Amazon’s strategies in the eBook and eReader markets

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Executive Summary

The eBook and eReader markets present a very interesting business environment for observing firms’ strategies. The complex interdependent structure of strategic interaction between firms in both markets creates a very unique situation. This thesis analyzes, Amazon, a specific case in these markets and explores its strategies in the both markets to determine the motivations for past actions and incentives for future actions. Given its unique and dominant position in the market it makes for a very enlightening perspective. Amazon has been the primary driver of change in the market through its actions and other firms’ reactions.

The end result of such interactions can have profound effects on consumer welfare for example in Bertrand competition prices are equal to marginal cost, but in the Diamond paradox prices are equal to the monopoly price. This thesis determined the effect of Amazon’s strategies on the consumer welfare in these markets. A more precise measurement was taken of the effect in the eBook market. The reason for this is that consumers in the eReader market have been made better off in absolute terms, which can be clearly evaluated as prices have fallen while quality has improved. The result of this can be attributed to intense competition in the market, strong substitutes and acceleration in the technology segment linked to eReaders.

The strategies in the eBooks are more difficult to determine and therefore this thesis has it as the primary focus. However the interconnectedness of the two markets makes it necessary to consider them together. The way this is done is by analyzing the markets using an integrated model constructed of several models created by other economists. The approach to using the models is to assess whether Amazon as a retailer in the eBook market would prefer to set the price under the wholesale model or let the publishers set the price under the agency model. The reason for this is that this choice of price setting behavior is determined by the firm’s strategy based on market forces. Determining the preferred price-setting model therefore provides insights into the firm’s strategies. The first model by Foros et al. (2014) considers competitive pressures and concludes that Amazon would prefer the wholesale model when the competitive pressures are lower at the retail level and prefer the agency model when competitive pressures are higher at the retail level. Two exceptions to the model are when there are externalities present or when profit maximization is not the prime objective.

One externality that is present is a negative cross spillover from the eBook market on the print book market. This means higher eBook sales decreases the number of print book sales. Guadin and White (2013) present another externality, which is the positive externality that exists between eBooks and eReaders as complementary products. These externalities cause misalignment between retailer and publisher objectives, which explains why they are exceptions to the first model. Abhishek et al. (2013) concludes that the agency model is more efficient because it reduces the problem of double marginalization. Therefore Amazon should prefer the agency model expect when there is a high level of misalignment such as when there is both negative spillover and positive externalities present.
Johnson (2013) model considers lock-in as another perspective of the eBook and eReader markets. The conclusion on the strength of lock-in in these markets is that it is strong enough in both markets for Amazon that taken together with Reimers and Waldfogel (2014) dynamic vs. static strategy it can be considered relevant. The conclusion is that Amazon will prefer the wholesale model in both periods.

The data from De los Santos and Wildenbeest (2014) can be contrasted with the theoretical conclusions. The situation in the market excludes competitive pressures from the determining strategies. The construction of the model from Abhishek et al. (2013) means that it is can correctly evaluate past actions, but cannot predict future ones. The model and its conclusions are therefore consistent with the data. Guadin and White (2013) are correct from the period 2007-2010, but after that the model does not correctly predict Amazon's actions. The data is consistent with the predictions from Johnson (2013) for the past actions in the eBook and eReader markets.

From the calculations on consumer welfare in the eBook market consumers have always been better off under Amazon’s strategies. Its actions have made consumers better off while other firms in the market have used strategies that have made consumers worse off. Considering the print market, which is a mature market, its strategies are still consumer friendly. Based on its action in the print book market and its overall business strategy Amazon does not seem to behave opportunistically instead it can be concluded that Amazon is a consumer centric company.
Introduction

In the United States the electronic markets for books and readers have grown rapidly in the last 8 years from small, niche markets into a multibillion-dollar industry. It has been interesting to watch the evolution of both markets over time and observe the changes that have occurred and how firms have adapted to these changes. The high growth has made it lucrative for firms to enter. When new firms enter there will be strategic interactions between the incumbents and the entrants. As these markets have an oligopoly structure firms are interdependent; therefore, there will also be strategic interaction between all firms in the market. At one extreme firms could begin a price war and on the other they could collude. The type of interaction will have implications for consumer welfare.

Generally in markets there is always a tension between firms’ interests and consumers’ interests; therefore, it follows that this is also the case in these two electronic markets. The purpose of this thesis is to analyze Amazon presence in both markets in the United States in order to understand its strategies and their effect on consumer welfare. Amazon makes an interesting case study because of its unique position in both markets. The Kindle was the catalyst that began the eBook revolution and now Amazon is the biggest player in both the eBook and eReader markets in the United States. It is necessary to analyze both markets jointly rather than individually because of the nature of eBooks. In order for consumers to experience any welfare from eBooks they need a platform. The eReader is a device that has been specially created as a platform for accessing eBooks. These two products are complementary in nature and what happens in one market affects the other.

The strategies in the eBook market are the more complex of the two so a larger portion of this thesis will be dedicated to analyzing it. This is because of the number of players in the eBook market that must be considered. In the eReader market Amazon is both a manufacturer and a retailer so any friction that usually exists between the two parties is internalized. In the eBook market Amazon is only a retailer so it must take publishers actions into consideration when creating a strategy. There are two models Amazon must choose between in the eBook market: the agency model where the upstream firm sets the price and the wholesale model where the downstream firm sets the price. Using models Amazon’s choice will be predicted. Comparing Amazon’s choice with the choice that is predicted will be central to the strategy analysis. Because if the strategies converge then Amazon is acting as would be expected, but if the strategies diverge then there must be some other motivation to explain Amazon’s actions.

Problem Statement

What are Amazon’s strategies in the United States’ eBook and eReader markets and what is their effect on consumer welfare? There are two objectives in this problem statement. The primary objective is to analyze Amazon’s strategies in both markets while the secondary objective is to evaluate the comparative effect its actions have on consumer welfare by assessing whether Amazon’s strategies make consumers better or worse off.
Theoretical framework
This thesis relies mostly on papers that have been published recently as they deal directly with the main issues related to the problem statement. Foros et al. (2014) discuss the effect of competitive pressures on the price, upstream and downstream, related to the agency and wholesale models. Bertrand (1883) and Chamberlain (1933) models of competitive behavior provide intuition into how firms compete. Abhishek et al. (2013) analyze the affects of spillover and positive externalities on prices and firm strategy. Guadin and White (2013) discuss the eReader as a specific positive externality in relation to the eBook market. Johnson (2013) adds another perspective of firm strategy based on lock-in, which is complemented by dynamic vs. static price maximization from Reimers and Waldfogel (2014). De los Santos and Wildenbeest (2014) provide empirical results to compare with the theoretical results.

Methodology
The methodology used in this paper follows a pyramid structure starting with a very basic model and then systematically building on it. The basic model has only one product and two upstream and downstream firms. This is broken down further by analyzing competition at each level using Bertrand and differentiated Bertrand competition. Next, the model is expanded to include spillover at the publisher level, as this is an externality it changes the decisions publishers make. The next addition adds positive externalities at the retail level with a specific focus on eReaders as a positive externality. The final development is the inclusion of lock-in as part of the model. An addendum to the models is to consider a dynamic setting rather than a static one.

When speaking about building a model it is a conceptual model constructed from the models in the theoretical framework rather than an actual mathematical model, which is beyond the scope of this thesis. The word model is used in this context to mean a nominal construct and draws upon other economists’ models to create an integrated model that can be used to explain and predict strategies in the eBook and eReader markets.

This simple format allows for a thorough and clear analysis of Amazon’s strategies. The eReader and eBook market are evaluated before beginning the analysis. Having a context allows motives and intentions to be understood more clearly because incentives and payoffs are easier to identify. The evaluation of each market is done very differently. A uniform assessment would contain elements that are unnecessary; therefore, each evaluation focuses on those elements that are the most important as contextual reference points for the analysis.

Value
This thesis attempts to assess the collective value of the work done in these two markets over the last few years. The value this thesis offers to the economic community is to create an integrated framework of the models already created. It does this from a theoretical and an empirical perspective, which gives the results more significance. The second value added is that of an explicit assessment of past and future consumer welfare under the strategies pursued by Amazon in these markets.
The eReader market

The United States’ eReader market was a niche market when Amazon introduced its first Kindle. Niche markets consist of groups of consumers (market segments) within the larger marketplace who have similar demographics, buying behavior and/or lifestyle characteristics (Thilmany, n.d.). The demand in niche markets can be quite inelastic (Bailey & Ward, n.d.) because of its unique characteristics.

When Sony first entered the market it priced its product relatively high, which is indicative of an inelastic characteristic in the market. In May 2004 Sony set a price of $376 (¥40,000) for its first eReader the Sony Librie in Japan (Smith, 2004) and $420 for an English version, which it exported (ereaderguide.info, n.d.). In 2006 it introduced the Sony PRS-500 at $349.99 (engadget.com, n.d. a). These initial prices are very possibly monopoly prices as Sony was essentially a monopolist in the market. In a technical sense it was not a monopolist; however other eReader firms were small, which left Sony with market power equivalent to a monopolist. The difference between the prices in 2004 and 2006 can be attributed to a decrease in marginal cost. Initially the eReader was produced for the Japanese market, but needed to be modified in order to sell in foreign markets. Since the monopolist maximizes its profit where marginal cost is equal marginal revenue if marginal cost decreases price will decrease.

In October 2007 Sony released the PRS-505, which was priced at $299 (engadget.com, n.d. b). Such a large drop in pricing cannot be solely attributed to another decrease in marginal cost. Its pricing was a reaction to a new entrant, Amazon, which released the first generation Kindle in November 2007 and interestingly it was priced at $399 (engadget.com, n.d. c). Amazon as a second mover and a new entrant priced its eReader $100 more than the incumbents eReader. Amazon strategy was that as consumers had inelastic demand they would be willing to pay more for a better product.

Amazon’s offering was superior in several ways, while Sony eReaders needed a pc to download books and then transfer them manually via USB, Amazon’s Kindle could download content directly via a free 3G connection. The Amazon online bookstore also had more content to choose from and purchases made on any device using the same amazon account synced automatically with the Kindle device. Amazon also had a very big customer base, which represented a large amount of potential buyers for the Kindle. Even though the market moved from a monopoly to a duopoly the price in the market didn’t decrease dramatically. The apparent pricing strategy of the firms was to continue to exploit the inelasticity of demand and share the benefits from the higher prices rather than engaging in a price war.

In October 2008 Sony introduced an improved product with a higher price tag, the PRS-700 priced at $399 which soon after the fell to $349 (the-ebook-reader.com, n.d.). Following Amazon’s strategy they increased the quality of their product so they could price it higher. They added features such as a touch screen capability, a faster processor and a built-in front light (Carnoy, 2008). In February 2009 the second generation Kindle entered the market priced at $349 (Tabini, 2010) identical to the reduced price of the PRS-700. Amazon lowered the price of the Kindle 2 in July 2009 to $299 and in October prices for the Kindle
2 were cut again to $259 (Tabini, 2010). Sony introduced two new eReaders in August 2009 priced at $199 and $299 (Carnoy, 2009).

In December 2009 a third major player entered the market. Barnes & Noble a big player in the book market decided to try and expand its eBook sales and get a portion of the profits from the eReader market. It priced its eReader NOOK 1st edition at $259.99 (The Verge, n.d.). When it entered Barnes & Noble was content to stay with the status quo and price its eReader at the same level as the other firms. However in June 2010 a price war started between the Kindle and the NOOK. Barnes & Noble decreased the price of the NOOK to $199 with 3G and $149 with Wi-Fi. Amazon responded by cutting the price of the Kindle 2 by $70 to $189 (Tabini, 2010). Sony reduced the price on all its eReaders: PRS-300 at $149, PRS-600 at $169 and PRS-700 at $299 (Hoffelder, 2010).

Figure 1 outlines the evolution of prices in the eReader market from the launch of the first Kindle till Apple’s iPad launch. There is a noticeable decline in eReader prices, which becomes quite sharp and clustered after the iPad launched in May 2010. The black line is the trend line for the prices of eReaders.

![Evolution of eReader prices](image)

Barnes & Noble went from cooperating with the incumbents to engaging in a price war. The explanation for the change in strategy can be explained by the emergence of a strong substitute product. Apple began selling its iPad, one month before the price war started (Brown, 2010). It was priced within a range of $499-$829 depending on the version (Reimers and Waldfogel, 2014). The iPad was a complete game changer for the technology industry so there was no question that it would impact the eReader market. Apple sold 3.3 million iPads in the first three months after its launch and 5 million in the next three months (timesofindia-economictimes, 2010).

Although it was technically a price war between the firms in the eReader market it was actually a reaction to an outside threat. The firms knew they couldn’t charge consumers half the price of the iPad for a product with less than half the
capabilities. Apple did not only threaten the eReader market it also threatened the eBook market. Apple launched its own online bookstore, iBooks, in April 2010 (O’Dell, 2010). Barnes & Noble used their presence in the book market to expand into the technological market while Apple used the reverse path moving from the technological market into the eBook market.

The eBook market
According to a survey by Association of American Publishers (AAP) and Book Industry Study Group (BISG) eBooks share of the trade book market (excludes educational and academic book) was 0.6% in 2008, 2.7% in 2009 and 6.4% in 2010. The size of the eBook market in 2012 was 13% of the total book market revenues and 20% of the US trade book market, which was a 45% increase from 2011 in which the eBook market was 13.8% of the trade book market (Wischenbart et al 2013). In 2013 sales in the eBook market were approximated to be 23.3% of the trade book market (Wischenbart et al 2014). In 2013 the trade book industry was approximately valued at $15.2 billion with the eBook segment worth $3.04 billion according to PricewaterhouseCoopers (PwC). The figures from BookStats valued the book trade industry at $15.05 billion and the eBook segment at $3.35 billion (Owen, 2013).

The high growth rate and expansion of the eBook market has had two implications for the book market as a whole. On the one hand it has increased the growth of the US trade book market. For example there was an overall shrinkage in 2012 in the total book market, but the trade book market experienced a growth of 7%, which came from eBooks. On the other hand it has cannibalized print sales as by the end of 2012 unit sales of print books had fallen 9%. The number of American’s over 16 reading eBooks increased from 16% to 23% this is in contrast to a decrease in the number of Americans over 16 reading print books, which fell from 72% to 67% (Wischenbart et al 2013). Because the total book market and the print book market are shrinking while the eBook market grows eBooks must have a negative cross spillover effect on the print book market.

In 2013 the growth of the eBook market seemed to have reached a period of slower more shallow growth. The initial steepness of the growth was brought on by a migration of readers from print to electronic platforms. This trend continued until the portion of readers more inclined to switch from print to digital began to reach a plateau. This happens because of frictions that are present when switching between the two markets. For example it is a much greater cost for older individuals to switch from print to digital, as it requires them to learn to operate a device. There is also the question of genuine preference as seen in a study by Scholastic Inc. that found that children (age 6-17) prefer reading print to eBooks (Williams, 2013).

Below are two graphs that clearly outline the current situation in the book market. Graph 1 shows two sets of figures, which represent growth in the eBook market as percentages. The blue line is the real figures and the red is a forecast made in 2009. The first conclusion is that although from 2007-2009 growth in the eBook market had been substantial the growth forecasted was outperformed.
by the real growth. The second conclusion is that the market is maturing, as the real data line is shallower at the end. There is a decline in growth at the end of the forecasted data line as well. Both the real and forecasted data show a trend consistent with a maturing market.

Graph 2 also shows two sets of figures. Both figures show sales in terms of revenue. The decreasing line is the print and audio sales and the increasing line is the eBook sales. The figures are within the trade book market and are forecasts by PwC. The most striking observation is that by 2017 eBooks will have more sales than print and audio within the trade book market. According to PwC the trade book market will be worth 16.1 billion in 2017 and that $8.2 billion of those sales will comprise of eBooks. Currently PwC estimates 16% of total book sales to be eBooks, but by 2017, 38% of total sales will be eBooks (Owen. 2013). This indicates that although the eBook market has slowed it will continue to grow in the future.
Major players in the eBook market

In the first quarter of 2010 Amazon’s market share was at 80%, Sony and Barnes & Noble had each 9.9%, and Kobo had 0.25% (Gilbert, 2013). Since then there have been significant changes in market. The major players in the industry now are Apple, Amazon, Kobo, Barnes & Noble, and Google. Sony decided to form an alliance with Kobo and transfer their readership to them (Owen, 2014). Sony has also closed down their reader stores all around the world except Japan (Dent, 2014). This effectively means it is not competing in either the eBook or eReader market.

A simple snapshot of market shares is difficult to find because firms do not publish their unit sales or product revenue figures. However the ranking of firms is quite clear with Amazon having the largest share, Apple and Barnes & Noble vying for 2nd place while Google and Kobo have the majority of the remaining market. There are some estimates on how much market each firm has. The Global eBook Report puts Amazon’s share of the market at 67%. It cites that earlier estimates put Apple’s share at 10%, but Keith Moerer (Apple executive) has said that Apple’s share is around 20%. One analyst for the industry said Apple’s share was around 24% (Wischenbart et al 2014). In 2013 a complete set of figures was published by BISG in Consumer Attitudes Towards EBook Reading. According to it Amazon has 67% of the market, Barnes & Noble are 2nd with 11.8%, Apple are 3rd with 8.2% and the rest of the market is classified as “other” with 12.8% with the biggest piece of “other” being taken by Kobo and Google (Perry, 2013). These figures are somewhat consistent with (Gilbert, 2013) figures that put Amazon’s share at 70%, Barnes & Noble around 19% and Apple at 10% in march 2012.

Although Amazon’s market share has fallen from 80% to 67% its sales have increased. In 2012 its sales grew by 70% while in 2013 they grew by a smaller margin of 20% (Wischenbart et al 2014). As they say, “a rising tide lifts all boats” so it seems that, as the market for eBooks grows most firms continue to experience growth in this industry segment. There have been some exceptions as was the case with Sony and seems to be the case for Barnes & Noble. Barnes and Nobles’ third quarter results in 2014 were reported to have fallen 50.4% in the Nook (B&N eReader) division while digital sales content fell 26.5%. They also announced that they would be cutting investments in the Nook division by 74% (Wischenbart et al 2014).

Compared to other firms Google has a different focus in the eBook market. Its main goal so far has been to create the largest library of digitalized works. It has had some legal issues with regard to copyright because of its scanning of various works without consent. It sells books or provides them free through its Google play store. It claims that it has 3 million eBook titles. Kobo has positioned itself as an eBook partner for independent bookstores, which means it has replaced Google in that respect (Wischenbart et al 2014). In the future Amazon’s biggest competitor will be Apple although for now Barnes & Noble are still an important rival in the market.
Pricing model developments

When Apple launched the iPad in 2010 it also launched its iBooks online bookstore thus competing as a substitute in the eReader market and a direct competitor in the eBook market. Apple’s general business model was a very different one than Amazon’s. Speaking not just of the eBook and eReader markets Amazon has a reputation as a low cost retailer and has been compared to Wal-Mart. Apple on the other hand is known for its high prices, high quality and high-end image. While Apple engages in non-price competition, Amazon uses price competition as a key component of its strategy. Apple successfully created an offering that could compete as a substitute with Amazon’s Kindle on a non-price level; however, the homogeneous nature of books made it impossible for them to do the same in the eBook market. Using the agency model would level the playing field for Apple by excluding the possibility for retailers to compete on prices.

According to De los Santos and Wildenbeest (2014) publishers had three reasons for wanting to switch to the agency model. 1) The low price that Amazon set was eroding the perceived value of books as was shown by the informal boycott of digital books priced over $9.99 (Rich, 2009). 2) Ebook sales were cannibalizing print sales, the traditional revenue source of the book industry. 3) Amazon had 80% of the eBook market and it didn’t seem like its dominance could be challenged unless firms could set the same prices without incurring loses they could not finance. Publishers were worried that if Amazon continued to dominate the market it could eventually begin to squeeze their already thin margins as Wal-Mart had notoriously done to its suppliers. This point was included in Steve Jobs arguments to convince HarperCollins to sign a deal with Apple (Albanese, 2013).

Albanese (2013) writes about the negotiations that took place between Apple and the six biggest publishers in the United States: Random House, HarperCollins Hachette, Macmillan, Penguin, and Simon & Schuster. Since neither Apple nor the publishers wished for the $9.99 pricing to continue in the eBook market they agreed to switch to the agency model. The only publisher that did not sign an agreement with Apple was Random House on the grounds that the new model was foreign to the market, which included price protection and less revenue per sale for publishers. However in March 2011 Random House also switched to the agency model (De los Santos and Wildenbeest, 2014).

De los Santos and Wildenbeest (2014) explain how the five major publishers and Apple’s agreement worked. The agreement stated that publishers set the prices of books for Apple and did not allow it to change the set price. However it included a most favored nation clause (MPN). This meant that if another retailer set a price lower than Apple’s, it was allowed to lower its price below the publishers set price to match the retailer’s price. This was the price protection Random House was concerned about as it meant that publishers had to make similar deals with all the retailers that sold their books. At the unveiling of the iPad on January 27, 2010 Steve Jobs informed the public that the price of eBooks would be the same for all retailers (Albanese, 2013).

After the switch to the agency model the price of eBooks increased sharply. Because of sharp increase in prices the US Department of Justice (DOJ) took
Apple and the five publishers to court over “[a] conspiracy to limit e-book price competition [... and have] prices stabilize at levels significantly higher than $9.99” (Archive.org, n.d.). This type of behavior is known as collusion as firms in the market worked together to set a price other than the one established through market competition. As of 2014 the court found all parties guilty and the five publishers have reached settlements while Apple has appealed the decision.

After the lawsuit a new agency model was created where publishers set the list price for the book to be sold at and receive a percentage of the price for every book sold. The main difference is that retailers are allowed to discount the list price so long as the aggregate of the discounts for given a publisher’s eBooks are not excessive (De los Santos, B. and Wildenbeest, 2014). The primary difference between old and new agency model is the disappearance of resale price maintenance (RPM). In all the models in this thesis the central difference between the agency and wholesale models concerns who sets the retail price. Although the model is referred to as a new agency model for the discussion in this thesis the model is necessarily a new type of wholesale model.

**Wholesale and Agency Models**

The pricing of eBooks is dependent on the type of pricing model used in the market. There are two types of models: agency and wholesale. Understanding how these models work and how they have been used is key to understanding pricing within the eBook and eReader markets. In most markets the wholesale model has been the most widely used model, but recently there as been a proliferation of the agency model especially within the electronic marketplace (Abhishek et al. 2012). Historically publishers have used the wholesale model in the print book market so it was naturally adopted in the eBook market when books became digitalized. This was the model under which Amazon operated until 2010 when publishers switched to the agency model (Gilbert, 2013).

In the wholesale pricing format a manufacturer sells a good to a retailer at a fixed price and the retailer then sets the market price (the price consumers buy at). In the book market publishers set an initial price for their books called a list price. The books are then sold to a retailer at a discount of the list price. The discount offered by publishers is normally around 50% of the list price. It is then up to the discretion of the retailer to decide how much to price the book. For eBooks a digital list price was created, which was 20% lower than the print list price. The 20% discount was supposed to reflect the cost difference faced by the publishers between print and eBooks (Albanese, 2013).

Under the agency format the manufacturer sets the market price of the good and uses the retailer as a platform to reach consumers. For the service provided by the retailer the manufacturer pays a fee. It is referred to as the agency model because of the principle-agent relationship between manufacturer and retailer. In the eBook market publishers also set a list price, which was discounted for consumers by publishers (see appendix 1b). The publishers paid the retailers 30% of the sale and kept 70% (Gilbert, 2013). An important part of the agency model is that retailers could not discount the eBooks and had to sell them at the price set by the publisher (Boyle, 2012).
The agency model is a pricing practice called *resale price maintenance* (RPM). Upstream firms generally use RPM as a way of dealing with an inefficiency called double marginalization. This problem occurs when the upstream and downstream firms both have market power. This allows them to set a price above the competitive price (marginal cost), which causes a welfare loss. Since the upstream firm has market power it will markup its product and then sell it to the downstream firm which will also markup the product on top of the upstream firm’s markup creating a double markup, hence double marginalization (Sanders, n.d.). Vertical integration or RPM is a way to reduce the inefficiency hence under the agency model the market should be more efficient.

(Mattewson and Winter, 1998) define RPM as *any contract in which the upstream firm retains the right to control the price at which a product is sold downstream.* They state that the closer the downstream firm’s price is to its marginal cost the better off the upstream firm is in terms of profit. This is necessarily the case as firms face a downward sloping demand curve, which implies that at lower prices a larger number of units are sold.

The graph below demonstrates double marginalization. The upstream firm sets the wholesale price ($P^W$) equal to the monopoly price ($P^M$) and the downstream sets it retail price ($P^R$) above $P^W$. When the price moves from $P^W$ to $P^R$ consumer surplus shrinks from $B+C+D$ to $D$, the upstream firm loses $A$, the downstream firm gains $B$, and $C$ is dead weight loss. The change in the summed surplus for producers (manufacturers and retailers) is negative so they are collectively worse off as $A>B$ and consumers are worse off because $B+C+D>D$ therefore double marginalization makes both the producers and consumers worse off.
Consumers are generally worse off in terms of diminished surplus when the price set by firms is above the competitive price \((P_C)\). The higher the price the smaller the consumers’ surplus will be. The conclusion from figure 4 is that firms are overall worse off under double marginalization when considering both up- and down-stream firms. However as separate profit maximizing entities they will not maximize industry profit unless it also maximizes their own profit. This can create a misalignment of objectives between firms. It is therefore necessary to explore the competitive environment firms find themselves in and under what conditions they would choose one model over the other.

**The basic model**

Foros et al. (2014) present the first set of general conditions under which one model would be preferred to the other. In their model they consider two upstream firms and two downstream firms allowing the upstream firms to sell their goods through both downstream firms. This is an important consideration for a relevant conclusion, as their model is a good representation of the players and their relationship to each other in the eBook market. They conclude that if each agreement between an upstream firm and a downstream firm allocates the same share of revenue then competitive pressures will lead one model to be more desirable to the other under a pure profit maximization strategy. In other words if the revenue share for downstream firms 1 and 2 are given as \(s_1\) and \(s_2\) respectively and \(s_1 = s_2\) then either \(\pi^d > \pi^w\) or \(\pi^d < \pi^w\) depending on competitive pressures where profit under a wholesale agreement is \(\pi^w\) profit under agency agreement is \(\pi^d\).

Competitive pressures have an influence on how prices are set therefore when there is asymmetry in up and downstream competition one model will be preferable to the other. The higher the level of competition the lower prices will be and conversely the lower the level of competition the higher prices will be. Naturally downstream firms will prefer to set prices if competitive pressure is relatively less downstream and prefer for prices to be set upstream if pressures are relatively less upstream. These results may not hold if revenue shares are not the same across firms. However in the eBook market it seemed like each retailer received a share equal to 30% so that \(s^1 = s^2 = \ldots = s^n = 30\). Additionally publishers had most favored nation (MFN) agreements with at least one firm, which restricted them from asymmetric pricing across firms.

In order to use these results to assess the eBook market it necessary to analyze the competitive environment at the publisher and retailer level. On a book-by-book basis books can be considered homogeneous products; however, since each author gives a specific publisher exclusive rights over his or her book in exchange for royalties a given publisher’s offering must necessarily be differentiated from every other publisher’s offering. It is the level of differentiation that will determine the degree of competition for publishers. The range of differentiation \((d)\) can be measured by \(d \in [0,1]\) where books are completely differentiated at zero for example a cookbook and a crime novel and move towards one when it is a copy of the same book.

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Although publishers sell differentiated products retailers do not since every publisher sells through every retailer it must follow that every retailer offers the same selection of products. As publishers offer the same list prices and approximately equal discounts to retailers, marginal cost can be assumed to be the same and constant across retailers. The usual conditions that exist in the material world do not exist in the digital world for example production takes place instantaneously and at zero cost without capacity constraints or inventory costs. All these characteristics in addition to a linear demand function are the components of Bertrand competition (Bertrand, 1883). Therefore it can be used to assess the competition at the retail level. The pricing decision range for retailer \( i \) will be:

\[
P_i \in [c, p^n]
\]

Pricing begins at marginal cost because below that firms lose money on every sale and it ends at the monopoly price because it is the profit-maximizing price. The values \( i \) can take will be restricted to two firms, which will then be used to generalize competition between all firms in eBook market. The market competition can be reduced to two firms because under Bertrand competition when a firm’s price is different from the other firms it either loses or gains the entire market, depending if it is above or below the other firms’ price, so pricing should always be clustered. If Amazon deviates from the cluster there will be two prices in the market: Amazon’s price and the cluster price. This can be expressed as:

\[
\pi(P_{Amazon}, P_{Cluster}) = \begin{cases} 
0 & \text{if } P_{Amazon} > P_{Cluster} \\
\frac{1}{n}D(P_{Amazon})(P_{Amazon} - c) & \text{if } P_{Amazon} = P_{Cluster} \\
D(P_{Amazon})(P_{Amazon} - c) & \text{if } P_{Amazon} < P_{Cluster}
\end{cases}
\]

\[
D(P_{Amazon}) = \text{Demand given Amazon's price (} P_{Amazon} \text{)}
\]

The reason why the profit is divided by \( n \) and not by two is because there are \( n-1 \) firms in the cluster so when profits must be split evenly between all firms it must be divided between \( n \) firms. Notation for the firms will be \( \text{Amazon (A)} \) and \( \text{cluster (C)} \) and their pricing choices are:

\[
P_A \in [c, p^n]; P_C \in [c, p^n]
\]

The solution for a single period game will be:

\[
(P_A^*, P_C^*) = (c, c)
\]

The reasoning for the solution is as follows. If the firms set their collectively optimal price they would set monopoly price (\( p^m \)) and each firm would earn:

\[
\pi = \frac{1}{n}D(p^m)(p^m - c)
\]
However every firm knows that if it charged \( p^m - \varepsilon \) (where \( \varepsilon \) is a very small number) it could earn:

\[
\pi = D(p^m - \varepsilon)(p^m - \varepsilon - c)
\]

If every firm deviates and charges \( p^m - \varepsilon \) then:

\[
\pi = \frac{1}{n} D(p^m - \varepsilon)(p^m - \varepsilon - c)
\]

Amazon will then come to the conclusion that every other firm will have the same idea and try to grab the entire market by charging the monopoly price minus a very small amount (\( \varepsilon \)). It will then consider charging \( p^m - 2\varepsilon \). However every other firm will make the same assumption as in the first instance. These calculations will continue until Amazon decides to set a price equal to marginal cost (\( c \)). It knows that no other firm will charge a price below \( c \) because if it did it would lose money on every unit it sells. Graphically the reaction functions for Amazon (\( R_A \)) and the cluster (\( R_C \)) are:

![Graph showing reaction functions for Amazon and the cluster](image)

At any price above marginal cost firms have an incentive to undercut each other by \( \varepsilon \). At marginal cost firms will set the same price because there is no incentive to undercut. If this were the pricing outcome for retailers the competitive pressure would be greater at the retail level and retailers would prefer the agency model.
However this one period game is more related to contract bidding than the eBook market. The model must be expanded. The eBook market more closely resembles an infinite period game. Infinite periods are the only logical way firms do not automatically end up pricing at marginal cost. In a multi-period game if Amazon deviate in the first period they will forfeit the possibility of profits from future periods as undercutting in the first period will trigger the other firms to react creating a price war until prices are equal to marginal cost. However if they believe that other firms will deviate in the first period so will they.

In a finite game firms will not forfeit any future profits if they deviate in the last period because there are no subsequent periods. This relates to the classic one period game as described above so prices will be set to \( c \). Since the equilibrium price will be \( c \) in the final period firms will not be punished for deviating in the last but one period. Therefore the same logical conclusion will be reached for the last-but-one period and the equilibrium price will also be \( c \). If the same logic is followed for every previous period the final result is that \( c \) will be the equilibrium price level in every period. The only way to avoid this is to make the end of the game unforeseeable (infinite).

In order for a firm to deviate in an infinite period game the following condition would have to hold:

\[
\pi > \frac{\pi}{n} + \delta \frac{\pi}{n} + \delta^2 \frac{\pi}{n} + \ldots + \delta^n \frac{\pi}{n}
\]

The profit from deviating the first period must be greater than the shared, discounted profit over all subsequent periods. The discounted value needed to prevent deviation is calculated below:

\[
\pi > \frac{\pi}{n} (1 + \delta + \delta^2 + \ldots + \delta^n)
\]

\[
\pi > \frac{\pi}{n} \left( \frac{1}{1 - \delta} \right)
\]

\[
1 - \delta > \frac{1}{n}
\]

\[
1 - \frac{1}{n} > \delta
\]

\[
\delta < 1 - \frac{1}{n}
\]

Assuming that when the two values are equal, instead of being indifferent, the firm will not deviate, the discount factor must be at least equal to \((1 - 1/n)\) for the firm to not deviate. As the number of firms \((n)\) grows so does the required discount factor. The discount factor is defined as:

\[
\delta = \frac{1}{1 + r}
\]
As $\delta$ increases $r$ must necessarily decrease. The smaller the value of $r$ or the larger the value of $\delta$ the more a firm will value future gains. The smaller the discount factor the more likely it is that a firm will deviate. This is because a dollar today is worth more than a dollar tomorrow and as the interest rate ($r$) increases the more valuable a dollar today becomes worth.

The discount factor is also related to the length of each period because the longer the period length the smaller the discount factor. A dollar received in ten years is worth less than a dollar received in one year. Periods in the digital market are shorter than in traditional markets because firms can discover deviation and react much quicker. Retailers do not have a very strong incentive to deviate from a set market price because it loses more than it gains from deviating.

Two additional observations can be made when the market share is not split evenly or if the market is growing. Using the market share from the BISG report the equations for Barnes & Noble and Amazon will be:

**Amazon's decision**
\[
\pi > .67\pi + .67\pi\delta + .67\pi\delta^2 + ... + .67\pi\delta^n
\]

**Barnes & Noble's decision**
\[
\pi > .118\pi + .118\pi\delta + .118\pi\delta^2 + ... + .118\pi\delta^n
\]

This is an interesting result because it is clear from the two equations that Barnes & Noble has a larger incentive to deviate than Amazon. The explanation is that Barnes & Noble gain less relative to Amazon for every period it corporates and therefore gains relatively more when deviating. This result is significant because contrary to Amazon’s reputation for low prices if Amazon’s strategy was purely profit maximization it would have more incentive for higher prices than other firms. When the market is experiencing growth firms face a further disincentive from deviating. The total profit the right hand side (RHS) of the inequality will get larger relative to the left hand side (LHS) resulting in a lower incentive to deviate. This has important implications when considering static vs. dynamic profit maximization.

The above result shows how firms will react to changes in prices. What is not clear is at what level prices will be set. From economic theory it is understood that if firms are making abnormal profit and barriers to entry are low in the long run new firms will enter the market and prices will be pushed down. This means that incumbents will either lower prices in order to keep entrants out or they will be happy to make an abnormal profit in the short run at higher prices. Regardless of their choice in the long-run competition at the retail level will be higher than at the publisher level. This means given Foros et al. (2013)’s model retailers will prefer the agency model in the eBook market.

**Spillover**
The analysis will now be broadened to include the print book market. These products are substitutes so cross price elasticity will be positive. Abhisheken et al. (2013) model first considers the outcome from spillover given a level of
competition and then includes different levels of competition at the retail level in relation to varying levels of spillover. Their model has one manufacturer (M) that sells through two electronic retailers (X and Y) that only have an online presence. In the model retailers can choose to use the agency (A) or the wholesale (R) model, but must make the decision independently and simultaneously. Although retailers choose the model they are subject to the action of the manufacturer after their choice. The possible outcomes are therefore: RR, RA, AR, AA where RA and AR are indistinguishable.

Their model contains the term $\beta$, which is equivalent to the term $d$ introduced earlier in this thesis. Where $\beta \in [0,1]$ so if $\beta=0$ then products are not substitutable and retailers can act as monopolies. If $\beta=1$ then products are perfect substitutes and competition becomes perfectly competitive. M faces a demand of $q_e = q_x + q_y$ through the electronic channel. Its demand through its traditional channels is $Q + \tau q_e$ where $\tau \in [-1,1]$. The variable $\tau$ captures the spillover effect from the electronic channels on the traditional channels.

Under these conditions their model gives the following results in proposition 1 for a given $\beta$ (see Appendix 2 for specifics):

<table>
<thead>
<tr>
<th>Spillover ($\tau$)</th>
<th>Model choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>All negative and low positive</td>
<td>AA</td>
</tr>
<tr>
<td>Medium positive</td>
<td>RA or AR</td>
</tr>
<tr>
<td>High positive</td>
<td>RR</td>
</tr>
</tbody>
</table>

Note that $\beta$ is given and not varied so the results cannot be contrasted with Foros et al. (2014). This result is based entirely on the impact of a spillover from the electronic channel on the traditional channel. The choice of model is influenced by its efficiency, which is related to the earlier discussed problem of double marginalization. Abhishek et al. (2013) explain that the agency model, with a percentage fee structure, will decrease prices relative to the wholesale model making it more efficient.

When there is a spillover effect objectives become misaligned between the manufacturer and the retailers. This is because the manufacturer wants to maximize profit from both traditional and electronic channels while retailers only want to maximize profit through the electronic channel. When there is a negative spillover effect the manufacturer will want to limit the effect, which is accomplished by raising prices in the electronic channel. Reimers and Waldfogel (2014) state that when products are imperfect substitutes then an increase in the price of one will decrease its demand while increasing demand for its substitute, which is consistent with the manufacturer increasing prices in reaction to negative cross channel spillover. Under the wholesale model this action will lead to higher retail prices and increase the inefficiency in the market by worsening the double marginalization problem. Given this outcome retailers will prefer the agency model.

When the spillover is very positive the opposite will be true. The manufacturer will want to set a price that is very low and below the efficient retail price. Retailers will want to use the wholesale model to prevent the manufacturer from...
setting retail prices that are too low and because the manufacturer will be willing to set lower wholesale prices to maximize positive spillover. When the spillover is medium there are equal benefits from channel efficiency with agency and pricing power with wholesale so the choice is mixed.

From the section on the evolution of the book market Wischenbart et al. (2013) concludes that eBook sales have cannibalized print sales. This is indicative of a negative spillover effect of eBooks on the print book market. From Abhishek et al. (2013) model the conclusion is that under a negative spillover effect retailers in the eBook market would choose the agency model. When they change the level of competition (β) they find that as β increases retailers increasingly prefer the agency model to the wholesale model. This is the same result as Foros et al. (2014) who concluded that the choice of model depends on competitive pressure.

Positive Externalities
Abhishek et al. (2013) extend their model to include positive externalities (e) at the retail level. Two examples of positive externalities that they give are complementary products and market penetration. Positive externalities are present between complementary products because sales of one product increase sale of the other. Reimers and Waldfogel (2014) note because eBooks and eReaders are complements and cross-price elasticities are negative across complements an increase eBook prices will decrease demand for both products. Conversely if the price of eBooks is lowered it will increase demand for not only eBooks, but also eReaders hence a positive externality exists. As Amazon sells both eBooks and eReaders it would want to maximize the joint profit from the two goods much like publishers wanted to maximize joint profit from both electronic and traditional channels.

If positive externalities exist then, all else being equal, retailers will want to sell more of the product than if there were no externalities. In the first case externalities are symmetric so that eX = eY. Under the agency model the only way for retailers to increase sales is by reducing the fee or the commission that they charge the manufacturer. This gives the retailer a limited amount of control over the retail price whereas with the wholesale model the retailer has direct control over the retail price.

When there are negative spillovers retailers still prefer the agency model except when the spillovers are very negative. This is because the higher the negative spillover the more misaligned a retailer and a manufacturer’s desired outcomes are. When it reaches an extreme level the increased efficiency is not enough to induce retailers to choose the agency model over the wholesale model. β is no longer considered because retailers want to reduce prices so competitive pressures can be excluded.

An interesting result from Abhishek et al. (2013) is that when the level of externalities is high enough retailers may set the retail price below the wholesale price. This is the same as a firm pricing its goods below marginal cost. The retailer does this if it believes it can recoup the losses with gains from the externalities.
In the second case externalities are asymmetric so that one retailer experiences positive externalities and the other does not. The result is that retailers choose a mixed outcome where the retailer that experience positive externalities picks the wholesale model and the retailer that doesn’t experience positive externalities picks the agency model. An important addendum to this model is that if complementary products are being sold at marginal cost, positive externalities will not be present in the form of increased profit. Rather, as Reimers and Waldfogel (2014) suggest there may be network effects or a market share gains.

Guadin and White (2013) take a more concrete look at eReaders as a complement. In their model they consider two cases: the essential case and the non-essential case. In the essential case the retailer exclusively sells a device that must be purchased for consumers to derive any utility from having eBooks. In the non-essential case the retailer loses its monopolistic market position over the sale of devices. An important assumption for their conclusions is that Marshall’s Second Law of Demand hold, which they call condition 1. This law states:

*The elasticity of demand strictly decreases, up to the point where marginal revenue reaches zero. Formally, \( \eta'(q) < 0 \), for all \( q \) such that \( MR(q) > 0 \).*

In their model the wholesale price (\( w \)) set by a publishing house (\( H \)); \( p_w \) is the final price set by a retailer (\( R \)), \( T_w \) is the price of the device set by \( R \) in the essential case. In the agency model \( R \) sets \( \alpha \), which is the share of revenue it keeps where \( \alpha \in [0,1] \), \( H \) sets the final price \( p_w \), and in the essential case \( R \) sets the device price as \( T_{\alpha} \) and the monopoly price is \( p_m \).

Their arguments for the essential case are as follows. The retailer is able to extract all possible consumer surpluses through the price of the eReader. Thus the retailer does not have any incentive to increase eBook prices when it has the power to do so, which is the case in the wholesale model. If it controls the final price the retailer will set the price of eBooks equal to marginal cost, \( p_w = w \). Given these results the publisher will set price such that \( w = p_m = p_w \).

They assume that under the agency model the retailer will keep a strictly positive share so that \( \alpha > 0 \). The publisher will then effectively face a marginal cost greater than \( c \) so that \( p_{\alpha} > p_m \). If Marshall’s Second Law of Demand holds they conclude that in the essential case the equilibrium price of eBooks will be strictly greater under the agency model than it is under the wholesale model as \( p_{\alpha} > p_m = p_w \). They continue that given these results total surplus, industry profits and the price of the device are greater under the wholesale model than the agency model. Formally: \( TS^w > TS^a \), \( \pi^w > \pi^a \), \( T_w > T_{\alpha} \).

Next they consider the non-essential case. Because the retailer no longer controls an essential device it cannot extract consumer surplus from low priced eBooks. Therefore it no longer has an incentive to price eBooks low under the wholesale model. The conclusion from this is that the wholesale equilibrium price for eBooks will be higher than the monopoly price, which creates a double marginalization problem. The agency model format is the same as in the
essential case except that the retailer has an incentive to increase $\alpha$, which will increase the manufacturer’s marginal cost by a larger margin and so $p_a$ will increase further above $p_m$. The retailer does this because he does not face the same opportunity cost that was present in the essential case.

Since under both models the price is above the monopoly price it is not immediately obvious under which model the price will be higher. However they concluded that if condition 1 holds then the equilibrium price under the wholesale model will be strictly greater than under the agency model, $p_w > p_a > p_m$. If this is the case then total surplus, consumer surplus, and industry profits will be greater under the agency arrangement than the wholesale one. Formally: $TS^w > TS^a, CS^w > CS^a, \pi^w > \pi^a$.

In the essential case retailers would prefer the wholesale model because they want control over pricing. In the non-essential case they would prefer the agency model because it more efficient.

**Comparing the theoretical models with historical data**

**2007-2010**

Around the same time that Amazon launched its Kindle, priced at $399, it was pricing most of its eBooks at $9.99. In his testimony Naggar (2013), the vice president of Kindle Content, gave some intuition into how the pricing worked. According to the testimony the price that Amazon sold these books at were around break-even. New released hard covers had a list price of $25, which meant the digital list price was $20 because of the 20% discount. Given that retailers are given a 50% discount of the list price Amazon's cost for digital books would have been $10. He admits that around 3% of the titles were sold at a loss accounting for 15%-20% of the eBook revenue. De los Santos and Wildenbeest (2014) write that the loss was roughly 10% of the titles.

The general conclusions from Guadin and White (2014) and Abhishek et al. (2013) seem consistent with what took place in the two markets in the period 2007-2010 when the market was under the wholesale model. Guadin and White (2014) predict in the essential case that Amazon as a retailer would want to price eBooks as low as possible and then extract the consumer surplus via its eReader. Abhishek et al. (2013) predict that given the high level of negative spillover effect that eBooks have on print books publishers would want to set a price higher under the agency model than the wholesale model. Because Amazon experiences positive externalities it would prefer the wholesale model so they can set prices lower and gain benefits from the externalities. Guadin and White (2014) in the essential case also predict higher prices for eBooks under the agency agreement than under the wholesale agreement. The prediction of the behavior of a profit-maximizing retailer was the same as Amazon’s actual behavior in the market.

Both models can also explain the 3%-10% of eBooks sold at loss. If positive externalities were large enough Amazon would be willing to price eBooks below marginal cost if it calculated that the gains from the externalities more than
offset the losses. Likewise Amazon could possibly extract the consumer surplus from prices below marginal cost through the price of its Kindle. Because externalities can be considered an exception to the Foros et al. (2014) conclusion their explanation of competitive pressure does not predict Amazon’s actions.

2010-2013
Guadin and White (2014) explain that Apple was not able to extract consumer surplus the same way Amazon could because iPads were bought for reasons not related to eBooks. For Apple, eBooks were a single unconnected product, which they wanted to maximize profit for individually. This is also a reflection of the asymmetric positive externalities from Abhishek et al. (2014) where the firm with positive externalities will prefer the wholesale model and the firm without externalities would prefer the agency model.

As mentioned earlier Apple and five major publishers colluded to switch to the agency model. Amazon was forced to switch to the agency model (Naggar, 2013) in April 2010 and was followed by other retailers as agreements were reached between the five publishers and the retailers (De los Santos and Wildenbeest, 2014). Average prices at Amazon went up 18.6% and 19.9% at Barnes and Noble for eBooks from the five major publishers. The biggest increase at Amazon was New York Times bestsellers, which increased by 42.7% and overall prices for New York Times bestsellers increased 40% one year after the switch to the agency model (De los Santos and Wildenbeest, 2014). This is consistent with the prediction from Guadin and White (2014) in essential case that switching from the wholesale model to the agency model will lead to higher prices. Given negative spillover and positive externalities the increase in prices was also predicted by Abhishek et al. (2013).

However in 2010 the price of eReaders fell dramatically because of internal and external competitive pressures. From the discussion on eReaders it can be concluded that Amazon was no longer able to extract consumer surplus in the eBook market, which is equivalent to the non-essential case. According to Gaudin & White (2013) rather than being forced Amazon should have been glad to accept the agency model because it could no longer extract consumer surplus. De los Santos and Wildenbeest (2014) found in the period 2012-2013 when the market switched from the agency model to the modified wholesale model Amazon’s prices decreased dramatically. This result is contrary to Gaudin & White (2014) prediction that prices should have increased as in the non-essential case the price under the wholesale model will be higher than under the agency model.

Abhishek et al. (2014) do not define what the positive externality is so even though eReader profit externalities have disappeared there may be another reason for the decrease in prices. There are several possible externalities that may account for Amazon’s decrease in prices. It may be engaging in predatory pricing to push out rivals in order to gain market share. It may be interested in gaining and retaining customers for its eBooks in order to sell them other digital content or some of the other products it offers. Amazon has also recently started its own publishing division. With its 67% market share it could squeeze publishers margins making authors worse off in the long run so that they will
sign with Amazon’s publishing division for bigger profits (Reimers and Waldfogel, 2014).

In summary Guadin and White (2013) correctly predict Amazon’s behavior from 2007-2010 and the increase in prices when the market switched from the wholesale model to the agency model in 2010. However they incorrectly predict that Amazon would prefer the agency model when it lost the ability to extract consumer surplus through eReader prices. They are also incorrect in the assumption that price should have increased when the market changed back to a wholesale model in 2012-2013. Abhishek et al. (2014) predictions accurately predict Amazon’s and the market’s behavior if there are other positive externalities other than complementary sales. Foros et al. (2013) prediction seems to confirm the presence of positive externalities, as if there were none competitive pressures would mean Amazon should have preferred the agency model.

**Lock-in introduction**

Johnson (2013) adds an important dimension to the discussion on strategy. He investigates the effects of lock-in on price levels in connection with the agency and wholesale arrangements. His model allows for market power both up and downstream, incorporates consumer lock-in and is multi-period. In the first period consumers are allowed to choose freely between retailers, but in the second period they are locked-in to whichever retailer they purchased from in the first period. If the second period market is attractive (sufficiently valuable) then in the first period wholesale model retail prices will be below agency model retail prices, but the opposite will be true in the second period.

The difference between prices in the two models is based on how publishers and retailers value consumer lock-in. Retailers have a strong incentive to lock-in consumers in the first period so that it can have monopoly power over that share of the market in the second period. As long as the market in the second period is valuable retailers will compete aggressively to maximize their share of second period consumers. If the incentive is strong enough retailers may even be willing to subsidize consumer purchases in the first period below marginal cost if they can recover the loses in the second period. Publishers on the other hand have no interest in consumers locked-in to particular retailers because publishers sell through all retailers so lock-in has no effect their revenue.

(Johnson, 2013) explains that under the wholesale model in the first period retailers will set very low prices to grab as large a share of the consumers so that in the second period they will be able to exploit their monopoly position and raise prices. Under the agency model retail competition is controlled by competing suppliers instead of retailers with monopoly power. He also adds that lock-in may not be the only reason for this pricing phenomenon. If there are network effects in the market or if an incumbent is engaging in predatory or limit pricing then the same phenomenon may be present in the market.

His model offers another exception to Foros et al. (2014) conclusion on competitive pressures. In the first period if competitive pressures are higher at
the retail level retailers still prefer to set prices. However in the second period the conclusion is compatible as competitive pressures are lower at the retail level and retailers prefer to set prices. However Foros et al. (2014) model was static based on the assumption that retailers wanted to maximize static profit. In the first period retailers want to maximize market share not profit. Because the profit-maximizing assumption doesn’t hold in the first period it explains why Foros et al. (2014) model should not apply.

**Lock-in discussion**

To assess the relevance of Johnson (2013) conclusions it is necessary to determine whether lock-in exists in the eBook and eReader markets and whether it is strong enough to create a monopolistic effect. Generally lock-in occurs when purchases are made over multiple periods and purchasing from more than one firm causes the consumer to face a cost. Lock-in can occur as a result of there being few, poor or no alternatives on the market. It can be a gradual process such as when service providers gain a good reputation through years of providing excellent service for a firm’s mission critical activities. Additionally it can be an active strategy sought by a seller by positioning its product in a way that it creates costs to discontinue its use (Shapiro and Varian, 1999).

The principle effect of lock-in is that it creates switching costs. To switch to a different provider of a service or use a different product causes the consumer to incur a cost large enough to discourage switching. There are many different ways this can happen and the cost need not be monetary although it can be measured in monetary terms especially when related to businesses. Shapiro and Varian (1999) outline the basic types of lock-in and the switching costs associated with them. The following discussion on lock-in analyzes the most relevant types presented in their book.

**Durable purchase**

Consumers face durable purchase lock-in if they purchase a relatively expensive piece of hardware. The money spent becomes sunk and usually can’t be recovered. Resale is sometimes possible although much of the value can be lost as soon it is purchased. The example most often cited is that as soon as a car is driven out of a dealership lot it loses about 20% of its value. The resale value of an eReader after a few months will generally be much lower than the original value. There are a number of reasons for this, such as, the pace at which new models are introduced to the market and the rapid progress of technology within the industry. Reselling and purchasing a device also have an opportunity cost. The lock-in consumers face is relatively weak now that Kindles and other eReaders are available at low prices. The cheapest version of the Kindle is $79 though it can be purchased at $59 when it is being discounted. Consumers face stronger lock-in for higher end Kindles. The most expensive are the Kindle Tablet fire HDX 8.9 at $594 and the Kindle eReader Voyage 3G at $289 (see Appendix 3).

Additionally lock-in occurs because once a durable product is purchased in the first period it is necessary for consumers to continue to buy other products that
are compatible with it in subsequent periods. One common example is software and hardware compatibility. The illustration Shapiro & Varian (1999) give is Bell Atlantic and AT&T where at first Bell Atlantic bought telephone switches from AT&T, but later had to buy transmission and voice messaging equipment to work with the switches. AT&T could give Bell Atlantic a good deal on the switches because it could charge higher prices for the complementary products. This type of lock-in is another perspective of Guadin & White (2013) essential case.

In markets where technological improvements are constant switching costs are lower. This is because as old technology becomes dated or obsolete it may become necessary or desirable for consumers to switch to the newer technology by purchasing a new device. The cost of switching is compensated by the better technology. Retailers also offer contract based purchases, which is a form of lock-in, but it also makes switching easier because expensive purchases can be spread over a number of months or years.

**Product compatibility**

The first eReaders had a very closed system. The Sony eReader could read BBeB, RTF, TXT and PDF (which it didn’t read very well) (Hoffelder, 2012). The first generation of Kindle could read AZW, TXT, MOBI, and PRC (amazon.com, n.d. b). Owning a Sony eReader in 2007 meant that any eBooks that were not purchased from the Sony online bookstore had to be viewed in either a TXT of RTF format. While owning a first generation Kindle meant any eBooks not purchased from the Amazon bookstore had to be viewed in a TXT format. Additionally eBooks bought from either retailer were bought in BBeB (Sony) or MOBI (amazon) format. The software and hardware from both retailers were created to integrate with their own products, but not with alien ones.

The present situation is quite different from 2007, as more eReader producers have entered the market there has been a standardization of eBook formats. Although there are a number of formats available the main formats are ePUB, PDF, Plain text, HTML and MobiPocket. Of these ePUB is the most prominent as it is a free and open format. All eReaders that have come out recently can read ePUB except the Kindle eReader although the Kindle tablets can. All devices can read PDF and Plain text and the majority can read HTML and MobiPocket. In other words the cost of switching in terms of product integration lock-in are much weaker than in the past. EReader apps have also reduced the lock-in.

**Database and Information**

Product integration is also related to database and information lock-in. The larger the product database consumers own the higher the switching cost because essentially all that information or data has to be transposed or converted to be compatible with a new piece of hardware. At the beginning of the eReader era when this type of lock-in was at its strongest it still had some weaknesses. At the time there were a range of free format converters that could be used to convert a number of input formats to produce a variety of output formats. The cost of converting the eBooks in terms of time would not be very high depending on the number of eBooks to be converted and the speed of the personal computer’s processor. Two programs available in 2007 that could manage the task were Book Designer and LIBPRS500 (Sony specific converter).
A further aspect that weakens the lock-in strength is the opportunity cost of reading a book. Once a book has been read it is less likely that the same person will read it again. This is because the opportunity cost of reading can be relatively high. This will vary between books and especially genres. Crime novels are the least likely to be reread, as their plot is a large part of their utility. Once the plot is known reading a crime novel again will not give the reader much utility compared to the opportunity cost of reading. The kinds of books that will be used repeatedly and owners would want to keep if they switched eReaders are non-fiction such as cookbooks.

These switching costs mitigate the some of the effects of technological improvements. Still this form of lock-in is weaker than in the past. However one could imagine in other industries were the opposite would be true. Take for example a large firm that uses spreadsheets as an important part of its work. If the firm used Lotus 123 for years it would have a large amounts of data encoded in this format. If it wanted to start using Microsoft Excel instead there would be an enormous cost to switching. These costs not only include the actual change over, but the cost of down time and learning to operate the new software.

**Brand specific training**

These additions costs are connected with a type lock-in Shapiro and Varian (1999) call brand-specific training. The cost grows the more complex and the more integral the training is for operations. Generally speaking the longer a system is in place the higher the cost of switching. This is evident from the fact that the longer employees use a system the more knowledge and know-how is gained so when the system is no longer used all that expertise is lost and additionally new skills must be learned.

**Psychological costs**

Learning to use a new product may have other costs beyond training. Once a consumer is familiar with a certain product they may not want to switch because of how comfortable they are with it. Psychological costs can result from developing an emotional connection or forming of a habit. There is a psychological tendency to stay with the things you know well such as a particular restaurant, route to work, supermarket, city, vacation spot or product. Overcoming the inertia of moving from something well known to something unknown can have a considerable psychological cost for a consumer. Some forms of psychological costs are easier to overcome than others. Generally it can be quite difficult to overcome an emotional connection whereas a behavioral connection (habit) is easier to overcome. Loyalty is an indicator of how strong a connection a consumer has formed with a brand or product.

**Loyalty programs**

To increase loyalty for their products firms use loyalty programs. Shapiro and Varian (1999) call loyalty programs an artificial lock-in because they are a construct of a firm’s strategy. Loyalty programs don’t just decrease customer migration they can also increase spending, lower service cost, create more opportunity for upselling, and increase referrals. The idea behind loyalty programs is that consumers are rewarded for making repeat purchases from the
same firm. Consumers are faced with the switching cost of lost rewards if they don’t make repeat purchases from the same firm.

Loyalty programs can be categorized according to the loyalty-pricing scheme (Butscher, 1999). The two loyalty-pricing schemes that are the most relevant to Amazon strategy are multi-product pricing and two-part tariff. One form of multi-product pricing is tie-in sales. This is related to complementary products like printers and toner or cars and replacement parts. Under the wholesale model Amazon used a tie-in loyalty-pricing scheme with its kindle. Once a consumer purchases a Kindle they will go on to buy its complementary products, eBooks, at low prices.

Amazon has also been using a version of tie-in called loss leader. The idea of a loss leader strategy is selling a product at a loss to attract customers who will eventually buy other products sufficient enough for the seller to make a profit. The 3%-10% of eBooks sold at a loss qualify as loss leaders. In 2012 HIS Suppli estimated that Amazon’s Kindle fire’s cost price was $210 and their sales price was $199, which implies an $11 loss on each device sold (Garrity et al., 2012). On 60 minutes Jeff Bozes made a statement that the Kindle Fire HDX was sold at cost price. The strategy is to make a profit by selling digital content (Bezos, 2013). Bozes’ comment also made a direct reference to a loss leader strategy for eReaders and eBooks. Amazon Prime has also been being used as a loss leader (Tuttle, 2013; Rogowsky, 2014).

Amazon Prime is Amazon’s major loyalty program. It is a yearly subscription based loyalty program that offers a number of benefits to subscribers. At a flat payment paid up-front it offers a number of free or discounted products and services including buying or loaning eBooks (amazon.com, n.d. a). This is a two-part tariff strategy. By charging a flat upfront payment and then giving discounts to consumers it is optimal for them to purchase more units because the average cost per unit decreases as it is spread over more purchases. Kindle Unlimited gives a subscriber unlimited access to 700,000 eBooks as well as thousands of audio books (amazon.com, n.d. c). Since the subscribers pay nothing additional for each book they borrow their marginal cost is zero so the average cost decreases very quickly the more they read.

**Search costs**

Search costs are one of the most common forms of switching costs. A consumer behaving rationally will try to find the best value offer on the market. He will continue to search for the best value offer until the additional cost of searching (s) is equal to the marginal benefit or utility (μ) it provides (The Economic Times, n.d.). Anderson & Renault (1999) explain how lower search costs would allow buyers to search more and as a result lower prices would be expected. Conversely it can be reasoned that if search costs were higher, consumers would search less and prices would increase.

The most extreme case of the effect of search costs is the Diamond Paradox presented by Diamond (1971). The Diamond paradox can be contrasted with Bertrand competition as it follows similar reasoning, but ends up with the opposite conclusion. Whereas Bertrand (1883) concluded that firms would
charge a price equal to marginal cost Diamond (1971) predicts monopoly prices when search costs are included in the model. Anderson & Renault (1999) provide a summary of the Diamond Paradox. They present it as two parts. In the first part, given that search costs are positive, the only equilibrium for Diamond’s model is one where every firm sets the monopoly price and this equilibrium is reached regardless of the number of firms in market. The second part’s conclusion is that at equilibrium buyers will no longer search.

Diamond’s model can be deconstructed using the two firm market structure constructed earlier for evaluating the Bertrand model. Like the Bertrand model products are homogeneous so that consumers will always buy from the cheapest firm. Suppose initially firms do not include the effect of search costs in their strategy. The conclusion will be the Bertrand model equilibrium where prices are set at marginal cost. Now beginning at marginal costs firms will include search costs in their strategy.

Assume that Amazon set a price equal to \( c + s \). If consumers shopping at Amazon decide to search elsewhere they will only be able to increase their utility by \( s \) as products are homogeneous and other firms are charging \( c \). However by searching they must necessarily incur a search cost \( (s) \). Therefore the consumer will decide not to search. Amazon can set a price higher than other firms without losing market share therefore earning a higher profit. The other firms will by the same reasoning conclude that Amazon will increase its price by \( s \). They will then suppose they can raise prices \( 2s \). Again \( \mu = s \) so consumers will not search and firms make a larger profit. Firms will continue this stepwise reasoning until all firms charge the monopoly price.

Diamond’s second conclusion is reached by assuming that consumers will be able to reach the same conclusion as the firms and therefore will assume that incurring a search cost will not increase their utility since all firms will charge the monopoly price. The paradox of this model is that by adding search costs firms that normally would charge the competitive price will move to other extreme and charge the monopoly price.

Anderson & Renault (1999) rightly point out that Diamond’s model is based solely on price, as consumers are only interested in finding a better price. It does not include the search costs incurred by consumers looking for a product they like better. They conclude that product differentiation can resolve the Diamond Paradox. They argue that as long as differentiation is present in the market prices will fall with search costs. Diamond’s model is presented as a limit case when search costs are high or product differentiation is low. Davis & Holt (1993) have also investigated the Diamond Paradox and conclude that monopoly prices are not generally observed.

Davis & Holt (1993) explanation for their conclusions is based on the behavior of individuals. The Diamond model does not hold up because sellers do not realize that they can include search costs in the price of their offering and they also find it difficult to learn the repetitive “price-plus-shopping-cost” logic required to create the monopoly result. Instead Davis & Holt (1993) attribute the effect of search costs to the general effect switching costs have on price. When search costs act in this capacity they make moving between firms more difficult for
consumers, which increase the market power of firms allowing them to increase prices.

Bakos (1997) additional insight is that when search costs are reduced for differentiated products prices may actually increase. This is also consistent with the precious discussion of lock-in. When consumers know which firm offers the product that most satisfies them, they are likely to be demotivated to continue searching when making repeat purchases. If the firm recognizes this behavior in its customers it will be able to increase its price because it knows that its customers benefit more from buying its product than they would by purchasing it from another firm.

**Strength of Lock-in in eBook and eReader markets**

Lock-in begins with search costs because before consumers can buy a product they must search for it. A consumer can choose any platform to access eBooks, but must have one in order to do so. The search cost for information for the first platform must be incurred or it can be assumed that every consumer is aware of at least one platform. After that consumers must decide whether to incur search costs to become informed about other platforms. Firms advertise to try to reduce this cost in relation to their own offering. Search costs lock-in is not particularly strong in the eReader market since there is a degree of product differentiation and the cost of searching is relatively low to the utility of the information.

Once a consumer has purchased a particular platform they face durable lock-in and compatibility lock-in. This type of lock-in is weaker than in the past due to standardization of formats and free, powerful converts. However the battle for standardization still exists in the eReader market as Kindle eReaders don’t read ePub and NOOK eReaders don’t read MobiPocket. Database lock-in also exists to a degree. Consumers face psychological and learning costs related to eReaders, which reflects the level of loyalty consumers have for products. The loyalty programs, Amazon Prime and Kindle Unlimited, lock-in eBook consumers through attractive prices for repeat purchases. As eBooks are homogeneous products search costs can have a considerable impact on eBook prices.

Amazon’s customers face lock-in at two levels. First they face lock-in for eReaders through a unique user experience, brand loyalty and database lock-in. Second they face lock-in when buying its eBooks through format incompatibility and loyalty programs. Additionally search costs exist in both markets and increase consumer lock-in. The combined lock-in at both levels provides enough evidence for Johnson (2013) model to be useful.

Price elasticity can be extrapolated as a measure of lock-in strength. If one firm faces more inelastic demand for eBooks than another firm then it must have higher switching costs. Amazon claims its demand is very elastic with an own price elasticity of -2.24, which means by reducing prices from $14.99 to $9.99 it can increase eBook sales by 74%. Just like Apple’s claim that it had 20% of the eBook market it is difficult to know if these figure are true especially when there studies that point to an opposite result. Reimers & Waldfogel (2014) found Amazon’s own price elasticity to be approximately between -0.39 and -0.54.
Chevalier & Goolsbee (2003) find that Amazon has an own price elasticity print books to be -0.45, which is close to Reimers & Waldfogel (2014) figures. Amazon’s figure means that lock-in may be quite weak however the other figures mean that lock-in is strong enough to support Johnson (2013) conclusion.

**Analyzing the eBook and eReader markets**

When the market switched from the wholesale model to agency model prices increased. This observation is consistent with (Johnson, 2013). When the market switched from the agency model to the altered wholesale model the prices went back down. This may contradict the model because the prediction is that in the second period prices would be higher under the wholesale model than the agency model. To evaluate the prediction it is necessary to understand what a period represents.

It is possible to divide the timeline into periods under certain assumptions. If market growth is taken into consideration then until the market reaches a plateau large numbers of consumers enter the market. If a firm increases its price it will lose most of the consumers who enter the market. Therefore a period of high growth could be considered period one in Johnson (2013) model. If these assumptions are accepted then the market reacted as he predicted where in period one prices would be lower under the wholesale model than the agency model.

This explanation is an example of a concept discussed earlier, static vs. dynamic pricing. Reimers and Waldfogel (2014) explain when firms are looking to maximize profit dynamically their prices will be below the static profit maximizing level. Consumers that have already purchased a Kindle and have purchased eBooks from its online store are locked-in. Amazon could raise prices for those consumers, but it would price itself out of the market for new consumers entering the market. Therefore the dynamic price will be lower than the static price. In the long run once the market reaches maturation the optimal profit maximizing strategy would be to raise prices.

From the analysis of the eBook market in 2012 when the market switched back to a wholesale model the market was still experiencing high growth. Given the above definition of periods Johnson (2013) model correctly predicts that prices should have decreased. Interestingly Wischenbart et al. (2013) write that in 2013 the eBook market began maturing. De los Santos and Wildenbeest (2014) find that by extending their timeframe to the first five months of 2014 the average prices at Barnes and Noble and Amazon have begun increasing since the beginning of 2014. Adjusting their sample for titles within 180 days since their release, prices at Barnes and Noble are higher than agency prices. Doing the same for Amazon its prices have begun increasing dramatically since 2014. If this trend in prices continues it will be consistent with both Johnson (2013) and Guadin and White (2014) predictions. Lock-in also implies lower competitive pressures at the retail level so an increase in prices complies with Foros et al. (2013) conclusion.
Table 12 (see Appendix 4) taken from De los Santos & Wildenbeest (2014) gives some insight into Amazon’s current pricing strategy. The table shows that Amazon’s prices for the six biggest publishers were 82% of the digital list price. The conclusion from this is, assuming that Amazon makes the usual 30% fee, the average price for books is not below marginal cost. Around 15% of eBooks are sold at less than 70% of the digital list price, which indicates they are being sold at a loss. A large share of these books are bestselling books, while books sold at 85% of list price are in the lower half of the sales rank distribution. This result is consistent with the discussion on loss leader strategies and Amazon’s pricing in 2007. Interestingly Barnes & Noble have an average price of 98% of the digital list price. This is an indication that Amazon experiences positive externalities from the sale of eBooks so it prices its eBooks lower in order to capture it.

Johnson (2013) also makes exceptions for positive externalities. He says that if these externalities exist then prices may not increase. This is the same conclusion from Abhishek et al. (2013). Given the possibility of positive externalities the increase in price may be an abnormality. Without conclusive evidence it is difficult to predict what strategy Amazon will use. However there is one more reference point that can be used to predict future prices.

The print book market has been a mature market for many years. In a mature market a firm would pursue a static profit maximizing strategy. Reimers & Waldfogel (2014) find that Amazon prices books in the print book market well below static profit levels. From their calculations they estimate the marginal cost in the market to be $13.56; however, for Amazon to be profit maximizing given the price it charges the marginal cost would have to be $2.93. In the non-self publishing eBook market the marginal cost is estimated to be $9.23 and the marginal cost needed for a profit-maximizing outcome given the current price set is $-6.24. Given this result it is very probable that Amazon’s strategy in the eBook market will be similar to its strategy in the print book market.

Additionally Amazon’s eBook and eReader strategies need to be considered within the context of Amazon’s overall strategy. Jeffrey Bezos writes to Amazon’s shareholders that Amazon’s strategy is market leadership. The metrics that are used to assess its position are customer and revenue growth, strength of its brand, and repeat purchases. He emphasizes the focus on customers calling it a “customer obsession” (Bezos, 2013b). Below is a table that shows Amazon’s profit and revenues (see Appendix 5). The increase in revenues is consistently growing while the profit fluctuates, which indicates that Amazon’s focus is its revenue while its profit is a secondary focus of that strategy. In financial terms Amazon pursues a growth strategy instead of a profit strategy.

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<tbody>
<tr>
<td>Revenue</td>
<td>$ 74,452</td>
<td>$ 61,093</td>
<td>$ 48,077</td>
<td>$ 34,204</td>
<td>$ 24,509</td>
</tr>
<tr>
<td>In millions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profits (loss)</td>
<td>$ 274</td>
<td>$ (39)</td>
<td>$ 631</td>
<td>$ 1,152</td>
<td>$ 902</td>
</tr>
<tr>
<td>In millions</td>
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However the strategy for eReaders is subject to the competitive forces in the market. Despite lock-in, eReader prices face strong downward pressure. Technological progress in the market means that durable lock-in is weak. Substitute products also put downward pressure on prices. There are relatively cheap tablets available for example Amazon sells its Kindle tablet for $199. Because of substitute cross price elasticity if eReader prices increase consumers will stop buying eReaders and start buying tablets. Amazon’s competition in the tablet market is much stronger than the eReader market so it will not want consumers to switch markets. Amazon will follow a tie-in strategy for its eReaders in order to sell a larger volume of eBooks.

**Welfare calculations**

Brynjolfsson, Smith & Hu (2003) use a model for calculating consumer surplus that can be adapted to determine the change in consumer welfare (see Appendix 6). Assuming that the number of new eBooks available over a period approximately stays the same their model can be used by substituting the price for eBooks already available for eBooks that are newly introduced. The model will then be:

\[
CV = -\frac{p_1x_1 - p_0x_0}{1 + pe}
\]

[9]

Where CV is consumer surplus, \((p_1, x_1)\) are price and quantity after the pricing model is changed, \((p_0, x_0)\) are the price and quantity before the change in model. By using the price elasticity \((pe)\) the equations can be rewritten because a small change in price \(\Delta p\) will lead to a change in quantity that is equal to \(\Delta p^* pe\).

\[
CV = -\frac{(1 + \Delta p)p_0(1 + \Delta p^* pe)x_0 - p_0x_0}{1 + pe}
\]

[10]

The average price at the six major publishers was slightly below $9.00 in 2010 and $6.20 at non-major publishers (Gilbert, 2013) (see Appendix 7). At that time Amazon had an 80% share of the market; however it quickly declined to 70% after Apple’s entry (Gilbert, 2013). The size of the market in 2010 was $1.52 billion and in 2011 it was $2.31 billion. That puts Amazon’s share of the market at $1.064 billion in 2010 and 1.617 billion in 2011. When the agency model was adopted in the market prices at Amazon increased by 18.6% at the five main publishers. According to Gilbert (2013) their share of the market was 48.8%. Using the largest range of price elasticities from Amazon’s calculations of -2.24 to Reimers & Waldfogel (2014) lower bound of -0.39 the change in consumer surplus is calculated below. Under the agency model consumer welfare, for people buying eBooks at Amazon, decreased between $214 million and $325 million in 2010 and 2011 (see Appendix 8).

<table>
<thead>
<tr>
<th>(\alpha)</th>
<th>-2.24</th>
<th>-0.39</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 CV in million</td>
<td>-129</td>
<td>-85</td>
</tr>
<tr>
<td>2011 CV in million</td>
<td>-196</td>
<td>-129</td>
</tr>
</tbody>
</table>
De los Santos & Wildenbeest (2014) found that the eBooks being sold under the agency model in 2012 decreased in price by 18% at Amazon. It was only the six major publishers using the agency model and the their market share was 67%. The size of the market in 2012 was $3.35 billion. The increase in consumer welfare at Amazon in 2012 was between $302 million and $183 million (see Appendix 9).

<table>
<thead>
<tr>
<th>$\alpha_1$</th>
<th>-2.24</th>
<th>-0.39</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 CV in millions</td>
<td>0.183</td>
<td>0.302</td>
</tr>
</tbody>
</table>

These numbers are just an estimation of the welfare. There are number of assumptions that may not reflect the real numbers in the market. The market shares for publishers were assumed unchanged from those in 2010 even though prices increased. This may be true because the market size is measured in revenue not sales. The increase in price may have been enough to offset the loss in sales so that revenues were approximately the same. The impact of this is ambiguous as revenue may have increased or decreased at the publishers. The result would either be an over or under calculation of the impact welfare depending on the effect.

Market shares at Amazon are also assumed to reflect the total eBook market shares. That is, since the five publishers had a 48.8% market share in the total eBook market they also had an equivalent 48.8% market share at Amazon. This assumption seems reasonable since Amazon has a 67%-70% share of the total market and allow any publisher to use their services as a retailer. If this was not the case it is more likely that the big publishers had a larger share at Amazon because Google and Kobo have been representing many independent publishers. If this were the case consumers would have been an extra degree worse off under the agency model and an extra degree better off after the switch back to the wholesale model. Lastly Since the price increase began in early 2010 and ended in early 2012 the complete revenue from 2010 and 2011 is used since sales revenue from every month is not available. As the eBook market has been growing the impact on consumer welfare will be under calculated.

**Conclusion**

This thesis has used several models to create and integrated framework for the eBook and eReader markets. This allows for a more precise evaluation of historical and future strategies. Competitive pressures can be used to predict prices except when there are positive/negative externalities or when firms are pursuing a dynamic lock-in strategy. When publishers are faced with negative cross spillover from electronic books on their traditional print book channel they will to raise prices of eBooks in mininize the negative effect. If Amazon experiences positive externalities from eBooks it will prefer lower prices. In the case of complementary eReader and eBook markets Amazon set low prices in the eBook market and high prices in the eReader market.

This was the situation from 2007-2010. While Print sales fell dramatically electronic sales grew rapidly. While publishers experienced the negative
spillover effect from low priced eBooks, Amazon enjoyed the positive effects on its eReader sales. In this setting Amazon behaved as a static profit-maximizing firm would. Even though consumers experienced large surpluses in the eBook market Amazon was able to extract it through the pricing of the Kindle; however, even before prices went up in the eBook market prices had already started to fall in the eReader market. This implies that although Amazon benefited from the increased sales of Kindles it also had other reasons for its low price strategy.

Because of Amazon’s pricing in the eBook market there were no abnormal profits to be made in the long run so it was not an attractive market for firms in the enter. In addition consumers faced switching costs, which made the market even less attractive. Apple knew it would earn very low profits in the eBook market when it launched iBooks so it colluded with the 5 biggest publishers to switch from the wholesale model to the agency model. Amazon did not want to accept the agency model, but had to capitulate as the 5 publishers controlled nearly 50% of the market. The change in models caused eBook prices to go up 18.6%. At this time eReader prices were near marginal cost so Amazon could not benefit from positive externalities from increased eReader profits, which meant given Guadin and White (2013) conclusion they should not have had to be forced into accepting the model. Prices fell 18% when the market switched back to the wholesale model, which also contradicts their model.

Johnson (2013) and Reimers and Waldfogel (2014) provided an explanation for the decrease in price. Lock-in and a dynamic profit-maximizing pricing strategy can explain Amazon’s low pricing before and after the agency model period. In a market with high growth Amazon would not want to raise prices until the market became a mature market. Since the eBook market is relatively young the model predicts that Amazon’s prices should remain low. Now that the market is maturing Amazon may begin to increase prices. De los Santos and Wildenbeest (2014) find that in the beginning months of 2014 prices at Amazon and Barnes and Noble began to increase.

In the future if Amazon’s growth slows or shareholders become dissatisfied with consistently low profits it may be forced to revise its strategy and raise prices. Amazon’s strategy may also be predatory in nature. It may be trying to push competitors out of the market and accumulate market share. This change in the market share could definitely be categorized as a positive externality. Both of these issues raise questions about Amazon’s consumer friendly prices.

However this is too short a period of time to predict future prices. The print book market is a mature market and Amazon continues to pursue a low price strategy in it. In addition Amazon has always made slender profits. Its share value comes from its high growth. Shareholders have been very generous over the years and allowed Amazon to continue with its strategy of low profits and high growth. Using an adaptation of Brynjolfsson, Smith & Hu (2003) model consumer surplus was always larger when Amazon set its own prices then when publishers set them. Consumers have been increasingly better off in the eReader market as new technologies have made devices better and prices have decreased near marginal cost. Now Amazon sells its latest Kindles at cost and tries in make a profit from selling digital content.
The conclusion from this thesis is that instead of waiting for the second shoe to drop Amazon's strategy should be interpreted as consumer friendly. Most of the evidence from Amazon's actions point to Amazon being a customer focused firm. The brand loyalty ranking shows the direct effect Amazon's strategy has on its customers. In 2008 it was ranked 11th and by 2011 it had reached 1st place. In 2014 Amazon's tablets were the highest ranked brand in the US (Passikoff, 2014; Keys, 2012)

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Appendix

Appendix 1 – Screen shots from De los Santos and Wildenbeest (2014)

Figure 1: Screenshot of *True Compass: A Memoir* (Amazon.com)

(a) February 2010

(b) May 2010
Appendix 2 – Figures from Abhishek et al. (2013)

(a) Model choices with competition and spillover

(b) Selling formats in equilibrium

(a) In the lighter region, retail prices under reselling are lower than retail prices under agency selling.

Figure 7: Price comparison and equilibrium sales formats for $\xi_1 = \xi_2 = 1$.

(b) Model choices with competition, spillover and externalities
Appendix 3 – Screen shots from Amazon.com

(a)

(b)

(c)
### Appendix 4 – Table 12 from De los Santos and Wildenbeest (2014)

**Table 12: Retailers’ E-book Pricing Strategies under the Wholesale Model**

<table>
<thead>
<tr>
<th></th>
<th>E-books</th>
<th>Print books</th>
<th></th>
<th>Amazon</th>
<th>B &amp; N</th>
<th>BAM</th>
<th>Amazon</th>
<th>B &amp; N</th>
<th>BAM</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Panel A: Average price/list price</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Big Six</td>
<td>0.821</td>
<td>0.978</td>
<td>0.958</td>
<td>0.734</td>
<td>0.747</td>
<td>0.747</td>
</tr>
<tr>
<td><strong>By Publisher</strong></td>
<td></td>
<td></td>
<td>Harper Collins</td>
<td>0.821</td>
<td>0.979</td>
<td>0.998</td>
<td>0.737</td>
<td>0.760</td>
<td>0.783</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Hachette</td>
<td>0.894</td>
<td>0.996</td>
<td>0.738</td>
<td>0.852</td>
<td>0.696</td>
<td>0.784</td>
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<td></td>
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<td>Simon and Schuster</td>
<td>0.818</td>
<td>0.890</td>
<td>0.983</td>
<td>0.724</td>
<td>0.744</td>
<td>0.793</td>
</tr>
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<td></td>
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<td>Macmillan</td>
<td>0.819</td>
<td>0.988</td>
<td>1.000</td>
<td>0.721</td>
<td>0.741</td>
<td>0.742</td>
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<td>Penguin</td>
<td>0.798</td>
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<td>0.971</td>
<td>0.756</td>
<td>0.709</td>
<td>0.769</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Random House</td>
<td>0.807</td>
<td>0.974</td>
<td>0.975</td>
<td>0.704</td>
<td>0.728</td>
<td>0.722</td>
</tr>
<tr>
<td><strong>By Sales-rank Percentiles</strong></td>
<td></td>
<td></td>
<td>Most popular 1%</td>
<td>0.697</td>
<td>0.859</td>
<td>0.853</td>
<td>0.620</td>
<td>0.620</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1-5%</td>
<td>0.752</td>
<td>0.804</td>
<td>0.893</td>
<td>0.644</td>
<td>0.637</td>
<td>0.659</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5-15%</td>
<td>0.734</td>
<td>0.887</td>
<td>0.885</td>
<td>0.647</td>
<td>0.659</td>
<td>0.661</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15-30%</td>
<td>0.765</td>
<td>0.900</td>
<td>0.956</td>
<td>0.696</td>
<td>0.693</td>
<td>0.654</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30-50%</td>
<td>0.827</td>
<td>0.997</td>
<td>0.976</td>
<td>0.737</td>
<td>0.757</td>
<td>0.755</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>more than 50%</td>
<td>0.854</td>
<td>0.999</td>
<td>0.977</td>
<td>0.778</td>
<td>0.798</td>
<td>0.793</td>
</tr>
<tr>
<td><strong>Panel B: Price/List Price Distribution (%)</strong></td>
<td></td>
<td></td>
<td>Less than 0.5</td>
<td>4.0</td>
<td>1.0</td>
<td>0.0</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5 to 0.7</td>
<td>16.8</td>
<td>3.1</td>
<td>2.2</td>
<td>36.3</td>
<td>32.7</td>
<td>32.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.7 to 0.9</td>
<td>60.9</td>
<td>5.8</td>
<td>17.3</td>
<td>52.7</td>
<td>48.2</td>
<td>54.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>More than 0.9</td>
<td>24.3</td>
<td>91.9</td>
<td>80.5</td>
<td>10.8</td>
<td>22.1</td>
<td>13.5</td>
</tr>
</tbody>
</table>

_Notes:_ Panel A presents average prices as a proportion of their list price for different retailers and by percentiles of the sales-rank distribution. For e-books we use the digital list price, for print books we use the list price for the calculation, similarly we use the Kindle sales rank to e-books and the print book sales rank for the print edition. In Panel B, the table presents the distribution of observations for different ranges of the proportion of prices to their digital list prices. The number of observation is 1,413. Data is for June 18, 2014.

### Appendix 5 – Income statement from Bezos (2013b)

**Statements of Operations:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(in millions, except per share data)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net sales</strong></td>
<td>$ 74,452</td>
<td>$ 61,093</td>
<td>$ 48,677</td>
<td>$ 34,204</td>
<td>$ 24,509</td>
</tr>
<tr>
<td><strong>Income from operations</strong></td>
<td>$ 745</td>
<td>$ 676</td>
<td>$ 826</td>
<td>$ 1,406</td>
<td>$ 1,129</td>
</tr>
<tr>
<td><strong>Net income (loss)</strong></td>
<td>$ 274</td>
<td>$(39)</td>
<td>$ 631</td>
<td>$ 1,152</td>
<td>$ 902</td>
</tr>
<tr>
<td><strong>Basic earnings per share (1)</strong></td>
<td>$ 0.60</td>
<td>$(0.09)</td>
<td>$ 1.39</td>
<td>$ 2.58</td>
<td>$ 2.08</td>
</tr>
<tr>
<td><strong>Diluted earnings per share (1)</strong></td>
<td>$ 0.59</td>
<td>$(0.09)</td>
<td>$ 1.37</td>
<td>$ 2.53</td>
<td>$ 2.04</td>
</tr>
</tbody>
</table>

Weighted average shares used in computation of earnings per share:

- Basic: 457, 453, 453, 447, 433
- Diluted: 465, 453, 461, 456, 442

**Statements of Cash Flows:**

- Net cash provided by (used in) operating activities: $ 5,475 | $ 4,180 | $ 3,903 | $ 3,495 | $ 3,293
- Purchases of property and equipment, including internal-use software and website development: (1,444) | (3,785) | (1,811) | (979) | (373)

**Free cash flow (2):** $ 2,031 | $ 355 | $ 2,029 | $ 2,516 | $ 2,920

**Balance Sheets:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(in millions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>$ 40,159</td>
<td>$ 32,555</td>
<td>$ 25,278</td>
<td>$ 18,797</td>
<td>$ 13,813</td>
</tr>
<tr>
<td><strong>Total long-term obligations</strong></td>
<td>$ 7,433</td>
<td>$ 5,361</td>
<td>$ 2,625</td>
<td>$ 1,561</td>
<td>$ 1,192</td>
</tr>
</tbody>
</table>
Appendix 6

Total effect of the change on consumer welfare

[1] \[ CV = e(p_{e0}, P_{n0}, u_t) - e(p_{e1}, P_{n1}, u_t) \]

Derivation to split total effect into variety effect and price effect

[2] \[ CV = [e(p_{e1}, P_{n0}, u_t) - e(p_{e1}, P_{n1}, u_t)] + [e(p_{e0}, P_{n0}, u_t) - e(p_{e1}, P_{n1}, u_t)] \]

If new product introduction is assumed to be zero over the period such that \( P_{n0} = P_{n1} = P_n \)

\[ CV = e(p_{e0}, P_n, u_t) - e(p_{e1}, P_n, u_t) \]

Demand function

[4] \[ x(p, y) = Ap^{\rho_x}y^\delta \]

Roy’s identity

[5] \[ x(p, y) = -\frac{\partial v(p, y)}{\partial p}/\frac{\partial v(p, y)}{\partial y} \]

Indirect utility function

[6] \[ v(p, y) = -A\frac{p^{1+\rho_e}}{1+pe} + y^{1-\delta} \]

Expenditure function

[7] \[ e(p, u) = [(1 - \delta)(u + \frac{Ap^{1+\rho_e}}{1+pe})]^{1/(1-\delta)} \]

Combining [3] and [7]

[8] \[ CV = \left[\frac{1-\delta}{1+pe}\right]^{1/(1-\delta)} y^{-\delta} (p_{e0}x_0 - p_{e1}x_1) + y^{(1-\delta)} \]

Based on prior research income elasticity (\( \delta \)) is assumed to be zero

[9] \[ CV = -\frac{p_{e1}x_1 - p_{e0}x_0}{1+pe} \]

[10] \[ CV = -\frac{(1 + \Delta p)p_{e0}(1 + \Delta p^* pe)x_0 - p_{e0}x_0}{1+pe} \]
Appendix 7 – Figure from Gilbert (2013)

Figure 3: The average per unit e-book prices at Amazon of each First Wave Agency Publisher increased significantly when it switched to agency

Appendix 8

<table>
<thead>
<tr>
<th></th>
<th>Δp</th>
<th>1+Δp</th>
<th>pe</th>
<th>Δp*pe</th>
<th>1+Δp*pe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>0.186</td>
<td>1.186</td>
<td>-2.24</td>
<td>-0.41664</td>
<td>0.58336</td>
</tr>
<tr>
<td>2011</td>
<td>0.186</td>
<td>1.186</td>
<td>-2.24</td>
<td>-0.41664</td>
<td>0.58336</td>
</tr>
<tr>
<td></td>
<td>0.186</td>
<td>1.186</td>
<td>-0.39</td>
<td>-0.07254</td>
<td>0.92746</td>
</tr>
<tr>
<td>2011</td>
<td>0.186</td>
<td>1.186</td>
<td>-0.39</td>
<td>-0.07254</td>
<td>0.92746</td>
</tr>
<tr>
<td>p0x0</td>
<td>0.519232</td>
<td>0.35923843</td>
<td>-0.1599936</td>
<td>-1.24</td>
<td>-0.1290271</td>
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<tr>
<td>2010</td>
<td>0.789096</td>
<td>0.54594787</td>
<td>-0.2431481</td>
<td>-1.24</td>
<td>-0.1960872</td>
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<td>0.519232</td>
<td>0.57113836</td>
<td>0.05190636</td>
<td>0.61</td>
<td>-0.0850924</td>
</tr>
<tr>
<td>2011</td>
<td>0.789096</td>
<td>0.86798</td>
<td>0.078884</td>
<td>0.61</td>
<td>-0.129318</td>
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</table>

Appendix 9

<table>
<thead>
<tr>
<th>Δp</th>
<th>1+Δp</th>
<th>pe</th>
<th>Δp*pe</th>
<th>1+Δp*e</th>
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<tbody>
<tr>
<td>-0.18</td>
<td>0.82</td>
<td>-2.24</td>
<td>0.4032</td>
<td>1.4032</td>
</tr>
<tr>
<td>-0.18</td>
<td>0.82</td>
<td>-0.39</td>
<td>0.0702</td>
<td>1.0702</td>
</tr>
<tr>
<td>p0x0</td>
<td>p1x1</td>
<td>p1x1 - p0x0</td>
<td>1+pe</td>
<td>CV $bn</td>
</tr>
<tr>
<td>1.503815</td>
<td>1.73032563</td>
<td>0.22651063</td>
<td>-1.24</td>
<td>0.18266986</td>
</tr>
<tr>
<td>1.503815</td>
<td>1.31969391</td>
<td>-0.1841211</td>
<td>0.61</td>
<td>0.30183786</td>
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