Secondary Markets

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Revised

Abstract

There is a broad and growing literature on secondary markets, partly inspired by the increased ability of consumers to resell and distribute items over the internet. In this entry I consider when secondary markets exist and discuss the existing theoretical and empirical literatures on both the performance of secondary markets and on how secondary markets affect welfare and what happens in primary markets.

Keywords secondary markets, primary markets, resale, used goods, durable goods, perishable goods.

JEL Classifications D2, D4, D6, D8, K21, L1, L8

A secondary market is a market where a good or asset can be reallocated. Examples include markets for used durable goods, such as cars, academic textbooks or DVDs; markets for tickets to events, which will not have been used when they are resold; markets for rights, for example to spectrum, emission rights for pollution or the right to receive life insurance payout upon death; and most financial markets, where sales in the primary market, for example, for US treasury bills, may also be limited to a small subset of dealers. A secondary market is defined by its relationship to the primary market where the good, asset or instrument is initially transacted. Examples of primary markets would include the market for new cars, event tickets sold by a sports team or an event organizer and auctions conducted by the Federal Communications Commission or the US Treasury. Sometimes, but not always, primary market sellers (producers or retailers) play some

role in the secondary market: for example, Ticketmaster operates platforms for selling event tickets in both the primary and secondary market, and for many events listings from both markets are now posted side-by-side; similarly, new car dealers may sell both new cars and used cars, and academic bookshops may sell new textbooks and also resell used books. One can also view settings where a manufacturer sells new units to a distinct group of intermediaries who may then compete with the manufacturer for sales to final customers as being a type of secondary market. For example, a film distributor may distribute movies for screening in cinemas, but also sell the rights for films to be shown on on-demand or on cable television at a later date. An auto manufacturer sells cars to consumers but also sells large numbers of cars to rental and leasing companies, which may create competition in both the new and the used auto market.

Secondary markets have attracted interest from both theoretical and empirical economists. The obvious benefit of a secondary market is that it can allow existing units to be efficiently re-allocated to the people who value them most. However, it is not necessarily the case that a primary market seller benefits from the existence secondary market and economics can help to identify when restrictions on the secondary market are good for sellers and when they may benefit society. Welfare considerations are important when primary market sellers, ranging from life insurance companies to music publishers to event organizers, have lobbied for legal restrictions on secondary markets, often with some success. On the other hand, in some cases, such as the film industry, it is primary market buyers (cinemas), that have lobbied for restrictions on the ability of upstream firms to distribute films to other channels (Kendall and Schwartzel, 2018).

This entry will discuss the insights that economics can provide about three questions:

(1) When do secondary markets with significant volume exist? What types of legal restrictions limit or regulate secondary market activity?
(2) What factors affect the performance of secondary markets?
(3) How does the existence of secondary markets affect welfare, and pricing and sale strategies in primary markets?

Of course, these questions will touch on topics, such as adverse selection, that are not unique to settings with secondary markets and readers are recommended to look at entries on durable goods

and adverse selection amongst others for more detailed discussion of topics that will be discussed briefly here.

When Do Secondary Markets Exist?

Identifying the welfare effects of a secondary market requires an understanding of why the secondary market exists in the first place.

There are active secondary markets for many used durable goods. Gavazza et al. (2014) report that there were roughly four times as many used as new car transactions in the US in 2000, and Edmunds (2018) estimates that 10 million used cars were sold in the second quarter of 2018. Gartner (2015) predicted that consumers worldwide would trade-in or resell 120 million smartphones in 2017, with many of the used units moving internationally. For many durable goods it is natural to assume that quality depreciates over time, in which case the existence of an active secondary market can be rationalized by the existence of heterogeneous consumers with different valuations for product quality. Consumers who value quality the most will periodically buy new units from a manufacturer and, when doing so, they will sell their old unit in the secondary market to a consumer with a lower valuation of quality. This transaction may happen either directly or through some type of trade-in. Used units may be re-sold multiple times until they are scrapped.

Heterogeneous valuations may also lead the primary market seller to attempt to third-degree price discriminate in the primary market. A manufacturer may sell used goods as part of a price discrimination scheme (Shulman and Coughlan (2007)) or a resale market may arise as some strategic buyers attempt to arbitrage prices in different markets. This can also happen for goods that are not used, such as prescription pharmaceuticals that are sold at very different prices in different countries (Lichtenberg (2011)) and electronics and fashion goods that are transacted in so-called "grey markets". The US and EU courts have both held that certain types of grey market sales are legal even when manufacturers actively try to suppress them (Antia et al. (2004), Dove and Hamilton (2008)). Less legitimate sales of pirated digital products, such as DVD and software, may occur because technology allows a valuable product to be duplicated at minimal cost. Often in these markets, however, primary market sellers will try to operate their own schemes to sell to lower valuation buyers in a way that they can control: for example, film distributors will sell film

rights to television channels several months or years after film release, and fashion good manufacturers may operate discount mall outlets that are relatively distant from major cities.

In some settings secondary markets can be rationalized by the existence of consumers whose values of a product may change over time even if consumers are ex-ante identical. For example, Courty (2003) presents a two-period model of the market for event tickets. In the first period consumers do not know their value of attending the event, but this is revealed in the second period. Courty shows it can be optimal for the event organizer to sell tickets to uninformed consumers in the first period and to allow resale in the second period. This conclusion would be reinforced if there are also some informed consumers who have a preference for buying their tickets early (Sweeting (2012)). More generally it is surely quite common for some people to buy tickets in advance and then find out that they are unable to attend and to want to resell them. This may be particularly common for sports events where many consumers purchase a bundle of tickets for a large number of home games (81 in the case of a Major League Baseball season ticket). There has been a progressive relaxation of the legal restrictions limiting resale of tickets in most US states, although restrictions on selling close to venues and limitations on markups above face value remain in many places (Courty (forthcoming)). For example, in New York the maximum resale price is 45% above face value, plus reasonable service charges, for tickets to venues that hold more than 6,000 people. There has also been increased cooperation with primary market sellers, with Ticketmaster providing both primary market and secondary market platforms for event organizers and teams in all major sports leagues in the US having partnerships with some type of secondary ticket platform since 2008. Some of these partnerships also try to place some restrictions on secondary market pricing: for example, the New York Yankees have tried to impose a floor on secondary market prices (Courty (forthcoming)).

Changing valuations or needs can also explain the existence of secondary markets for life insurance (Doherty and Singer (2003), Daily et al. (2008)). A life insurance policy holder may find out that she no longer has a need for insurance or that she has a current need for cash. In this case, she may be willing to sell the policy, for a cash sum that is less than the death benefit but above the surrender value offered by the insurer, to a third party life settlement company that will pay the premia and collect the death benefit when she passes away. Life settlement transactions usually involve people over 65 who are in relatively good health. "Viatical" settlements may be used by

younger people who experience a negative, and likely terminal, health shock and the viatical settlement market grew rapidly in the 1980s during the AIDS crisis. A further, and simple, example of changing valuations creating a secondary market comes from the market for academic textbooks (Chevalier and Goolsbee (2009)). Students will usually only have a high value of a textbook during the semester when they are taking the course for which the text is required. A further example of changing valuations generating trade concerns the market for spectrum: new services and an evolving market place for existing services may mean that the allocation of spectrum achieved in an initial FCC auction becomes far from optimal. In evidence before the FCC in 2000, Peter Cramton argued that ‘‘secondary markets are essential for the efficient and intensive use of spectrum. Secondary markets identify gains from trade that are unrealized by the primary market which, in this case, is the FCC spectrum auctions.” Mayo and Wallsten (2010) document the rapid growth of the secondary market for spectrum in the US between 1994 and 2009 as the FCC made the process for approving transfers and leases of spectrum more straightforward.

Secondary markets may also exist because of mispricing or sales restrictions in the primary market. Many people have argued that concert tickets are often systematically underpriced, either because of the artist’s desire to cultivate fan loyalty or to generate buzz around the event. Even if the average ticket for an event is not underpriced, primary market ticket pricing within a venue is often coarse so that there will be significant excess demand for the best tickets. Of course, underpricing does not necessarily imply that a secondary market will exist, because the consumers who value seats the most could simply expend the most effort (for example, by standing in line or its online equivalent) to secure their seats in the primary market. But in practice, underpricing creates opportunities for specialist re-sellers with low queuing costs to secure seats in the primary market and make a profit by reselling them. While most discussion has focused on underpricing, tickets may also be overpriced in the primary market especially if they are set before some relevant information about demand (such as the performance of the home team this season) is known. In this case, the event organizer and a fan who does not want to see a losing team may both try to sell tickets in the secondary market.

Regulation may also restrict participation in the primary market, so that many buyers have to use the secondary market to acquire an asset. The most obvious example is the market for US Treasury

bills (Bikchandani and Huang (1993)) where only a select group of approved dealers is able to submit competitive bids in the primary market auction. The broader set of investors therefore has to participate in the secondary market to initially secure these valuable assets as well as to refine their portfolios. The average daily trading volume for treasury bills was over $500 billion in 2016 (Statistical Abstract of the United States 2018, p. 768).

As already mentioned, a number of different types of legal restrictions may affect secondary markets. These restrictions can be classified into a number of different categories. The first type of restrictions are consumer protection laws that try to address the adverse selection problems that arise when units are durable and differ in quality, and sellers are small and possibly difficult to track down. Examples include restrictions on secondary markets for event tickets introduced in the UK Consumer Rights Act of 2018, federal and state laws affecting what information and protections dealers have to provide in used car markets (Federal Trade Commission, 2016), and investor-protection laws that affect the sale of mortgages or consumer-debt by banks which led to a number of lawsuits following the 2008 financial crisis (US Department of Justice, 2018). As these rules may encourage buyers to participate in secondary markets, one can often interpret consumer protection restrictions as encouraging the growth of these markets.

The second type of restriction are, in contrast, aimed at limiting or shutting down secondary markets, including explicit bans on resale that are supported by law. In some cases, such as rules restricting the ability of consumers to buy prescription drugs from Canadian pharmacies, one can interpret the rules as being motivated by either a desire to protect consumers or a desire to protect the profits of manufacturers. An area of the law that is frequently challenged concerns the ability of primary sellers of digital products, such as software, books or music, to prevent buyers from selling their copy of a product once they have used it. For example, a 2012 decision by the European Court of Justice in *UsedSoft vs. Oracle*, permitted purchasers of a product to sell license seats that they did not use (Stothers, 2012). The attempt by software manufacturers to limit resale is clearly motivated by a desire to protect primary market profits.

The third type of restrictions are also try to limit secondary market sales, but are primarily aimed at protecting primary market buyers (not the sellers). A good example concerns restrictions on the time window after a movie's theatrical release that the movie can only be shown at cinemas, before

distribution on DVDs or pay-per-view television channels can begin. These restrictions, which in the United States can be traced back to the Paramount restrictions on studios that were negotiated in the late 1940s and early 1950s, are motivated by protecting movie theaters, and it is currently being argued that the window should be eliminated or shortened (Macnab et al., 2017, Kendall and Schwartzel, 2018).

What Factors Affect the Performance of Secondary Markets?

Many secondary markets are fairly unconcentrated with large numbers of potential buyers and sellers. While this might lead one to expect that market power would not be a significant problem, a number of factors, mostly connected with types of information imperfection, may lead many secondary markets to operate inefficiently. I describe several different frictions here. Empirical work estimating the magnitude of different frictions is quite limited, but researchers have often estimated "transaction costs", which can be thought of as capturing the cumulative effects of different frictions, to be substantial. For example, Gavazza et al. (2014), who measure transaction costs using the difference between the buy and sell prices of used cars, find that they amount to 15% of purchase prices for one-year old cars and more than 50% of prices for cars that are more than ten years old.

Akerlof's (1970) classic analysis of adverse selection was motivated by the used car market. Adverse selection arises because the quality of different units varies, and can be more accurately determined by a seller than by a potential buyer before the transaction takes place. As the seller will be more willing to sell a low quality unit at a low price, the market can unravel so that only the very lowest quality units are sold.

While adverse selection seems like a compelling theory in the context of the used car market, the market clearly exists and the empirical evidence on adverse selection is mixed (Genesove (1993), Emons and Sheldon (2009), Engers et al. (2009)). Hendel and Lizzeri (1999a) present a model where there is asymmetric information about product quality, but significant gains from trade can still exist because many potential sellers in the used car market will be people who value quality highly (leading them to want to replace their old vehicle with a new one) and so will tend to be

selling higher quality cars. This improves the mix of cars that are being sold at a given price. One explanation for the increasing role of leasing in the primary market for new vehicles is that car manufacturers understand that this can improve the performance of the used car market by ensuring that there will be a relatively steady flow of quite new, high quality vehicles into the secondary market (Hendel and Lizzeri (2002)). Researchers have also looked for evidence of adverse selection in other settings: for example, Gilligan (2004) shows that, in the market for used business jet aircraft, brands that tend to depreciate more quickly are traded less, whereas if buyers have heterogeneous valuations for quality then we would expect these units to be transacted more quickly under full information.

A severe form of adverse selection arises when sellers can make explicitly fraudulent statements about the products that are being sold. For example, the secondary market for event tickets was long associated with shady characters standing outside venues and selling tickets that might not prove to be legitimate. In the absence of a legally enforceable sales contract a buyer has little recourse when the product proves fraudulent. One might expect that the problems of fraud, and adverse selection more generally, would become more severe when trying to complete secondary market transactions remotely over the internet. However, the internet has also facilitated the creation of marketplaces which have been able to overcome some of these problems quite effectively. For example, Stubhub, the largest US secondary marketplace for event tickets, guarantees buyers that they will receive legitimate tickets for seats that are at least as good as those purchased on its site. By holding credit card and other information on sellers it is able to discipline its sellers from committing fraud. In the market for used business equipment, marketplaces such as eBay and Ritchie Brothers Auctioneers, which sell used construction vehicles using online and onsite auctions, also offer quality assurance for buyers against large undisclosed quality defects. The ability to provide this type of guarantee, as well as their role in bringing a large number of buyers and sellers together, is one explanation for why these marketplaces are able to charge commissions that are higher than the fees that sellers would have to pay to post classified advertising on platforms such as Craigslist.

Some degree of market power for individual sellers can also arise in secondary markets because of search costs and product differentiation. Sweeting (2012) finds that there is significant price dispersion in both transaction and list prices charged for similar tickets for the regular season Major

League Baseball games, and the demand estimates imply that sellers can increase prices above their value of holding on to the ticket quite substantially. The perishability of tickets, which lose their value when the event is held, also leads to systematic dynamic pricing by sellers who tend to lower prices as an event approaches. The declines are large: for example, list prices fall by around 40% in the month leading up to a game. Dynamic pricing may also be driven by the incentives of inexperienced sellers to learn about demand, as they may start off trying to sell at a high price and then lower the price if the good remains unsold. The tendency of sellers to lower prices over time may cause additional search by buyers as they may look at what is available repeatedly in search of the best deal. The degree of price dispersion, a high level of commissions, some of which may only be apparent to a buyer when it comes to complete a transaction, may be one reason why secondary markets for event tickets are often regarded as less "fair" than the primary market (Shapiro et al. 2016). Marketplaces such as Stubhub have responded to the existence of search costs by developing search tools and rankings that help buyers to identify listings that represent a favorable trade-off between quality and price. Search costs may also be significant in many financial secondary markets that have traditionally been viewed as fairly frictionless. For example, Brancaccio et al. (2017) show how imperfections in information can lead to large bid-ask spreads and trading motivated simply by the desire to acquire information in the US market for municipal bonds.

Since 2007 Stubhub has operated as a purely list price market. Additional search costs and frictions may arise when used goods are transacted using auctions, where a buyer may be uncertain whether she will get the item being sold even if her bid is the highest when it is made, or when it is necessary for the buyer and the seller to bargain over prices, as is common in many decentralized markets for used durable goods, such as cars (Larsen (2014)). On the other hand, auctions and bargaining may appeal to sellers when there is some uncertainty about potential buyers' willingness to pay, especially if it is costly to maintain the item in the secondary market while buyers are searching. In the context of secondary markets for event tickets on eBay, Bauner (2015) also shows that that sellers may choose to use different types of sales mechanism to strategically soften price competition.

How Do Secondary Markets Affect the Primary Market and Welfare?

I now address the question of how the existence of secondary markets affects primary markets and welfare. I will primarily focus on whether the existence of a secondary market benefits primary market sellers (I will follow the literature by mainly focusing on the case of primary market monopoly) in the sense of raising their profits, and how primary market sellers may change their selling strategies to either limit the secondary market or, if they benefit from the secondary market, to try to make it work better.

Two countervailing factors determine whether a primary market seller benefits from the existence of a secondary market. The first factor is that someone buying a good in the primary market will usually value it more if they have the option to resell it later if someone else values it more than they do. In this case, the existence of the secondary market will raise the willingness to pay of the primary market buyer and benefit the seller, all else equal. The second factor is that the secondary market may provide competition to the primary market seller, reducing its ability to raise prices, thereby lowering its profits.

In the context of durable goods, a literature has shown how the balance of these two factors can depend on the details of a model. This occurs both in discussions of whether a primary market seller will try to shut down the secondary market entirely or whether they will choose to make the products sold in the primary market less durable than the social planner would choose to do. Swan (1980) proposed a model where, as long as purchasers of a product always account for resale values and do not throw away products that others are then able to salvage and use, the seller (Alcoa in his example) is not harmed by the secondary market. Swan's earlier work (Swan (1970, 1972), Sieper and Swan (1973)) had shown that a primary market seller's durability choices would be optimal in the context of a model with homogenous consumers, full commitment and the ability of consumers to use multiple units of a depreciated good to achieve the same service quality as when they use a new unit.

If secondary markets raise the profits of primary market sellers this may have additional welfare benefits when these profits allow the creation of new and better products, which require the payment of significant fixed or sunk costs, and may require the producer to face a great deal of uncertainty. For example, by the early 1990s theatrical box office revenues made up less than 25%

of the total revenues for a US movie, with the other streams coming from video (now DVD) sales and rentals and television performance (Young et al., 2010). Of course, if secondary markets diminish the profits of primary market sellers, as argued by the pharmaceutical industry for example (where the secondary market undermines price discrimination) then their existence could cause fewer products to be developed (Lichtenberg (2011)).

Hendel and Lizzeri (1999b), Rust (1986) and Waldman (1996, 1997) have shown that Swan's predictions change under different assumptions. A major reason is that competition from older vintages can reduce the ability of the primary market seller to set the price that it would like for new units. To get the intuition, consider a nondurable market where consumers have heterogeneous tastes for quality. The logic of second degree price discrimination suggests that the primary market seller would like to reduce the quality of the product sold to all consumers who value quality less than the maximum in order to be able to extract more surplus from consumers who value quality the most. With a competitive and efficient secondary market for used units, and optimal durability, used units will typically be too attractive to the consumers whom the primary market firm would like to buy new units. Additional reasons to shut down the secondary market may come from an inability of the primary market seller to commit to not lower its new good prices as the used market grows.

There has been relatively little empirical work estimating how secondary markets for durable goods affect primary market seller profits. Chevalier and Goolsbee (2009) examine the US market for academic textbooks and argue that, as long as students correctly anticipate how revision policies will affect resale prices, which their analysis suggests is the case, that textbook publishers do not have incentives to kill off (or limit) the market for used textbooks by inefficiently introducing new editions. Chen, Esteban and Shum (2013) consider a dynamic model with oligopoly sellers of new cars in the primary market, and consumers with heterogeneous preferences for quality who are able to buy in the primary market or in the secondary market where they may have to pay transaction costs. They estimate that competition from the secondary market can reduce primary market seller profits by as much as 35%. Of course, taking the supply of new units as fixed, heterogeneous consumers may benefit from the existence of secondary markets which both increase the number of products that are available and provide competition to the primary market seller. Gavazza et al. (2014) also estimate the welfare effects of shutting down the

market for used cars in the United States, although their model of primary market competition is more restricted. They estimate that total welfare would fall by 2-3%, but that there would be a large decline in consumer surplus, especially for poorer households who would end up with no vehicle, and a large increase in primary market sales. Clerides (2008) provides a particularly nice example of the benefits of secondary markets to consumers. Prior to 1993 imports of used cars into Cyprus were restricted, and Clerides shows that the removal of the restriction created consumer benefits of $2,000 per purchaser per year after the restrictions were removed.

For markets that do not involve durable goods, the secondary market will tend to increase willingness to pay in the primary market if it can result in units being allocated to those who value them most. The importance of this effect will depend on the heterogeneity in consumer valuations and the allocative efficiency of the primary market. Leslie and Sorensen (2013) estimate a model of concert ticket markets to understand the interactions between the primary and secondary markets, allowing for transaction costs and broker intermediaries. They show the secondary market improves the allocation of tickets and total surplus, partly because primary market pricing is too coarse, but that a lot of the surplus created by re-allocation is captured by brokers who compete with fans for tickets in the primary market. They predict that the welfare of concert attendees would actually fall significantly if the secondary market was made frictionless. Bennett et al. (2015) suggest that the secondary market has different effects on primary market event organizers depending on the level of demand: for high demand events, the option value effect dominates so that the existence of the secondary market allows sellers to charge higher prices, whereas, for low demand events, the secondary market provides competition and they argue that organizers of low demand events have responded by moving them to smaller venues.

In the early 2000s, a number of papers considered the effect of elicit file-sharing (a `black' secondary market) on sales of music or DVDs of films in the primary market. Theoretically one could rationalize either a large substitution effect, where file-sharing decreases purchases, or stories where consumers only download files for which they would be unwilling to pay the primary market price or they use downloads to sample music ahead of purchase, in which case downloading could actually increase sales. The bulk of the evidence, much of it discussed in Liebowitz (2014), suggests that illegal file-sharing explains most of the large decline in music sales that occurred in the early 2000s, and that downloading continued to decrease legal music sales even once services

such as iTunes, which were designed to provide a legal downloading service, became available (Waldfogel (2010)). Once again, this question is important partly because negative effects on revenues would be likely to diminish the number oor quality of works that are created.

Primary market sellers may change their selling strategies in various ways in response to the possibility of secondary market transactions. For example, primary market sellers may encourage the leasing, rather than the sale, of new products, although adopting a strategy of only leasing is currently prohibited for dominant sellers under US antitrust law. Leasing may be motivated either by a desire to limit the secondary market, by restricting the number of units that enter the market, or by the desire to make it work more effectively by reducing the possibility of adverse selection, because leased units are likely to enter the secondary market at the end of the lease terms regardless their quality (Waldman (1997), Hendel and Lizzeri (1999a)). Daily, Hendel and Lizzeri (2008) present a model of contracting in the life insurance market when insured consumers can potentially resell the policy in the life-settlement market. They show that the possibility of resale may lead the life insurer to require premia to be front-loaded, which may be undesirable if incomes tend to grow over time.

Most models of primary-secondary market interactions assume a single primary market seller. Shulman and Coughlan (2007) consider a model, motivated by the market for textbooks, where manufacturers (i.e., publishers) sell to retailers who can choose to participate in the secondary market, where they buy back books from students who have finished courses and resell them to later generations of students. In their setting, the existence of the secondary market, operated through the retailer, can allow for price discrimination which raises the profits of the distribution channel. The paper lays out how the contract between the publisher and the retailer may be adjusted to account for the secondary market. The integration of primary and secondary markets for sports events has also been driven by a desire of sports teams to capture some of the rents generated by re-allocation in the secondary market. The use of paperless tickets, where someone has to present the credit card used for the transaction in order to secure admission, can be viewed as a way that event organizers, who can re-issue the tickets when an approved secondary market transaction takes place, are able to create market power in the secondary market, although it also helps to provide additional protection against fraud.

A separate literature has considered how the possibility of resale can affect auction or mechanism design. Most of the auction literature considers only the immediate post-auction allocation, but many auctioned assets, including treasury bills (Bikhchandani and Huang (1993)), rights to cut timber (Haile (2001)) and spectrum (Mayo and Wallsten (2010)) are resold. Haile (2000) shows how the possibility of resale in a model where bidders are uncertain of their final valuations during the initial auction, changes primary auction bidding strategies and optimal reserve price policies. Garrett and Troger (2006) show that the possibility of resale by a speculator can create differences in the expected revenues of different auction formats even under symmetric, independent private values where revenue equivalence would hold if resale was not possible. Calzolari and Pavan (2006) consider a more general mechanism design problem when there is a monopolist primary market seller and resale, where the resale price is determined by bargaining, is possible. They show that the possibility of resale can have substantial effects on the optimal mechanism used in the primary market which may include the use of random allocations, which are chosen in order to make it possible that a buyer in the secondary market will have a high value.

References

Antia, Kersi D., Mark Bergen, and Shantanu Dutta. "Competing with gray markets." *MIT Sloan Management Review* 46, no. 1 (2004): 63.

Akerlof, George A. "The market for "lemons": Quality uncertainty and the market mechanism." *The Quarterly Journal of Economics* 84, no. 3 (1970): 488-500.

Bauner, Christoph. "Mechanism choice and the buy-it-now auction: A structural model of competing buyers and sellers." *International Journal of Industrial Organization* 38 (2015): 19-31.

Bennett, Victor M., Robert Seamans, and Feng Zhu. "Cannibalization and option value effects of secondary markets: Evidence from the US concert industry." *Strategic Management Journal* 36, no. 11 (2015): 1599-1614.

Bikhchandani, Sushil, and Chi-fu Huang. "The economics of treasury securities markets." *Journal of Economic Perspectives* 7, no. 3 (1993): 117-134.

Brancaccio, Giulia, Dan Li and Norman Schurhoff, "Learning by trading: the case of the US market for municipal bonds." Working paper, Princeton University, 2017.

Calzolari, Giacomo, and Alessandro Pavan. "Monopoly with resale." *RAND Journal of Economics* 37, no. 2 (2006): 362-375.

Chen, Jiawei, Susanna Esteban, and Matthew Shum. "When do secondary markets harm firms?." *American Economic Review* 103, no. 7 (2013): 2911-34.

Chevalier, Judith, and Austan Goolsbee. "Are durable goods consumers forward-looking? Evidence from college textbooks." *Quarterly Journal of Economics* 124, no. 4 (2009): 1853-1884.

Clerides, Sofronis. "Gains from trade in used goods: Evidence from automobiles." *Journal of International Economics* 76, no. 2 (2008): 322-336.

Courty, Pascal. "Ticket pricing under demand uncertainty." *Journal of Law and Economics* 46, no. 2 (2003a): 627-652.

Courty, Pascal. "Some economics of ticket resale." *Journal of Economic Perspectives* 17, no. 2 (2003b): 85-97.

Courty, Pascal. "Secondary Ticket Markets for Sports Events." in Handbook of Sports Economics, forthcoming, SAGE Publishing

Daily, Glenn, Igal Hendel, and Alessandro Lizzeri. "Does the Secondary Life Insurance Market Threaten Dynamic Insurance?." *American Economic Review* 98, no. 2 (2008): 151-56.

Doherty, Neil A., and Hal J. Singer. "The benefits of a secondary market for life insurance policies." *Real Property, Probate and Trust Journal* (2003): 449-478.

Dove, Ronald G and Hope Hamilton. "Combat Grey Market Goods in the US", *Managing Intellectual Property*, November 2008, available at https://www.cov.com/files/Publication/6c6c6077-89f7-4155-9d79-6a1754a1a2e1/Presentation/PublicationAttachment/66a867f6-2999-4eae-9ebe-714e35e5df58/Combat%20Grey%20Market%20Goods%20in%20the%20US.pdf

Edmunds, "Used Car Report Q2 2018", 2018, available at https://static.ed.edmunds-media.com/unversioned/img/car-news/data-center/2018/aug/used-car-report-q2.pdf

Engers, Maxim, Monica Hartmann, and Steven Stern. "Are lemons really hot potatoes?." *International Journal of Industrial Organization* 27, no. 2 (2009): 250-263.

Emons, Winand, and George Sheldon. "The market for used cars: new evidence of the lemons phenomenon." *Applied economics* 41, no. 22 (2009): 2867-2885.

Federal Trade Commission. "Buying a used car." November 2016, available at https://www.consumer.ftc.gov/articles/pdf-0077_buyingausedcar.pdf

Garratt, Rod, and Thomas Tröger. "Speculation in standard auctions with resale." *Econometrica* 74, no. 3 (2006): 753-769

Gartner, “Gartner Says Worldwide Market for Refurbished Smartphones to Reach 120 Million Units by 2017”, press release, February 18, 2015, available at https://www.gartner.com/newsroom/id/2986617

Gavazza, Alessandro, Alessandro Lizzeri, and Nikita Roketskiy. "A quantitative analysis of the used-car market." *American Economic Review* 104, no. 11 (2014): 3668-3700.

Gilligan, Thomas W. "Lemons and leases in the used business aircraft market." *Journal of Political Economy* 112, no. 5 (2004): 1157-1180.

Genesove, David. "Adverse selection in the wholesale used car market." *Journal of Political Economy* 101, no. 4 (1993): 644-665.

Haile, Philip A. "Partial pooling at the reserve price in auctions with resale opportunities." *Games and Economic Behavior* 33, no. 2 (2000): 231-248.

Haile, Philip A. "Auctions with resale markets: an application to US forest service timber sales." *American Economic Review* 91, no. 3 (2001): 399-427.

Hendel, Igal, and Alessandro Lizzeri. "Adverse selection in durable goods markets." *American Economic Review* 89, no. 5 (1999a): 1097-1115.

Hendel, Igal, and Alessandro Lizzeri. "Interfering with secondary markets." *RAND Journal of Economics* (1999b): 1-21.

Hendel, Igal, and Alessandro Lizzeri. "The role of leasing under adverse selection." *Journal of Political Economy* 110, no. 1 (2002): 113-143.

Kendall, Brent and Erich Schwartzel. “Now showing: US mulls changing movie rules for the big screen.” *Wall Street Journal*, December 2, 2018, available at: https://www.wsj.com/articles/now-showing-u-s-mulls-changing-movie-rules-for-the-big-screen-1543755602

Larsen, Bradley. “The efficiency of real-world bargaining: Evidence from wholesale used-auto auctions.” Working paper No. w20431. National Bureau of Economic Research, 2014.

Leslie, Phillip, and Alan Sorensen. "Resale and rent-seeking: An application to ticket markets." *Review of Economic Studies* 81, no. 1 (2013): 266-300.

Lichtenberg, Frank R. "Pharmaceutical companies’ variation of drug prices within and among countries can improve long-term social well-being." *Health Affairs* 30, no. 8 (2011): 1539-1544.

Liebowitz, Stan J. "How much of the decline in sound recording sales is due to file-sharing?." *Journal of Cultural Economics* 40, no. 1 (2016): 13-28.

Macbab, Geoffrey, Gabriele Niola, Martin Blaney, Elisabet Cabeza and Melanie Goodfellow. “Are much shorter theatrical windows around the corner?” *Screen Daily*, January 2, 2017,

https://www.screendaily.com/features/are-much-shorter-theatrical-windows-around-the-corner/5112398.article

Mayo, John W., and Scott Wallsten. "Enabling efficient wireless communications: The role of secondary spectrum markets." *Information Economics and Policy* 22, no. 1 (2010): 61-72.

Rust, John. When is it optimal to kill off the market for used durable goods?. *Econometrica* 54, no. 1 (1986): 65-86.

Shapiro, Stephen L., Brendan Dwyer, and Joris Drayer. "Examining the Role of Price Fairness in Sport Consumer Ticket Purchase Decisions." Sport Marketing Quarterly 25, no. 4 (2016): 227-240

Shulman, Jeffrey D., and Anne T. Coughlan. "Used goods, not used bads: Profitable secondary market sales for a durable goods channel." *Quantitative Marketing and Economics* 5, no. 2 (2007): 191-210.

Sieper, E., and Peter L. Swan. "Monopoly and competition in the market for durable goods." *Review of Economic Studies* 40, no. 3 (1973): 333-351.

Stothers, Christopher. "When is copyright exhausted by a software licence? UsedSoft v Oracle." *European Intellectual Property Review* 34, no. 11 (2012): 787-91.

Swan, Peter L. "Durability of consumption goods." *American Economic Review* 60, no. 5 (1970): 884-894.

Swan, Peter L. "Optimum durability, second-hand markets, and planned obsolescence." *Journal of Political Economy* 80, no. 3, Part 1 (1972): 575-585.

Swan, Peter L. "Alcoa: The influence of recycling on monopoly power." *Journal of Political Economy* 88, no. 1 (1980): 76-99.

Sweeting, Andrew. "Dynamic pricing behavior in perishable goods markets: Evidence from secondary markets for major league baseball tickets." *Journal of Political Economy* 120, no. 6 (2012): 1133-1172.

United States Department of Justice. “Wells Fargo agrees to pay $2.09 billion penalty for allegedly misrepresenting quality of loans used in residential mortgage-backed securities.” Press release, August 1, 2018, available at:
https://www.justice.gov/opa/pr/wells-fargo-agrees-pay-209-billion-penalty-allegedly-misrepresenting-quality-loans-used

Waldfogel, Joel. "Music file sharing and sales displacement in the iTunes era." *Information economics and policy* 22, no. 4 (2010): 306-314.

Waldman, Michael. "Durable goods pricing when quality matters." *Journal of Business* (1996): 489-510.

Waldman, Michael. "Eliminating the market for secondhand goods: An alternative explanation for leasing." *Journal of Law and Economics* 40, no. 1 (1997): 61-92.

Young, S. Mark, James Gong and Wim Van der Sted. "The business of making money with movies." *Strategic Finance*, February 2010, available at: https://sfmagazine.com/wp-content/uploads/sfarchive/2010/02/The-Business-of-Making-Money-with-Movies.pdf

Zentner, Alejandro. "Measuring the effect of file sharing on music purchases." *Journal of Law and Economics* 49, no. 1 (2006): 63-90.