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Brian J.M. Quinn

Boston College Law School, brian.quinn@bc.edu

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Asset Specificity and Transaction Structures: A Case Study of @Home Corporation

Brian J.M. Quinn¹

ABSTRACT

This is a case study of asset specific investments, a class of transactions that is well understood in the context of economic theory but that is under-analyzed empirically. Because specific investments are particular to a single location, use or customer, their next best use is of much lower value than the use for which they are initially intended. Consequently, asset specific investments face the threat of ex post opportunism and allocative inefficiency. This contracting problem is particularly difficult when firms that are otherwise rivals must coordinate individual investments to create a shared resource. In such cases, generating credible expectations of cooperation among rivals is critical to coordinating these investments. The case of @Home Corporation is an example of how rival cable companies were able to employ “hybrid” structures including contractual safeguards like joint ownership, specialized governance devices and economic lock-in to overcome the problem of asset specificity and then build out a nationwide cable-based online service network during the 1990s. As the market subsequently developed alternatives to @Home, the economic lock-in required to induce cooperation failed to materialize, and @Home collapsed. The ultimate failure of @Home points out that those strategies that provide the proper ex ante incentives many not always be durable, leaving contracting parties with less than perfect options.

1. Assistant Professor of Law, Boston College Law School. Thanks to Mike Klausner for his comments on early drafts of this paper as well as Ron Gilson for his insights and perspective on “deals” like this one. Thanks also to Elizabeth D. Johnston (BCLS, '11) for valuable editorial assistance.

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I. INTRODUCTION

While broadband Internet access seems commonplace today, during the mid-1990s the technology required to support the development of high-speed residential Internet access was still nascent. Before service providers could introduce such technology nationwide, proponents of a broadband vision had to overcome a series of technical and economic challenges, not the least of which involved coordinating large investments in dedicated infrastructure capable of supporting such a network. This article is a case study of how the largest cable companies in the United States used contract and transaction structures to overcome these challenges and build the first nationwide high-speed network.

@Home Corporation (“@Home”) was founded in 1995 by Tele Communications, Inc. (“TCI”) with the goal of bringing cable-based Internet access to the public. TCI later brought in cable company rivals Cox Communications, Inc. (“Cox”) and Comcast Corporation (“Comcast”) as minority shareholders in @Home and ultimately sold shares in the venture to the public.² The cable company rivals relied on a series of contractual devices to overcome the challenge of coordinating each of the investments required to make the nationwide, cable-based network a reality.

Within a few short years, the structure of this transaction allowed the cable companies to cooperate and build a broadband network. By 2001, @Home boasted more than 4.1 million subscribers and 45% of the residential broadband market.³ By almost any technical measure, the @Home network was a success. Notwithstanding this technical success, ultimately, the firm collapsed financially.

An asset specific investment has two traits: first, the investment is made in advance of an anticipated exchange with a counterparty; and second, the assets created have value in a particular location, use, or counterparty’s hands, such that the assets’ next best use is of much lower value than the use for which they are initially intended.⁴ Challenges created by asset specific investments have attracted the interest of many economists and legal scholars.⁵ In particular, scholars have been interested in the threat of strategic behavior (i.e., opportunism) as a potential deterrent to socially valuable specific investments. In the absence of contractual protections, after a party

2. Venture capital firm Kleiner Perkins Caufield & Byers was also an early minority shareholder. At Home Corp., Amended Registration Statement (Form S-1/A) (June 20, 1997).

3. At Home Corp., Registration Statement (Form S-1), at 6 (May 16, 1997). See also Rachel Konrad et al., *Family Feud: Excite@Home, AT&T: A Case Study in Boardroom Politics*, NEWS.COM, Feb. 28, 2002, available at <http://news.cnet.com/2009-1033-8466668.html>; Todd Wallack, *Who Killed Excite@Home*, S.F. CHRON., Dec. 17, 2001 at E-1, available at <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2001/12/17/BU23049.DTL>.

4. Oliver E. Williamson, *Credible Commitments: Using Hostages to Support Exchange*, 73 AM. ECON. REV. 519, 522 (1983).

5. The problem of asset specificity has been the subject of a number of important works in the area of transaction cost economics. See, e.g., Williamson, *supra* note 4; Benjamin Klein et al., *Vertical Integration, Appropriable Rents and the Competitive Contracting Process*, 21 J.L. & ECON. 297 (1978); Benjamin Klein & K.B. Leffler, *The Role of Market Forces in Assuring Contractual Performance*, 89 J. POL. ECON. 615 (1981); Paul L. Joskow, *Contact Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets*, 77 AM. ECON. REV. 168 (1987); Victor P. Goldberg & John R. Erickson, *Quantity and Price Adjustment in Long-Term Contracts: A Case Study of Petroleum Coke*, 30 J.L. & ECON. 369 (1987).

has made a specific investment (e.g., a pipeline), the counterparty can extract virtually all the surplus that the specific investment might yield through an opportunistic negotiation over access to the complementary asset (e.g., crude oil from the counterparty's well).⁶ In light of the potential for opportunistic behavior by a counterparty, it is necessary for a party making specific investments to protect its interest through ex ante contractual arrangements or transaction structures. Otherwise, that party will not make the investment in the first place, and jointly valuable assets will not be created.

When parties must make joint investments in specific assets such as a broadband network, there are additional opportunities and challenges. If parties can successfully coordinate their investments, then they can share in joint gains. However, the joint gains available in this type of network investment are contingent on all parties cooperating. If any party defects, joint gains may fail to materialize. At the same time, each party to a network investment has an incentive to shirk, thereby generating smaller societal gains and then free-riding off the joint investments of others. As a result, the equilibrium outcome in such situations is that no party cooperates. Unless parties, especially rivals, can create credible expectations that they will cooperate, they may be unable to successfully coordinate the required joint investments.⁷

Where contracting and vertical integration are unable to reduce ex post incentives for opportunism and generate an expectation of cooperation, parties may rely on hybrid forms.⁸ Hybrid forms are characterized by three traits. First, they involve pooled resources or joint assets, sometimes among rivals.⁹ Second, parties to hybrid forms usually rely on relational contracting, such as long-term contracts

6. Goldberg and Erickson explore this tension in the context of coordinating investments in petroleum coke calciners. See Goldberg & Erickson, *supra* note 5, at 375.

7. This type of coordination problem is known as a "stag hunt." Lewis summarizes the stag hunt problem in the following manner: "Suppose we are in a wilderness without food. Separately we can catch rabbits and eat badly. Together we can catch stags and eat well. But if even one of us deserts the stag hunt to catch a rabbit, the stag will get away; so the other stag hunters will not eat unless they desert too." DAVID K. LEWIS, *CONVENTION: A PHILOSOPHICAL STUDY* 7 (1969). For a lengthy discussion of the stag hunt, see BRIAN SKYRMS, *THE STAG HUNT AND THE EVOLUTION OF SOCIAL STRUCTURE* (2004).

8. Hybrid forms of organization are distinct from either market contracting or vertical integration. See Oliver E. Williamson, *Comparative Economic Organization: The Analysis of Discrete Structural Alternatives*, 36 ADMIN. SCI. Q. 269, 271 (1991).

9. Claude Ménard, *A New Institutional Approach to Organization*, in HANDBOOK OF NEW INSTITUTIONAL ECONOMICS 281, 294-302 (Claude Ménard & Mary M. Shirley eds., 2005).

with specialized governance arrangements, to secure the cooperation of rivals.¹⁰ Third, though parties in hybrid forms will typically cooperate in the area of concern to the hybrid, they continue to compete against one another in other areas.¹¹

This article analyzes how the founders of @Home responded to the problem of asset specificity and the need to coordinate specific investments among rival cable companies by creating a hybrid transactional structure. This structure included joint ownership, specialized governance arrangements, and an economic lock-in strategy. It tied rival cable companies together and created credible expectations of cooperation, thereby inducing the rival companies to make the specific investments required to build the @Home network. However, when industry conditions later changed, the switching costs for both consumers and each of the cable companies declined dramatically. As a result, the cable companies found it unnecessary to continue their cooperation. Each subsequently replicated the functions of the @Home network independently, and @Home failed.

The rise and fall of @Home provides unique examples of both the methods of contracting in order to coordinate asset specific investments and the vulnerability of such methods. In its ascent, @Home's story demonstrates how rival parties can employ a combination of contractual safeguards and economic lock-in to create incentives for each of them to make asset specific investments in a joint enterprise. The collapse of @Home, however, illustrates that such strategies also have inherent weaknesses. Subsequent to the initial investment, changes in market conditions lowered the switching costs associated with substitutes for the @Home service. As these costs fell to near zero, @Home's reliance on economic lock-in to tie the parties together proved ineffective.

This article is laid out in six sections. Section 1 describes the concepts of asset specificity and opportunism as well as the contractual safeguards that can be employed to address these issues. Section 2 provides background on the formation of the @Home Corporation, including some of the commercial and economic challenges to building out the @Home network in the mid to late 1990s. Section 3 describes the devices that @Home and its investors used to

10. *Id.*

11. *Id.* at 294-302. MasterCard is an example of an organizational form where parties both cooperate and compete within the framework of the hybrid structure. See DAVID S. EVANS AND RICHARD M. SCHMALENSEE, *PAYING WITH PLASTIC: THE DIGITAL REVOLUTION IN BUYING AND BORROWING* 155-58 (2005).

respond to the particular asset specificity challenges they faced. Sections 4 and 5 describe the exogenous changes in the industry that lowered the switching costs for @Home's cable company partners that led to the collapse of the firm. Section 6 summarizes and concludes.

II. ASSET SPECIFICITY AND POTENTIAL RESPONSES

Asset specific investments exhibit two important traits: first, costs are incurred in advance of the anticipated exchange; second, the assets are particular to a single location, use, or customer, such that their next best use is of much lower value than their anticipated use.¹² An oil pipeline connecting an oil well to a refinery is the classic example of a specific asset.¹³ The pipeline must be built prior to, or at least in conjunction with, the development of the oil well, and it is located in a particular place – between the well-head and the refinery; it has a single, highly specialized use – transporting oil from the well-head to the refinery; and it is dedicated for the use of a particular customer or supplier – the refinery and well-head. Because of the specific nature of a pipeline, the party that has invested in it is vulnerable to ex post opportunism by the owner of the field to which the particular pipeline is dedicated. For example, if after a pipeline is installed the oil well owner were to decline to send its oil through it, the pipeline's value would be significantly diminished. If the well owner's threat to withhold oil is credible, then the pipeline owner has little choice but to accept transport fees that can all but eliminate the returns it otherwise would have earned from transporting the oil. In this manner, the owner of a non-specific asset can "hold-up" the owner of a specific asset and retain the lion's share of the surplus for itself.¹⁴

In the absence of asset specificity, parties can rely on low switching costs and the threat of market competition to constrain potential ex post opportunism. For example, if the pipeline were capable of

12. Williamson, *supra* note 4, at 522. Specific assets are divided into four sub-groups: site specificity, physical asset specificity, dedicated assets, and human asset specificity. Site specificity relates to the particular geographic location of assets. Physical asset specificity relates to the highly specialized use of individual assets. Dedicated assets relates to new capacity for designated customers, without whom the capacity is excessive. Human asset specificity relates to job specific skills that employees develop over time that will have little or no use elsewhere. See OLIVER E. WILLIAMSON, *THE MECHANISMS OF GOVERNANCE* 59-60, 105-106 (1996).

13. Benjamin Klein et al., *Vertical Integration, Appropriable Rents and the Competitive Contracting Process*, 21 J.L. & ECON. 297, 310-13 (1978).

14. For a discussion of the "hold-up" problem, see ROBERT COOTER & THOMAS ULEN, *LAW & ECONOMICS* 263 (2000).

serving multiple well owners, then the threat by any single well owner to withhold crude oil from a pipeline would be inconsequential. In the event that one well owner declined to use the pipeline, the pipeline owner would simply replace that well's crude with supplies from another well. Thus, when switching costs are low, the threat of competition can deter the well owner from attempting to hold up the pipeline owner.

Asset specificity may also have temporal aspects. Certain assets, when viewed prospectively, may appear to be specific; but, after the passage of time and changes in market conditions, the same assets may lose part or all of their specificity.¹⁵ Take, for example, a pipeline built to connect a single oil well to a market. The pipeline is specific to the well. If other wells are discovered along the route of the pipeline, the pipeline may lose some or all of its specific nature as it becomes able to serve the new wells. Consequently, assets that are specific in the short term may lose their specific nature over time as market conditions change.

Where assets are specific, alternative uses are much less valuable than the original uses for which the assets were intended. As a result, if a would-be investor in a specific asset expects to be vulnerable to an ex post hold-up, he may decline to make the investment. Alternatively, the prospect of an ex post hold-up may lead the owner of the specific asset to over-invest in hedging against a potential hold-up.¹⁶ For example, a pipeline owner may design a longer-than-necessary pipeline that traverses many fields to hedge against a potential hold-up by well owners in any single field. Unless parties are able to address the possibility of an ex post hold-up prior to making an asset

15. Masten et al. use the term "temporal asset specificity" to describe economic lock-in. Scott E. Masten et al., *The Costs of Organization*, 7 J.L. ECON. & ORG. 1, 9 (1991).

16. Klein et al., *supra* note 13, at 311. It is not uncommon for commercial airlines, which have to make significant specific investments in support facilities, personnel, and training, to spread their aircraft purchases between Boeing and Airbus even though it would be more economical for them to consolidate all their purchases with a single supplier. Commercial airlines make multiple specific investments to avoid being held-up by any single supplier of aircraft. This is clearly a second-best solution since the airline would be better off by economizing on its specific investments in personnel and support facilities. The aircraft manufacturer might also be better off if it could credibly commit not to engage in ex post opportunism. Making those manufacturer's commitments credible is a contracting challenge, which the airline hedges by over-investing in specific assets using the threat to switch aircraft suppliers at the margin to forestall opportunistic behavior. See also Joseph Farrell & Nancy T. Gallini, *Second-Sourcing as a Commitment: Monopoly Incentives to Attract Competition*, 103 Q.J. ECON. 673 (1988) (describing how parties can use second sourcing – building in excess supplier capacity – to avoid hold-up problems).

specific investment, they may miss opportunities for joint gains, and resources could thus be allocated inefficiently from a societal point of view.¹⁷

There are several potential responses to the challenges posed by specific assets. The object of each response is to create cooperation between the parties for long enough to permit the parties to earn a sufficient return on their investments. In a highly stylized world, the best response is a perfectly specified contract addressing all possible ex post opportunities, thus providing parties the assurance needed for them to enter into the required long-term relationship.¹⁸ Where, as in the real world, contracting and enforcement costs of such a contract can be prohibitive, vertical integration of the parties is an alternative solution to the challenges of asset specificity.¹⁹ In addition to vertical integration or state-contingent contracting there are other contractual responses and economic structures that can adequately address the risk of opportunism.

A. *Vertical Integration*

When the costs of contracting and enforcement are high relative to the costs of integrating, vertical integration is the best response. Vertical integration entails the consolidation of a specific asset and the activity that utilizes the asset within a single firm to internalize the incentives for ex post opportunism.²⁰ For example, a power plant located at the mouth of a coal mine is extremely vulnerable to the threat of opportunism by the coal mine owner (especially if the coal mine owner has other potential buyers for its coal). The cost of specifying and then enforcing a long-term supply contract can be very high. Consequently, it is common for power plants that are adjacent to coal mines to have the same owners.²¹ Common ownership of both

17. Klein et al., *supra* note 13, at 298.

18. Williamson notes it is understood that such complete contracts are impossibly complex to write and are thus invariably incomplete. See OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 333 (1985).

19. Klein et al. argue that the relative size of "appropriable quasi rents" increases as the costs of contracting increase. Where those rents are high, a cost minimizing solution is vertical integration. Where those rents are low, market contracting can sufficiently protect against opportunism. See Klein, et al., *supra* note 13, at 299.

20. Oliver E. Williamson, *The Vertical Integration of Production: Market Failure Considerations*, 61 AM. ECON. REV. 112, 112 (1971).

21. See Joskow, *supra* note 5. Spot market transactions for coal are unlikely to be competitive alternatives for power plant owners. Mine-mouth coal plants are situated next to coal mines with low energy value coal. This coal has a relatively high weight to energy ratio, making it expensive transport long distances. In order for the power supplied by these plants to be competitive, the plants must be located in very

the mine and the plant reduces contracting costs and eliminates the possibility of the coal mine owner holding up the power plant owner. With vertical integration, the single owner of both assets receives the full surplus and the issue of ex post hold-up vanishes.

B. *Joint Ownership*

Joint ownership shares some characteristics of vertical integration but is more likely to occur in a special circumstance: when horizontal rivals must share access to a complementary specific asset, like a network or a pipeline. With joint ownership, horizontal rivals create a new, jointly-owned entity that invests in, owns, and manages the shared specific asset.

To illustrate, recall the example of the pipeline and the oil well. If one oil well owner vertically integrates and builds a pipeline connecting all the oil fields in a particular area to the refinery, that owner might be in a position to use his control over the pipeline to extract rents from other oil-well owners who need to use the pipeline.²² The threat of a hold-up by the vertically integrated rival would deter investment in wells in the area or it would lead them to make inefficient investments in excess pipeline capacity so as to avoid a hold-up. With joint ownership of a pipeline, however, rival owners can reduce the likelihood of a hold-up, reduce excess pipeline capacity, and ensure that capacity is available to all well owners. In this respect, joint ownership of complementary assets permits rivals to reduce the opportunity for a hold-up and find limited areas of cooperation.²³

Joint ownership is necessarily incomplete, however, in that it does not address issues related to rivalry and opportunistic behavior

close proximity to the mine that supplies the coal. Thus, mine mouth plants exhibit all the characteristics of asset specificity described by Williamson: location, use, and customer.

22. It should not be surprising to learn that pipelines are often owned jointly by the rival oil-wells for precisely this reason. See Klein et al., *supra* note 13, at 299.

23. This is particularly true when the complementary asset has characteristics of a network. See MasterCard Inc., Registration Statement (Form S-1), at 5 (Sept. 15, 2003). Until the recent IPO, MasterCard was owned by a consortium of the rival banks that issued credit cards. See also Iridium World Commc'n Registration Statement (Form S-1), at 49 (Mar. 17, 1997). Iridium, a global satellite telephone service provider, was owned by a consortium of the variety of telephone companies that connected the system with subscribers.

among well owners at the level of the jointly-owned entity's operations and distribution of the entity's profits.²⁴ These issues must be addressed by contract among the co-owners. To this end, joint ownership is typically combined with a long-term contract, either in the organic documentation of the jointly-owned entity or by separate agreement between the entity and the owners, or both.

C. Long-Term Supply Contracts

Where specific investments are required but the contracting costs are not as high as in the previous cases, parties can overcome hold-up threats by using long-term supply contracts.²⁵ In a long-term supply contract, the party that is not investing in a specific asset commits to long-term purchases of the service or good from the party making a specific investment. Legally enforceable long-term commitments can provide the party making the specific investment with certainty against the possibility of ex post opportunism.²⁶ For example, a pipeline owner could enter into a long-term transportation contract with an oil well owner prior to building the pipeline. This would assure the pipeline owner of a steady revenue stream for many years. Of course, a legally enforceable long-term commitment does not eliminate the threat of opportunism by oil well owners at the point of renegotiation many years in the future. It can, however, provide the owner of the pipeline a sufficient number of years over which it can earn an acceptable return on its investment.²⁷

Because long-term supply contracts lock parties into a relationship, they must also be sufficiently flexible to manage unanticipated developments that may arise over the course of the contract. The sheer number of contingencies over the life of a long-term contract makes full specification of long-term contracts an impossible task. This problem is even more complicated in industries where technology is changing rapidly.²⁸ In industries characterized by specific investments in rapidly developing technology, even extremely flexible

24. These issues include agency problems as between majority and minority stockholders in a joint venture of the like described in Randall Morck et al., *Corporate Governance, Economic Entrenchment and Growth*, 43 J. ECON. LIT. 655 (2005).

25. Williamson, *supra* note 20; Klein et al., *supra* note 13.

26. A long-term contract will not reduce the incentive for a hold-up at the point of renegotiation. However, if the contract is sufficiently long, the owner of the specific asset is able to amortize the cost of its investment over time and thus may be more amenable to a redistribution of the surplus at a later stage.

27. Williamson, *supra* note 20, at 116.

28. Long-term contracts are rare in businesses that are undergoing rapid technological development. *Id.*

long-term arrangements may not be suitable. As such, unless parties can manage the incompleteness of these contracts, they leave themselves open to opportunistic behavior in mid-stream negotiations.²⁹

Long-term supply contracts manage incompleteness of information in three ways. First, they may define and allocate purchase and sale obligations among the parties. Second, with or without purchase and sale obligations, they may provide a mechanism that creates incentives for cooperation and constrains opportunism. Third, they create dispute resolution mechanisms that can resolve disagreements among the parties.³⁰

D. Price and Quantity Adjustments

When entering into a long-term supply contract, it is difficult to specify in advance the prices and quantities that will be required over time. Therefore, parties must create a credible mechanism for determining these values.³¹ Where there is a market for the good or service that is the subject of the contract, the parties can usually refer to the market price to set future prices. If there is no such market, parties can specify future price adjustments through a variety of mechanisms including indexing, pricing formulas, and commission pricing.³²

Indexing is an easy-to-implement, though imperfect, device. Indexing has the benefit of ensuring that prices in a long-term contract reflect changes in some set of market prices. However, to the extent the index relied upon does not perfectly correlate with the subject of the contract, index pricing may be inefficient.³³

One alternative to indexing is commission pricing. In a commission pricing scheme, the contract price is specified as a percentage of the counterparty's sale price. This has the benefit of both permitting the price to be flexible over time and economizing on pre-contract

29. In the classic example of ex post opportunism, Fisher Body-General Motors, GM fell victim to moral hazard when Fisher Body began to game with the pricing formula to extract rents from GM. See Klein et al., *supra* note 13, at 308-10; see also Benjamin Klein, *Vertical Integration as Organizational Ownership: The Fisher Body-General Motors Relationship Revisited*, 4 J.L. ECON. & ORG. 199 (1988).

30. Long-term agreements are not appropriate in every circumstance, however. For example, writing long-term contracts where technology at the core of the agreement is changing or unproven can be especially difficult, if not impossible. Williamson, *supra* note 20, at 115-16.

31. Victor P. Goldberg, *Price Adjustment in Long-Term Contracts*, 1985 WIS. L. REV. 527, 527-28 (1985); Goldberg & Erickson, *supra* note 5, at 370-71.

32. Goldberg, *supra* note 31, at 534; Goldberg & Erickson, *supra* note 5, at 382-83.

33. Goldberg and Erickson, *supra* note 5, at 382-83.

search costs.³⁴ Commission pricing is easier to arrange and police if the counterparty acts only as a broker.³⁵ If, however, the broker adds value before resale or offers complementary services by incorporating the product into another product, the process of setting internal prices may become more complicated. The more a broker integrates the particular product into other products that the broker offers, the greater the potential for disputes regarding appropriate compensation increases and the less attractive commission pricing becomes as a method for resolving the problem of price adjustment over time.³⁶

E. *Safeguards*

Parties can bolster their confidence in long-term contracts by including safeguards.³⁷ Contracting with safeguards entails the use of incentives to constrain opportunism and give parties confidence that they will be able to amortize their specific investments over time.³⁸

Contractual safeguards alter ex post incentives by raising the cost of opportunistic behavior.³⁹ This goal can be achieved through the exchange of "hostages," or items with value to the parties. As in the days when warring kings exchanged princes or princesses to guarantee peace commitments, the presence of a metaphorical hostage can create incentives for the party not making the specific investment to credibly commit to cooperation rather than opportunism.⁴⁰

In the context of a contract, hostages can take the form of forfeitable bonds, termination fees, liquidated damages, or other cancellation penalties triggered by opportunistic defaults.⁴¹ By incorporating explicit hostage costs into a contract where one party must make a

34. *Id.*

35. *Id.*

36. Goldberg and Erickson note that in the case of coke, when the reseller simply acts as middleman, arranging for contracts and reshipping, then tracking the proper commission level is a simple task. On the other hand, when the reseller begins to hold inventory, mix coke from various sellers, or reprocess the coke before reselling it, then determining an appropriate percentage to assign as commission before more is troublesome. *Id.*

37. OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 32-35 (1985) (analyzing the important role of protective safeguards in contracting).

38. *Id.* at 140.

39. Axelrod showed that raising the costs of defection in the Prisoners' Dilemma game relative to the benefits of defecting – thereby changing the structure of the payoffs – can dissuade defection. See ROBERT AXELROD, *THE EVOLUTION OF COOPERATION* 133 (1984).

40. Williamson, *supra* note 4, at 537.

41. THOMAS C. SCHELLING, *THE STRATEGY OF CONFLICT* 135-36 (1960). Hostages need not always take the form of cash. In some circumstances, they could take the

specific investment, parties are able to impose a cost on opportunistic behavior and thereby promote cooperation. For example, if an oil well owner were required to post a significant default bond with a third party, he would be more likely to continue providing oil to the pipeline, and, to the extent price or quantity terms turn out to be incomplete, to cooperate in revising terms in the event they stray too far.

Parties can also reduce incentives for opportunism by creating economic lock-in, a variation of the hostage strategy that does not rely on an explicit contractual penalty for defecting. Economic lock-in occurs when the economics of a deal are such that the parties, once engaged with one another, expect to find cooperation more attractive than non-cooperation. Economic lock-in can be created by mutual asset specific investments or joint efforts that are expected to yield a product or business that is too valuable to abandon. By creating economic dependence, as opposed to a contractual obligation, lock-in raises the switching costs of the party likely to defect.⁴²

For example, during the mid-1990s, AOL used the concept of economic lock-in to keep some of its customers from defecting. AOL made a series of asset specific investments in its network. At the same time, customers had a choice of a number of competing proprietary networks. Presumably, subscribers could have switched online service providers at relatively little cost to themselves. However, AOL was able to raise switching costs and lock in retail subscribers through the use of subscriber e-mail accounts. Because e-mail accounts were tied to the network (i.e., @aol.com), switching away from the AOL network created costs for retail subscribers and dissuaded them from leaving.⁴³ Locking in subscribers ensured AOL a long-term stream of revenues and at least initially allowed it to amortize its specific investments in its network.

form of an important license granted automatically upon the existence of some condition or default. See Farrell & Gallini, *supra* note 16, at 673-74.

42. At the same time, once locked in, the balance of power in a relationship shifts. To reduce the likelihood of opportunistic behavior, parties can also rely on joint ownership of assets where there is a strong potential for lock-in. Henry Hansmann, *Ownership of the Firm*, 4 J.L. ECON & ORG. 267, 279 (1988).

43. The key insight is that customers will not switch away until the benefits of switching away exceed the costs of doing so. By raising the marginal costs of switching away, a seller can deter customers from switching. See CARL SHAPIRO & HAL R. VARIAN, *INFORMATION RULES: A STRATEGIC GUIDE TO THE NETWORK ECONOMY* 109-10 (1999).

III. @HOME DEAL BACKGROUND

Though the Internet has become a central feature in economic life today, it was still nascent in the 1990s. At that time, the Internet was plagued with congestion and reliability problems. In addition, in the mid-1990s the Internet was not yet synonymous with the World Wide Web; rather, it was an amalgamation of different network communication protocols, among them Gopher, Telnet, SMTP, and IRC HTTP/HTML. Because of this, the Internet could be difficult to search and navigate.⁴⁴ The first browser, Mozilla (later Netscape), was not released until late 1994, while Internet Explorer was not released until the middle of 1995.⁴⁵

Not surprisingly, part of the consumer appeal of online service providers like AOL, CompuServe, and Prodigy was their ease of use for consumers who were not technically-oriented. Online service providers, therefore, focused on developing proprietary networks and content to serve specifically these consumers.⁴⁶ These services provided important intermediation functions by selecting, organizing, and presenting information and content to subscribers. AOL, the industry leader, could be easily accessed by unsophisticated consumers using proprietary software and a telephone modem. AOL offered subscribers exclusive access to a wide variety of content.⁴⁷ With the exception of Internet access, all of AOL's content was on its proprietary network so that once a subscriber logged into the network, the only constraint to accessing content was the speed of the subscriber's telephone modem. AOL's strategy of supplying content on a proprietary network along with the means for easy navigation was

44. Though AOL permitted members to access the Internet, the lack of a useful browser limited subscribers' ability to explore the web. During the middle of the 1990s, Internet access was still considered "risky." For example, AOL's terms of service at this time included a disclaimer that members accessing the Internet "did so at [their] own risk." See William W. Burrington, *Cable Online Services*, 437 PLI/PAT 387, March 1996.

45. Netscape Communications, Registration Statement (Form S-1) (June 23, 1995); JONATHAN E. NEUCHTERLEIN & PHILIP J. WEISER, *DIGITAL CROSSROADS* 127 (2005).

46. America Online, Inc., Annual Report (Form 10-K) (September 30, 1996). In the mid-1990s, Microsoft's MSN network adopted the same online services business-model: online content walled off from the Internet and available only to subscribers. See Paul Thurrott, *MSN: The Inside Story*, May 19, 2005, http://www.winsupersite.com/showcase/msn_inside_01.asp.

47. See generally AOL Inc., AOL Timeline, <http://corp.aol.com/content/aol-timeline> (last visited Feb. 15, 2010) (giving examples of services introduced by AOL at various points).

successful. AOL's customer base grew rapidly during the mid-1990s, going from 1 million customers in 1995 to 5 million in 1996.⁴⁸

In March 1995, TCI, the largest cable company in the United States at the time, formed @Home.⁴⁹ @Home planned to use new cable technologies to provide online services at speeds much faster than were previously available to consumers.⁵⁰ While the telephone modems used by subscribers of online services could transfer data at speeds of only 14-56 kbps, TCI planned to create a cable-based online service that would leverage cable's higher capacity and permit high-speed transmission to retail subscribers at speeds of 2 to 5 mbps, more than 100 times faster than a 28.8 kbps telephone modem.⁵¹ A relatively new technology called hybrid fiber/coaxial cable ("HFC") made this possible. HFC allowed high-speed, two-way transmission of data and video into and out of households.⁵² On @Home's network, subscribers would establish an "always on" connection with the network using their cable television connections and a cable modem, thereby avoiding busy signals and other nuisances associated with dial-up.⁵³ This network promised, for the first time, to deliver high-speed Internet access to retail subscribers.

TCI planned to use HFC technology to build a proprietary high-speed network for its cable subscribers, but rather than having customers simply plug into the Internet with all its congestion and reliability problems, TCI would have @Home build its own high-speed backbone parallel to the Internet.⁵⁴ The @Home network would utilize a series of Regional Data Centers ("RDCs") that could cache content physically close to subscribers, thereby reducing network

48. *Id.*

49. At Home Corp., Third Amended Registration Statement (Ex. 3.01 to Form S-1) (May 16, 1997).

50. Cable companies had been unsuccessfully attempting to turn their cable lines into something more than an antenna service since the 1970s. In the late 1970s, Warner Cable rolled out its experimental online service, QUBE, in Columbus, Ohio. In the late 1980s and early 1990s, Interactive TV (TCI, Inc.) and the Full Service Network (TimeWarner) were "electronic superhighways into the home." See MARK ROBICHAUX, *CABLE COWBOY* 125 (2002). However, by December 1992, these efforts had failed. Both of these early services were closed, proprietary networks. MARK ROBICHAUX, *CABLE COWBOY* 123-25, 153-54 (2002).

51. At Home Corp., Annual Report (Form 10-K405), at 4 (March 31, 1998).

52. Download time for 2 mb file using a 56 kbps modem is approximately 5 minutes; the same file can be downloaded in 0.2 seconds using a 10 mbps cable modem. Sharon Eisner Gillet & William Lehr, *Availability of Broadband Internet Access: An Empirical Analysis* 3 n.7 (Sept. 1999) (unpublished manuscript, on file with author).

53. At Home Corp., Registration Statement (Form S-1), at 4 (May 16, 1997).

54. *Id.* at 41.

congestion and allowing for fast downloads.⁵⁵ Each of these proposed RDCs could support between 500 and 1,000 subscribers.⁵⁶ The network architecture that TCI envisioned for @Home ensured that subscribers could access its proprietary multimedia content inside the @Home fence without the congestion and frustration associated with the public Internet and at a faster speed than competing dial-up services.⁵⁷ @Home would provide subscribers with a customized browser/interface and, through its start-page, would guide subscribers to broadband content like CD quality audio, video clips, games, and shopping.⁵⁸ @Home would be, in essence, AOL on steroids.

TCI envisioned third-party content providers paying to be located inside the @Home fence to gain access to the large base of TCI's subscribers.⁵⁹ The high speed of the network would permit content providers to supply multimedia content that had not been available up until that point to subscribers. Though subscribers would still be able to access the Internet through the @Home network, TCI expected that the rich content inside the high-speed fence would keep subscribers from straying far.⁶⁰

This new high-speed network would be expensive. It would cost approximately \$140 million to build the backbone and regional nodes sufficient to service 10 million subscribers.⁶¹ Upgrading cable systems to handle high-speed data traffic would cost an additional \$1,000-\$3,000 per subscriber, but because TCI had failed to make

55. *Id.*

56. GEORGE ABE, RESIDENTIAL BROADBAND 153 (2001).

57. Lucien Rhodes, *The Race for More Bandwidth*, WIRED, Jan. 1996 (describing the business model and technical challenges).

58. @Home offered subscribers access to content through its homepage, which it organized in various channels that it hoped would simplify navigation and make online content accessible to a mass audience. See At Home Corp., Registration Statement (Form S-1), at 5, 7 (May 16, 1997).

59. See Rhodes, *supra* note 57.

60. @Home offered subscribers "a customized browser and aggregated . . . multimedia content" similar to the AOL strategy. At Home Corp., Registration Statement (Form S-1), at 5 (May 16, 1997). See also Frank Rose, *The \$7 Billion Delusion*, WIRED, Jan. 2002, available at www.wired.com/wired/archive/10.01/excite.html (discussing @Home's development). The "walled garden" strategy used by @Home is a common one for various kinds of networked industries; most recently wireless telephone providers have been attempting the same strategy. See Li Yuan, *Breaking Down the Walls of Phones' Wireless Web Gardens*, WALL ST. J., Aug. 2, 2007, at B1.

61. Marc Gunther, *The Cable Guys' Big Bet on the Net*, FORTUNE, Nov. 25, 1996, at 102.

past upgrades, its costs were likely to be higher than the industry average.⁶²

Compounding these costs was the fact that the cable industry was highly fragmented. TCI's franchises, like those of other major cable companies, were spread out across the country, and only a small fraction could be found in contiguous clusters.⁶³ The term "clusters" refers to the rapid transformation of discontinuous geographic service areas into contiguous geographic service areas. For example, in 1995 only 5.1 million subscribers out of approximately 62 million basic cable subscribers nationwide were located in clusters of greater than 500,000 subscribers.⁶⁴ As a consequence of the dispersed nature of the cable service areas, fixed costs of serving cable television subscribers were higher than they might have been had the service areas been clustered. In order for @Home to become a viable business and justify the high levels of fixed capital investment required, TCI would have to find a way to cooperate with competing cable companies with contiguous franchises to build the @Home network in a way that would benefit both TCI and its rivals.⁶⁵

To build this network, @Home and the cable companies offering the service had to make large simultaneous investments in the network's infrastructure. @Home, the network operator, had to make a substantial investment in a nationwide fiber-optic network that served as the backbone for this private network. @Home also had to make a series of investments in RDCs to service between 500 and 1,000 potential subscribers each.⁶⁶ These RDCs had to be distributed

62. ABE, *supra* note 56, at 155. See also Joshua Cho, *Cable Ops Spending Mega Bucks to Upgrade Plant*, CABLE WORLD, June 21, 1999; Deborah A. Lathen, BROADBAND TODAY, Oct. 1999, available at <http://www.fcc.gov/Bureaus/Cable/Reports/broadbandtoday.pdf>. TCI acquired a reputation for failing to invest in upgrades of the sort that would be required to make the @Home network possible. See ROBICHAUX, *supra* note 50, at 94, 164.

63. Municipalities typically regulate the provision of cable television services, granting long-term exclusive contracts to cable companies in the form of renewable franchises. At Home Corp., Notice and Proxy Statement (Form DEF 14A), at 26 (May 26, 2000).

64. See Status of Competition in Markets for the Delivery of Video Programming, FCC Release No. 97-423, 13 FCC Rcd 1034, 1998 FCC LEXIS 140, at *447-48 (Jan. 13, 1998). See also NCTA, CABLE DEVELOPMENTS 4, 222 (2002).

65. Although TCI, Cox, Comcast, and other cable providers each had monopoly service areas, they competed against each other for service franchises. Their competition for these franchises can be characterized as intense. At the same time, the cable companies cooperated in numerous areas outside the context of franchise competition where cooperation might be valuable, such as in the development of television programming.

66. ABE, *supra* note 56, at 153.

around the country in locations where @Home was likely to attract subscribers. Once deployed, the @Home backbone and RDCs had only one real function: to service the @Home network. Any other use for the assets would be of much lower value. As such, the network was a specific investment.

In order to offer this service to its subscribers, cable companies had to make complementary investments in upgrading their own cable systems from analog to next-generation HFC. The HFC upgrades were required to permit two-way, high-speed data transmission between a subscriber's desktop and an RDC. Since upgrading to HFC often involved digging up streets to lay the new cable, the costs associated with these upgrades were significant. At the time, there was no other service that required the two-way capabilities that HFC offered, so cable company investments in these upgrades would be dedicated to a particular use, namely serving the @Home network and its subscribers. As such, these upgrades would also be asset specific.

The asset specific investments required to build the nationwide @Home network, including the backbone, the RDCs, and the HFC upgrades, presented significant contracting challenges. Because the investments were asset specific, the return on @Home's investments in the backbone and RDCs was dependent upon the cooperation of the cable companies, while the cable companies' investments were simultaneously dependent on the cooperation of @Home and each of the other cable companies. If all the parties were not able to successfully coordinate their investments, the individual investments would be dramatically devalued.

IV. @HOME AS A RESPONSE TO ASSET SPECIFICITY

Given the asset specific nature of the investment in @Home, its ownership structure, its internal governance, and its business strategy can rightly be understood as a response to the challenges of asset specificity.

A. *Challenges Require Cooperation*

In order for the network to be commercially viable, the challenges presented by the asset specific nature of the @Home network required cooperation among rival cable companies.

In the mid-1990s, the nation's cable television networks resembled a patchwork quilt because relatively few cable subscribers were located in contiguous clusters managed by the same cable company.

In 1996, there were only eighteen contiguous clusters of more than 400,000 subscribers, accounting for less than 12% of all cable subscribers.

TCI was no different from other cable companies in this respect. Because of the fractured nature of its network, it would have been prohibitively expensive for TCI to build out the @Home network to its 11 million subscribers.⁶⁷ To spread the cost of investments in network infrastructure over a large enough base of potential subscribers, TCI had to find a way to partner with other cable companies. Cox and Comcast were obvious partners as each had access to large subscriber bases in areas contiguous with TCI's existing service areas. At the time, Comcast was the fourth largest cable company in the country, with 4.28 million subscribers nationwide, while Cox was the fifth largest with 3.26 million subscribers.⁶⁸ Combined with TCI's subscribers, these three cable partners would give the @Home network access to about 18.5 million cable subscribers – 29% of all cable subscribers in 1995.⁶⁹

Bringing the three rivals together to offer the @Home service would be difficult, however. The biggest of the challenges would be creating credible incentives to induce the parties to cooperate rather than to free ride on others' specific investments. At the network level, TCI, through @Home, needed to make large, highly asset-specific investments in a national backbone and regional data centers that would cache content in numerous locations near subscribers on the network. At the subscriber level, each of TCI, Cox, and Comcast needed to make significant investments in upgrading their local cable networks from analog to HFC technology. Each of the cable partners making investments in HFC risked a potential hold-up by TCI. Unless TCI simultaneously invested in caching and backbone infrastructure, the HFC upgrades made by each of the participating cable companies would not be valuable. Without access to TCI's backbone infrastructure or the cache services at the system level of the @Home network, the cable companies' HFC upgrades would be essentially useless. Until this hold-up threat could be credibly overcome, TCI, Cox, and Comcast would find it difficult to move from the equilibrium position and coordinate the investments needed to make the network a reality.

67. At Home Corp., Registration Statement (Form S-1), at 12 (May 16, 1997).

68. *Id.*

69. NCTA, Table: Basic Cable 1979-2001, CABLE DEVELOPMENTS 4 (2002) (64.6 million basic cable subscribers in 1996).

B. *Overcoming Challenges of Asset Specificity*

In response to these challenges, TCI, Cox, and Comcast employed a number of solutions to safeguard their relationships against opportunism. First, the parties agreed to a joint ownership model for the network and the data centers. To this end, TCI sold minority stakes in @Home to Cox and Comcast while retaining a majority of shares for itself.

At the network level, @Home was responsible for managing traffic and aggregating content on its own network. Each of the participating cable companies retained ownership and control over its own cable network and relationships with its subscribers. The structure of joint ownership of the @Home entity included a number of governance mechanisms designed to protect Cox and Comcast from possible opportunistic behavior by TCI.⁷⁰

Second, Cox, Comcast, and TCI each agreed to provide @Home with the exclusive right to market cable Internet to their subscribers. Exclusivity eliminated the possibility that any of the rival companies might attempt to build a competing network or direct traffic to a third-party network during the contract period and thereby gave Cox and Comcast an incentive to cooperate with TCI in building the @Home network. These exclusivity arrangements were subject to an important exception, discussed below, meant to address potential opportunism by TCI in complying with its own obligations to upgrade its systems and market the @Home service to its subscribers.

Finally, exclusivity was limited to an initial five-year period because TCI envisioned economic lock-in inducing long-term cooperation between the three companies. This lock-in would require the creation of a valuable network with popular content "inside the @Home fence." The attractiveness and difficulty to replicate the @Home network would lock in subscribers and thus leave Cox and Comcast locked in once the period of exclusivity ended in 2002.

1. *Joint Ownership and Governance Mechanisms*

In June 1996, TCI sold minority equity stakes in the @Home venture to Cox and Comcast.⁷¹ Comcast and Cox each purchased 13.4% of @Home's Series A Preferred stock, representing a total of 11.8% of

70. See *infra* Section 3.2.A.

71. Kleiner Perkins, a venture capital fund, was already a minority shareholder at the time Cox and Comcast were added as "Additional Investors" in 1996. See At Home Corp., Amended Registration Statement (Form S-1/A) (June 20, 1997).

the voting power.⁷² TCI maintained the largest economic interest as well as voting control of the enterprise. Though TCI's high-vote Series T Preferred shares equaled 42.8% of the equity value, they represented 74.9% of the voting power of @Home.⁷³

TABLE 1: SHARE DISTRIBUTION AND VOTING STRUCTURE⁷⁴

SHAREHOLDER	TYPE OF SHARES	% OF EQUITY	VOTING %	DIRECTORS
TCI	Series T Preferred	42.8%	74.9%	2 Series T
	Series A Preferred			3 Series A
Kleiner Perkins	Series K Preferred	12.2%	5.4%	1 Series K
Comcast	Series A Preferred	13.4%	5.9%	1 Series A
Cox	Series A Preferred	13.4%	5.9%	1 Series A
Management	Management Pool	5.1%	1.6%	1 Common
	Shares – Common			
Other (employees, friends, family, etc.)	Common	9.6%	3.9%	
TOTAL		100%	100%	9

While joint ownership of @Home addressed the issues of asset specificity by internalizing some incentives for opportunism, it did not prevent TCI from potentially abusing its position as controlling shareholder to extract rents from the joint entity at the expense of Cox and Comcast. For example, without additional safeguards, TCI might have an incentive to use its majority position to roll out the @Home service in areas where TCI subscribers were primarily located. Alternatively, TCI might use its position to promote video services on the @Home network that might compete directly with cable television services offered by Cox and Comcast.

To manage problems of this type, the parties coupled joint ownership with specialized governance mechanisms designed to limit TCI's ability to act opportunistically against minority shareholders. One of these mechanisms was a "board within a board" (the Series A directors) that consisted of three directors nominated by TCI and one director each nominated by Cox and Comcast. @Home's certificate of

72. These ownership percentages were calculated immediately prior to @Home's June 1997 IPO. See At Home Corp., Registration Statement (Form S-1), at 70 (July 11, 1997).

73. Prior to the IPO, Kleiner Perkins held 13.55% of the outstanding equity and 5.4% of the voting power through its Series K shares. *Id.*

74. *Id.*

incorporation specified that these Series A directors would have special voting rights to approve certain corporate actions, including adjustments in revenue splits, approval of capital investment budgets, and approval of competing online video offerings.⁷⁵ These voting rights required either unanimity among the cable partners or assent of at least one of Cox or Comcast. This structure ensured that while TCI could set the agenda for board action, it could not act opportunistically against the minority shareholders.

One area of particular concern for the @Home partners was the treatment of online content providers that would be critical to the success of an AOL-like online service.⁷⁶ Through its controlling stake in @Home, TCI could cause the network to favor TCI-owned content providers over content providers owned by Cox or Comcast or other third parties. For example, TCI could cause @Home to favor a TCI-owned search engine over either Looksmart or About.com, owned in part by Cox and Comcast respectively, by limiting the ability of non-preferred search engines or other content providers to cache their content on the @Home network or by limiting the visibility of non-preferred content on @Home's start page.

To manage the potential conflict over access to the @Home network, the shareholders created the ".Com Committee."⁷⁷ The .Com Committee was designed to ensure equal treatment and equal access

75. The supermajority voting structure limits the opportunism discussed in the previous section by requiring supermajority approval for: the approval of any fundamental transaction, like a merger, declaration of dividends, or appointment of a CEO; the adoption of any budget that serves to create unequal rollout of services; any change in the revenue split between @Home and its cable company partners; and the appointment of outside directors to oversee contracting for online content for the @Home service with related parties (the ".Com" Committee). The unanimous provisions required amongst the Series A directors (Cox, Comcast, and TCI) before the board might approve any action for recourse debt, to change the number of directors, or to modify rights of Series A. At Home Corp., Fourth Amended Registration Statement (Form S-1/A) (July 8, 1997) [hereinafter At Home Corp., Fourth Amended]. See also At Home Corp., Amended Registration Statement (Form S-1/A) (June 20, 1997). Provision of video services by @Home required a supermajority vote of all the cable companies. At Home Corp., Master Distribution Agreement Term Sheet (Form S-1/A) (June 20, 1997) [hereinafter At Home Corp., MDA].

76. Each of the cable partners had ownership stakes in websites and other online content services. For example, TCI held ownership stakes in Priceline.com, iVillage, Homegrocer.com, Pogo.com, Student.net, Wine.com, and Women.com among many others. Cox held ownership interests in Looksmart, Homestore.com, Autotrader.com and MP3.com among others. Comcast held ownership interests in About.com, Ticketmaster.com, CulterFinder.com, and Deja.com among others. Price Colman, *Old Media Dotcom: New Media Are the Hot Investment for Cable Operators and Broadcasters*, BROADCASTING & CABLE, Nov. 15, 1999, at 62.

77. *Id.*

to the @Home network for all providers' content regardless of ownership.⁷⁸ By adopting a content-neutral mechanism, TCI credibly signaled to Cox and Comcast that it would not use @Home to promote its content to the exclusion of third parties.⁷⁹

To guard against the possibility of TCI using the @Home start page to promote its own content at the expense of its partners, the parties built in safeguards to regulate placement of content on the start page. One of these safeguards involved dividing the start page into two separate areas: local and national. Local cable operators each had complete control over the placement of links in and access to the local area of the @Home start page, thereby permitting local branding and localized content. Access to the national section of the start page was controlled by @Home.⁸⁰ However, Cox and Comcast each retained the right to block up to three links appearing in the national portion of @Home's start page and could block additional links in exchange for payments.⁸¹ The free blocks gave Cox and Comcast the ability to limit TCI's potential abuse of its position as controlling shareholder. At the same time, by making it costly for Cox and Comcast to block more than three links, the provision ensured that Cox and Comcast would only use their veto power when it was necessary.⁸²

2. Contracting with Safeguards: Exclusivity Arrangements

Notwithstanding Cox and Comcast's economic interests in @Home, the possibility remained that the cable companies might use

78. "[@Home] acknowledges and agrees that its policy and practice with respect to its willingness to negotiate and enter into all .Com Agreements . . . is one of openness and non-exclusion, regardless of the identity of such content provider and its relationship with [@Home], and that it is in the best interest of [@Home] and its stockholders for [@Home] to enter into as many such agreements as is practicable." At Home Corp., Amended Registration Statement (Form S-1/A), at 26 (June 20, 1997).

79. Notwithstanding @Home's content-neutral stance, the network nevertheless subjected video streaming to a binding constraint of no more than ten minutes in length. One might properly interpret discrimination against video content as an attempt by the cable partners to protect their interests in more traditional video programming. See At Home Corp., MDA, *supra* note 75.

80. *Id.*

81. These payments took the form of an adjustment to the 65-35 revenue split agreed to by the parties. In the event Cox or Comcast blocked more than ten links, then the blocking party would reduce its revenue sharing to zero. *Id.*

82. In the end, these protections turned out not to be very relevant as the terms of the Master Distribution Agreement expressly permitted subscribers to the @Home service to change the default start-page on their web browsers, thereby making it relatively simple for a subscriber to "exit" the @Home network, or at least to avoid visiting the start-page. *Id.*

their monopoly over access to subscribers to hold up @Home and thereby extract surplus from TCI once the network was in operation.⁸³ In June 1997, TCI, Cox, and Comcast entered into distribution agreements (Master Distribution Agreements or "MDAs") with @Home that locked each of them into a five-year exclusive arrangement.⁸⁴ By doing this, Cox and Comcast gave up their ability to force an opportunistic renegotiation over content during the first five years of the network's operation.

The five-year term of the MDA was relatively short in light of the asset specific investments that @Home had to make.⁸⁵ Since @Home entered into a twenty-year lease with AT&T for backbone capacity to serve the network,⁸⁶ the five-year term of the MDA therefore invited an opportunistic negotiation at a point when @Home would still have significant future costs associated with the backbone lease.⁸⁷

Because a long-term supply contract was not feasible, the parties relied on an expectation of the value of @Home's network as an economic lock-in. They expected the five-year exclusivity agreement would be sufficient to bridge the gap between the initial investment period and the point at which the network would be uniquely valuable. With a valuable network in place, exclusivity would no longer be required to induce cooperation because the costs of exiting the network would be so high that any threat to do so would not be credible.

In addition to setting the length of the exclusivity period, the MDA outlined pricing policies for the @Home service. Pricing policies

83. Klein examined how long-term contracting between General Motors and Fisher Body reduced the incentive of General Motors to act opportunistically against Fisher Body, thereby inducing Fisher Body to make certain asset specific investments. At the same time, the requirement that General Motors deal exclusively with Fisher Body created an incentive for Fisher Body to engage in a "reverse hold-up" of General Motors by either "increasing price or decreasing quality." See Klein, *supra* note 29, at 201. Williamson calls this phenomenon the "fundamental transformation" or that point when large numbers competition gives way to a monopoly relationship following an investment decision, fundamentally altering the economic incentives among the parties. See OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 61-63 (1985).

84. At Home Corp., MDA, *supra* note 75.

85. The long-term contracts of the type described in Section 2, *supra*, are typically long enough to amortize the costs of the specific investments. For example, the terms of nine of the ten long-term contracts examined by Goldberg and Erickson were at least ten years with a presumption that they would last for twenty years. See Goldberg & Erickson, *supra* note 5, at 377.

86. At Home Corp., Registration of Securities (Form S-4), at 147 (Apr. 27, 1999). See also At Home Corp., Amended Annual Report (Form 10-K405/A) (Apr. 27, 1999).

87. However, given the rapid obsolescence of technology, with the exception of the twenty-year backbone lease, most of the investments in the network could be amortized over the initial five-year period.

determined the allocation of revenues between @Home and cable companies offering the service (including, but not limited to Cox, Comcast, and TCI). @Home, Cox, Comcast, and TCI adopted a revenue splitting formula akin to a commission pricing approach. Cox, Comcast, and TCI, along with any third-party cable company that offered the @Home service, would keep 65% of subscriber revenues, while @Home would receive 35%.⁸⁸

The revenue splitting approach adopted by @Home permitted the cable companies, which had better information about their subscribers, to adjust retail prices in real time without having to negotiate pricing with @Home. In addition, the strategy was simple and left little to dispute. Once the revenues came in, a cable company only needed to send 35% of it to @Home. As discussed in Section 1.4, *supra*, such a pricing strategy can be appropriate where the reseller is adding little value beyond acting as a middle man and arranging for resale of a service.⁸⁹

The pricing strategy adopted by the parties, however, was plagued by some important weaknesses. First, the cable companies were doing more than just brokering the sale of the @Home service. The local cable companies added value through a number of activities, including billing and technical and customer service. As a result, the actual costs associated with the cable companies' offering the service were subject to some degree of variability that might or might not have been reflected adequately in the uniform revenue split.⁹⁰ Properly assigning these costs internally could have proven troublesome or created incentives for TCI, Cox, or Comcast to spend less on these value-added services than might have been optimal. Second, Cox, Comcast, and TCI all had an incentive to use the pricing formula to extract surplus from @Home. For example, TCI, Cox, or Comcast could bundle the @Home service together with premium cable services, effectively using the @Home service as a loss leader to

88. This was subject to certain reductions in the event they elected to block access to content on the @Home website. See *supra* text accompanying notes 80-82.

89. Goldberg & Erickson, *supra* note 5, at 382-83. In this case it is arguable whether the participating cable companies, which managed local networks, as well as handled customer service and billing, were merely middlemen and not adding value.

90. The highly fragmented nature of the cable industry in the mid-1990s made offering the @Home service outside a cable company's core clusters marginally less profitable because the average costs of servicing smaller clusters was higher for cable companies than it was for @Home. See NCTA, CABLE DEVELOPMENTS 4, 222 (2002); At Home Corp., Notice and Proxy Statement (Form DEF 14A), at 26 (May 26, 2000); Status of Competition in Markets for the Delivery of Video Programming, FCC Release No. 97-423, 13 FCC Rcd 1034, 1998 FCC LEXIS 140, at *447-48 (Jan. 13, 1998); *supra* note 65.

attract customers to other services.⁹¹ Though simple, the commission pricing strategy adopted by @Home and its partners was subject to considerable vulnerabilities that made it a less-than-optimal pricing strategy.

3. *Contracting with Safeguards: Creating Lock-in*

A key component of @Home's network design was the development of a content-rich environment.⁹² @Home would, much like AOL, provide subscribers with "directory and navigation services" connecting them to broadband content on the network.⁹³ @Home's service would be different from AOL's in that its high-speed network would be able to deliver more and richer content to subscribers. Content providers wishing to gain access to @Home's large subscriber base would have to pay for placement on the @Home start-page or inside the @Home fence. Third-party content aggregated inside the high-speed @Home fence created a competitive advantage for @Home against its dial-up competitors: AOL, CompuServe, and Prodigy.

The creation of a valuable, content-oriented network would have important benefits for TCI and @Home in maintaining their relationship with Cox and Comcast. Specifically, a valuable network would improve @Home's bargaining position upon expiration of the five-year exclusivity provision of the MDA. As a valuable destination for @Home's subscribers, a content-rich network would create positive switching costs and thus mitigate the potential for either Cox or Comcast to act opportunistically upon the expiration of the MDA. In the absence of these positive switching costs, at the expiration of the MDA, Cox and Comcast would be able to credibly threaten to switch away from the @Home network and thus capture more surplus in any subsequent renegotiation of the relationship between the cable companies and @Home. In addition, a valuable @Home network would provide assurance to Cox and Comcast that TCI would maintain its relationships with the network and continue supporting its expansion. Finally, a valuable network would be attractive to other non-equity-holding cable companies seeking to offer online services to their subscribers. @Home could sell Internet access to third-party

91. In bankruptcy filings, @Home's creditors alleged that Cox, Comcast, and TCI engaged in pricing practices that siphoned revenue away from @Home and to other revenue-generating services, thereby benefiting each of the cable companies at the expense of @Home. See Decision Re Debtor's Motion to Reject Executory Contracts, *In Re At Home Corp.*, No. 01-3-2495-TC (N.D. Cal. Nov 30, 2001).

92. At Home Corp., Amended Registration Statement (Form S-1/A) (June 20, 1997).

93. At Home Corp., Fourth Amended, *supra* note 75.

cable companies and their subscribers, thereby diversifying @Home's subscriber base and reducing @Home's reliance on any single cable company for subscribers. Diversification of the subscriber base would further assist @Home in resisting subsequent hold-ups by any of its cable company shareholders.

4. *Contracting with Safeguards: The "High C" Test*

Though cable-based online access is now commonplace, the success of such a product was far from certain.⁹⁴ The technology was unproven, and the market for online services was very competitive. At the same time, upgrade costs were significant: as much as \$30 billion to upgrade all the homes passed by the @Home partners.⁹⁵ Notwithstanding these uncertainties, the best strategy for @Home was for all the cable partners to cooperate and simultaneously invest in upgrades to serve the network. Doing so would create the largest possible pool of potential subscribers and increase the economic value of the network while lowering @Home's unit costs. If successful, the benefits would be shared by all the shareholders of @Home. The costs associated with the upgrades, however, which were larger than the costs of the backbone and the regional data centers, would be borne by the individual cable companies and not @Home.

TCI, Cox, and Comcast were not identical with respect to the physical plants that they brought to the @Home venture. TCI was the largest cable company in the United States with far more potential subscribers for the @Home service than any other cable company. However, TCI had a reputation in the industry for not investing in its physical plant.⁹⁶ Consistent with its reputation, by 1997 only about 7% of the TCI network had been upgraded to HFC. Cox and Comcast were more aggressive in upgrading their physical plants with 19% and 12%, respectively, of their networks already served by HFC (see Table 2 below). The disparity in the quality of the physical plants created an incentive for TCI to withhold investments in further upgrades of its network until the business plan's viability had been proven on the basis of Cox and Comcast's upgrades. However, success of the online service relied on creating the largest network possible.⁹⁷ As a result, the parties needed to create a mechanism to

94. *Supra* note 50.

95. FCC Staff Report, BROADBAND TODAY, October 1999, at 26.

96. ROBICHAUX, *supra* note 50, at 94-95.

97. Ensuring the largest network possible was important to the success of @Home in part because online service provision is a "two-sided" market. Two-sided markets are markets where "two sets of agents interact through an intermediary platform, and . . . the decisions of each set of agents [whether to participate in the market]

jumpstart TCI's network upgrades and create credible expectations among the rival cable companies that TCI would cooperate by upgrading its plant.

TABLE 2: TWO-WAY HFC UPGRADES

	% of Homes Passed ⁹⁸				
	1996	1997	1998	1999	2000
@Home	4.5%	9%	23%	33%	51%
TCI	[-]	7%	[-]	25%	51.8%
Cox	1.4%	19%	44%	46%	73%
Comcast	N/A	12%	24%	34%	50%

Cox and Comcast were able to alter TCI's incentive to free ride by tying their exclusive commitment to @Home to an objective performance measure: the "High C" test. Under the High C provision, if TCI was unable to generate two times as many subscribers as a percentage of "homes passed" than either Cox or Comcast by mid-1999, then either Cox or Comcast, or both, would be permitted to terminate its exclusive commitment.⁹⁹ In the event TCI did not cooperate, then

affects the [decisions of other agents], typically through an externality." Marc Rysman, *The Economics of Two-Sided Markets*, 23 J. ECON. PERSPECT. 125, 125 (2009). In this case the larger the network, the more likely retail subscribers will want to participate. At the same time, the more retail subscribers, the more likely online content providers will want to locate their content on the @Home network. See generally DAVID EVANS & RICHARD SCHMALENSEE, *PAYING WITH PLASTIC* (1999) (on the development of payment and credit card networks and two-sided markets).

98. Homes Passed: A home is "passed" if it can be connected to the company's network without any further extension of the network. NCTA, *supra* note 64, at 15. Sources for data in table: At Home Corp., Annual Report (Form 10-K), at 3 (Apr. 2, 2001) (38 million of 74 million homes passed); At Home Corp., Annual Report (Form 10-K405), at 3 (Mar. 30, 2000) (24 million of 72 million homes passed); At Home Corp., Annual Report (Form 10-K405), at 4 (Feb. 19, 1999) (13.2 million of 57.3 million homes passed); At Home Corp., Annual Report (Form 10-K405), at 4 (Mar. 31, 1998) (4.5 million of 50 million homes passed); At Home Corp., Registration Statement (Form S-1), at 6 (May 16, 1997); Comcast Corp., Registration of Securities (Form S-4), at VII-5 (Feb. 11, 2002) (1999: 4.974 million data ready/marketable homes passed; 2000: 14.523 million data ready/marketable homes passed) (AT&T Broadband data); Comcast Holdings, Annual Report (Form 10-K), at 7 (Mar. 2, 2001) (1999: data ready: 6,360,000); Cox Communications, Annual Report (Form 10-K405), at 4 (Mar. 19, 2001) (2000: data ready: 7,122,773; subscribers: 481,947); Cox Communications, Annual Report (Form 10-K405), at 6 (Mar. 23, 2000) (1999: data ready: 3,759,229; subscribers: 186,918); Cox Communications, Annual Report (Form 10-K405), at 6 (Mar. 29, 1999) (1997: data ready: 954,271; 1998: data ready: 2,634,515); Cox Communications, Annual Report (Form 10-K405), at 8 (Mar. 19, 1998) (1996: 70,909 data ready, 134 subscribers).

99. The "High C" provision reads as follows:

Performance Default" shall occur, if as of the indicated date, the High C Performance Ratio exceeds the product of (I) two times (II) the TCI Performance Ratio. The "High C Performance Ratio" shall be the greater of (i) the amount equal to (x) the aggregate number of residential subscribers to the @Home

Cox or Comcast had the ability to unilaterally withdraw from @Home, thereby reducing the entity's value and punishing TCI for defecting.

C. Summary of the Deal

In sum, when the @Home service was successfully rolled out to subscribers in 1997, its corporate structure was knit together by a number of contractual safeguards intended to manage the problems of asset specificity and induce TCI, Cox and Comcast to make substantial investments that, together, would create a nationwide broadband network. If TCI aggressively upgraded its old network and marketed @Home's service, then exclusivity would be maintained. Otherwise, Cox and Comcast would be free to effectively terminate the agreement and seek other means of providing broadband Internet services to their subscribers.

The @Home network appeared to be a technical success by 2000. In 1996, only 4.5% of the homes passed in @Home's network were utilizing HFC networks. By the end of 2000, that number was 51%.¹⁰⁰ When @Home went public in July 1997, it had only 5,000 subscribers. By December 2000, @Home reported over 4 million subscribers.¹⁰¹ In addition to the three original shareholders, by 2000 @Home had sold access to its service to at least thirteen other large cable companies that collectively served 93% of all cable television subscribers.¹⁰²

Service of Comcast Cable and its Controlled Affiliates, divided by (y) the aggregate number of Homes Passed by Qualifying Systems owned by Comcast Cable and its Controlled Affiliates and (ii) the amount equal to (a) the aggregate number of residential subscribers to the @Home Service of [Cox] and its Controlled Affiliates, divided by (b) the aggregate number of Homes Passed by Qualifying Systems owned by [Cox] and its Controlled Affiliates, in each such case as of the end of the calendar month preceding the date of determination (the Cable Partner with respect to whom such amount is greater as of the applicable date of determination being referred to herein as the "High C"). The "TCI Performance Ratio" shall be an amount equal to (A) the amount equal to (x) the aggregate number of residential subscribers to the @Home Service of TCI and its Controlled Affiliates, divided by (B) the aggregate number of Homes Passed by Qualifying Systems owned by TCI and its Controlled Affiliates, in each case as of the end of the calendar month preceding the date of determination.

A home is deemed "passed" if it can be connected to the company's network without any further extension of the network. At Home Corp., MDA, *supra* note 75.

100. See *supra* Table 2: Two-Way HFC Upgrades.

101. Konrad et al., *supra* note 3.

102. TCI/AT&T, Comcast, Cox, Charter, Adelphia, Cablevision, Mediacom, and Insight all offered the @Home service by the end of 2000. These companies represented

@Home's rapid growth also included its shareholder base. @Home started as a closely-held venture owned by TCI. By 2000, @Home had added many shareholders, including the Kleiner Perkins venture fund, cable companies Cox, Comcast, Cablevision, and Rogers Communications, and public shareholders. @Home had grown from a closely-held start-up to the country's largest provider of broadband online service in a little more than three years. As a result of its IPO, @Home developed interests independent of its cable company founders and required a management team with duties to all of its shareholders. These separate interests became salient after 2000 when the interests of Cox, Comcast, and TCI began to diverge.

@Home is an excellent example of how parties can respond to the problems presented by asset specificity through the use of contract and transactional structures. The founding partners of @Home used these tools to create credible expectations of cooperation that overcame each party's incentives to act opportunistically. Economic lock-in was the linchpin of the deal structure. At the same time, it was also the structure's Achilles' heel. If @Home was not able to create a network that was valuable to the cable partners, then the venture would fail.

V. @HOME'S DEMISE: EXOGENOUS CHANGES IN THE INDUSTRY UNDERMINE THE TRANSACTION STRUCTURES

Just as @Home was successfully ramping up its service, changes in the underlying business environment and the technology of the Internet conspired to erode many of @Home's competitive advantages. During the 1990s, investments by the telecom industry significantly reduced congestion and improved the reliability of the public Internet. At the same time, firms began to offer plain vanilla high-speed access to the Internet as well as caching services that increased the speed with which a user could access content. The rapid acceptance of browser technologies, like Netscape Navigator and Internet Explorer, and improvements in directory and search services, like Yahoo!, AltaVista, and Looksmart, gave the Internet a user-friendly face. This combination made the Internet accessible to novice users and reduced the importance of the content intermediation role that @Home hoped to play. Finally, cable companies aggressively moved to defragment their markets through "clustering" strategies. The result of all these changes, just as @Home was hitting its stride, was

eight of the ten largest cable companies in the United States at the time. At Home Corp., Annual Report (Form 10-K), at 5 (April 2, 2001); NCTA, *supra* note 64, at 8.

that many conditions contributing to @Home's competitive advantage no longer existed.

A. *Decrease in Congestion*

While backbone capacity was a constraint in 1995, by 2001 there was a glut of high-speed backbone capacity that reduced Internet congestion. During the 1999-2001 period, more than 100 million miles of optical fiber were laid.¹⁰³ At the same time, technological advances (e.g., multiplexing, technology which allowed for the transmittal of multiple signals simultaneously down one line of cable) increased the throughput of each single piece of fiber.¹⁰⁴ The confluence of these forces resulted in a rapid decrease in congestion on the Internet. In 1998 alone, network speeds at the Internet's access points increased by 60% from the previous year.¹⁰⁵

The increase in backbone capacity led to increased competition in the provision of high-speed data services. Whereas there were only a small handful of backbones available in 1995, by 2000 there were already over forty competing private national backbones that could carry Internet traffic.¹⁰⁶ Availability of new capacity also led to increased competition at the retail level and, by 2000, a number of retail service providers had sprung up to sell high-speed Internet access services to cable companies. For example, companies like High Speed Access Corp. and ISP Channel offered basic, turnkey Internet packages specifically designed to allow even a small cable system to provide Internet access services to its subscribers.¹⁰⁷

In addition, substitutes for @Home's caching services (which previously had contributed to @Home's competitive advantage) appeared in the marketplace by 2000. Private caching services from Akamai,

103. Simon Romero, *Shining Future of Fiber Optics Loses Glimmer*, N.Y. TIMES, June 18, 2001, at A1 (noting that the price of a ten year contract for a fiber optic phone line had fall by nearly 90% between 1999 and 2001.)

104. Sidak notes that improvements in division multiplexing increased the number of channels on each strand of installed fiber from 2 to over 1,000 channels per strand. See J. Gergory Sidak, *The Failure of Good Intentions: The WorldCom Fraud and the Collapse of American Telecommunications After Deregulation*, 20 YALE J. REG. 207, 216 (2003).

105. *World Wide Wait 60 Percent Shorter*, WIRED, Mar. 11, 1998, available at <http://www.wired.com/science/discoveries/news/1998/03/10846>.

106. Michael Kende, *The Digital Handshake: Connecting Internet Backbones* 14 (FCC Office of Plans & Pol'y Working Paper No. 32, 2000).

107. High Speed Access Corp., Registration Statement (Form S-1), at 32 (Mar. 19, 1999); American Independence Corp., Amended Annual Report (Form 10-K/A), at 44 (Feb. 2, 1999).

Inktomi, Network Appliances, and others replicated @Home's caching services.¹⁰⁸ These services placed servers in strategic locations around Internet interconnections and hosted content for a fee in the same way that @Home did. The combination of increased capacity plus the emergence of private caching services reduced the value of the @Home network in the marketplace.

B. *Improvements in Accessibility*

Development of browser applications and search technologies in the mid-1990s facilitated consumers' Internet use and thereby reduced the value of @Home's role as an intermediary. Until that time, online service market leaders like AOL and Prodigy provided both the means to access the Internet and the proprietary software for guiding subscribers to preferred content.¹⁰⁹ By the end of the 1990s, however, that business model was becoming obsolete. With the combination of browser and search services, subscribers could easily replicate the content intermediation function played by online service providers like @Home.¹¹⁰

C. *Increases in Clustering Activity*

During the summer of 1997, cable companies began to aggressively consolidate their subscribers into "clusters."¹¹¹ Recall that, in 1996, only 18% of cable subscribers were located in large clusters of

108. Jeff Peline, *Ending the "World Wide Wait"*, CNET NEWS, Oct. 27, 1997, http://news.com.com/Ending™he+World+Wide+Wait/2100-1001_3-204673.html (last visited Feb. 25, 2010). See also Akamai Techs. Inc., Annual Report (Form 10-K/405), at 5-6, 48 (Mar. 3, 2000).

109. Yahoo! and other search firms organized and presented online content to non-expert users in a user-friendly fashion, thus taking away from @Home the intermediation function that it relied on to generate traffic to its start page.

110. In addition, the rise of free, Web-based e-mail services, like Hotmail, which were portable, made it easier still for subscribers to be divorced from their Internet Service Providers, thus reducing switching costs and subscriber lock-in. Indeed, even Microsoft's MSN moved away from its proprietary business model not long after it was launched in 1995. Kathy Rebello with Amy Cortese & Rob Hof, *Inside Microsoft*, BUS. WEEK, July 15, 1996, available at <http://www.businessweek.com/archives/1996/b3484001.arc.htm>. By 1998, online service provider Prodigy "had moved entirely to relying on the Web for its content." DANIEL L. BRENNER ET AL., CABLE TELEVISION AND OTHER NONBROADCAST VIDEO § 18-5 (2003). The market leader at the time, AOL suffered a similar fate. It began to lose subscribers beginning in 2002 as they migrated to "naked" broadband services without content. See *From :-)* to *:-(: Time Warner and AOL*, THE ECONOMIST, May 20, 2006, at 63.

111. The rapid "clustering" of the cable industry (meaning transformation into contiguous geographic cable television areas) was started by TCI in the summer of 1997 as it sought to improve its economies of scale. See Interview by Tom Southwick with Leo Hindery (Aug. 7, 2001), available at www.cablecenter.org/education/library/

greater than 400,000 subscribers. From 1997-1999, some 40-50% of all subscribers in the cable industry changed hands in “subscriber swaps.”¹¹² By 2000, approximately 58% of all cable subscribers were located in large clusters of greater than 400,000 subscribers (see Table 3 below). Whereas in the mid-1990s fragmentation required that cable companies find some way to cooperate in rolling out a cable-based online service, in 2000 cable companies found themselves controlling ever-larger concentrations of subscribers. With large, contiguous groupings of their own subscribers, cable companies could more efficiently manage their own networks and compete against new competitors, like telephone companies and satellite-based providers.

TABLE 3: CLUSTERING ACTIVITY 1996-1999¹¹³

Numbers of Subscribers	1996		1997		1998		1999		2000	
400-499,000	8	3.6	8	3.7	7	3.2	9	3.9	13	5.9
>500,000	10	7.7	16	11.9	21	19.6	28	23.8	34	34.3
Total	18	11.3	24	15.6	28	22.8	37	27.7	47	40.2
% Total Subs	18%		24%		34%		40%		58%	

The combined effect of the changes in the market and technology was to reduce the economic lock-in of agreements underlying the @Home network while increasing the value of the public Internet. Subscribers could replicate many of @Home’s intermediation and

oralHistoryVideo.cfm?id=111&ln=hindery (describing subscriber swap activity beginning in 1997).

112. Interview, *supra* note 111. “Subscriber swaps” are common transactions in the cable industry in which one cable company swaps its rights to a municipal franchise to another. Swaps are usually motivated by an interest to consolidate otherwise fragmented subscriber bases. Cable companies engaged in subscriber swaps amongst themselves in order fill in “gaps” and generate larger and larger clusters in particular areas of the country. TCI/AT&T was concentrated in technology-friendly cities like San Francisco, Boston, Denver, Dallas/Ft. Worth, and Atlanta. Comcast had clusters of subscribers in several large Eastern cities, including Baltimore, Philadelphia, and Detroit. Cox had clusters of subscribers in metropolitan areas in the South and Southwest, including Phoenix, San Diego, Las Vegas, and New Orleans. See Status of Competition in the Market for the Delivery of Video Programming, FCC Release No. 02-338, 17 FCC Rcd 26901 (Dec. 31, 2002); NCTA, *supra* note 64, at 222 (providing an industry definition of “clustering” as the “grouping together of independent cable systems in a larger, more efficient single system that utilizes some of the same infrastructure.”); Status of Competition in Markets for the Delivery of Video Programming, FCC Release No. 98-335, 13 FCC Rcd 24284 (Dec. 17, 1998); Status of Competition in Markets for the Delivery of Video Programming, FCC Release No. 97-423, 13 FCC Rcd 1034 (Jan. 13, 1998).

113. FCC02-338, FCC 97-423, FCC 98-335 and NCTA, CABLE DEVELOPMENTS 2002.

search services. "Naked" Internet services, where a broadband access company provided only Internet access without access to proprietary online services, became the dominant business model.¹¹⁴

VI. @HOME UNRAVELS

The most important lesson from @Home's experience can be simply stated: contractual safeguards and transactional strategies can be effective in altering incentives so as to jump-start efficient asset specific investments that would not be made otherwise. However, safeguards and structures only go so far and can be vulnerable to adverse changes in the underlying business environment. @Home responded to the coordination challenges of asset specificity by relying on economic lock-in to tie the original cable partners together. By making the network valuable to its partners, @Home hoped to create credible incentives to encourage cooperation in building-out and developing the network. Ultimately, however, when changes in the industry lowered switching costs and made lock-in less feasible, the transaction structure proved imperfect.

To make matters worse, when TCI's performance was evaluated for the first time under the "High C" test in 1999, the company was deemed to be in performance default.¹¹⁵ Recall that the High C test required TCI's ratio of @Home subscribers to homes passed by its network to be greater than double the same ratio for either Cox or Comcast. At the end of the first quarter of 1999, Cox reported 90,000 subscribers to the @Home service out of 8 million homes passed (1.125%).¹¹⁶ For the same period, TCI reported only 50,000 subscribers out of a base of nearly 19 million homes passed (0.26%).¹¹⁷ In

114. There remains a tension between the proprietary network business model and the naked Internet service business model that one can see in current debates about network neutrality. For an overview of this debate see Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925 (2001) and Tim Wu, *Network Neutrality, Broadband Discrimination*, 2 J. ON TELECOMMS. & HIGH TECH. L. 141 (2005) (outlining the debate and taking the position that network neutrality is the preferred approach).

115. After a failed merger attempt with Bell Atlantic, TCI faced internal financing difficulties in 1997 that resulted in its reducing its efforts to upgrade systems to HFC. Tim Barkow, *Dueling with the Death Star*, WIRED, Apr. 1997, available at <http://www.wired.com/wired/archive/5.04/updata.htm>. Cox agreed not to terminate the MDA pursuant to the "High C" test in exchange for promises of additional stock in @Home in the event TCI failed to meet a target of 277,000 subscribers by March 2000. At Home Corp., Beneficial Ownership Report (Schedule 13D/A), at Ex. 13 (April 13, 1999).

116. Alan Breznick, *Cox, Comcast Gain Greater Control of @Home*, Cable World, Apr. 19, 1999, at 6.

117. *Id.*

order for TCI to meet the requirements of the High C test, the company would have needed a base of at least 427,500 subscribers. When TCI failed to meet its obligations under the “High C” clause, Cox and Comcast obtained a right to immediately terminate the agreement’s exclusivity provisions.¹¹⁸ Thus, Cox and Comcast were freed from their contractual commitment to exclusivity even before the end of the five-year term. Moreover, the changes that were occurring elsewhere in the industry gave them considerable bargaining power over @Home.

Rather than immediately terminate the distribution agreements, Cox and Comcast used their newfound bargaining power to renegotiate and improve their position in the @Home venture¹¹⁹ by transferring greater control of @Home to themselves.¹²⁰ Previously, one of either Cox or Comcast was required to approve certain board actions. Following TCI’s failure to meet the rollout requirements, all board actions had to be approved by both Cox and Comcast. This change gave Cox and Comcast, two minority shareholders, decisive voices in the management of @Home. Cox and Comcast also negotiated absolute subscriber targets for TCI, which at that point was a subsidiary of AT&T. According to that new agreement, TCI/AT&T had to sign up 250,000 new subscribers within one year or else transfer a prescribed percentage of @Home stock to Cox and Comcast for every subscriber below 250,000.¹²¹ This ambitious target represented a more than 300% increase over TCI/AT&T’s 1999 subscriber numbers.¹²²

TCI/AT&T failed to meet its new subscriber targets in January 2000, at which point Cox and Comcast forced a second negotiation.¹²³ In this negotiation, Cox and Comcast essentially obtained a guarantee from TCI/AT&T that the value of @Home would increase by approximately 33% within one year. The guarantee took the form of a

118. At Home Corp., Current Report (Form 8-K), at 3 (Apr. 8, 1999).

119. *Id.*

120. At Home Corp., Notice and Proxy Statement (Form DEF 14A), at 26 (May 26, 2000).

121. At Home Corp., General Statement of Acquisition of Beneficial Ownership (Form SC 13D/A) (May 31, 2000). AT&T completed its acquisition of TCI in March 1999. As a condition of the agreement, AT&T agreed not to change any members of the board of @Home until at least one year following the closing of the transaction so as not to implicate change in control provisions under the MDA that could trigger an end to Cox and Comcast exclusivity. See AT&T Corp., Current Report (Form 8-K) (Mar. 9, 1999).

122. At Home Corp., Annual Report (Form 10-K405) (Mar. 30, 2000).

123. The result of this second negotiation was an amended distribution agreement that restructured the relationships among TCI/AT&T, Cox, Comcast, and @Home. At Home Corp., Amended General Statement of Acquisition of Beneficial Ownership (Form SC 13D/A) (Mar. 30, 2000).

put option exercisable at a 33% premium to the market price at the time of the negotiation.¹²⁴ In exchange for this guarantee, Cox and Comcast relinquished control over all governance matters.¹²⁵ In addition, Cox and Comcast terminated their exclusive relationship with @Home.¹²⁶

By January 11, 2001, @Home's stock price had dropped to \$7.72, far below the \$48 exercise price of the put option. Cox and Comcast accordingly exercised their puts for approximately \$2.9 billion, payable in AT&T stock, and formally ended their participation as shareholders in @Home.¹²⁷ TCI/AT&T was left holding 34% of the economic stake and more than 70% of the voting power in @Home.¹²⁸ In August 2001, Cox and Comcast notified @Home that they would terminate their non-exclusive distribution agreement with @Home effective June 4, 2002, moving their subscribers to their own networks and leaving TCI/AT&T as @Home's largest customer.¹²⁹ In December 2001, @Home, by then in bankruptcy, attempted to force a renegotiation of TCI/AT&T's access to the network. TCI/AT&T refused to negotiate and quickly moved all its subscribers to its own network.¹³⁰ Following TCI/AT&T's departure, @Home was left with no subscriber base and virtually worthless network assets. @Home liquidated at the end of February 2002.¹³¹

VII. CONCLUSION

@Home's experience illustrates both the value and the limitations of transactional responses to asset specificity. @Home used contractual safeguards and transactional structures that it hoped would

124. Floyd Norris, *AT&T in Deal to Avoid More At Home Stock*, N.Y. TIMES, May 21, 2001, at C12.

125. At Home Corp., Amended General Statement of Acquisition of Beneficial Ownership (Form SC 13D/A) (Jan. 12, 2001).

126. At Home Corp., Annual Report (Form 10-K), at 64 (April 2, 2001). In conjunction with terminating the exclusivity provisions, @Home agreed to transfer ownership of certain RDCs within Cox and Comcast clusters to the respective companies to facilitate their pursuing alternate high speed access options. At Home Corp., Current Report (Form 8-K), Ex. 99.01 at 6 (April 3, 2000).

127. At Home Corp., Current Report (Form 8-K), at 3 (Apr. 8, 1999).

128. Norris, *supra* note 124, at C12.

129. Cox and Comcast took slightly longer to replace the @Home network. They signed transition agreements with @Home that maintained their service until February 28, 2002, when they replaced @Home with their own networks. See Wallack, *supra* note 3, at E-1; At Home Corp., Current Report (Form 8-K), at 2 (Apr. 8, 1999).

130. An AT&T spokesman said that AT&T simply treated its TCI subsidiary as an internal customer for its networking services and created a private backbone and caching service for it. See Konrad et al., *supra* note 3.

131. *Id.*

tie the rival cable companies together in spite of incentives for each to act opportunistically. The parties hoped that a valuable network, combined with joint ownership and an exclusivity obligation, would build a self-enforcing long-term dependency on @Home. Lock-in, however, never occurred because rapid change in the industry made it impossible for @Home to create a network that was more valuable than substitutes available on the market.

Fast developments in the Internet from 1995 to 2000 largely erased the advantage that a jointly-owned network might have had over the next-best alternative. As the marketplace changed, the partners found that they could efficiently replicate many, if not all, of the services of the @Home network on their own.

The experience of @Home provides two lessons. First, *ex ante* incentives matter. Parties can use contractual and deal structures to create credible incentives that overcome the problems of asset specificity and coordinate complex, multiparty investments of the type required to build out the @Home network. This was no small feat. Had parties approached the creation of @Home in a more conventional manner (e.g., reliance on long-term supply contracts with third-party cable companies), @Home might have avoided its ultimate fate in the short term. However, it likely would have faced greater obstacles to adoption of the technology and the service. The structure developed by the parties helped to successfully coordinate complex investments in specific assets and created incentives for the broad-based adoption of cable-based Internet access.

The second lesson from the @Home story is less sanguine. When markets are subject to rapid post-contractual change, parties cannot rely entirely on transactional structures like lock-in. Rather, they may need to rely more heavily on long-term supply contracts notwithstanding the vulnerabilities of such a strategy. Had TCI, Cox, and Comcast relied on a longer-term exclusivity arrangement, the @Home network might have been able to survive for a longer period. Of course, where underlying conditions – including technology – are changing rapidly, parties will rightly hesitate to enter into long-term commitments that might become obsolete almost immediately upon signing. This leaves parties, like the parties in @Home, in a dilemma for which it remains difficult to come up with a perfect solution.

