows that the downstream losses outweigh the upstream gains. Note that this mechanism only works if there is downstream Bertrand competition. If there is Cournot competition, when choosing its output the integrated firms takes the market share of the unintegrated downstream retailer as given. The integrated firm's upstream pricing decision is therefore not linked to its quantity choices the in downstream market.

2.5.3 Multiple vertical integration and downstream entry

We conclude this section by considering a particular case of a vertically integrated market structure, namely one in which all upstream firms are integrated, and the question is to what extent these firms will accommodate downstream (non-integrated) entry. This situation is of considerable importance in practice, as in many cases upstream bottleneck owners are active downstream already. An example is the telecommunications market in the Netherlands, where multiple networks (e.g. DSL and cable) are present all providing more or less the same downstream services. The issue here is to what extent downstream entrants are provided access onto the oligopoly networks in the absence of regulation. Similarly, in renewable energy production, upstream producers often are integrated with downstream retailers, and if the market for renewable certificates is concentrated, the question is whether independent retailers will have access to such certificates.

We limit ourselves to downstream Cournot competition and consider the case of general non-linear contracts. In this case we can apply the theoretical framework developed by Bernheim and Whinston (1998).[20] As discussed in section 2.4 they study non-linear contracts in a market with contracting externalities between upstream suppliers and downstream retailers. A market with two vertically integrated suppliers competing downstream and one downstream entrant contracting with the suppliers constitutes a concrete example of such a configuration. A contracting externality arises because the contract between the entrant and the one supplier directly affects the profit of the other supplier, who is not included in the contract negotiations.

In principle, there are three possible outcomes. First, exclusion might be the equilibrium. In this case, neither upstream firm supplies the downstream entrant. For each firm it should therefore be optimal not to supply given that the other firm does not supply. Second, the equilibrium might be an exclusive contract between one of the suppliers and the entrant. By signing with the one supplier it foregoes the opportunity of signing a contract with the other upstream supplier. The terms of this exclusive contract will be influenced by this opportunity cost and competition between the suppliers influences the terms of the contracts. Note that although the contract is exclusive and one of the supplier is excluded from selling to the entrant,

[20] If a contract between a supplier and the entrant is private

this supplier is not excluded from the market. Third, the equilibrium might be that both suppliers supply the entrant. Bernheim and Whinston (1998) call this a common contract. Obviously, common contracts do not lead to exclusion of any of the firms.

Exclusion

Exclusion is an equilibrium strategy if it is optimal for both suppliers to supply nothing to the entrant given that the other supplier does not supply anything. In particular, neither supplier should want to deviate by offering a nonzero quantity to the entrant. If the one supplier doesn't provide access, the other supplier can offer a contract extracting all the entrant's rents (because the entrant's opportunity cost of signing the contract is zero). In addition, the non-linear contract allows the supplier to determine the quantity sold by the entrant. Therefore, the supplier will simply maximize its profits plus that of the entrant given that it competes with the other vertically integrated supplier in the downstream market. To assess whether foreclosure is an equilibrium strategy if the suppliers use non-linear contracts, the question is whether selling nothing through the entrant is an optimal strategy for a hypothetical entity that integrates the entrant and one of the upstream suppliers.

Foreclosure will be optimal for such an integrated entity if supplying the entrant with a nonzero quantity reduces its profits relative to the situation where the entrant produces nothing. In general, it is hard to imagine markets with such a property. If products are differentiated, allowing the entrant to sell a nonzero quantity in many cases increases the total profit of the downstream entrant and the upstream supplier. Thus, in most models with differentiated goods supplying the entrant with a nonzero quantity is optimal and blocking entry is not an equilibrium.[21] In models with homogeneous goods, if retail costs are equal the integrated entity will be indifferent to which firm sells the product in the final market. Thus, exclusion of the entrant will often not be an equilibrium strategy if non-linear contracts can be written.

Exclusive contract with one of the suppliers

As in the monopoly case, the existence of contracting externalities is crucial in determining what types of contracts are optimal. The type of contracts will be selected to maximize the joint surplus of the vertically integrated supplier and the entrant (the first general principle noted by Bernheim and Whinston (1998)). If there are no contracting externalities, either exclusive contracts yield the same outcome as common contracts or common contracts dominate exclusive ones. Therefore, a necessary (but not sufficient) condition for exclusionary contracts to be preferred to common contracts is that there should be contracting externalities present. Competition between the vertically integrated suppliers in the downstream markets constitutes

[21] An exception would be when the entrant's retail costs are higher than the incumbents', and goods are not very heterogeneous. Then entry would not occur, but this would also be socially undesirable.

such an externality. Therefore, we might expect that in some cases exclusive contracts are optimal if suppliers are vertically integrated.

If it is optimal for the one integrated supplier to supply the non-integrated retailer if the other integrated supplier does not, the two suppliers will compete to be the retailer's supplier. In this way they compete away part of their profits. To what extent this happens is determined by the profit of the vertically integrated firm that does not supply the entrant. If downstream competition is in quantities, and upstream competition in prices, competition between the vertically integrated suppliers will always result in access at marginal costs. However, if downstream competition is in prices instead of quantities, the profit of the entrant's supplier can be lower than the profit of the other supplier but higher than the profit if both suppliers do not supply the entrant. The supplying incumbent has an incentive to reduce its own output because this raises downstream prices which increases the entrant's market share and the supplying incumbent's profit from upstream sales. If this softening of downstream competition to increase upstream profit happens, the vertically integrated firms will not compete to be the entrant's supplier. In a way, supplying the entrant is similar to producing a common good: both suppliers benefit if the entrant is supplied, but both want the other to supply him (Bourreau et al. 2007).

Linear contracts

Ordover and Shaffer (2006) assume linear pricing and consider a model with upstream and downstream Bertrand competition. They show that if downstream entry results in so-called own-supplier cannibalization, equilibria exist where no firm provides entry. Own-supplier cannibalization occurs if supplying an entrant mainly reduces the suppliers own market share.[22] On the other hand if entry results in so-called proportional cannibalization, the entrant is supplied at marginal costs. Proportional cannibalization occurs if supplying an entrant equally reduces both suppliers' market share.

2.6 Summary of the theory

Vertical foreclosure occurs when an individual firm in one of two vertically related markets directly or indirectly denies or limits access to its input. It is a common phenomenon in vertically related markets and arises most often as a consequence of exclusive contracts or vertical integration. Exclusive contracts restrict a supplier's possible sales to other retailers or a retailer from carrying other suppliers' products. As a result, the firms who are not party to the contract are restricted in either their sourcing or selling opportunity. Vertical integration changes a firm's incentives to supply to other retailers or to buy from other suppliers and may lead a firm to withdraw from the intermediate good's market. As a consequence, competitiveness of the intermediate good's market changes, affecting the vertically integrated firm's competitors.

[22] In fact, with uniform prices own-supplier cannibalization implies that the entrant's market share is obtained one for one from the supplying incumbent's market share.

Vertical foreclosure is not necessarily anti-competitive. Indeed, vertical integration and exclusive contracts in most cases benefit consumers by enhancing the efficiency of the participating firms. The decentralized nature of commercial decisions that affect the efficiency of the whole vertical structure creates externalities, which lead to inefficiencies. Vertical integration and exclusive contracts can (partially) internalize these externalities. Important efficiency effects are the elimination of double marginalisation, the reduction of incentives to free-ride and the elimination of hold-up problems.

Nevertheless, there are circumstances in which the strategies that lead to foreclosure lower welfare; when the main motivation for restricting access to an input (for example by exclusive contracts or vertical integration) is to put efficient rivals at a competitive disadvantage, or even to force them to leave the market (or not enter it in the first place). Below we briefly sketch the circumstances under which welfare reducing foreclosure can occur. We distinguish between three situations. First, there can be a monopoly either upstream or downstream. Second, there can be an oligopoly both upstream and downstream. This is called a bilateral oligopoly. Third, there can be a bilateral oligopoly with vertical integration.

Monopoly

The theory of exclusive contracts is relatively well understood for situations where either the upstream or the downstream segment of the market is a monopoly. In this case, economists of the so-called Chicago school have argued that there are no anticompetitive motivations for having exclusive contracts: the monopolist should be able to earn its monopoly profits anyway, and cannot earn more than that by signing exclusive contracts. More recent literature has challenged this view: while indeed exclusive contracts cannot increase profits beyond monopoly profits, such contracts may be essential to the monopolist in *protecting* its monopoly profits. In other words, the market may be more competitive than suggested by the monopoly position (and profits lower than monopoly profits) in the absence of exclusivity clauses or similar agreements.

The condition under which this result holds (and indeed, under which an anti-competitive effect of exclusivity occurs) is that the non-monopoly segment's firms should have profits that directly depend on the contracts that the monopolist signs with the other firms in this segment. This condition is met, for instance, when the monopolist is a supplier who contracts with retailers that compete in the same market: in this case, the monopolist's supplies to a retailer's rival affects the price in the downstream market, and hence the retailer's profit. It is not met, conversely, if the retailers sell in different (non-competing) markets, or if the monopolist is a retailer who buys from non-monopoly suppliers whose costs do not depend on the supplies to the monopolist from their rivals.

Bilateral oligopoly

In bilateral oligopoly, both up- and downstream markets are characterised by oligopoly structures. While theory of such cases is not fully crystallised yet, various predictions emerge from existing models.

The case for welfare reducing input foreclosure is similar to that in the situation of upstream monopoly. Provided the upstream oligopoly leads to significant market power for (any of) the upstream firms, and downstream oligopoly is relatively competitive, input foreclosure may be an equilibrium strategy protecting the upstream oligopoly rents.

While, conversely, welfare reducing customer foreclosure was no issue in the monopoly situations, it may manifest itself in the bilateral oligopoly. Under the condition that at the upstream level there are scale advantages, either as a result of economies of scale in production or as a consequence of network externalities among consumers, exclusion of one of the manufacturers can be an equilibrium. Since in this case multiple buyers are necessary to allow a competitor to stay in the market, an upstream firm may exclude his rival by exploiting coordination difficulties among retailers. This effect may be reduced if downstream competition is sufficiently fierce that an individual retailer may capture a large share of the market if it prices below its rivals' price levels.

Partial or full integration

If firms are vertically integrated, but face competition in both up- and downstream markets, exclusion of non-integrated rivals does not seem to be profitable in many cases. Supplying independent retailers or buying from independent (more efficient) suppliers will often increase profits ex post. A prerequisite for successful exclusion seems to be that firms can somehow commit not to supply to or buy from non-integrated competitors. Such commitment may originate in choosing firm specific technologies.

In markets with multiple vertically integrated firms, two key questions should be answered. First, is it profitable for an individual vertically integrated firm to supply a non-integrated retailer, if none of the other vertically integrated firms does so? Sometimes supplying a non-integrated retailer leads to own-product cannibalization: the new retailer gains mainly at the expense of the supplying firm's market share. In that case, full exclusion can be a market outcome. If the entrant also gains substantial market share from a competing integrated player, at least one of the vertically integrated firms will supply a non-integrated retailer. Second, to what extent do the vertically integrated suppliers compete to be the non-integrated retailer's supplier? The answer seems to depend on the nature of downstream competition. If retailers compete mainly in quantities, competition to be the non-integrated retailer's supplier will be fierce and retailers will be supplied at competitive prices. For price competition, there might be no competition to be the non-integrated retailer's supplier at all, implying that retailers will be supplied at high prices.

3 Empirical literature

In this section, we discuss the empirical literature on foreclosure. Although limited in scope, it complements the competitive assessment on the basis of pure theory and the antitrust cases discussed in the policy section.

3.1 Classification of empirical studies

Empirical papers fall in two categories. The one which factors stimulate vertical integration, and matches these findings with the theory. The other studies whether vertical restraints or vertical integration have led to foreclosure (that can be either naked exclusion or raising rivals' costs) and if so, how efficiency was affected. Efficiency is measured by changes in prices and quantities after the vertical relationship was established. Decreasing prices or increasing quantities show that production became more efficient, yielding lower costs, and consumers were better off. The analyses mainly use price and market share data. However, cost data is often not available due to its commercial sensitivity.

The empirical literature on foreclosure can also be classified according to the techniques used. A large group of studies apply the structure-conduct-performance (SCP) paradigm and estimate reduced models by using classical econometric techniques such as cross-section, time series and panel data analysis, natural experiments or event studies. Lafontaine and Slade (2005 and 2006) and Cooper et al. (2005) provide an extensive summary of this studies literature. These models however do not allow for an identification of the underlying microeconomic parameters. To address this issue, structural models based on the equilibrium of economic models for imperfect competition were developed. This development was termed new empirical industrial organization (NEIO). Taking market structure characteristics into consideration, these models are able to provide more robust results. The other advantage is that one can evaluate changes of regulation ex ante, by running simulations based on models tested previously on pre-change data. So far, there have been very few applications of NEIO in the field of vertical restraints (see e.g. Asker (2004a,b), Brenkers and Verboven (2006), and Mortimer (2004); NEIO is more commonly used for horizontal-market structures). However this methodology is developing rapidly. The following box describes these techniques.

3.2 Techniques used

Structure-conduct-performance (SCP)

The most straightforward way to examine how vertical agreements affect welfare is to analyze descriptive statistics. However due to providing little explanatory value by itself, descriptive statistics are combined with econometric analysis. Three main classical methods can be

distinguished: (i) cross section, time series and panel data analysis of firms and regions, (ii) natural experiments, and (iii) event studies (for more extensive discussion and also for the theoretical models behind see Lafontaine and Slade, 2005 and 2006).

Cross section analysis performs multivariate regression across retail establishments that are or are not in vertical relations. Besides a dummy variable indicating the presence of vertical restraints, the effects of other variable relating to supply, demand and policy on prices or quantities are also estimated. A common problem of cross section analysis is relating to endogeneity of variables. To overcome this problem and if unobserved heterogeneity is time-invariant, panel data analysis can be performed. Otherwise and also to compare prices, quantities or market shares before and after changes in vertical relations or in legislation, time series analysis can be run. However in this case other factors changing over time have to be considered as well.

Policy changes can also be considered as *natural experiments* in the sense that it is an exogenous factor in the market and affects a certain group of firms or brands (treatment group) and leaves other firms or brands unaffected (control group). The differences of respective variables between these groups are estimated, and then compared within regions (called difference-in-difference estimator). If the estimate is not constant but depends on changes in the respective variables, one can conclude on how the policy change affected prices and quantities in that region. This technique is widely used when assessing the effects of vertical divorcement. When a firm is publicly traded, the effects of an *event* relating to vertical restraints on that firm's value can be examined by using stock market data. Excursion in value may be easily shown if the respective event was unexpected. However a legal change or an anti-trust case is rather predictable since they spread out over time, therefore these events can be partitioned into sub events. After estimating a system of seemingly unrelated regressions of each sub event, estimates across them are added to find the overall effect of the whole event.

New Empirical Industrial Organization (NEIO)

In the recent empirical literature, articles arise which aim at having a better understanding of the industry structure. Econometric models are based upon the equilibrium solution of such theoretical models for imperfectly competitive markets that fit best to the market in question. This empirical technique starts from game theoretical models of industrial organization where the equilibrium is determined by strategic interaction between market participants (see Pakes, 2007) and allow for identification of the underlying behavioral parameters. However the empirical analysis has to take into consideration that theoretical models are based on assumptions, hence the most robust theoretical results have to be used to gain verifiable empirical results.

Imperfectly competitive markets are characterized by prices containing a mark-up over costs. In principle, these mark-ups together with prices can be used to measure market power,

and costs can be used to assess efficiency gains (later in the analysis other factors leading to lower costs, such as development of costs over time are ruled out). However, although price data is often easily accessible, actual cost data is hardly available due to its commercial sensitivity. Therefore costs have to be estimated.

The general analysis goes as follows (based on Berry et al., 1995): demand estimates, such as own- and cross-price elasticities are obtained based on price data. From these elasticities, price mark-ups are calculated according to the equilibrium outcome of the respective theoretical model. Using estimated mark-ups and actual prices, costs are computed. Costs and prices are then used to test whether exclusive deals lead to raising rivals' costs: cost-based foreclosure (e.g. forcing rivals to use higher cost distribution channels) or promotion-based foreclosure (e.g. forcing rivals to use distributors with less effective promotion capacity), respectively. Foreclosure is also tested in a control group to rule out other factors leading to effects similar to foreclosure. These structural models are tested with either full-information maximum likelihood technique (if there is no identification problem) or with GMM (when instruments need to be used).

Shortcoming of empirical analysis

The empirical analysis may generally fail for three main reasons: insufficient amount and type of data, inappropriate technique, and shortcomings of the economic model in use.

The amount and type of data available in certain cases may not be satisfactory, which impedes appropriate analysis. The main data sources lie in research done for industry reports or commissioned by companies and other institutes or organizations. Furthermore companies in general have enormous amounts of information, however it is not public or difficult to acquire because of commercial confidentiality. Therefore the available data set does not necessarily cover the whole market. As it was mentioned earlier, for the same reason, cost data, serving as the basis of supply side analysis is generally unavailable. Even though, for instance in NEIO analysis, price mark-ups can be used to estimate marginal costs, fixed costs cannot be taken into consideration by this measure. Ignoring fixed cost may therefore distort the analysis if an important pro-competitive effect, the economies of scale takes place at any level of the market. Finally, data has to be adjusted as much as possible to the question in mind and also to the time horizon in which the problem is assessed. For instance, one of the most common critiques about price data is that it reflects list prices and not prices realized in trade which contain discounts.

The reliability of methodology used in empirical analysis certainly depends on the data used. Therefore if data is not sufficient or accurate, the analysis has to consider potential corrections and intuitions on how those corrections would modify the results. This problem might relate to other shortcomings of empirical techniques such as unobserved heterogeneity or ignoring time-variant factors. A careful consideration of the appropriate methodology may overcome this problem.

In general, economic models are used as a basis for empirical analysis. It has to be noted that in economic models assumptions are made to keep the framework tractable. Being restrictive, particularly on the market structure, on the number of players at each production level and on the information set of firms, such assumptions may also diminish the explanatory value of the respective empirical study.

Nonetheless, it has to be stressed that despite these shortcomings of empirical research, when economic theory leads to ambiguous effects, policy makers may have a better understanding of vertical restraints by relying on empirics to measure which of the effects dominates.

Most studies analyze markets with low concentration measure, although some degree of market power might be present. Frequently analyzed markets are the beer market and gasoline industry. Empirical evidence concerning concentrated industries is scarce. As a consequence, relatively few studies examine markets with high concentration measures. Examples are the cement and concrete industry, cable television programming and distribution, and oil refining and distribution. Hence lessons should be taken with some caution due to the limited number of studies. In contrast to the limited number of empirical studies of concentrated markets, these industries have received considerable attention of competition authorities precisely because they are concentrated.

Empirical literature in general supports the theoretical finding on under which circumstances a supplier engages in vertical integration with the retailer (i.e. bigger investments, higher complexity of inputs and more uncertainty in the environment). However results on when a retailer integrates with a supplier vary over the literature: effects of some factors revealed in the theoretical literature are confirmed (i.e. effort of firms), some effects are opposed (i.e. uncertainty), and for effects of some other factors empirics do not provide robust results.

Independently of the techniques used and markets analyzed, the empirical literature generally shows that privately negotiated exclusive contracts are often efficiency enhancing. Moreover exclusive dealing increases - or at least does not decrease - consumer welfare. These findings are explained in somewhat more detailed in the next section.

3.3 Main empirical findings

The first group of the empirical studies assesses which factors determine whether vertical integration between an independent supplier and a retailer comes about. The empirical analysis based on a theoretical model intends to verify the results of that particular model. Two types of integration are examined: (1) a retailer integrates with supplier or remains independent, and (2) a supplier integrates with a retailer (make or buy decision).

Empirical literature independently on the technique used supports the theoretical findings[23] in that the higher the effort a retailer (a supplier) exerts, the less (more) likely a retail will vertically integrate with a supplier. However, the opposite to the theoretical result saying that increased risk makes integration more likely is confirmed by the empirical analysis. Whether empirics match the theory in assessing the effects of other factors, such as cost of monitoring efforts, outlet size, brand value, etc., strictly depends on the specification of the models used in the empirical analysis. Nonetheless, the incentives why a supplier is willing to integrate with a retailer[24], that is larger investments, higher complexity of inputs and more uncertainty in the environment, are fully supported in the empirical literature.

The second group of studies analyzing the effects of vertical restraints on welfare is robust in verifying the pro-competitive nature of vertical mergers even in case of concentrated markets, however the evidence in highly concentrated markets is still rather insufficient.

Lafontaine and Slade (2006) and Cooper et al. (2005) provide an extensive summary of the existing empirical literature based on different classical techniques. The assessment of foreclosure and raising rivals' costs motives received most of the attention in the econometrics literature. Moreover, these effects have been more often analyzed in concentrated markets, such as cement and concrete, cable TV programming and distribution, and oil refining and distribution. Some of the collected empirical papers disclose evidence of exclusion or practices that negatively affect rivals as a result of privately imposed vertical restraints. Excluding services, however, does not necessarily result in foreclosure of firms from the market (e.g. cable market where exclusive dealing leads to less product variety at each cable company, see Chipty, 2001). Furthermore, as it is also shown in the theoretical literature, even if foreclosure takes place, it is usually found to be accompanied by efficiency gains, such as lessened double marginalization, positive dynamic effects or higher quality of products or services.

Two of these papers (Mullin and Mullin, 1997 on steel industry and Chipty, 2001 on cable distribution) assess the trade-off between these two effects and show that efficiency gains generally outweigh the welfare loss of foreclosure. Moreover, privately imposed vertical restraints generally led to lower costs, lower prices and greater consumption and in these instances benefited consumers or at least did not harm them.

[23] The studies are mainly based on moral hazard models, for more detail see Lafontaine and Slade (2006).

[24] Transaction-cost or occasionally property-rights models form the main theory behind. See Lafontaine and Slade (2006).

Similar results are found by using the methods of new empirical industrial organization. Asker (2004a, 2004b), analyzing both cost-based foreclosure (forcing rivals to use higher cost distribution channels) and promotion-based foreclosure (forcing rivals to use distributors with less effective promotion capacity) in the US beer market, considers a model with a three-stage complete information game where products are horizontally differentiated. In his paper upstream players (brewers) form an oligopoly and the retailer (a supermarket chain) has a monopoly position. Distributors represent a tier between these two layers, and may contract exclusively with the brewers, although they have an essentially passive role in the game. A stylized model of this market describes downstream monopoly with upstream competitions, in which market, according to the theory, no anticompetitive customer foreclosure may be expected. Asker indeed shows that anti-competitive effects are unfounded in the beer market. His results are supported by three findings: (i) demand increases in the presence of an exclusive distributor, (ii) marginal costs are lower for brewers with exclusive distributors and (iii) not higher for rival brewers in the same region.

To conclude, we emphasize that the existing empirical evidence seems to support the claims that vertical integration often occurs when participating parties find it beneficial and at the same time it increases consumer welfare and efficiency. Empirical findings are also in line with theoretical predictions in the following sense: when there is fierce competition upstream and downstream, studies show that although foreclosure took place in most of the cases, it made consumers better off. This implies that in these markets efficiency enhancing effects dominate welfare reducing effects. Studies assessing particularly the trade-off between pro- and anti-competitive effects find positive overall welfare effect in case of markets with sufficient downstream competition and some upstream market power. Independently of techniques used, studies yield the same conclusion, however the NEIO approach is more applicable if welfare gains and effects of policy intervention have to be considered. Some findings in the econometrics literature are summarized in the following table.

Table 3.1 Empirical studies – effects of vertical restraints on welfare

Market	Country	Method	Vertical restraint	Market characteristics	Findings
Insurance[a]	USA	Classical (not specified)	Vertical integration (exclusive vs. independent agents)	Non-contractible investments: potential for independent agents to free-ride in insurance lines	Higher advertising activity (more efficient system of selling); dynamic effects (investments in new products)
Beer[b]	USA	NEIO	Exclusive dealing (brewers vs. supermarket chains)	Upstream competition, downstream monopoly	Pro-competitive effects: higher demand, lower (or not higher) costs
Beer[c]	UK	Natural experiment (difference in difference)	Exclusive dealing: A divorcement case (brewers vs. pubs)	Tied trade vs. free trade	After divestiture, prices increased and profits decreased
Cable TV[d]	USA	- Descriptive statistics + classical (reduced form) to test competition effects - NEIO to test welfare effects	Vertical integration (cable TV providers and program distributors)	Basic vs. premium service operators Exclusive franchise areas Some market in both level	VI excluded rival services but no foreclosure (program specialization) Pro-competitive effects: high value product-price mix offered to consumers Latter outweighs former
Steel[e]	USA	Stock market event study	Vertical integration	Long term lease agreement	Dynamic effects

[a] See Marvel (1982) and for summary Whinston (2006).
[b] See Aker (2004).
[c] See Slade (1998).
[d] See Chipty (2001)
[e] See Mullin and Mullin (2004)

4 Policy framework

In this section, we discuss how the insights from our analysis can be translated into a framework that policy makers can use to analyse the potential for welfare reducing vertical foreclosure. We identify four important steps.

First, any assessment should start with the question whether in this market foreclosure, if it would occur, has the potential to reduce welfare. If this is not the case, foreclosure, though it might occur in practise, is not a relevant policy issue.

Second, if welfare reducing foreclosure is in principle possible, we should assess whether it is also likely to happen. Based on the theory presented in chapter 2 we distinguish between different market structures and different types of vertical foreclosure. In each case, we can provide some guidance to the circumstances under which foreclosure may be an equilibrium.

Third, if a theory of foreclosure is formulated, we should assess whether there exist welfare enhancing effects of the vertical restrains or vertical integration that can outweigh the detrimental effects. The empirical literature suggests that such effects are almost always present, but does not distinguish between different effects. On the basis of economic theory it is often possible to argue that some effects are more likely to be present than others.

Fourth, if foreclosure is likely and the welfare decreasing effects are larger than the welfare enhancing effects, we should assess what policies are suitable to address foreclosure. It is important to realize that foreclosure can be realized in several ways. Banning one of them may lead firms to substitute another. In addition, different policy instruments differ in intrusiveness. Policymakers should opt for less intrusive interventions before resorting to more severe measures. Finally, the possibility of assessment errors should not be neglected. What is worse: prohibiting a contract or merger for which the welfare enhancing effects outweigh the welfare reducing effects of foreclosure or allowing a contract or merger for which the welfare reducing effects of foreclosure outweigh the welfare enhancing effects?

Each of these steps is discussed in more detail below.

4.1 Is there sufficient upstream and downstream competition?

Theory and empirics both show that vertical foreclosure is not very likely to be welfare reducing when there is sufficient competition both upstream and downstream. Although an exclusive contract between a supplier and a retailer denies competing retailers access to that particular supplier, or competing suppliers access to that particular retailer, neither upstream nor downstream competition is reduced because there are enough other suppliers and retailers.

Therefore, if exclusive contracts and vertical integration occur in such markets (and they do in reality), it will be purely for efficiency reasons. This theoretical prediction seems to be confirmed by the empirical literature: when there is fierce competition upstream as well as

downstream, all empirical studies we are aware of (see chapter 3) show that although foreclosure took place in most of the cases, it made consumers better off.

4.2 Is welfare reducing vertical foreclosure likely?

If market power is present somewhere in the vertical chain, denying or limiting competitors' access to an intermediary input or to customers may reduce competition. In this case, foreclosure may be welfare reducing.

Based on the theory in chapter 2, we distinguish between two types of foreclosure: input foreclosure and customer foreclosure. Input foreclosure happens when downstream retailers are foreclosed from buying from a particular upstream supplier. Customer foreclosure happens when an upstream supplier is foreclosed from selling to a particular retailer. The theory predicts that the likeliness and type of welfare reducing vertical foreclosure differs between markets with and without vertical integration. In addition, markets where there are several competing vertically integrated combinations from markets where there is a single vertically integrated entity.

No vertical integration

1. If a monopoly exists upstream while the downstream industry is potentially competitive, there is a danger of input foreclosure. As discussed in section 2.4, an upstream monopolist negotiating with many downstream retailers faces difficulties in credibly restricting its output. By vertically integrating or signing exclusive contracts the monopolist can credibly limit its downstream sales and restore market power. Customer foreclosure is not an issue here, because there is only one upstream firm.
2. If a monopoly exists downstream while the upstream industry is potentially competitive there is little probability of customer foreclosure. As discussed in section 2.4, the downstream monopolist cannot gain market power by signing exclusive contracts with upstream suppliers, because it can fully determine how much it sells to consumers and at what price. Input foreclosure is not an issue because there is only one downstream firm.
3. If both the upstream as well as the downstream market are oligopolistic, while economies of scale or network effects are important upstream, customer foreclosure may occur. Entry in the upstream market then requires a particular scale and may be prohibited by signing exclusive contracts with a sufficient number of downstream retailers. Fierce downstream competition may reduce the number of contracted retailers necessary to achieve sufficient scale for entry. This reduces the scope for customer foreclosure.

Vertical integration

1. If a monopoly exists upstream while the downstream industry is competitive, then some degree of foreclosure is likely without the need for explicit exclusion. By vertically integrating, the monopolist can credibly limit supplies to non-integrated retailers.
2. However, exclusion is less likely if there are (non-integrated) upstream rivals that are almost as efficient as the vertically integrated firm. The integrated firm is then limited in its possibility to extract rents from the retailer because of the retailer's option to source from the upstream rival. Only if firms can physically commit (e.g. by choosing incompatibility) exclusive practices may be an equilibrium.

Multiple competing vertically integrated combinations

1. Foreclosure of downstream entrants becomes less likely as they are more likely to win market share from integrated competitors (e.g. if upstream products are close substitutes).
2. Foreclosure of downstream entrants becomes more likely if their retail products are closer substitutes to the provider's own retail products than to those of the provider's vertically integrated rivals (e.g. if upstream products are very differentiated).

Table 4.1 below summarises these results.

Table 4.1 Is welfare reducing vertical foreclosure likely?

	Input foreclosure	Customer foreclosure	
No vertical integration			
Case 1: A monopoly exists upstream while downstream industry is potentially competitive	√		Danger of welfare reducing input foreclosure. Welfare reducing customer foreclosure is not an issue because there is only one upstream firm.
Case 2: A monopoly exists downstream while the upstream industry is potentially competitive			Little probability of welfare reducing customer foreclosure. Welfare reducing input foreclosure is not an issue because there is only one downstream firm.
Case 3: Upstream oligopoly, downstream oligopoly or competition	√	√	Danger of welfare reducing input foreclosure. In addition, welfare reducing customer foreclosure may be rational if the upstream sector exhibits strong economies of scale or network effects. Fierce downstream competition may reduce the risk of customer foreclosure.
Vertical integration			
Case 1: Upstream monopoly while downstream competitors	√		Some degree of welfare reducing foreclosure, without the need for explicit exclusion
Case 2: Upstream competition (efficient upstream rivals)			Welfare reducing exclusion less likely, except if upstream firms manage to commit not to supply rivals, e.g. by choosing incompatible production technology
Multiple competing vertically integrated combinations			
Case 1: upstream products are not highly differentiated			Welfare reducing foreclosure of downstream entrants less likely, as these will (also) win market share from integrated competitors
Case 2: upstream products highly differentiated	√		Welfare reducing foreclosure of downstream entrants may be rational since retail products will be closer substitutes to the product sold by the access provider

4.3 Is foreclosure detrimental to welfare?

Even if foreclosure has welfare reducing effects, the strategies that lead to foreclosure often also have welfare enhancing effects. In fact, the overview of the empirical literature in chapter 3 shows that efficiency effects were present in almost all cases studied in the literature. Although one should be careful not to draw general conclusions from the limited set of industries under consideration, this seems to indicate that in first instance policymakers should assume that efficiency enhancing effects are present.

In practice, assessing the relative magnitude of welfare enhancing and welfare reducing effects requires a detailed empirical analysis. This can be very difficult and we do not address how to measure such effects empirically. However, based on the theory, guidelines can be given as to when particular welfare enhancing effects may be present and when they will be absent.

Double marginalisation

Double marginalisation occurs if the input price an upstream supplier charges to a downstream retailer contains a mark-up over its marginal costs, and the downstream retailer in turn charges a mark-up over this input price (its marginal costs) to the consumer. The resulting consumer prices are inefficiently high and may be above the monopoly level.

Double marginalisation is not an issue if there is sufficient downstream competition. In this case, downstream prices will be competitive and the only price mark-up will be at the upstream level. Nonlinear contracts can eliminate double marginalisation. For example, two part tariffs, allow firms to set the price for an intermediate good close to marginal costs, and extract profits by setting an appropriate fixed fee. However, if goods are (easily) tradable, non-linear contracts give rise to arbitrage opportunities and cannot be used. Suppliers will instead have to write linear contracts. The presence of large uncertainty about costs may also restrict the contracts that can be offered. Therefore, if downstream competition is weak and products are easily tradable or there exists large uncertainty about costs, vertical restraints or vertical integration can eliminate or reduce double marginalisation.

Free rider effects

Vertical contracts and vertical integration may reduce free rider effects. Free rider effects occur if firm specific investments are important and part of the benefits generated by investments spill over to competitors. Such spillovers can exist between retailers and between different brands. As an example of the former, consider investments by retailers in services like providing guidance to potential buyers. If these buyers can easily switch to other retailers free riding occurs and retailers will under invest.

It is necessary that the benefits from the investment can not be appropriated by the retailer or the supplier. For example, if investments in a pub’s interior decoration make it more

attractive for potential customers, this does not justify exclusive contracts with brewers. Although other brewers would free ride one brewer's investments, the pub's owner could invest him self and reap all the benefits due to the increase in customers.

Hold-up problems

Vertical integration and vertical contracts can also affect a firm's incentive to invest by solving hold-up problems. For this it is necessary that benefits arising from the investment are non contractible and that opportunistic behaviour is possible. Exclusive contracts only affect the incentives to invest investment if the investment affects the value of trade with parties outside of the contract.

In determining the effect on the level of firm specific investments of protecting such investments (for example by exclusive contracts) two aspects are relevant. First, who makes the investment: the supplier or the retailer? Second how does the investment affect the profits from the trade with other suppliers or retailers?

Protecting firm specific investments will *increase* investments if (1) the *supplier* makes the investment and the investment *decreases* the value of external profits (i.e. decreases the value of the supplier's outside option) or (2) the *seller* makes the investment and the investment *increases* the value of external profits. Protecting firm specific investments will *decrease* investments if (1) the *supplier* makes the investment and the investment *increases* the value of external profits, or (2) the *seller* makes the investment and the investment *decreases* the value of external profits (Whinston (2006)).

Investment and innovation

Foreclosure can also indirectly affect investment if it reduces competition. If investment in new technologies is important and can be recouped by the investor only if he can protect his market power by foreclosing access, prohibiting foreclosure may harm welfare. In general, the relation between competition and investment or innovation is ambiguous (Aghion et al. (2005)).

Based on theoretical arguments, a negative relationship between competition and innovation may be expected in markets with several of the following characteristics: low marginal and high fixed costs, intensive use of labour and human capital, network effects, competition for the market (winner-takes-all-race) and very profitable market leaders (Evans and Schmalensee (2000), Canton (2002)).

Type I and type II errors

It is important to consider the consequences of assessment errors, the so-called 'false positives' and 'false negatives', or type I and type II errors. A Type I error corresponds to an unnecessary policy intervention, and a Type II error corresponds to not intervening when intervention was necessary. What is worse: prohibiting a contract or merger for which the welfare enhancing

effects outweigh the welfare reducing effects of welfare reducing foreclosure or allowing a contract or merger for which the welfare reducing effects of welfare reducing foreclosure outweigh the welfare enhancing effects?

Consider for clarity the simple case of a merger with both a competition decreasing effect due to foreclosure and a efficiency enhancing effect, e.g. because it solves double marginalisation.[25] Either the foreclosure effect outweighs the efficiency effect, in which case the merger should be prohibited, or the efficiency effect outweighs the foreclosure effect, in which case it should be allowed. However, an error in the assessment of these effects may lead to a wrong policy decision. What type of errors is more detrimental for welfare, and therefore is more important to prevent?

The answer to the latter question depends on the relation between competition and innovation. Assume that in the long run the dynamic welfare effects resulting from innovations outweigh the short run static effects from efficiency and competition. A type I error increases competition, but reduces efficiency more. A type II error increases efficiency, but reduces competition more.

If increased competition increases innovation, the efficiency reducing effect of a type I error is mitigated by the long run dynamic effects. However, the (in aggregate) negative effect on welfare of a type II error is only made worse. Therefore, in this case the emphasis should be on avoiding type II errors. If increased competition decreases innovation, the competition reducing effect of a type II error is partially mitigated by dynamic effects in the long run, whereas the negative effect on welfare of a type I error is only made worse. In this case the emphasis should be on avoiding type I errors. The table below summarizes this analysis.

Table 4.2 Which error is more detrimental?

	Type I error	Type II error
More competition increases innovation	less detrimental	highly detrimental
More competition decreases innovation	highly detrimental	less detrimental

This implies that a positive relation between competition and innovation calls for a tough stance foreclosure: policymakers should avoid not intervening when intervention was needed. A negative relation between competition and innovation calls for a more lenient stance on foreclosure: policymakers should avoid intervening when intervention was not needed.

[25] The case of mergers with only efficiency enhancing or welfare reducing effects is probable very rare.

4.4 Policies that can address foreclosure

There are several policy options that can reduce the risk of welfare reducing foreclosure. We classify these into two main policy groups: structural and behavioural policies. Structural policies affect the market structure of the industry. They are more intrusive than behavioural policies, which affect firms' behaviour under a given market structure.[26] Below we discuss each policy option in more detail.

- Structural policies
  - Merger control
  - Structural separation policies

- Behavioural policies
  - Access regulation
  - Common carrier policies
  - Banning certain types of vertical restraints
  - Ex-post enforcement of competition law
  - Non-discrimination requirements
  - Disclosure requirements

Merger control

Mergers beyond a certain size have to be assessed by competition authorities. The European Commission is currently working on the new Guidelines on the assessment of non-horizontal mergers, which provides a framework for such an assessment.[27] In the preliminary draft of this document, the Commission recognises that vertical mergers are generally less likely to create competition concerns than horizontal mergers, since they (i) do not entail the loss of direct competition between the merging firms; and (ii) provide scope for efficiencies (such as efficiency gains from better coordination, lower transaction costs, and consumer benefits from the possibility of one-stop shopping). Yet, there may be situations in which vertical mergers can affect consumer welfare negatively.

With respect to foreclosure, the Guidelines specifically focus on "anticompetitive foreclosure", defined as foreclosure in which "the merging companies – and, possibly, some of its competitors as well – may be able to profitably increase the price charged to consumers" (p.5 of EC, 2007). The Commission proposes a three-step framework for the assessment of

[26] Here we apply the terminology, in according to which the term 'structural' is used as opposed to 'behavioural', in order to highlight that such policies intervene in the structure of the industry. Such terminology is used e.g. by OECD and ERT (European Round Table of Industrialists). Note that in other contexts the term 'structural' can also be used as a synonym of 'permanent'.

[27] More details are available on http://ec.europa.eu/comm/competition/mergers/legislation/non_horizontal_consultation.html.

foreclosure. These three steps include the evaluation of (i) the ability to foreclose access (to inputs or to downstream markets); (ii) incentives to do it; and (iii) overall likely impact on effective competition.

Since merger assessment is a difficult task, there is a positive probability of mistakes been made. These mistakes are classified into two types: *Type I errors*: efficient mergers may be disallowed and *Type II errors*: inefficient mergers may get through.[28] There are different views in Economics on the value of both types of errors and on the desirability of the government intervention to adjust the market structure. Stringent approach towards mergers is rooted into the belief that the welfare loss of letting a bad merger happen (Type II) is generally larger than the loss of rejecting a good merger (Type I), therefore, it is better to prevent bad mergers than to fight them ex post. Choosing for structural policies is in line with this reasoning. In contrast, according to the Chicago school, market would typically do better job than the state. Economists of the Chicago school would, therefore, rather commit an error of Type II, than an error of Type I , as they believe that Type I errors are typically more costly (see Voigt and Schmidt, 2003, for more discussion). Note that both types of errors have also 'dynamic effects', in the sense that either some potentially welfare improving mergers will not be pursued or, oppositely, a larger number of inefficient mergers will be notified. Improving assessment techniques helps to reduce both types of errors.

Another important issue is that there may be situations in which, even if the merger of two firms has been banned, welfare reducing foreclosure may still be achieved by certain contractual arrangements among these firms. Therefore, banning a merger may not always solve the problem, and other measures may be needed.

Structural separation policies

While merger control is applied to firms that intend to integrate, structural separation policies, such as divestitures and line-of-business restrictions, can be used to separate the firms that are initially vertically integrated. Mandated divestiture forces the firm to sell part of its assets. Line-of-business restriction precludes the vertically separated entities from entering into downstream businesses formerly occupied by the incumbent (see ICU, 2002, for more detailed discussion of these policy options in the case of telecommunications).[29]

Such policies are typically applied in newly liberalised network industries, such as utilities which originally featured vertically integrated incumbent firms. However, they can also be required by an antitrust authority as remedies for a horizontal merger to be allowed. Separation

[28] In statistics, the terms Type I and Type II errors are used in a hypothesis test. A Type I error occurs when the null hypothesis is rejected when it is in fact true; a Type II error occurs when the null hypothesis is not rejected when it is in fact false.

[29] In addition to structural separation, there are also less strong forms of separation, such as legal, functional or account separation. These latter forms are typically used to facilitate access regulation, which we discuss later.

serves to increase independence of the (bottleneck) network facility from the firms providing services over the network and facilitates competition among service providers.

Structural separation policies require careful assessment of costs and benefits. The benefits of improved competition should be weighed against the efficiency losses (e.g., lessened coordination, duplication of some activities and unexploited economies of scope).[30] The cost of the implementation of structural separation may be significant.[31] Therefore, this policy option is applied in last resort when it is hard to develop other measures that would prevent foreclosure. In some cases a milder form of structural policies can be used as a demand that the essential facility is jointly owned by all users. (Rey and Tirole, 2003).

Empirical finding about mandated vertical separation

Some empirical analyze the welfare effects of regulatory interventions in vertically related markets. When a regulator believes that vertical integration in a market amplifies the risk of abusing (especially horizontal) market power, it may opt for vertical separation. The most common example where divestiture has already happened is the gasoline market where different types of vertical contracts exist depending on whether the refiner or the gasoline station owns the whole vertical chain or they share it. In these cases the competition authority estimated that vertical separation (e.g. changing contract from a fully refiner owned vertical structure to a mixed structure) may result in higher efficiency. However empirical studies find that mandated divorcement systematically reduced or did not improve consumer surplus: either retail prices or costs got higher (see Vita (2000), Blass and Carlton (2001), Hastings (2004), and for summary Lafontaine and Slade (2005) and Cooper et al., 2006). On the other hand, as it is estimated in Blass and Carlton (2001), imposing vertical separation had significantly high costs. Similar results are found when a regulator mandated vertical restraints (compiled in Lafontaine and Slade, 2005).

Asker (2004b) also analyzes the effect of regulatory intervention on welfare. He derives slightly different conclusions, claiming that ex post assessment of vertical restraints might still lead to an effective decision of vertical separation according to the case-by-case doctrine. In counterfactual experiments based on his dataset and prior results in the beer market, Asker shows that one has to take into consideration what the source of, for instance, lower costs is in the presence of exclusive agreements. According to his analysis, when cost efficiency is gained by investments due to stronger incentives, mandating exclusive contracts to be terminated may decrease consumer surplus and total industry profit. Nonetheless, if foreclosure yields cost advantage for the incumbent, then intervention may succeed in increasing welfare. Asker suggests that if after understanding the economic rationale of exclusive dealing it is revealed that brewers have been contracted for pure foreclosing reasons, the current case-by-case approach in regulatory policy can be an effective means to increase social welfare.

To summarize, even though mandating vertical restraints or divorcement may be detrimental to consumer welfare, after assessing carefully the effects of foreclosure, and also the reasons what lead to a particular market outcome (e.g. low production costs), the case-by-case approach may be still kept in a hold in order to increase welfare if needed. Since possessing market power or restricting competition are not *per se* detrimental to welfare, therefore a case has to be judged after assessing all potential pro- and anti-competitive effects, and concluding whether the latter outweigh the former.

[30] See Mulder et al. (2005) for economic analysis of costs and benefits for the case of the structural separation of the Dutch energy industry.

[31] Rey and Tirole (2003) also argue that there may be a situation in which it is profitable for the firm to voluntarily divest certain assets in order to foreclose new entrants.

Access regulation

In addition to structural policies, there are also less intrusive policies that do not interfere with the industrial structure but restrict actions of the integrated owner of a bottleneck facility (or bottleneck input). Access regulation (also called third party access regulation, or TPA-regulation) is such a policy measure. Access regulation is often used in newly liberalised industries to ensure (non-discriminative) access of new entrants to the bottleneck facility, which is typically vertically integrated with the incumbent supplier. The main instruments that are used in this case are access quantity regulation, access price regulation and price linkages.

Access quantity regulation imposes the requirement on the integrated incumbent to open a certain part of its capacity to other players. For example, European Commission required each operator of Eurotunnel (British rail and SNCF) to allocate 25% of its capacity to new entrants for passenger and freight services.

Access price regulation means that the regulator sets the maximum tariffs that can be charged by the facility. For example, price regulation has been applied for regional electricity distribution networks and for telecommunication networks in the EU. Price regulation ensures efficient pricing of services, preventing partial forms of foreclosure through raising the cost of rivals. Yet, there may be situations in which price regulation is not desirable because price restrictions may undermine incentives to invest in expanding the facility or in the development of new technology.

Access regulation can take a more mild form of the so-called “mandated price linkages”, when the regulator defines the rule to set tariffs. Typically, the Efficient Component Pricing Rule is used (ECPR, or Baumol-Willig rule), which consists in the requirement that the access price charge to competitors should not exceed the price charged by the integrated firm on the competitive segment minus the incremental cost of that firm in the competitive segment. However, the ECPR rule only partly addresses the problem (Rey and Tirole (2003)). In an unregulated environment, it does not prevent the possibility for the integrated firm to exercise its market power by setting high prices on the final good, and thus set high access charges, precluding new entry.

Access regulation is less intrusive than structural separation policies. On the negative side, because of the information asymmetry between the regulator and the regulated firm, regulation may not always achieve the desirable effect. For example, a regulated vertically-integrated incumbent may mislead the regulator regarding its costs, and hence, to receive too generous tariffs on its regulated activity. This may allow this firm to price its unregulated businesses somewhat below the level of competitors in order to deteriorate the competitive position of rivals or even to force them to exit the market. In addition to this, vertically integrated firms may be able to raise rivals’ costs by using non-price discrimination practices. While prices and quantities are generally observable and relatively easy to monitor, soft discrimination practices,

such as sabotage or quality degradation, are difficult to detect. Monitoring the behaviour of the firms is rather difficult and can involve significant regulatory cost and effort.

Common carrier policies

In some industries, third party access can be arranged in such a way that upstream firms receive the possibility to sell their products or services directly to consumers. In this case, the structure of industry 'turns upside down'. This type of policies are applied in industries with complimentary goods and called 'common carrier policy'.

A common carrier is an organization transporting some product or service, which offers its service to general public. This term initially referred to traditional transportation companies, but later was extended to companies transporting services, such as telecommunication, and public utilities. Previously, in order to buy the product or service, consumers always had to deal with these transportation companies directly. However, the situation has been changing: consumers now deal directly with the suppliers of these products and services, while the transportation network ('common carrier') keeps its transportation function. In this way, the vertical structure has been turned upside down, so that upstream firms can sell to customers directly, instead of selling the good through downstream firms.

According to the theory, a price increase is more likely if the bottleneck is located downstream, rather than upstream. This provides a rationale for common carrier policies, which reverse the structure and move a more competitive segment downstream (Rey and Tirole, 2003). An example of the implementation of common carrier policies is Order 436 in the US, which created the possibility for gas producers to directly contract with the customers rather than stay mere suppliers to pipelines, who then sell it to customers in a bundle with transport.

Banning certain types of vertical contracts

This policy option is relevant for industries exhibiting characteristics under which specific vertical contracts increase the risk of foreclosure. For example, banning could be applied to exclusive contracts, tied sales, rebates, MFN-contracts, etc. See chapter 4 for some examples of antitrust cases that were concerned with such contracting practices.

However, these restraints may have both pro-competitive and anti-competitive effects. Therefore, similarly to the case of vertical merger assessments, the rule of reason should be applied in evaluating them: "what really matters is not the restraint used but the context in which it is used and the goal it is supposed to achieve" (Rey and Vergé, 2005).

The current European practice is stricter with respect to price restraints (such as RPM) than with respect to non-price restraints (such as exclusive contracts). Certain price restraints are banned per se. For example, RPM with minimum prices are banned completely (but maximum prices and recommended prices are evaluated under the rule of reason). The attitude towards non-price restraints, such as exclusive provisions, has been rather lenient. On the one hand,

exclusive purchasing clauses are seen as impediments to competition, thus, they fall under Article 81(1) of the competition law. On the other hand, they are often exempted based on Article 81(3), granting exemption to franchises in which the obligation not to buy from an alternative supplier is needed to protect the identity or reputation of the network or intellectual property (see Rey and Vergé (2005) for more detail on this topic).

It is important to realise that different types of restraints can be substitutes to each other, e.g. exclusive outcome can be also achieved by 'non-exclusive contracts' (e.g. non-linear pricing[32]). Therefore, the option of banning of a particular type of vertical restraints should be evaluated within the right policy context and be consistent with other policies.

Non-discrimination requirements

Non-discrimination requirements can be imposed by the government or the regulator to ensure that vertically related firms treat their competitors upstream or downstream in the same manner as the firms to which they are vertically related. This is a more generic measure than access regulation or banning a certain type of contracts. It is also less intrusive, because the regulator does not prescribe which contractual or pricing practices the firm may apply and which not.

Sometimes regulatory rules promote non-discriminative pricing, for example, the rule obliging the bottleneck firm to charge the same access price to all users or charge a single per-unit price. Such rules however may have a perverse effect: "they benefit the upstream bottleneck because, by forcing the bottleneck to sell further unites at the same high price as the initial ones, they help the bottleneck commit not to flood the market" (Rey and Tirole, 2003). Therefore, these rules should be applied with great care.

Ex-post enforcement of competition law

In Europe, the EU Competition Law prohibits anticompetitive practices. This is covered by Articles 81 (banning practices that can distort competition in member-states, such as collusion) and 82 (abuse of dominant position). As we have mentioned earlier, Article 81 prescribes rules regarding certain types of vertical restraints, such as RPM and other price fixing practices, market sharing practices, etc.[33] It allows the competition authorities to eliminate practices triggering foreclosure. Article 82 fights abuses of market power by dominant firms. The recent discussion paper by DG COMP (see EC, 2005) opened the consultation round on the review of Article 82 for its application to exclusionary abuses. "By exclusionary abuses are meant

[32] For example, Rey and Vergé (2005) mention the antitrust case of Michelin. In 2001, Michelin was fined 20 mln euros for abuse of dominant position (Article 82) for using a system of rebates (which is a particular type of non-linear pricing) that induced distributors to buy exclusively from Michelin.

[33] Article 81 explicitly prohibits the following actions: "(a) directly or indirectly fix purchase or selling prices or any other trading conditions; (b) limit or control production, markets, technical development, or investment; (c) share markets or sources of supply; (d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts."

behaviours by dominant firms which are likely to have a foreclosure effect on the market, i.e. which are likely to completely or partially deny profitable expansion in or access to a market to actual or potential competitors and which ultimately harm consumers. Foreclosure may discourage entry or expansion of rivals or encourage their exit". The Commission is currently reflecting on the comments received from the public to determine the best approach to the review. Under Article 85, the European Commission has a power to track down and punish firms that violate these articles. Similar provisions are made in the national competition laws of the EU members. In cases when companies' actions have lead to anti-competitive foreclosure, the competition authority can use these articles to restore competition ex post.

There are pros and cons of waiting for foreclosure to manifest in a form that can be mitigated by means of these articles of the Competition law, instead of acting more proactively and eliminating the possibility of foreclosure ex ante. These pros and cons relate to the errors of Type I (prohibiting a good merger) and Type II (allowing a bad merger to take place) discussed in the section on merger control. Ex-post approach is in line with the believe that errors of Type I are more likely and expensive for the society than Type II errors.

Disclosure requirements

The requirement to publicly disclose contracts for intermediate goods helps to achieve more transparency in contracts of suppliers. This requirement by itself does not preclude charging different tariffs from different firms, yet decreasing information asymmetry may help prevent foreclosure by promoting competition downstream. (Rey and Tirole, 2003.) It should be noted that in addition to this positive effect on competition in the downstream market, transparency can have a negative effect on competition in the upstream market, since publicly observed contracts facilitate commitment to monopoly prices and also may facilitate coordination and collusion among the producers of the intermediate good. See Albæk et al. (1997) for an example in which transparency facilitated collusion among producers of concrete. Therefore, the overall effect of this measure should be assessed before applying it.

Table 4.3 Different policy measures in mitigating foreclosure

Policy option	Intrusiveness	One-off action or permanent monitoring	Information requirements and complexity	Other remarks
Structural separation policies	very high	one-off	low	may exacerbate potential hold-up problems
Merger control	high	one-off	low	vertical contracts may substitute
Access regulation	high	permanent	high	may provide incentive to mislead the regulator or to engage in sabotage
Common carrier policies	high	permanent	low	often not applicable
Banning certain types of vertical restraints	medium	permanent	low	risk of substitution between types of contracts
Ex-post enforcement of competition law	low	permanent	high	may come too late
Non-discrimination requirements	low	permanent	low	may facilitate commitment to high prices or low quantities
Disclosure requirements	very low	permanent	low	may facilitate collusion

Conclusions

The discussion in this section highlighted two different perspectives of looking at a foreclosure problem: the antitrust policy perspective and the regulatory perspective. From the antitrust perspective, the question of policy intervention is only raised if there are signs of (potential) anticompetitive behaviour; while from the regulatory perspective, the intervention is justified in any situation in which policy intervention will improve welfare (consumer welfare or total welfare depending on the particular industrial context and political preferences). These perspectives are confronted with each other in making choice towards more and less proactive and stringent approach to foreclosure. The latter types of policies are represented by stringent merger control, structural separation policies, while the antitrust perspective leans more towards ex-post competition policies.

Based on the discussion of the policy options provided in this chapter, we can see that policy differ in many aspects. Therefore, when comparing policies, trade-offs should be made with respect to their intrusiveness (affecting productive efficiency), complexity, one-off as well as systematic costs associated with their implementation. Table @ highlights these trade-offs. For example, structural policies, such as structural separation and merger control, are very intrusive, but also relatively simple to implement and highly effective in establishing separation among companies and eliminating the incentive to foreclose rivals in order to maximise the joint profits

of the companies. Therefore, no systematic costs are needed for monitoring the behaviour of the companies. All these factors should be taken into account.

Note, since foreclosure can arise not only in the case of vertical integration, but also based on certain contractual arrangements among the companies, structural policies alone may be ineffective. Therefore, an integral assessment is needed when choosing a relevant policy in each particular case. In this integral assessment, attention should be paid to the institutional framework currently applied, because foreclosure may have been facilitated by idle regulation or a policy restriction, in which case removing that restriction may already solve the problem.

5 Case studies

5.1 Antitrust cases

Below we discuss in some detail two antitrust cases concerning exclusive agreements where the potential for foreclosure has been assessed by competition authorities or by courts, and relate them to the theory discussed in chapter 2.

Langnese-Iglo / Schöller v. European Commission / Mars: The ice-cream market in Germany

As a reaction to a complaint by Mars, in 1992 the EC decided to forbid the use of exclusive contracts between ice-cream retailers and two leading producers, Langnese and Schöller, in the German market. The contracts specified exclusive dealing of the products of Langnese and Schöller and were often coupled to a loan financing the purchase of freezer cabinets in which only the ice-cream manufacturer's products were to be stored. The judgment was based on the infringement of Article 81 of the Treaty. Langnese and Schöller appealed against the decision, but the European Court of Justice ruled in favour of the EC in 1998. The type of foreclosure that potentially arises is customer foreclosure, because other upstream ice-cream producers are prohibited to deliver to downstream retailers with exclusive contracts. In our analysis we partly draw on a discussion by Motta (2004) of the Langnese and Schöller cases

The relevant market defined by the EC covers the ice-cream produced in industrial process (77% of total sales in 1990), and it is further restricted to products sold in individual portions. This definition is based on the facts that these products are the most relevant determinants of "impulse" purchases and the majority of exclusive deals are used in this market segment. For these products manufacturers have to make investments to keep the ice-cream at low temperature during various stages of the production procedure, especially at the end of the production chain. Even though 14 manufacturers were present in the German market in 1991, Langnese and Schöller held respectively 45 and 20% of the relevant market.

Stylized model

A stylized description of the market would be as follows. The downstream market consists of many local markets that are competitive, there is no vertical integration. Products are differentiated, and there are upstream entry barriers because it is necessary to establish a distribution chain and to build up a brand reputation. It is not known how high these entry barriers are, i.e., how costly establishing a distribution chain or brand reputation is.

Upstream there are many firms, some of which are large foreign ice-cream producers (like for example the complainant Mars), but as a result of brand differentiation producers may enjoy some market power. Therefore the upstream market is an oligopoly.

Exclusive agreements can be best described by non-linear contracts in the sense that besides the per unit price the retailer has to pay a loan for using the freezer. Contracts can be renegotiated, but the contracts of different retailers do not expire simultaneously.

(1) Is there market power upstream or downstream?

The upstream market is an oligopoly and the downstream market is competitive. If the EC definition of the relevant market is correct, market shares are high, which may point towards market power upstream. However, Motta (2004) argues, the EC definition is not complete since due to different production technologies, close substitutes such as ice-cream sold in bulk (scooping ice-cream) and craft traded ice-cream are excluded from it. If these substitute products have also been considered, upstream shares would drop approximately by a half.

(2) Is anticompetitive foreclosure likely?

If there are economies of scale to ice-cream production and distribution, Langnese and Schöller may use exclusive agreements to deter entry of their rivals, because they have a first mover advantage, even though retailers would benefit from more intensive upstream competition. Upstream producers would then exploit the inability of retailers to coordinate their actions.

If we believe the EC market definition to be correct and if we accept that there exist sufficient economies of scale, the theory predicts customer foreclosure, aimed at excluding upstream rivals. The Commission concluded that due to high fixed costs and already existing exclusive contracts, it has been difficult to enter the industrial impulse ice-cream market, therefore exclusive agreements might have foreclosed upstream entrants. Moreover, the demand of retailers was fragmented since the number of retailers was high, and therefore each retailer carried little bargaining power and was unable to coordinate with its rivals. In this case each exclusive contract signed with the incumbents decreases the number of potential outlets the entrant could contract with, thus making foreclosure even more likely. However, in this argument the Commission ignored the fact that brokers, offering full range of products to retailers have some market power too, thus making entry by some niche products possible.

(3) Are there offsetting welfare effects?

During the analysis the EC focused mainly on assessing the anti-competitive effects which are related to entry barriers. Pro-competitive effects, on the other hand, were less extensively assessed. In the relevant ice-cream market two types of exclusive agreements exist. First outlet exclusivity, which implies that the manufacturer requires the retailer to sell only its own products in the outlet; and second freezer exclusivity which implies that the manufacturer leases

freezers to the outlet and requires the retailer to store only its own products there. Freezer exclusivity is not necessarily accompanied with outlet exclusivity. Manufacturers' investments in freezers caused considerable growth in the market, because these made it possible to introduce more products in outlets. If we assume that manufacturers have an advantage in financing the freezers compared to retailers, freezer exclusivity could be used to protect these investments from free-riding of other brands, providing an efficiency rationale for freezer exclusivity. This may be the case if retailers are more risk avers than manufacturers or is if manufacturers can buy freezers more cheaply. If there is no such advantage, retailers can appropriate the additional profits from investing in freezers themselves. This would invalidate the efficiency argument.

However it is more difficult to find convincing efficiency rationale for outlet exclusivity. The only reasoning parties used in court was that it lowers distribution costs which otherwise would be higher due to competition that decreases demand for its own product. By solely questioning the competitive nature of the market, this argument provides weak evidence for pro-competitive effects of outlet exclusivity.

(4) What are the policy options?

In this case competition law was enforced ex post and the contracts were banned.

Toys "R" Us v. Federal Trade Commission: The toys market in the US

The Federal Trade Commission (FTC) condemned Toys "R" US (TRU) for abuse of dominant position and exclusive dealing in 1996. According to the FTC, TRU, a giant retailer owning 20% market share in the toy industry, acted as the coordinator of a horizontal agreement among toy manufacturers (including the two main ones, Hasbro and Mattel). This horizontal agreement formed a network of vertical contracts between the TRU and the independent manufacturers. Each vertical agreement aimed at limiting the distribution of a manufacturer's products to low-priced warehouse club stores, on the condition that other manufacturers would do the same ("warehouse policy"). The FTC required TRU to terminate its exclusive contracts and not to enter new ones, and the decision was confirmed by the Court of Appeals in 2000. Potentially the type of foreclosure that emerges is input foreclosure, where a refusal to supply other warehouses might exclude them from the toy retail market. Our analysis is based on the FTC (2000) case and the summary of the case in Rey and Verge (2005).

At the retailers' level, toys are sold in different kinds of stores: (i) traditional toy stores and department stores (high-end, selling with 40 to 50% markup), (ii) specialized discount stores (selling at an average of 30% mark-up), (iii) general discounters like Wal-Mart, K-Mart, and Target (with 22% mark-up), and (iv) warehouse clubs like Costco and Pace (low-price end of market and selling with 9% markup). Since for longer time TRU has been present and

possessed strong position in the low-price-end of toy sales market, this latter segment constitutes the main focus of this case.

Although a club is selling exclusively to its members and prefers name-brand merchandizing, it intends to provide products of all manufacturers so that the consumers can easily compare its prices with its rivals' prices. Due to this strategy, clubs' market shares in total toy sales increased from 1.5% to 1.9% within a year. Worrying about losing its market share in the low-price-end segment, in 1992 TRU introduced its "warehouse policy" towards the manufacturers (FTC, 2000): "(i) the clubs could have no new or promoted product unless they carried the entire line, (ii) all specials and exclusives to be sold to the clubs had to be shown first to TRU to see if TRU wanted the item, (iii) old and basic product had to be in special packs, (iv) clearance and closeout items were permissible provided that TRU was given the first opportunity to buy the product, and (v) there would be no discussion about prices." These exclusive agreements were negotiated individually.

Stylized description

The toy market can be characterized as follows. On the one hand the relevant downstream market contains warehouse clubs. This market counted more than 600 club stores in 1992, none of them vertically integrated to manufacturers. Due to their name-brand merchandizing activity, their brands are differentiated. On the other hand, for a long time, TRU had enjoyed a strong position at the low-price-end retail market segment, because its only competition arose from traditional toy stores who target at a different consumer segment, reflected in their higher prices, and from general discounters, which could not offer similar product variety as TRU, yet pricing somewhat higher than TRU.

Upstream there are a few manufacturers producing differentiated toys: two big companies, Mattel and Hasbro have 12% market share in traditional toys sales, and share the market with a few other big manufacturers such as Fisher Price and Tyco. This market is an oligopoly.

According to the FTC, with its exclusive agreements TRU orchestrated a boycott in which key manufacturers agreed to join "on the condition that their competitors would do the same". In other words, manufacturers colluded in relation to sales in warehouse clubs.

(1) Is there market power upstream or downstream?

Before the exclusive agreements, the downstream market had a competitive segment, that is warehouse clubs and a player with first mover advantage and market power, that is TRU and the upstream market exhibited imperfect competition. After contracting with manufacturers TRU was able to gain its market share back and drive manufacturers into horizontal agreements.

(2) Is anticompetitive foreclosure likely?

In this case theory suggests that anticompetitive input foreclosure is likely: for the dominant producers exclusive sales allow them to extract full market power rents from the market (avoiding intrabrand competition). These rents can be shared with the favoured retailer. In addition, as pointed out, the agreements might have facilitated horizontal collusion upstream. As FTC claimed, by its warehouse policy "TRU sought to eliminate the competitive threat the clubs posed by denying them merchandise, forcing the clubs' customers to buy products they did not want, and frustrating customers' ability to make direct price comparisons of club prices and TRU prices." As a result, within 3 years clubs' sales shares dropped from 1.9% to 1.4% in the total US toy market and the products of coordinating manufacturers disappeared from these shops.

(3) Are there offsetting welfare effects?

TRU referred to entering exclusive agreements due to potential free riding on its distribution efforts, however the FTC could not find evidence for it. In the toy market manufacturers paid each retailer directly for the services they wanted the retailer to furnish, including advertising, full-line product stocking, and extensive inventories. Therefore the FTC concluded that exclusive dealing was entered with clear anti-competitive purposes.

(4) What are the policy options?

In the TRU case the competition law was applied ex post, and FTC obliged parties to terminate the contracts.

5.2 Case study: Electricity market

This case focuses on the electricity sector. This market has a long history of regulation, motivated by the natural monopoly characteristics of parts of the sector. Is fear of anticompetitive vertical foreclosure a concern in this sector, and should regulation take this risk into account? We first give a brief overview of the sector, and next apply the policy framework to assess risks of anticompetitive foreclosure.

Stylized description

In the electricity market, the main segments to be distinguished are generation, retail, and transport. The generation sector consists of power production plants. Economies of scale in this sector have gone down as the size of viable new facilities has decreased. As the sector was no longer viewed as natural monopoly, in many countries liberalisation of the generation market has taken place. With a growing emphasis on renewables and small-scale distributed generation, the reduction in scale for new entry may further continue. Retail comprises sales of energy to

smaller end-users. Larger, industrial users can often access the wholesale market for electricity without assistance from retail intermediaries.

While generation and retail provide a clear example of a vertically organised sector where vertical foreclosure might play a role, we focus in this case study on the role of the electricity networks: the transportation and distribution parts of the electricity chain. Both are usually considered (regional) natural monopolies, as large economies of scale make duplication of networks non-economical. Transportation refers to the high voltage transmission grids, which connect (large) generators to distribution grids and some very large end-users. Transmission networks in different countries or regions also interconnect with each other, providing access for producers or traders in neighbouring zones. In Europe, the functions of the transmission companies typically also comprise of systems operations, apart from pure transportation of energy. The system operator's role is coordination, in (near) real-time, of generation and consumption decisions, making sure the two remain balanced. In the current liberalised generation market this usually involves operating a balancing mechanism or market.[34]

The term distribution networks refers to the more finely meshed lower voltage grids distributing the energy from the high-voltage grid to end-consumers. In relation to the tendency in the generation market of smaller scale and more distributed generation, distribution networks may also play an increasingly important role in connecting to generating units. One may think of the feeding-in of electricity locally produced by wind generation, by photovoltaic cells on rooftops of individual consumers, or as technology progresses, perhaps produced domestically by household scale gas-fired combined heating and power appliances.

Vertical market structure

Are networks part of a vertically organised chain in the electricity sector? To answer this question, we first observe that networks sell two distinct products: rights to withdraw electricity from the network (for consumers or their agents), and rights to feed electricity into the network (for producers, or for market parties operating in different regions)[35]. On the consumer side, the network sells its connection services directly to consumers, and retailers sell the electricity directly to consumers. The relation between networks and retailers may therefore be characterised as a horizontal relationship, rather than a vertical one, and we will therefore not focus on the network-retailer interactions.

The other product, access for producers, is more appropriately described as part of a vertical chain. Producers sell their electricity into the wholesale market, and have to acquire, as a necessary input, connection to a network. In this relationship, the network is the upstream player and the producer the downstream player. In investigating the potential for anticompetitive foreclosure we focus on this part of the electricity market.

[34] In the US, ownership of networks and system operation are more commonly separated.

[35] We here ignore the system operations part of the network's activities

(1) Is there market power?

As mentioned before, networks are (natural) monopolies: producers connecting in a specific region have no choice in access provider. When a producer chooses where to locate, there may be some competition between networks, though, provided various networks offer access to the same wholesale market for energy. (This is generally the case for distribution networks: irrespective of which region within the country the small producer is located (and hence, of which local network he connects to), he can sell his energy on the national wholesale market.) Theoretically such a producer could condition its location choice (and hence, its choice of input provider of network access) on the terms of access provision for each network. In practice, however, for an individual small-scale producer connecting to the distribution grid there is often no flexibility in location choice, as the production opportunity is connected to a particular location (consider e.g. a factory building a cogeneration plant, or a household choosing to install photovoltaic panels). We will therefore consider the upstream sector, the network, as a monopoly.

The downstream sector (in the terminology explained above) is that of generation of electricity. This sector is currently, in Europe, often characterised as an oligopoly, manifesting imperfect competition (see e.g. CPB, 2006, for an overview, or EC, 2007, for a detailed analysis of market power in the European wholesale market). Imperfect competition may originate from entry barriers to new players, and also from constraints in cross-border transmission capacity, segmenting the geographic market into, mostly, individual countries and reducing competitive pressure from abroad.

(2a) Analysis of anticompetitive foreclosure in the absence of regulation

As indicated above, regulation of the electricity networks is widespread, as a response to various market failures. Nevertheless, we first address the question of whether anticompetitive foreclosure would be likely in a hypothetical situation where such regulation is absent. Next we address how the presence of regulation itself might alter the analysis, and to what extent this regulation is also a good policy response to foreclosure.

According to the policy framework, we first note that, indeed, market power is present, with a monopolistic (upstream) network sector, and an oligopoly in the downstream generation market. We pursue the analysis by distinguishing a situation with, and without vertical integration. Both situations occur in reality: in the Netherlands, as in various other countries, the transmission grid is an independent firm from the generation sector. In some other European countries, transmission is vertically integrated with generation companies. Regional networks are often integrated with generation.

Consider first the situation without vertical integration. In the absence of (price) regulation, according to the checklist, we would be in the situation where there is a risk of input foreclosure (i.e. generators could be excluded from the market), but not customer foreclosure. The network

would try to exercise its monopoly power towards generators, charging monopoly prices. In doing so, however, it would be vulnerable to risk of opportunistic behaviour: after contracts had been struck with generators for access to the network, the network operator might find it profitable to make additional profits by providing additional network capacity (or, for instance, expanding interconnection capacity with neighbouring markets). Anticipating the undermining of their competitive position ex post, generators would be reluctant to pay monopoly prices to the network. Some way of commitment by the network operator, to preserving their competitive position would be called for, such as exclusive contracts[36].

With vertical integration of the network into the generation market, the network can more easily commit not to (over)supply the market with access to transmission. Its own stake in the generation market allows it to credibly refuse to give access to independent generators, as this would undermine its own profits from selling energy. Foreclosure is then a risk.

(2b) Anticompetitive foreclosure and regulation

The previous analysis illustrates the general analysis proposed in this document, but in this case is largely hypothetical since in reality networks are usually regulated to prevent them from reaping the monopoly rents from their natural monopoly position. Typically, regulation involves both access price regulation and requirements to provide access to third parties on non-discriminatory terms. Foreclosure to protect monopoly rents from the network may seem less relevant, since such rents may be reduced as a result of regulation anyway.

Consider first the situation without vertical integration. Note first that, if there is no price regulation but there is a requirement of providing non-discriminatory access, the monopoly problem is increased: the non-discrimination requirement allows the network to commit to charging the same, monopoly, prices to all connected generators. The network does not suffer from a risk of opportunistic behaviour and as a consequence needs no input foreclosure to safeguard its monopoly profits. It is therefore essential to also regulate the price at which access is given. Provided the regulated price at least equals the costs of connecting generators, there will be no incentive to deny access to generators, and more strongly, if the price is set (slightly) too high, the network will have an incentive to provide as much access as it can. Foreclosure is then no more a concern.

The situation is different in the presence of vertical integration: the network operator then internalises the loss of profits of increased competition on the generation market. Assume again that the network is subject to access regulation, including regulation of price and non-discriminatory access provision to third-party generators. If regulation would be perfect, clearly there would be little remaining problem, and foreclosure would not occur.

[36] An alternative solution could appear to be that connection contracts are short term (or renegotiable), so that they can be updated when competitive conditions alter. This would however create hold-up problems, since both network and generator make large relation-specific upfront investments.

In reality though, there may be large information asymmetries between regulator and integrated firm, in particular regarding capacity to provide access, and, related, the costs of increasing this capacity. Claims that capacity is insufficient to accommodate (rival) generators will be costly to verify for the regulator, and similarly it will be very hard for the regulator to make sure that, say, a national transmission operator makes every effort to make all investments in cross-border interconnection capacity that are (socially) efficient. In spite of regulation, anticompetitive foreclosure may still remain.

(3) Are there welfare enhancing effects of foreclosure?

Can there be welfare enhancing effects of foreclosure, or more generally vertical integration? Perhaps the most important factor would be enhanced coordination between network operation and investment when fewer generators can be active in the market, and a lower risk of hold-up in case of vertical integration. At the operational level, transaction costs of system balancing may increase with number of market players, as would coordination of maintenance on networks and generation. (As a counterargument, incentives for efficiency in balancing will be higher under increased competition). In the long run, similarly, issues of coordination for investment in network and generation may play a role. However, these arguments hold in particular for the extreme situation where foreclosure leads to generation monopoly, are unlikely to be relevant if foreclosure merely leads to generation oligopoly. In the extreme case, without regulation of the monopolist generator, these benefits seem unlikely to balance the disadvantages of monopoly.

(4) What are the policy options?

In the presence of price regulation foreclosure may remain a risk if there is vertical integration. This is due to the fact that there is significant asymmetric information, in particular in assessing available capacity and in deciding on new investments. Mandated vertical separation can provide a solution to such risks. This measure is currently proposed by the EC for transmission networks (and, in the Netherlands, for distribution networks as well). The principal question to answer then remains how large the costs are of such separation (e.g., loss of synergies), and how they compare to the risks of foreclosure (and, potentially, other risks). For such analyses for ownership unbundling in the Netherlands, see e.g. CPB (2005) and SEO (2006).

5.3 Case study: Dutch Healthcare market

In this case study, we evaluate the possibility of anticompetitive foreclosure in healthcare markets. We focus on interaction between insurers and hospitals. After briefly introducing the Dutch healthcare market, we describe a stylised model of vertical relations between hospitals and insurers. We analyze the risk of anticompetitive foreclosure in this model, illustrating how

the framework can be applied in practice. Note however, that our analysis is not meant to capture the Dutch healthcare system in all its complexity. At the end, we list several factors that may be important to add to this basic case in order to make the analysis more applicable for the Dutch practice. An in depth evaluation of the effect of vertical integration in this market is the topic of separate research currently undertaken by the CPB.

The Dutch healthcare market has recently been reformed. In 2006, the prices of some healthcare services (in the so-called B-segment) were liberalised and a new national insurance system was introduced. These changes pose new policy challenges with respect to vertical relations in this market. Two key features of the new Dutch healthcare model are free choice of the insurer by consumers and the possibility of selective contracting between insurers and providers of healthcare services (hospitals in this case).[37] Free choice of the insurer by consumers is backed up by an obligation on the side of insurers to accept customers at the same premium (this is known as community rating). This is meant to facilitate competition among insurers, stimulating them to select better providers. This will give providers incentives for better performance. In this way, the scheme is intended to achieve higher efficiency and quality of healthcare services.

Insurers cannot differentiate prices of products across consumers who buy the same basic benefit package[38], except that they may charge higher prices for non-contracted services. Fully exclusive contracts are not feasible under the Dutch legislation, which stipulates that consumers should receive a 'reasonable' compensation for treatments in any hospital, including non-contracted hospitals. The law is silent on what exactly constitutes reasonable compensation.

Although there has been so far only two examples of strengthening of vertical relations between healthcare providers and insurers – the take-over of a share in a small orthopaedic clinics by the CZ insurance group and a financing contract between local GP's by Menzis– the Dutch Competition Authority may be confronted with potential vertical mergers in the near future. Therefore it may also be useful to look at other countries' experiences. See the textbox below on vertical relations in the US health market.

[37] We leave out the distinction between different types of health care providers.

[38] Group discounts are allowed.

Vertical relations in the US healthcare market

In the US, the extent of vertical integration increased in the last two decades. Its growth coincided with the growth of 'managed care', which was driven by the desire to contain healthcare expenditures. Two main forms of managed care organisations (MCO) in the US market are Health Maintenance Organisations (HMO) and Preferred Provider Organisations (PPO). Both these forms put restrictions on the choice of provider by their policy holders, in exchange for better terms from these providers. Historically, MCOs arose in the form of HMOs, which were fully integrated organisations that were signing exclusive contracts with their providers and restricting the choice of their subscribers to the contracted providers. The current trend is towards less exclusive forms such as a PPO, offering financial incentives to subscribers for choosing certain providers (Baranes and Bardey, 2004).

Stylized model

We consider the following model consisting of two related markets: the hospital market ('upstream') and the insurer market ('downstream'). Consumers buy health insurance from health insurers, who contract healthcare with hospitals.

We assume that hospitals are differentiated. In practice, the physical distance between the consumer's home and the provider may restrict consumer choice: consumers are not always willing to travel to providers that are not located in the neighbourhood of their homes, partly because they do not feel monetary consequences of their actions, as the bill goes to the insurer anyway. In addition, hospitals may differ in quality or in healthcare services they offer. Besides, consumers may prefer to be treated by a particular doctor. Also they often follow advice of their GP[39], who typically directs them to a neighbouring hospital.

About the insurance market, we assume that all insurers sell a standard benefit package,[40] covering the same set of healthcare treatments. However, insurers can charge a co-payment if the insured chooses to be treated by a non-contracted provider. As long as insurers do not selectively contract with hospitals (i.e., they do not restrict consumer choice of the hospital) the product that they sell is homogeneous. If different insurers contract with different groups of hospitals, their insurance policies become differentiated, because the hospitals are differentiated. We will cover both types of situations in our analysis. For simplicity, we also assume zero switching costs in this market. Besides, we assume that insurers mainly compete on prices[41]and therefore, we classify the competition in the insurance market as Bertrand competition.

In short, we interpret the insurance firms as downstream firms selling to consumers a range of differentiated upstream products. The upstream products that they sell represent healthcare services offered by various hospitals, among which consumers can choose when they need healthcare. As long as all insurers offer access to all hospitals, their products can be seen as

[39] GP stands for "general practitioner" ("huisarts").

[40] As the basic insurance package in the Netherlands.

[41] Especially in the beginning of the reform, price competition was very aggressive. In the first year, some insurers even priced their basic insurance products under their actual cost level (perhaps hoping that the consumers will stay with them for more years, so that they can eventually earn their money back). Douven and Schut (2006) estimate the losses of health insurers on basic insurance in 2006 between 375 and 950 mln euros.

homogeneous, to the extent that the insurers themselves are non-differentiated. Of course, insurers may be differentiated because of, for example, different service levels.

The general theory of vertical foreclosure presented in chapter 2 can be applied to the healthcare case if we realize that (i) the downstream firm pays to the upstream firm, and the consumer pays to the downstream firm only; and (ii) the downstream and upstream firms can use vertical contracts or integration. Although an integrated insurer cannot fully deter patients from going to another hospital, he can discourage this behaviour by offering financial incentives to consumers.[42]

Health economics literature on vertical relations

In addition to the general economic literature discussed in chapters 2 and 3, there is also a health economics literature specifically addressing the issue of foreclosure in the healthcare market. Like the general literature, this literature also stresses that anticompetitive foreclosure is only possible if there is market power at least in one market segment, and that certain factors may mitigate or increase both positive and negative effects of foreclosure.

In particular, Gaynor and Ma (1996) analyse a model with differentiated providers and homogeneous insurers. They show that as long as the insurance market is perfectly competitive, no anti-competitive effects arise from exclusive dealing. In the other words, exclusive dealing by itself does not create a problem.

This means that for exclusive dealing to be anticompetitive there must be a situation in which there was market power in the insurance market initially. In particular, if we introduce market power in the insurance market by introducing differentiated insurers, then foreclosure can arise in equilibrium. (Gal-Or, 1996). This result arises in the model with two insurers and two hospitals. The insurers decide if they award exclusivity to a certain hospital or make offer to both hospitals, and subsequently negotiate the price. When an insurer excludes a certain hospital his bargaining position vis-à-vis the remaining hospital improves, since this hospital may be willing to accept lower rates in exchange for higher volumes. Gal-Or obtains that if the probability to get sick is relatively low, and the extent of differentiation among hospitals is relatively small, then both insurers will contract the same hospital.

Adverse selection plays an important role in healthcare. Baranes and Bardey (2004) argue that exclusive contracts combined with differentiated providers lead to segmentation of patient risk groups (horizontal differentiation), which works pro-competitively. In their model, the increase of the number of insurers with exclusive contracts leads to lower premiums of conventional insurers. This effect arises because in equilibrium, consumers with relatively high risks of sickness buy conventional insurance, which gives them access to all non-contracted hospitals; and consumers with lower risks go to insurers who contract a particular hospital. Since with a larger share of exclusive contracts, the range of hospitals available to the patients of conventional insurers decreases, the premium of conventional insurance decreases as well.

[42] To date, Dutch insurers hardly used this possibility to affect the choice of provider. (NZa, 2006, and CPB, 2007).

We consider three situations: a basic model in which there are one regional hospital and multiple insurers, and two models that feature double oligopoly. The later two models represent the cases of homogeneous and differentiated insurance products: see Table 5.2.

Table 5.1 Stylised model

	Model 1 'basic model'	Model 2	Model 3
Hospital market	monopoly	oligopoly	oligopoly
Insurance market	oligopoly	oligopoly	oligopoly
Differentiated insurance products		no	yes

Diagnostics of foreclosure

Here we apply the framework developed in chapter 4 to assess the risk of foreclosure in this market. The framework includes four major questions, which we discuss below.

(1) Is there market power upstream or downstream?

In the 'basic model', we have assumed the hospital market to be a monopoly and the insurer market to be an oligopoly. Therefore, that situation is clearly characterised by the hospital market power (upstream). The downstream market (insurance) is competitive, since we assume product homogeneity and zero switching costs in this market.

In model 2, the hospital market (upstream) is characterised by some market power, while the insurer market (downstream) is competitive. Hospital market power arises because of product differentiation and consumer preferences for a particular hospital. It decreases with a decrease in concentration and specialisation of hospitals.

Model 3 introduces price differentiation in the insurer market, which creates market power in this market. Therefore, in Model 3 market power is present both upstream and downstream.

(2) Is anticompetitive vertical foreclosure likely?

In the 'basic model' with one regional hospital, there is a monopoly upstream. Therefore, there is a danger of input foreclosure. For example, a merger between the hospital and one insurer may potentially lead to input foreclosure (according to the general framework, see chapter 4). Customer foreclosure is not an issue, because there is only one upstream firm.

Let us turn to models with several firms operating in each market. Economies of scale may be important in the hospital market, therefore, entry in this market would require a certain scale. According to our framework, the presence of scale economies may lead to customer foreclosure in Models 2 and 3, but this is not always the case. The general framework also does not provide us guidance regarding the possibility of input foreclosure in these models. Therefore more detailed modelling may be needed. It appears from the health economics literature that in the case of homogeneous insurers foreclosure is unlikely (Gaynor and Ma, 1997, see the textbox).

In the case of differentiated insurers, customer foreclosure may be the case, if hospital products are not highly differentiated (Gal-Or, 1996).

(3) Are there welfare enhancing effects?

Foreclosure may have positive effects in the form of preventing double marginalisation, reducing free-rider effects, and facilitating specific investment. As we explain below, mainly the third effect (related to specific investment) has to be taken into account by anti-foreclosure policy. It is difficult assess the magnitude of this effect.

Double marginalisation is unlikely to play a role in practice. In the non-regulated segment, non-linear contracts are allowed,[43] which potentially eliminates double marginalisation; and in the regulated segment, the prices are capped by the regulator. Also, the hospital products bought by the insurer can not be traded.

Free-rider effects at the insurer level may appear important, for example in the context of prevention (of certain diseases). An insurance firm will only have incentive to invest in prevention if it can also appropriate the benefits. Foreclosure can be used as a mechanism to secure these benefits. However, there are also other possible instruments to achieve the necessary level of prevention (e.g. prevention could be organized at the level of the state, by mandating that firms have to contract certain level of prevention).

Finally, vertical contracts or vertical integration may be needed to facilitate specific investment by hospitals. This argument seems to hold for hospital ICT-systems. Both the hospital and the insurer may benefit from better insights in costs and benefits of the treatments, but the hospital may have insufficient incentive to install it.

(4) What are the policy options?

It is likely that in the future the Dutch competition authority will be confronted with the necessity to assess mergers between insurers and hospitals. Special attention should be given to situations similar to Models 1 and 3 analysed here, in which there is a risk of input foreclosure, the negative effect of which (in the form of price increases) may exceed the positive effects in (facilitating specific investment). If this is the case, merger prohibition could be a relevant measure.

With respect to potential effects of foreclosure policy on the level of innovations, we note that major technological innovations in the healthcare industry occur at the level of producers of medical equipment, pharmaceuticals, research centres and academic hospitals. The extent of innovations that would involve both a hospital and an insurer together is relatively small.[44]

[43] However, linear pricing is currently applied in most cases. In the regulated segment, the prices are regulated by the NZa, and therefore, they are linear by definition. In the free segment, non-linear contracts are in principle allowed, but it seems that they actually have not been used.

[44] There is mainly the scope for contractual innovations (e.g. partial capitation), which may be important to reduce moral hazard of providers, in particular, to prevent supplier induced demand. However, here when speaking about dynamic effects, we focus on product and process innovations.

Therefore, stringent anti-foreclosure policy in this market segment is unlikely to have strong negative dynamic effects. This implies that policy against foreclosure may be relatively more stringent (compared to cases with a high level of innovation, such as in the case study on the telecom sector considered in section 5.4).

Concluding remarks

We have used stylised models to highlight how vertical integration may cause foreclosure in this market and which factors are likely to play a role. Policy intervention (e.g. in the form of merger prohibition) would be needed to prevent foreclosure in such a case. In any application of the analysis presented in this chapter to the Dutch healthcare market, additional factors need to be taken into account, which were not included into our stylised model.[45]

1. Heterogeneity of insurers

   In the analysis above, we assumed a standardised insurance product. In practice, however, in addition to the standardised basic insurance, insurers also sell non-standardised supplementary insurance.[46] This increases the degree of heterogeneity in this market. Higher degree of insurer heterogeneity increases the risk of foreclosure (Gal-Or, 1996, see the textbox presented earlier in this section).

2. Switching costs

   In our analysis we have ignored consumer switching costs, which are generally present in the insurance market (Pomp et al., 2004). So far, these costs were not prohibitively high in the Dutch market[47], however, this may change in the future. For example, switching costs may increase if companies introduce loyalty bonuses or begin to adopt stronger acceptance policies for supplementary insurance. With the presence of switching costs, entry into the insurance market becomes more difficult. Therefore, this market may become less competitive, which may increase the risk of foreclosure.

3. Soft discrimination

   We note that in practice, in addition to the foreclosure mechanisms that we discussed in the theoretical part, foreclosure can be also achieved through soft discrimination. For example, the hospital may give a preferential treatment (e.g. in terms of waiting time) to the affiliated insurer.

4. Community ratings

[45] A more detailed analysis of the effects of vertical integration in this market is the topic of ongoing research.

[46] There is no standardised benefit package for supplementary insurance. Insurers can charge different risk-premiums and can refuse some customers. Basic and supplementary insurance are often sold as a joint product. More than 90% of the compulsorily insured population buys supplementary health insurance from the same insurer where they buy basic insurance (Schut et al., 2007).

[47] The switching rate reached 20% in the year of the introduction of the new insurance scheme (Douven et al., 2007).

Our model does not consider interregional aspects, such as the effect of foreclosure in one region on the situation in other regions. Since in the Netherlands, insurers have to apply community ratings (i.e. the same rates should be offered to everybody ensured by the same insurance firm[48]), a pricing strategy increasing the profit in one region may lead to losses in other regions. Inclusion of these effects into the model may change our results.

5. Effect of price regulation
   To date, less than 10% of hospital prices are liberalised, while the rest is regulated. Although the share of liberalised services will increase in the future, still, many healthcare services will remain under price regulation. Therefore, it is important to take the effect of regulation into account.

5.4 Case study: Telecommunication markets

Following the same structure as in the previous case studies, first we present a stylized description of the current Dutch telecommunications market. Based on this description, we apply the policy framework to analyze the risk of foreclosure is in this stylized version of the market, and discuss some policy options. Finally we mention potential developments in the market which may affect our analysis. This case study is based in part on a study of Bijlsma and van Dijk (2007).

Stylized description

A stylized version of the electronic communications markets in the Netherlands would consist of a downstream level where retailers compete for consumers in providing services (i.e. intrabrand or service-based competition) and an upstream level where network providers offer access to their networks (i.e. interbrand or facilities-based competition). At the upstream level, two firms are active that own a network with national coverage (KPN with its ADSL technology and regional cable operators) and are potentially able to provide wholesale network access to downstream retailers. Retailers need access to the networks to sell telecommunications services like broadband internet access, mobile or fixed telephony, and digital television to consumers (i.e. triple-play). The two upstream network suppliers are vertically integrated and compete through their subsidiaries in the downstream market with their non-integrated downstream rivals. Due to mandatory local loop unbundling (LLU) of KPN's network downstream competition accommodated non-integrated firms thus making service-based competition fiercer.

In reality, upstream firms with limited local coverage (for example Lomboxnet) or networks only catering for corporate users (for example BBned or Versatel/Tele2) are also present in the

[48] Group discounts are allowed.

Netherlands. In addition, there exist local initiatives for wireless networks (for example wireless Leiden). For simplicity we abstract from these features. Thus, we consider the telecommunications market in the Netherlands as a bilateral oligopoly with vertical integration.

Upstream services offered by networks to retailers (transport of digital data) can in principle be considered as close substitutes, whereas the retail services offered to customers by downstream retailers are differentiated. Because the amount of data that fibre optic networks can carry is very large, there are no significant capacity constraints in the data flow.[49] In addition, digital techniques increasingly succeed in compressing data flows. Therefore, price competition (i.e. Bertrand competition) with differentiated goods is probably an accurate description of competition in the downstream market.

Risk of foreclosure

To assess the risk of foreclosure by means of contracting, we apply the framework discussed in chapter 4 to the previously described market.

(1) Sufficient upstream and downstream competition?

Whereas upstream there are two competing firms (i.e. the two firms owning a network with national coverage), at the downstream level potentially many retail firms offer services to consumers. In addition, with current technologies the investments necessary to role out a competing telecommunications network with national coverage are prohibitively high. Clearly, this is a market where potentially upstream market power exists, while downstream markets are potentially competitive.

(2) Is anticompetitive vertical foreclosure likely?

As both network owners have downstream affiliates, the market is one of full vertical integration. In the absence of regulation we would generally expect the contracts between entrant and vertically integrated suppliers to be nonlinear, for example with a fixed, and a variable part. Such contracts can often increase the joint profit of a network and a retailer compared to a simple linear price and it is unlikely that network capacity will be easily resold if the network owner contractually prohibits this.

In a market with an upstream oligopoly, nonlinear private contracts, no capacity constraints, downstream differentiation and price competition, entrants will most likely not be excluded from the market, unless there is a large probability that entrants mainly steal market share from their supplier (so-called ‘own-product cannibalization’, Ordover and Shaffer, 2006). This effect might occur if consumers perceive services that are delivered through one type of infrastructure

[49] OPTA (2006) claims that there are capacity constraints because a network's administration may not be able to accommodate a large number of clients switching from one network to the other. This might indeed limit the potential rate of change in market shares.

as quite distinct from service over the other (upstream differentiation). In the absence of this effect, entrants will be able to enter into contracts with at least one of the network owners. These contracts may be exclusive, therefore foreclosure does occur. Nevertheless, if the networks compete in signing such exclusive contracts with retailers, the access price will be driven down to competitive levels. Hence in this case foreclosure is not detrimental to welfare. If the networks do not compete in signing such exclusive contracts and the number of potential downstream entrants is small, the access price may remain high. In this case, only one of the networks has incentives to provide entry and it will do so at high prices. Foreclosure is then anticompetitive. Conversely, if the number of potential entrants is high, the possibility to charge high prices is eroded by the usual commitment problem (see chapter 2) and prices will drop to competitive levels.

(3) Offsetting welfare enhancing effects?

In this market, double marginalization is unlikely, as both suppliers and retailer can use non-linear contracts to prevent this. Also firm specific investments by suppliers or retailers with free rider effects do not appear to be important. The one remaining efficiency argument that may play a role is the hold-up argument, given the specific investments that have to be made to connect to either infrastructure.

(4) What are the policy options?

If competition between both infrastructures is deemed too low, according to the current EU regulatory framework a network operator having significant market power over its infrastructure is obliged to provide access to rivals at a cost-based access price. Access regulation was successfully introduced in the Netherlands in the sense that it intensified service-based competition when the upstream market was characterized by a monopoly network. However in the presence of competing networks access obligation currently implies asymmetric regulation: access to only one of the networks (the former telephony network) is regulated. Asymmetric regulation may distort the competition between networks by leading to lock-in effects. Symmetric regulation may therefore be more beneficial and can take two forms: either regulating both networks or doing nothing.

The telecommunications market in other EU countries differs strongly from the Dutch market. In countries where there exists an upstream monopoly, e.g. in the UK or Germany. We briefly discuss the policy tools that are used to intensify competition there. The operational separation of local access and backhaul networks of British Telecom into OpenReach was carried out as a result of Ofcom's market review. Other examples may follow this decision (e.g. cases of Telecom Italia in Italy or Telstra in Australia). Despite insufficient upstream competition in Germany, Deutsche Telekom requested a regulatory holiday in order to be able to recoup its investment in VDSL technology. Discussion is still ongoing, now at the European

level, on whether VDSL technology constitutes a new market and if at all, then how it should be regulated. Even though the upstream market shows different characteristics in the Netherlands, similar problem may arise when KPN enrols its all-IP network (see discussion below).

Possible drawbacks of access regulation include its effects on investments and the incentive to engage in sabotage. These drawbacks should be taken into account when assessing whether access regulation is necessary.

Investments may be suboptimal if a network is mandated to unbundle its facilities at a regulated price. A monopoly upstream firm may choose a lower level of quality increasing investment if access price is regulated and it is able to offer similar value-added services at the same quality level as its downstream rival. However if the network's ability to provide value-added services is higher, it will over invest in order to foreclose its downstream rival (Foros (2005)).

If access is regulated, firms may have incentives to engage in sabotage; a non-pricing strategy that harms rivals. In electronic communications market sabotage may include providing lower quality services to other downstream companies, e.g. in case of broadband access, lower speed or limited dataflow, blocking rivals' services, withholding information from competitors about how infrastructure can most efficiently be used or setting standards and structuring services in favour of its own subsidiary and at the expense of its rivals.[50] In this case for example quality of services may not be contractible since it may not be observed, or if it is observable, reasons for lower quality may not be verifiable. In the presence of access regulation a monopoly network may have an incentive to engage in sabotage (Mandy and Sappington (2007)).

Conclusion

According to the theory, anticompetitive foreclosure is relatively unlikely in the stylized version of the Dutch telecommunications market presented above. If the drawbacks relating to network investments and the incentive to engage in sabotage are large enough, it may be welfare enhancing to choose a "do nothing policy" instead of the current asymmetric access regulation.

However, the stylized model presented above is an approximation to the current situation in the Netherlands. Some (potential) market characteristics that may invalidate the conclusions based upon this stylized description have not been taken into account, are discussed below.

[50] A related and hotly debated topic is the issue of network neutrality in Internet services and applications. We interpret one type of violation of network neutrality as a form of anticompetitive quality discrimination at the upstream level by vertically integrated network operators. It may take the form of quality degradation or blocking rival's competing services (see OECD, 2007 and Kocsis and de Bijl, 2007).

1. KPN's all-IP network

A development potentially influencing our analysis is the roll-out of KPN's all-IP network which intends to enable KPN to introduce qualitatively better network services. As a result, upstream products may become vertically differentiated. This potentially increases the risk of foreclosure of downstream entrants. However, even though foreclosure may take place, dynamic effects have a large weight in the assessment of pro-competitive effects which may offset the balance towards positive welfare effects.

2. Switching costs for service providers

In our stylized description, we've assumed that the upstream networks provide homogeneous services. However, despite being able to provide similar downstream services via both networks, the two networks are technically different and probably differ in the sense that the costs of connecting to a particular network differ. For a non-integrated downstream retailer there are costs associated with switching from one network provider to the other. Due to technical differences between the networks, switching requires investment in new hardware. According to market participants, these costs may be substantial.

In the presence of upstream switching costs, there is a possibility that equilibrium contracts will be exclusive and that there will be no competition between networks for downstream entrants. In this case, competition will not drive down the access price entrants have to pay.

3. Sabotage

Finally, we've argued that anticompetitive foreclosure by means of (nonlinear) pricing is less likely. However, we have not considered the possibility of foreclosure through non-pricing instruments, such as quality degradation or sabotage. Although it is theoretically unclear whether incentives to engage in sabotage also exist in the absence of access regulation, it remains a real possibility that should be investigated.

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