

Chapter 25

Economic Consequences of Piracy

25.1 Object of Consideration

Does piracy actually harm information providers? From industry representatives' point of view, this is established fact. Scientifically, the case is not so clear, though. The music market in particular has been investigated in a number of studies, which differ greatly in quality and expressiveness. Depending on which one you look at, you can find evidence for filesharing harming the music industry, having no effect on CD sales or even wielding positive influences. We will address these in more detail in the following. Other industries, such as those for software, film, games or books, have so far been investigated much less extensively, if at all, with regard to the effects of filesharing practice on sales figures, which is why we will mainly orient ourselves on the studies of the music industry. However, it can be assumed that the same principles apply to all information industries. Haller (2005, 182) sees structural similarities between the music and software industry, and Oberholzer & Strumpf (2009) correlate their metaanalysis of filesharing to all digital information goods, i.e. music, software, films, games and books.

In the following, we will thus initially observe, via simple microeconomic models, what consequences arise when piracy enters a market. Subsequently, the perspective will be broadened and the consequences of bootlegging are analyzed from dynamic viewpoints. As far as it is possible, the single arguments will be backed up by empirical analyses.

25.2 Consequences of Piracy from a Welfare-Theoretical Perspective

With the help of microeconomic models, initial (theoretical) insights can be gleaned into what happens when there are not only legal, but also illegal offers on a market. In order to conduct a before-after comparison, so-called comparative-static analyses are performed. One compares an initial situation (without piracy) with a second, changed situation, this time with piracy. The valuation standard in

this kind of analysis is the welfare of the consumers. One situation is judged preferable as against another if it has a higher consumer surplus.

We will regard the market for a music title, as representative for all information goods. The provider is a quasi-monopolist in consequence of the title's uniqueness. Since there are, typically, similar titles to switch to, we have a hybrid situation, which is called monopolistic competition in microeconomics (e.g. Mankiw et al., 2008, 411 et seq.). Several or many "monopolists" compete with each other. This means that there are several providers on a market, e.g. for music or films, which make similar, but not identical and interchangeable offers, e.g. for music or films. For all further considerations, we can thus assume a monopoly situation, in which the provider seeks to maximize his profits according to the monopolistic profit maximization formula (marginal cost = marginal revenue). The existence of competition results in a shift of the demand curve. The individual provider is left, in case of increasing competition, only with a decreasing part of the total market (Linde, 2008, 67 et seq.).

Apart from regular competition, which will at first be blocked out in the following by the focus on a monopoly, two groupings are of interest when considering piracy or pirate markets: commercial providers of pirate copies on the one hand, and private individuals who self-supply with pirate copies on the other.

Self-supply, i.e. the production of (physical) private copies, has been extensively investigated by Lang (2005). He compares the changes to producer and consumer surplus for one provider and one sound carrier at two different points in time. At the first point, there is only the legal market, at the second, the consumers have CD burners and are able to create pirate copies themselves. The price for producing a private copy is set at the variable (marginal) cost. It is thus far below the monopolist's price. The demand curve for the original market (N_1) is turned inward in this model (N_2) and a black market is created, represented as demand for private copies (N_{PC}). Total demand is unchanged. As marginal cost is near zero, price changes are marginal and for simplicity's sake we will assume that the old price (p_1) is the same as the new one (p_2).

As can very clearly be seen, some dramatic welfare effects occur. The creation of a black market shifts part of the old consumer surplus ($C_1 - C_2 - p_p$) to the private copiers (CS_1). The monopolist loses a significant share of his producer surplus ($x_1 - x_2 - C_2 - C_1$), which is transformed into consumer surplus of the private copiers (CS_2). Due to the low price, or, respectively, the low marginal cost, there is an expansion of demand. Customers who had not been willing to buy for the market price now copy the information good. It is thus much more widely distributed than before, as the increase in copying eclipses the decrease in sales. This leads to a net welfare gain (CS_3).

From the provider's perspective, not all of these effects are problematic. Customers who would not have bought anyway can now possess the CD, but do not cause any fewer sales. Much more painful are the customers who copy instead of buying. They cause a decrease in producer surplus. This can become—in case of a preexisting price-sales function—problematic, if the producer surplus becomes smaller than the fixed costs for manufacturing the information good. In that case,

the provider loses money and it will become more rational for him to cease production of new copies.

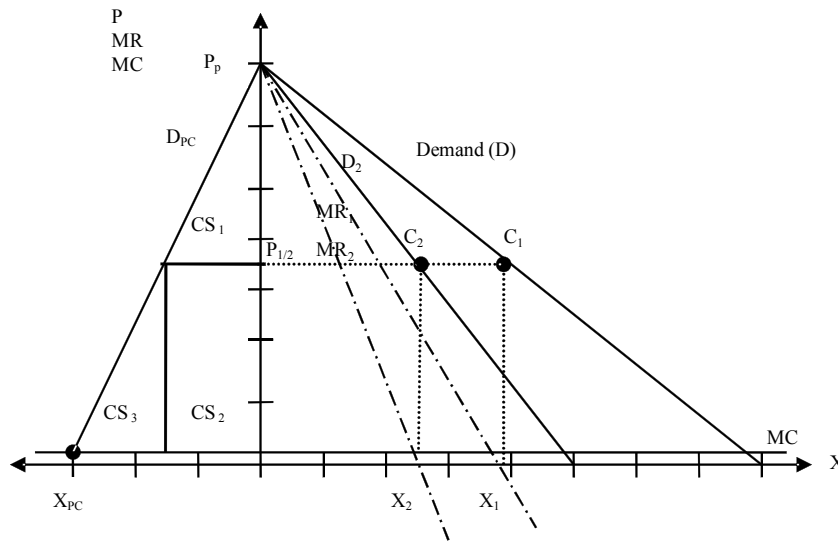


Figure 25.1: Effects of Private Copies on Net Welfare. Source: Following Lang, 2005, 636.

Hill (2007) performed a microeconomic analysis of the effect of the existence of **commercial pirates** and legal protection of information goods on pricing and market supply. An integrated perspective on the copying problem, which takes into consideration both commercial pirates and self-suppliers, can be found in Linde (2008, 98 et seq.). His approach will be represented in the following.

The existence of pirate copies is principally to be regarded the same way as the entry of competitors onto a market with a range of very similar or even identical products. Since pirates have no development costs to shoulder, the progress of their average-cost curve is significantly below that of the original provider's. Commercial Pirates (AC_{CP}) will have to make higher investments for reproduction than self-suppliers (AC_{SS}), which is why the cost curves progress differently. The competing product puts pricing pressure on the original offer. The original provider can react to this by lowering prices. The result is—as already discussed above—a redistribution from producer to consumer surplus and net welfare gains. The lowest price limit (LPL_m) lies, for the ex-monopolist, on a level where his average costs remain just about covered. The black market causes a sort of price differentiation. Consumers who had previously been excluded from purchases and are prepared for illegal actions, are now provided, or self-supply (p_{SS}), with the information good for a price right down to (p_{CP}). Net welfare increases. The greater the

price differences, and the lower moral qualms and (expected) quality deficits vis-à-vis the original product, the more people will defect to the black market.

The progresses of average costs depend on the kind of copying technology that is being used. If it is very difficult to acquire or use or if the costs are very high, average cost will be higher. Generally, cost behavior patterns in pirating CDs/DVDs are much higher than in using filesharing technology (OECD, 2008, 159). The effects on the legal offer just described are thus, again, much greater in the microeconomic analysis of the latter case.

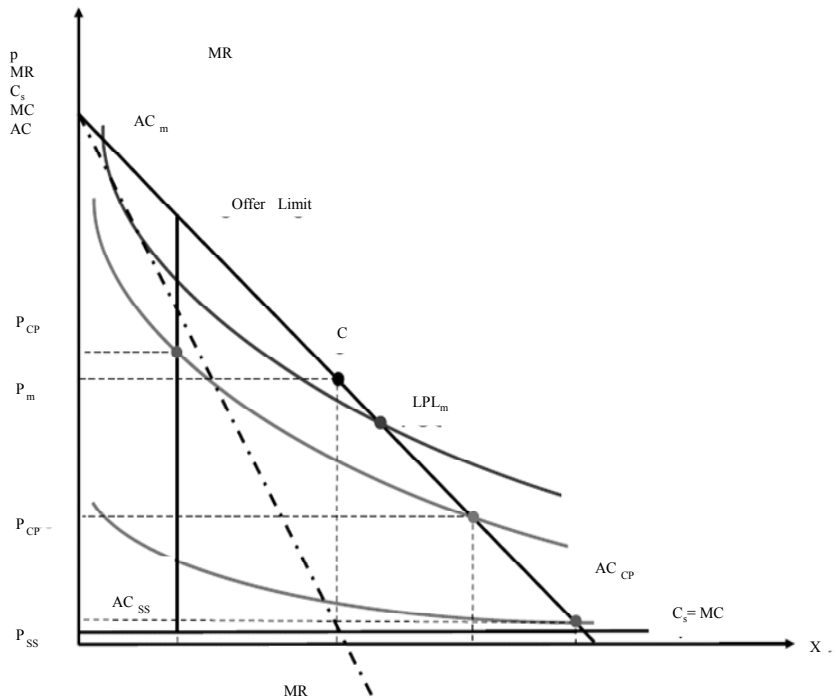


Figure 25.2: *Effects of Commercial Piracy and Self-Supply on the Market Offer.* Source: Following Linde, 2008, 103.

What will happen, then, if the original providers try to assert their exploitation rights more forcefully than they have so far? Firstly, measures to uncover illegal activities will incur costs for investigators, attorneys etc. The average cost curve (AC_m) shifts upward. The rising danger of being caught, however, also results in another cost progression for the pirates. Depending on the individual's assessment of the danger, the creation of illegal copies will be curtailed. This curtailment corresponds to a capacity limit, microeconomically speaking. Depending on the quantity at which it takes effect, the (commercial) offer of pirate copies can become

unattractive. In case of a very low offer limit, the cost-covering price (p_{CP}) would lie above that of the monopolist (p_m). For the original provider, this would even harbor the opportunity of raising his price to cover for his increased costs.

The comparative-static analysis shows that the advent of black markets benefits the individual consumer as regards an existing offer of information goods. Consumer surplus is increased. This result is not surprising, as monopolies always undersupply the market for reasons of profit maximization. The granting of exploitation rights makes these monopoly profits possible, and infringement of these rights leads to net welfare gains from a static point of view. This does not take into consideration the question of how the existence of black markets—dynamically speaking—will affect the development of new information goods.

25.3 Consequences of Piracy from Dynamic Points of View

Let us now turn to the dynamic analysis, in which developments over the course of time are investigated, starting from a given situation. After the aforementioned problem of undersupply with new information goods, we will explore how the possibilities of getting to know new information goods via piracy (sampling) and the existence of direct and indirect network effects affect the original provider.

A prevailing argument against any kind of bootleg copy is that lowered profits will erode the motivation for creating any new information goods. The market is **undersupplied** with new intellectual property, such as music, films, games etc. (e.g. Hill, 2007, 17-18). This argument, which is, statically, absolutely correct, can be countered by citing the development of new releases. For the timespan between 1992 and 2003, the German music market suffered no notable regression (Lang, 2005, 638). Recently, Oberholzer and Strumpf (2009, 23-24) have proven that the number of new releases in the music and film industries has increased significantly. The number of new albums has risen, in the U.S.A., from 35,516 in the year 2000 to 79,695 in the year 2007. 25,159 of these were digital releases. In the film industry, there has been a worldwide increase from 3,807 in 2003 to 4,989 in 2007. Even in countries like South Korea, India or China, where illegal copies play a huge role on the market, the number of new releases increased heavily over the same period. The existence of bootlegs has apparently not impeded the creative energy of artists and publishers as far as quantity is concerned. Whether the quality of the products has decreased is an open, as yet uninvestigated question. Creative people—as several other studies suggest—do not necessarily require monetary incentives. Intrinsic motivation and the hope of hitting the jackpot and entering the charts, if only the one time, appear to be enough reason to create (Tschmuck, 2009a).

As we already know, information goods display obvious information asymmetries. For potential buyers, it is of great importance to glean an impression of the quality of the offer before purchasing. Piracy is a suitable means for doing so, as it allows them to get to know new information goods, to listen, view, read or play them—this practice is called **sampling**. The crucial question, for sampling, is eco-

nomical: will it lead to a subsequent purchase of the product or will the sample suffice? Other than in sampling in stationary retail, where the information good must be purchased before it can be permanently used, illegal copies mean that the consumer already owns the good (as CD/DVD are already on his hard drive), which leads to the decision of whether to buy the original in addition. What effect will sampling have then? Will it create an impetus to buy, or is it so substitutive that any purchases that would have been made are rendered obsolete by possession of the sample? Here, there are different studies for the music industry. Liebowitz (2003; 2006) is a prominent advocate of the statement that samples displace purchases, i.e. that the substitution effect prevails. His argumentation is relatively simple: if the copy is of equal quality as the original, and copying is free, the labels' profits will decrease because the free copy will be preferred to the original. For filesharing, he formulates:

MP3 downloads are causing significant harm to the record industry (Liebowitz, 2003, 30).

As we mentioned in the previous chapter, however, it cannot be said in such a general way that a pirate copy replaces its original one-to-one. The illegally acquired titles must first be checked for quality, which can deviate noticeably from the original, if songs are incomplete, have a low bitrate or are virus-infested. Also, if a title is no longer available for purchase or if the original has special features, such as a booklet, a particular cover etc., the copy cannot replace it (Tschmuck, 2009b).

Peitz and Waelbroeck (2006, 908), among others, arrive at the opposite conclusion as concerns the effects of sampling:

Sampling appears to be important in the market for recorded music—music is an experience good where horizontal product differentiation and taste heterogeneity are important. Due to sampling, music labels may actually gain from P2P networks (and other ways to listen to recorded music for free) and use them to solve a two-sided asymmetric information problem between seller and buyers.

With the help of this model, the authors show that the providers of information goods generally profit from filesharing if consumer preferences are sufficiently heterogeneous. With regard to music, this means that if tastes are different enough, consumers will use filesharing to find titles that better suit their needs than in the absence of a black market. If, at the same time, the product variety of (music) providers is great enough, the possibility of sampling will lead to more sales. Profits rise

because consumers can make more informed purchasing decisions because of sampling and are willing to spend for the original although

they could consume the download for free (Peitz & Waelbroeck, 2006, 912).

The two studies represented above are based on theoretical models and arrive at the exact opposite conclusion.

What do empirical studies say about the relation between filesharing and sales figures? Oberholzer and Strumpf (2009) investigate this question via a metaanalysis of eleven studies of the music industry. Two of them state that filesharing has positive effects on music sales. In most cases, a negative effect is detected, which means that substitution effects prevail. They are estimated to amount to 20% in general (Oberholzer & Strumpf, 2009, 16). A significant portion of the studies arrives at a third result, namely that filesharing has no statistically significant effects on music sales. Tschmuck (2009c) classifies and investigates seventeen studies of filesharing, with similar results. Both investigations rate the quality of the different studies and conclude that filesharing is in no clearly detectable relation to sales figures. The same conclusion is also found in a current study of the U.S. Government Accountability Office, which notes that

the net effect cannot be determined with any certainty (GAO, 2010, 28).

What can be determined relatively simply, though, is a redistribution effect created by filesharing. Blackburn (2004) compares album sales and downloads for very prominent and for unknown, seldom-charting artists. For the stars, the substitution effect prevails, and downloads partially replace album purchases. For the unknown artists, though, the sampling effect dominates and sales are increased. Ergo, there is a redistribution—for neutral overall effects—from superstars to less-known artists. Gopal et al. (2006) arrive at the same results regarding redistribution, but make out a positive overall effect of sampling.

If there were no filesharing, the superstars would dominate the CD market and thus prevent a possible widening of diversity (Tschmuck, 2009d).

Another important influence quantity in relation to illegal copies is, again, represented by network effects. We remember that direct network effects are at play when the value of a(n information) good for the consumer is greater as a result of its wider prevalence than it would be on its own merits (basic value). Indirect network effects mean that the value of a good for the consumer is positively influenced by an attractive offer of complements.

Direct and indirect network effects are both ubiquitous for information goods, but they are not always equally pronounced (Linde, 2008, 42 et seq.). For a broader discussion of the correlation of network effects and illegal copying activities, consult Chapter 21 on Copy Protection Management. We will now investigate

more closely how illegal copies affect the market development via **direct network effects**. Linde's (2008, 135-136) model shows very clearly that pirate copies can contribute decisively to the reaching of critical mass required for establishing oneself on the market.

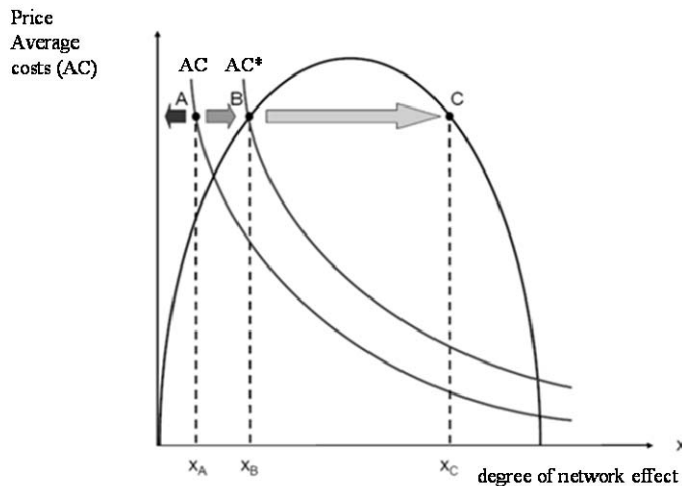


Figure 25.3: *Effects of Illegal Copies on Market Development.* Source: Following Linde, 2008, 136.

The model assumes a progression of the demand curve typical for information goods (Linde, 2008, 113 et seq.). High willingnesses to pay here only appear once the information good has reached a certain level of prevalence. If an information provider thus enters the market with a new product, selling it for price A due to the high first-copy-costs, too few units will most likely be sold in order to create network effects (x_A); it will flop. If, however, illegal copies are distributed, sales will increase. The market will be supplied with a legal offer of the volume x_A , and, in addition, with illegal copies ($x_B - x_A$). The total volume x_B is now enough in order to alert further, willing-to-pay customers. Critical mass has been reached and self-reinforcing network effects begin to work. The information good distributes itself further, because it has already reached a certain degree of prevalence. In the model, this means a jump to the equilibrium C with its corresponding volume x_C . Of disadvantage for the provider is the loss of sales that may result, which is represented by the shift of the average-cost curve to the right (AC*). The degression effect is only reached with a larger total sales volume of legal and illegal copies.

From the provider's point of view, pirate copies thus give the market development a significant push. This is precisely the effect that Andersen and Frenz (2007) confirmed in a study of Canadian users of sharing services. They observe that

downloading the equivalent of approximately one CD increases purchasing by about half of a CD (Andersen & Frenz, 2007, 3).

Expressed differently, the factor of 0.44 means that at least one more album is sold for every three albums downloaded. Filesharing does lead to substitution effects, but they are overcompensated for by the market development effect.

In a study of the British music market, it has been found out that users of filesharing services count among the best customers of the music industry.

Internet users who claim to never illegally download music spend an average of £44 per person on music per year, while those who do admit to illegal downloading spend £77, amounting to an estimated £200m in revenue per year (Demos, 2009).

These results beg the question: isn't the current behavior of the music industry counterproductive, scaring away its best customers as it does?

Further positive consequences of network effects—from the providers' point of view—resulting from a larger total distribution from sales and illegal copies consist of a higher Lock-In probability of customers and better chances of establishing a standard on the market (Castro et al., 2008, 85; Hill, 2007, 18-19). In the late 1990s, Bill Gates expressed a very pragmatic attitude toward this situation, contrasting short-term losses with long-term benefits created by network effects and Lock-In:

'Although about 3 million computers get sold every year in China, people don't pay for the software. Someday they will, though,' Gates told an audience at the University of Washington. 'And as long as they're going to steal it, we want them to steal ours. They'll get sort of addicted, and then we'll somehow figure out how to collect sometime in the next decade.' (Piller, 2006).

Staake and Fleisch report on the current situation, half a decade later, and the success of this strategy in the software industry:

About 90% of all programs in the Chinese software market are not legitimately licensed (BBC, 2005). The vast majority of personal computers use Microsoft Windows as an operating system, which, as a genuine product, is sold for a multiple of a Chinese white-collar worker's

monthly average income. Needless to say, if no illicit copies were available, only a fraction of today's PC users in China would be familiar with Microsoft's product and would rather use open source software such as Red Flag Linux. Now, after the Chinese government required computers manufactured within the country's borders to have pre-installed authorized operating software systems when they leave the factory, Microsoft can build upon a large user base and use its strong market position to generate revenue. The stakes are huge as China has become the world's second-largest PC market, with more than 19 million PC shipments in 2005 (Gartner, 2006). In an interview with CNN, Bill Gates stressed the beneficial effects of software piracy on the development of Microsoft's market in China, mainly due to lock-in and barriers to entry for emerging legitimate competitors (Kirkpatrick, 2007).

Let us now focus on music again, and the **indirect network effects** that play an important role here. Music recorded on sound carriers is in a complementary relationship with other information goods, such as concerts, merchandising articles or ringtones. As Connolly and Krueger (2006) were able to demonstrate, concerts and merchandising have become an important source of revenue for artists. Concerts and new records are reciprocal complements: a CD calls back a concert, and music that listeners already know makes the concert more intense experience (Oberholzer & Strumpf, 2009, 20). From this perspective, however, filesharing could prove to be a double-edged sword. A greater distribution of (free) music could increase demand for concert tickets, but at the same time it is possible that concerts will no longer lead to the same volume of CD sales, if songs can be downloaded from the internet. This would decrease the impetus to go on tour. For this aspect, we can initially observe that ticket prices for concerts have risen over the past few years, and much more steeply than the price index has, and that this increase has been reinforced following the advent of filesharing (Krueger, 2005). Mortimer and Sorensen (2005, 25) demonstrate, in an empirical study of more than two thousand artists over a period of ten years, that in the time before and after Napster the number of CDs that had to be sold in order to generate \$20 in concert revenue fell from 8.47 to 6.36. Filesharing provides artists with fans, who go to concerts without having to buy music. The artists, it can also be observed, have intensified their touring activities over the past few years since filesharing. Supply of and demand for concerts have increased with filesharing, and artists have earned more money.

Going beyond that, a higher distribution of music seems to also benefit sales of other information goods. Andersen and Frenz (2007, 34) demonstrate

that people who are interested in entertainment goods (such as music) are also interested in DVDs, concerts, cinema/movies and video games.

Apart from the aforementioned concerts, many other goods appear to have a complementary character. Among them is, of course, the hardware necessary for playing music, i.e. the customary iPod or MP3-player. Oberholzer and Strumpf (2009, 21) have made the following rough calculation on this subject for the U.S. market: the much-discussed decrease in music sales lies at around 15% over the period between 1997 and 2007. If we add concert revenue, however, the music industry turns out instead to have grown by 5% over the same timespan. If we then add the revenue from iPod sales, the industry growth, over the period of ten years, is 66%.

This analysis is supported by a study of the Times for the British music market over the period between 2004 and 2008 (TimesOnline 2009). The results it arrives at is that CD sales have decreased, but artists' profits from live concerts have increased significantly. The total profits of the (British) music industry have even increased over the past few years. The crisis of the music industry thus seems to be less a crisis affecting the entire industry than a crisis of the big record labels, whose income is generated mainly via sales of sound carriers.

In conclusion, we can state that the negative effects of filesharing cannot be taken as solid fact. To the contrary, it is even possible that they are outweighed by positive effects. A discussion of the consequences of filesharing should thus not restrict itself to the substitution effect between illegal downloads and decreasing sales figures, but incorporate the wide area of direct and indirect network effects.

25.4 Conclusion

Only available in the printed version.
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