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The IPRED law: A Study of how a Copyright Law Affects File Sharing on the Internet

Liselotte Fors
21291@student.hhs.se

Anna Zoubareva
21378@student.hhs.se

Abstract

In order to draw a conclusion of whether IPRED has reduced peer-to-peer file sharing in Sweden, this thesis uses both a regression analysis of Swedish data on file sharing and the technique of difference-in differences between file sharing in Sweden and Finland. A smaller survey is utilized to give an understanding of why the specific outcome of the analyses occurred. The results show that the law has only had a short-run effect in Sweden. An initial instantaneous drop in the level of file sharing was met by a faster growth rate than previous to the law, indicating a "catch-up" effect. One reason for the ineffectiveness of the IPRED law is found in the very small number of law suits filed during the year, which has likely reduced the perceived risk an individual takes when file sharing. Furthermore, a significant share of individuals has low moral perceptions of file sharing which appears to be hindering the effectiveness of the law. A central measure to protect copyrighted material such as IPRED appears to be weak on the Internet. Instead, decentralized measures, such as good substitutes for copyright infringement, seem to hold the key to reducing file sharing.

Keywords*: IPRED, peer-to-peer file sharing, intellectual property law, copyright infringement, moral behavior*

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1. Introduction

On April 1st 2009, the "Directive on the enforcement of intellectual property rights", commonly known as the IPRED law was introduced. Dagens Nyheter (Fildelningen slår nya rekord, 2009) reported that Swedish Internet traffic was reduced the same date by approximately forty percent, an indication that the law passed to reduce illegal file sharing was working. Nevertheless, by December 2009 the total Internet traffic had grown past the levels of March previous to the implementation of the law[1]. The implication of the law is that copyright holders now have the right to demand information on users of file sharing from Internet service providers(SFS 2009: 109), and the government has estimated the amount of cases to be filed per year to lie between 400 and 800 (Olsson, T., 2010). At the time of writing, roughly a year after the introduction of the IPRED law, three cases have been presented to a court of law.

In May 2009 the independent consulting company Mediavision released an investigation (Mediavision, 2009) based on 3500 interviews, stating that more than a third of young adults aged 15-24 have reduced or stopped file sharing completely since the introduction of the law. The main reason given by respondents was the risk of detection as well as harsher punishment. Mediavision did not draw any conclusions concerning the long term effect of the law. A new investigation (Mediavision, 2010) stated that there had been an increase in the illegal file sharing of films during the fall of 2009, based on interviews with 1700 Swedes. The new trend according to Mediavision appeared to be the opposite of the one found earlier in 2009. A different investigation conducted by the market research company SIFO, found that individuals in Sweden engaging in file sharing decreased from 26 percent in March 2009 to 11 percent in September 2009 (Viasat, 2009). Sifo has also found (Haraldsson, U., 2010) that among 1207 individuals 61 percent of 9-19 year-olds and 43 percent of 20-34 year-olds listen to music via the Internet through music services such as Spotify five to seven days per week.

Up to this point in time investigations on the effectiveness of the implemented law in Sweden have been based solely on interviews and surveys based on file sharing behavior. Currently, the law has been in use for one year which is a timeframe that sufficiently enables the conduction of a deeper analysis than previously. The aim of this thesis is to, through an econometric approach, determine whether the IPRED law has had a significant effect in reducing the file sharing of copyrighted

[1] See Appendix A1

material on the Internet. To give an understanding of the outcome, a smaller survey analysis is applied.

No other econometric analysis has been found that investigates the effectiveness of the IPRED law. The fact that the law has been in use for an entire year is expected to invite for new research and investigations. As such the area of previous research in Sweden is very small, and this thesis is a first of many expected to come that will add to the research within property rights protection.

Section 2 provides a background to the IPRED law, followed by a theoretical framework of intellectual property rights in section3. Research questions, data, hypothesis and method are found in sections 4-7, and after this the analysis is found in section 8. This is followed by a discussion of the results in section 9 and conclusions are drawn in section 10.

2. Background

2.1 Peer-to-peer file sharing

File sharing entails one computer on the Internet searching for and copying files from another computer. Several computers are often linked together in the same computer network. Such a computer network allows for users to find and copy numerous files, videos, software and music onto their own computers. A more specific term for these networks is peer-to-peer, as they connect nodes without requiring the utilization of a central root. In peer-to-peer networks used most often today, such as BitTorrent, small parts of files are shared between users in order to increase the speed of file sharing. This allows for downloading and uploading of files to occur simultaneously (Renfors, C., 2007, pp. 335-338). There will therefore be no distinction made between the uploading and downloading of files in this paper. Instead, the total sum of peer-to-peer file sharing will be studied.

The type of traffic that the IPRED law refers to is copyrighted material that may be shared illegally through peer-to-peer networks. Most peer-to-peer traffic is related to copyrighted material (Karagiannis, T., 2004, p. 3) and hence affected by IPRED. In this thesis the very small share of peer-to-peer traffic not containing copyrighted material is still included in the analysis of peer-to-peer file sharing. This should not affect the conclusions that can be drawn about the effect of the law .For the remainder of the thesis when the term "file sharing" is used, it implies peer-to-peer file sharing.

2.2 The IPRED law and renowned Court decisions

In April 2004 IPRED was adopted by the European Union. The aim of the Directive was to require "all Member States to apply effective, dissuasive and proportionate remedies and penalties against those engaged in counterfeiting and piracy" (European Commission, 2004). File sharing in Sweden had previously been dealt with by the national police force, but the new IPRED law allowed for the involvement of the actual copyright holders (Piracy law cuts internet traffic, 2009). If there is probable reason that an individual has infringed on the copyright law (SFS 2009: 109) through the file sharing of copyrighted material, the copyright holders have the right, through a court of law, to demand specific information on the individual from Internet service providers. The aforementioned individual may then become liable to pay a heavy fine to the copyright holder.

Two cases of conviction have been heavily discussed in the media during the past year. The first case is known as "the Solna case". On the day the law was introduced, five publishing houses for audio books requested permission to extract information from Internet Service provider Ephone, on one of Ephone's users. The user in question was under the suspicion of sharing several audio books and films online. The verdict of the Solna district court was for Ephone to disclose information about the specific user: a verdict that Ephone opposed. The court's decision was appealed to the Swedish Court of Appeal (Carp, O. 2009), which revoked the previous verdict (Mål nr. ÖÄ 6091- 09).

The case of Swetorrents was the second widely discussed case, where several film corporations demanded information on a customer of Internet Service provider TeliaSonera. The verdict was for TeliaSonera to provide the copyright holders with the necessary information about their customer. In December 2009, TeliaSonera appealed the court's decision (Olsson, T. 2009). More than a year after the introduction of the IPRED law, no Internet service provider has been forced to give out information on their customers. All verdicts have been appealed to the Supreme Court of Sweden.

Other Scandinavian countries have applied laws similar to IPRED. In 2006 Finland enforced an IPRED law that allows copyright holders to demand information about an individual suspected of file sharing through a court of law. Despite the Finnish IPRED law being enforced in 2006, illegal file sharing is still widespread in Finland today. An investigation by the Finnish National Research

Institute of Legal policy has shown that around 69 percent of all 15 year-olds in the country file share copyrighted material (Olsson, T. 2008).

2.3 Previous analysis of legal threats on file sharing behavior

Although no previous extensive research has been made of the impact of the IPRED law on file sharing in Sweden, such research has been conducted on peer-to-peer file sharing in the U. S. In June 2003 the Recording Industry Association of America (RIAA) announced that it would be suing individuals that were allegedly file sharing music. By December 2003, 382 lawsuits had been conducted with 220 settlements. The digital copyright law in the U.S. includes a special provision that allows a copyright holder to identify subscribers of anonymous Internet service providers through a court-backed subpoena. This differs from the IPRED law in Sweden as the subpoenas in the U.S do not need to be approved by a judge before being issued (Borland J. 2003). In fact, while copyright holders in the U.S can easily receive access to information on alleged copyright violators, in Sweden copyright holders must receive such information through a court of law.

Several analyses have been made on the effect of legal threats from RIAA on file sharing with differing results. Bhattacharjee et al., (2006) found that a significant number of file sharers responded to the legal threats by decreasing their file sharing behavior. The authors used a method of passively tracking users of the file sharing network Kazaa over a predetermined period of time. Although the main aim of RIAA was to target individuals that engaged in file sharing at a high level, individuals file sharing infrequently diminished their file sharing behavior as well. Even though file sharing diminished with the threat of legal action, the availability of files and peer-to-peer networks remained intact. The authors also conclude that an upsurge in frequency of use of file sharing networks occurred after the third threat of legal action by the RIAA. These individuals still found it valuable to access peer-to-peer networks and file share.

In contrast to these findings, Karagiannis et al., (2004) found, in their study of peer-to-peer file sharing in 2003 and 2004 that the file sharing trend during the period of RIAA threats had not changed. A limitation of this study is that peer-to-peer file sharing was measured for only an hour in May 2003 and an hour in January 2004. Those measures may not suffice in determining the exact impacts of the legal threats. Liebowitz S.J. (2004, p. 24) reviews evidence on the impact of RIAA legal threats on file sharing from several sources. He compares data from these investigations in

order to extract general results and concludes that the lawsuits had an initial negative impact on file sharing, but wore off as file sharing began to increase again.

3. Theory

3.1 Intellectual Property Rights

An intellectual property law is a legal regulation that governs an individual's or an organization's right to control the use of inventions and information. In order for an individual or an organization to receive such control, various legal systems and rules define an intellectual property law. Included in the term is copyright law, patent law, as well as trademark law (Encyclopædia Britannica Online 2010a). It wasn't until the end of the 20th century that the differences between these laws became more indistinct and was ultimately collectively named intellectual property law (Encyclopædia Britannica Online, 2010b). Specifically, the copyright law provides the creator of books, movies, musical compositions and works of art exclusive rights to copy, reproduce and publicly perform their creations (Encyclopædia Britannica Online, 2010a). The copyright law both defines the right of ownership as well as protects it: it enforces established rights (Liebowitz & Watt 2006, p.513).

Intellectual property laws allow private ownership of certain information while other information is regulated to the public domain (Resnik, D.B, 2003, p.322). Laws governing intellectual property have been tightened as they have come to have a greater economic and cultural importance for many industries. The profits of record companies are closely related to the companies' ability to enforce copyrights on their product offerings. The music industry has relied heavily on functional property laws since the development of electronic distribution of music, and lobbying for an increase in the protection of its property rights is common (Easley, R.F., 2005 p.164-165). Many researchers have conducted various studies concluding that file sharing has a negative impact on record sales (see for example Rob &Waldfogel 2006; Zentner 2006; and most recently Liebowitz 2008).

3.2 Economic theory of copyright

Intellectual property right law has received both support and critique in economic literature. The idea behind the copyright law is that the copyright holder should receive remuneration for his working efforts. Through the exclusion of free-riders, the copyright holder can charge a price higher than the cost of delivery of the intellectual property which is an incentive for creation (Liebowitz &

Watt 2006, pp. 514-515). The main argument from a utilitarian standpoint is that intellectual objects are nonexclusive. As such, consumption does not exhaust or use up the object. The marginal cost of providing an object to an additional user is therefore zero. With modern technologies an intellectual object could easily be made unlimitedly available at a low cost (Hettinger, E.C 1989, p. 34).On the other side of this support is a general critique against intellectual property law. Boldrin and Levine (2002, pp. 209- 212) argue that intellectual property right laws lead to inefficiencies and a monopoly in which resources are wasted. The authors (Boldrin & Levine 2009) also argue that there is little or no proof that intellectual property rights can have a positive effect on innovation.

According to E.C. Hettinger (1989, p.35), one of the main reasons for a widespread piracy of intellectual property is precisely because this property is nonexclusive. People may not consider unauthorized spreading of intellectual property rights as theft, because their belief is that it is unjustified to exclude others from intellectual objects. The owner of the object is not deprived of its use but of its potential profit. From a utilitarian standpoint the state, policy analysts and courts need to analyze the benefits and the losses to society from various intellectual property right laws in order to maximize social welfare. Furthermore, due to continuous evolvement of technology, laws and policies may require revision in order to take new types of property law violations into account (Resnik, D.B. 2003, pp. 324-325).

Most governments of industrialized states accept the arguments for intellectual property right laws and therefore strive to increase the protection of them (Helpman.E 1993, p.1247). In Sweden, a law protecting intellectual property rights was enforced in the 1960's (SFS 1960: 729).

3.3 Intellectual property rights on the Internet

Traditional laws and intellectual property cannot be assumed to apply in a similar way on the Internet, which is vast and complicated. The role of the state in regulating intellectual property right law on the Internet also differs. There is a discussion concerning a weakened role of the state on the Internet as Internet connections stretch beyond national borders and regulations. Internet sites can be located anywhere in the world and can thus bypass national restrictions (Drezner, D.W. 2004, s. 489).

Two distinct and often applied measures of implementing intellectual property right laws on the Internet exist. The decentralized intellectual property right system is based on a system of self-

governance, which implies that economic agents can control the distribution of their property through, for example, digital encryption. An example of this measure is record companies encrypting a piece of recorded music (Digital Rights Management) which allows users to copy or distribute the material a restricted amount of times. In contrast to this measure the centralized, traditional measure that is set up nationally by public authorities is found. An example of such a measure would be a national law governing intellectual property rights, such as the IPRED law implemented in Sweden. According to Brousseau, E. (2004) the decentralized measure alone may not be enough to govern intellectual property rights and may in fact lead to inefficiencies such as the development of a monopoly and discouragement of investments. His view is that both types of measures often need to exist in a society for this not to occur.

There are situations where infringement on copyrighted material may in fact be socially efficient. Infringement takes place at prices below market prices given by copyright law, allowing consumption by those who would not pay the market price. Assuming that only those who are not willing to pay the market price infringe, this would lead to a gain for society due to a reduction of the dead weight of those not consuming at the higher price (Liebowitz & Watt 2010, pp. 518-519). However, if a downloaded copy is not different from an original, there is hardly any incentive for the user to purchase the copyrighted work unless usage of the copy imposes a cost upon the user, such as the consequences of violating a law (Liebowitz, S. J 2004. p. 15). File sharing reduces the price of consumption to zero, and it may not be reasonable to assume that previously paying customers will continue to pay when the alternative is free and not significantly different from the original.

3.4 The expected utility theory and ethics in file sharing

There is literature suggesting that file sharing behavior depends on an individual's ethics and morals. Studies have been made on the impact of ethical morals in individuals on software piracy. Al-Jabri and Abdul –Gader (1997) found that an individual's beliefs have a significant effect on the intention to infringe on software copyright. Logston et al., (1994) conducted a study on individuals' tolerance towards unauthorized copying. Findings showed that a high tolerance existed towards software piracy which could be explained by software piracy being "perceived as an issue of low moral intensity". The authors state that as long as the moral intensity around file sharing remains low, a significant shift in software piracy cannot be expected.

The expected utility theory is a theory in which the individual chooses between the weighted utilities of possible outcomes in order to choose the option that gives him the highest utility. Oksanen and Valimaki (2007) use this model in order to examine whether property right lawsuits can limit file sharing on the Internet. An individual has a choice between file sharing on the Internet or purchasing the copyrighted material legally. The choice an individual makes depends on the marginal utility of the outcome. This marginal utility of file sharing will be reduced due to a liability risk associated with this activity. That is, an individual can get caught when file sharing and may have to pay a significant fine to the copyright holder. This liability risk is dependent on the number of new cases taken up in court. It also depends on the estimated fine imposed on file sharing, as well as the number of file sharers on the Internet. Thus, the liability risk is specified as

$$Liability\ Risk\ C_1 = \frac{N_{New\ Cases}}{N_{Number\ of\ File\ Sharers}} * C_{Fine}$$

If the copyright law manages to increase the number of new cases brought up in court, this increases the liability risk C_1 and decreases the number of individuals willing to file share. A reputational cost can be added to this model. This is the cost of engaging in morally incorrect behavior, and is caused by unofficial sanctions applied by the individual's peers. Instead of a reputation cost, there may also be a reputational benefit of file sharing. This is because the violation of the copyright law may be encouraged instead of discouraged by the individual's peers.

4. Research questions

As mentioned previously, the aim of this essay is to determine the effect of the introduction of the IPRED law on the file sharing of copyrighted material through econometric analyses. Furthermore, the underlying reasons for the effect of the law shall be investigated. According to Wooldridge (2009 p. 453), in order to determine an effect from a policy change, data from at least a year before the change and a year after is needed. Since the IPRED law was introduced on the 1st of April 2009, a year has passed at the time of writing this thesis. Thus the time period passed allows for an analysis of the long term effect of the law.

Research has already been made on the effects of the IPRED law in Sweden through various survey analyses. There is however, certain concern when applying solely a survey analysis method to

investigate the implication of the law. Such concern includes respondents not knowing with precision their exact file sharing behavior, and therefore giving imprecise results (Liebowitz S.J., 2004, p.7). Also, previous survey analyses have provided information on file sharing behavior for a specific point in time, but have failed to provide more long-term results. Unless several consequent surveys are made, this cannot be corrected for. Consequently the investigations of the long-term effect of the IPRED law have thus far run short.

As mentioned in the background, American studies that follow users online over a predetermined period of time, have been conducted. This method is not applicable due to the time-frame and due to the method being tedious. In order to arrive at conclusions concerning effects of a policy change, none of the methods mentioned above are therefore appropriate. Instead, a more reasonable approach to measuring the effect of IPRED on file sharing in Sweden is by looking at the total aggregated file sharing traffic. Combining this approach with a survey analysis enhances the validity of the conclusions that can be drawn.

Two research questions will be answered in this thesis:

1. **Has the Ipred law reduced total aggregated file sharing traffic in Sweden?**
2. **What are the underlying reasons for the observed effect of the law?**

To answer the first research question a regression analysis on Swedish file sharing data as well as a difference-in-differences analysis between Sweden and Finland will be made. The second research question will be answered through a limited survey analysis (see Method in section 7).

5. Data

Swedish Internet Exchange Netnod operates five national exchange points in Sweden, namely in Stockholm, Gothenburg, Sundsvall, Lulea and Malmoe (Netnod, 2010a). These five exchange points provide an infrastructure with high reliability. Netnod is the largest Internet exchange in Sweden and provides statistics on the aggregate total average traffic flowing through its exchange points (Netnod, 2010b). Statistics from Netnod thus gives a good approximation of the total Internet traffic in Sweden. As a result of Internet traffic flowing between national borders, statistics from Netnod do contain a certain amount of international traffic from neighboring countries. However,

due to the complexity of Internet traffic, it is not possible to determine the exact amount of international traffic in the data provided by Netnod (Lindqvist, K.E., 2010).

Netnod's statistics are based on a constant measurement of Internet traffic flow- ingoing and outgoing traffic-through the exchange points. Ingoing and outgoing traffic is virtually equal in size, and any difference between the two is due to faulty equipment. Software then calculates daily averages in traffic flow, measured in bits per second, and inputs the data into yearly graphs. The data is available publicly for the time period of April 2007-March 2010[2]. Since statistics from Netnod exist for both the year before the introduction of IPRED as well as after, this data is appropriate for a policy analysis.

To determine the amount of peer-to-peer file sharing out of total aggregate traffic, data from Procera Networks is used. Procera Networks is an organization that develops *evolved DPI solutions* which can track the activity of Internet users (Procera Networks, 2010). This has allowed Procera Networks to investigate what different components Internet traffic consists of for a certain period of time. The investigation is based on reviewing Internet traffic from a large Internet Service Provider in Sweden that supplies broadband cable Internet to its customers. Through this investigation Procera Networks has established what share of Internet traffic consists of peer-to-peer file sharing from the networks BitTorrent, Kazaa and Direct Connect.

Since 83 percent of the Swedish population has access to broadband at home (Statistics Sweden, 2009, p. 12), Procera Network's data is applicable to reviewing the level of peer-to-peer file sharing in the average total aggregate Internet traffic provided by Netnod. As such, data from Procera Network's investigation will be applied to Netnod's statistics in order to calculate peer-to-peer file sharing in Sweden. The data covers 28 points in time during the time period of March 25 2009 through September 30 of the same year[3]. Similar data is lacking for a considerable period before the IPRED law was introduced, although two observations do exist. One was on the 25th of March 2009. Another point was found for the beginning of 2008, measuring 75 percent file sharing out of total traffic (Benholm, S., 2009).

For the difference-in-differences analysis, statistics from the Finnish Internet Exchange, FICIX, is utilized. Similarly to Netnod, FICIX is the largest Internet exchange in Finland, with three national

[2] See Appendix A1to view the yearly graphs for this time period
[3] See Appendix A4 to view statistics provided by Procera Networks

exchange points (FICIX, 2010). Statistics from FICIX are therefore a good approximation of the total national Internet traffic in Finland. Data from FICIX covers the time period April 2007 through March 2010[4]. FICIX functions in a similar way to Netnod, and provides aggregated total average traffic statistics for more than a year before the introduction of IPRED and a year after. Two months of missing data exists in the FICIX statistics from February to March 2009. This, however, will not affect the conclusions that can be drawn from the difference-in-differences analysis. According to Mellin J. (2010), Finnish Internet statistics also include some international traffic.

6. Hypotheses

6.1 Analysis of Sweden before and after Ipred

When analyzing the Swedish file sharing trend before and after the introduction of the Ipred law there can be various outcomes. First, the results may show that the slope (the growth) of the file sharing trend is unchanged, but the overall level of file sharing has dropped to a new, lower level. This would imply that the IPRED law has had a long-run effect, and that the file sharing trend will never reach the level that would have prevailed had no law been implemented. Second, results may show that the overall level of file sharing dropped when IPRED was implemented, but that in the subsequent time period the rate of which file sharing grew was higher than the rate previous to IPRED. This would imply that the law has only had a short run effect: the level of file sharing dropped but is now growing faster to "catch up" to its previous higher level. If the rate at which file sharing is growing is instead lower than previous to the law implementation or even negative, this would signify a long-run effect. Third, results may show neither difference in the level of file sharing nor a difference in slope, which would indicate complete ineffectiveness of the law.

H1: Significant long term change of file sharing in Sweden after the Ipred law was introduced

6.2 Difference-in-differences analysis between Sweden and Finland

For the difference-in-differences analysis to be valid, Swedish and Finnish file sharing must follow the same trend during the time period before the IPRED law was introduced. If it does not, Finland

[4] See Appendix A1for graphs from FICIX depicting this time period

could not be used as a control variable to analyze the after-effects of the law in Sweden. It must be decided that Finland follows the same trend through the entire time period that is studied, if it is to be used as a control variable in the analysis.

H2: No significant difference between Swedish and Finnish file sharing previous to introduction of IPRED law

From the difference-in-differences analysis three different types of results can be obtained. First, the difference between the two countries' trends may be significantly smaller than before the law was introduced. In such a case, the law would have reduced Swedish file sharing. Second, if the difference between the two trends is significantly larger than before the implementation of the law, Swedish file sharing is growing faster than the Finnish trend, and hence the law would not have led to any long-term effects. Third, there may not be any change in the difference between the two countries' trends, indicating that the law has had no effect.

H3: Significant smaller difference between the trends of illegal file sharing in Sweden and Finland after implementation of IPRED law

Hypotheses 1 and 3 reinforce each other and if they are both tested and rejected, it would mean strong evidence against the long-run effectiveness of the IPRED law.

7. Method

7.1 Method for the collection of data

In order to investigate whether the IPRED law has had the desired effect in reducing file sharing in Sweden, data was used from the Internet exchange points Netnod and FICIX (see Data in section 5). For Swedish data on aggregated total incoming Internet traffic, three one-year graphs were used (from April 2007 through March 2010). Data from these three graphs was manually extracted and recorded. Manual extraction allowed for eight separate data points per month to be recorded[5]. Finnish aggregated total incoming Internet traffic data was extracted in a similar manner. However, this extraction allowed for eight to nineteen data points per month to be recorded for the time

[5] See Appendix A2 for a revision of this raw data

period of April 2007 through March 2010[6]. To be able to determine the peer-to-peer file sharing of the Swedish total Internet data, data on the share of peer-to-peer file sharing of total Internet traffic from Procera Networks was used. A linear trend for file sharing's measure of total Internet traffic in Sweden was created from the 27data points provided by Procera Networks. This linear trend was estimated and applied to the data on total Swedish Internet traffic to calculate the share of file sharing traffic.

For the second part of the analysis, a survey was conducted to find limited results about why the outcome found in the econometric analysis prevailed. File sharing is most widespread among individuals between the ages of 16-25 (World Internet Institute, 2009 p. 54). A specific group was chosen for the survey with this in mind. Business students at the Stockholm School of Economics ranging in ages of 18-25 that registered for the course "Applied Economics" during the years 2008-2010 were chosen as the population. Out of 916 students, 100 were randomly chosen to take part in the survey. Due to the limitation of this essay, a group of this size was deemed sufficient. Results from the survey will thus be applicable to the specific population chosen. A mail survey was sent out and as a motivator to increase the response rate (Brennan, M. 2004, p.4) participants were informed of a possibility to win a prize. Ten days after the first mailing a reminder was sent out to the participants that had not yet answered the survey.

7.2 Method of analysis

An econometric analysis was applied to the collected time series data, in order to find statistically significant results indicating the success or failure of the law to reduce file sharing. First, solely Swedish total aggregated average data of file sharing was analyzed using a regression analysis. The following regression model was used to compare file sharing before and after the introduction of the IPRED law:

$$y = \alpha_0 + \alpha_1 * IPRED + \beta_0 * time + \beta_1 * time * IPRED$$

where:

y denotes peer-to-peer file sharing from March 2007 through April 2010

α_0 denotes the constant for the trend before the introduction of IPRED

[6] See Appendix A3 for a revision of this raw data

α_1 denotes the constant for the level change in file sharing after the introduction of IPRED, where $IPRED$ is a dummy variable for the introduction of the law.

β_0 is the slope of the file sharing trend before the introduction of IPRED, where $time$ denotes the time period.

β_1 denotes the slope of the file sharing trend after the introduction of IPRED, where $time * IPRED$ is an interaction dummy for the time period after the introduction of IPRED

Due to a lack of data from Procera Networks before the introduction of the IPRED law on the share of peer-to-peer file sharing out of total Internet traffic, two extreme scenarios were tested. The first scenario, henceforth known as **Assumption 1**, assumed a lowest possible share of file sharing out of total Internet traffic in Sweden before the law was implemented[7]. In this case, the trend constructed from the data available from Procera Networks was used to estimate the development of file sharing from March 2007 to April 2010[8]. This trend showed a very small change - of two percentage points, in the fraction of file sharing for the whole time period.

The second scenario, henceforth known as **Assumption 2**, assumed the highest possible share of peer-to-peer file sharing out of total Internet traffic in Sweden before the introduction of IPRED[9]. In this case file sharing was assumed to lie at a high, stable level of 75 percent of total Internet traffic up until the introduction of the IPRED law, when it then dropped to the linear trend specified above in Assumption 1[10].The highest share was chosen to be 75 percent, as this was the highest share of file sharing out of total traffic that was recorded in 2008 (Benholm, S., 2009).

A difference-in-differences regression between Swedish and Finnish file sharing was conducted based on the data from Netnod, FICIX, and Procera Networks. The regression was conducted, just as the Swedish regression, under assumption 1 and 2. The following model was used for the difference-in-differences analysis between Finland and Sweden:

$$y = \delta_0 + \delta_1 * IPRED + \delta_2 * time + \delta_3 * time * IPRED$$

[7] See Appendix A6 to review the processed data for the estimation of Assumption 1
[8] See Appendix A5 to review the trend of share of file sharing made for Assumption 1
[9] See Appendix A6 to review the processed data for the estimation of Assumption 2
[10] See Appendix A5 review the trend of share of file sharing made for Assumption 2

where:

y denotes the difference between Finnish and Swedish aggregated total average traffic for the time period between April 2007 and March 2010.

δ_0 denotes the constant for the trend of difference-in-differences before the introduction of IPRED

δ_1 denotes the change in level of difference-in-differences after IPRED, where $IPRED$ is a dummy variable for the introduction of the IPRED law

δ_2 denotes the slope of the trend of difference-in-differences during the time period before IPRED, where $time$ denotes this time period

δ_3 denotes the change in slope of the difference-in-differences after IPRED, where $time * IPRED$ is an interaction dummy for the time period after IPRED

The reason for conducting a difference-in-differences analysis in addition to the regression for solely Swedish data, can be found in the international traffic of both Finnish and Swedish Internet traffic as well as overall factors that might affect the growth of peer-to-peer file sharing activity. For example, growth in bandwidth networks in Sweden could cause growth in peer-to-peer file sharing that is not correlated with the IPRED law. A difference-in-differences analysis between Sweden and Finland should exclude those variables that may lead to faulty conclusions. This assuming that international Internet traffic in Sweden and Finland follow the same trend.

For comparative purposes both Finnish and Swedish file sharing was aggregated to half-month averages and transformed into logarithms for the time period between April 2007 and March 2010. This will allow for valid difference-in-differences analysis between the file sharing of the two countries.

For difference-in-differences analysis to be valid, trends in Sweden and Finland should not differ before the policy change (Wooldridge, J.M., 2009 p. 453). To check for this validity, the difference-in-differences slope before the IPRED law needs to be insignificant - that is, not significantly different from zero (H2).

In an otherwise growing Internet traffic trend, the fraction of file sharing in Finnish Internet traffic is assumed to lie at a constant level over time[11]. Since the Finnish IPRED law was implemented in 2006 and proved to be ineffective, the implementations of the law should not affect Internet traffic

[11]See Appendix A6 to review processed data for Finnish Internet traffic

in 2007. The assumption of a constant fraction of file sharing from 2007 is thus considered reasonable. Therefore, Finnish Internet traffic data does not need to be modified as the difference-in-differences analysis will generate the same result.

In order to analyze the survey, statistical tests such as the Wilcoxon Signed Ranks test and Paired Samples T-test were used. These tests were conducted in order to analyze file sharing behavior between music and films/series, the ethical view on file sharing and the available substitutes to file sharing. Specifically for analysis of the ethical view on file sharing, three variables on a moral scale were compared to a variable for morals concerning file sharing.

8. Analysis

The analysis is split up into two parts. Results Part I describes the results from the two regression models stated in section 7. Results part II describes the results from the limited survey analysis.

Results Part I is split into two subsections, where the first section covers the comparison of the trend in file sharing in Sweden during the two-year time period before the IPRED law came into effect on April first, and the one-year time period following April first when the law was in effect. For data on Finnish file sharing to be used in a difference-in-differences analysis with data on Swedish file sharing, the growth trend for file sharing in Finland must have the same structure as the trend for file sharing in Sweden before the implementation of the IPRED law. Results on the fulfillment of this prerequisite are presented in section two. Section two then continues by demonstrating the results of the difference-in-differences analysis between the trends in Swedish file sharing and Finnish file sharing during the specified three-year period.

In Results Part II the outcomes from the limited survey analysis are shown - more specifically, results on the ethical values of file sharing, the frequency of file sharing in music and film/series and the available substitutes to illegal file sharing.

8.1 Results part I

8.1.1Trend Analysis of file sharing in Sweden

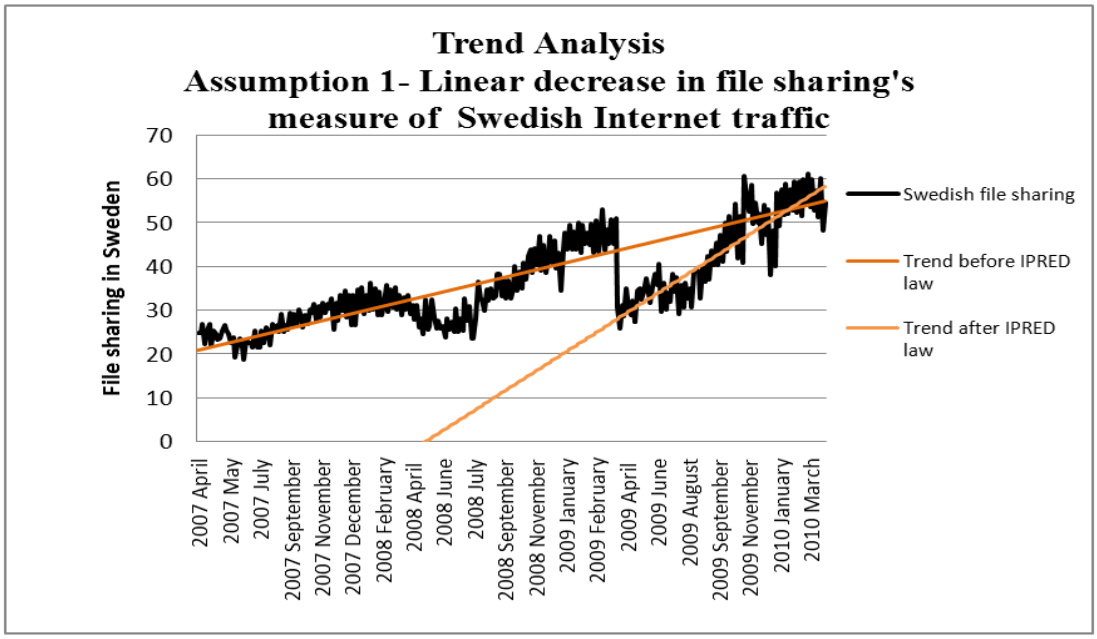
The Swedish data has been analyzed using the specified regression model in section 7. The regression analyses using Ordinary Least Squares (OLS) was conducted under *Assumption 1- Linear*

decrease in file sharing's measure of Swedish Internet traffic and *Assumption 2- Stable measure of 75 percent until April 1st, then linear decrease in file sharing's measure of Swedish Internet traffic*. For both regressions, standard assumptions of OLS properties were tested (Wooldridge, J. M., 2009, pp. 370-371). Tests were conducted for normality of standard errors, collinearity, heteroskedasticity, and AR(1) serial correlation.

Assumption 1-Linear decrease in file sharing's measure of Swedish Internet traffic

Under Assumption 1, file sharing previous to the IPRED law and after the implementation of the law can be illustrated as two independent trend lines. Figure 1 depicts the two trends[12]. The trends appear very different from one another, indicating some type of change after the introduction of IPRED. A regression analysis tests for a significant difference between the two trends.

Figure 1- Two trends for Swedish file sharing under assumption 1: before and after the IPRED law



By observing the residuals of a first regression in a histogram, it is concluded that the standard errors are normally distributed; neither skewness nor kurtosis is observed[13]. As such, a Durbin Watson statistic can be obtained, which investigates whether the data is serially correlated or not. The DW statistic obtained of 1.398[14] (4 degrees of freedom and 288 observations) is rejected at a five percent significance level (Stanford University 2006) and hence the assumption of no serial correlation is

[12] See Appendix A2 and A4-A6 for raw data of which the graph is based
[13] See Appendix A7 for the histogram of residuals
[14] See Appendix A7 for the outcome of the test

rejected. A Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was conducted and a constant variance was rejected at a one percent significance level[15]. The collinearity statistic is moderate at 23.39 (Törn, F., 2010), which is expected with two dummy variables in the regression function[16]. To correct for heteroskedasticity and AR (1) serial correlation Feasible Generalized Least Squares were used. Compared to the OLS estimator FGLS are asymptotically more efficient when the time series is weakly dependent, and the AR (1) model of serial correlation holds (Wooldridge J.M., 2009, p. 422). The Prais-Winsten estimation together with robust standard errors generated the regression results found in Table 1[17]. All independent variables are significant at a one percent significance level. The equation is modeled as follows:

$$y_{assump\ 1} = 20.79559 - 54.28144 * After + 0.1191555 * time + 0.2006912 * After * time$$

(0.6140135) (5.474804) (0.0069149) (0.0248045)

There is a significant drop in the level of file sharing (-54.28144) after the introduction of the Ipred law. However, this drop is met by a significant increase in the slope (growth) of file sharing after the introduction of IPRED (0.2006912). This suggests a short term effect of the IPRED law on file sharing, because there is an initial decrease in the level of file sharing after the introduction of the law but the growth of file sharing is taking place at a faster rate than previous to the law. This indicates the catch-up effect of file sharing.

Table 1. Linear regression of time on Swedish file sharing from April 1st 2007 through March 1st 2010 under assumption 1

Linear regression — Number of obs = 288; F(4, 284) = 2601.39; Prob > F = 0.0000; R-squared = 0.6896; Root MSE = 4.3303

Sweden_Ass~1	Coef.	Semi-robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-54.28144	5.474804	-9.91	0.000	-65.05778	-43.5051
Time	.1191555	.0069149	17.23	0.000	.1055444	.1327665
Time_Dummy~d	.2006912	.0248045	8.09	0.000	.1518673	.2495151
_cons	20.79559	.6140135	33.87	0.000	19.58699	22.00418
rho	.2993083					

Durbin-Watson statistic (original) 1.398104
Durbin-Watson statistic (transformed) 2.406740

[15] Ibi

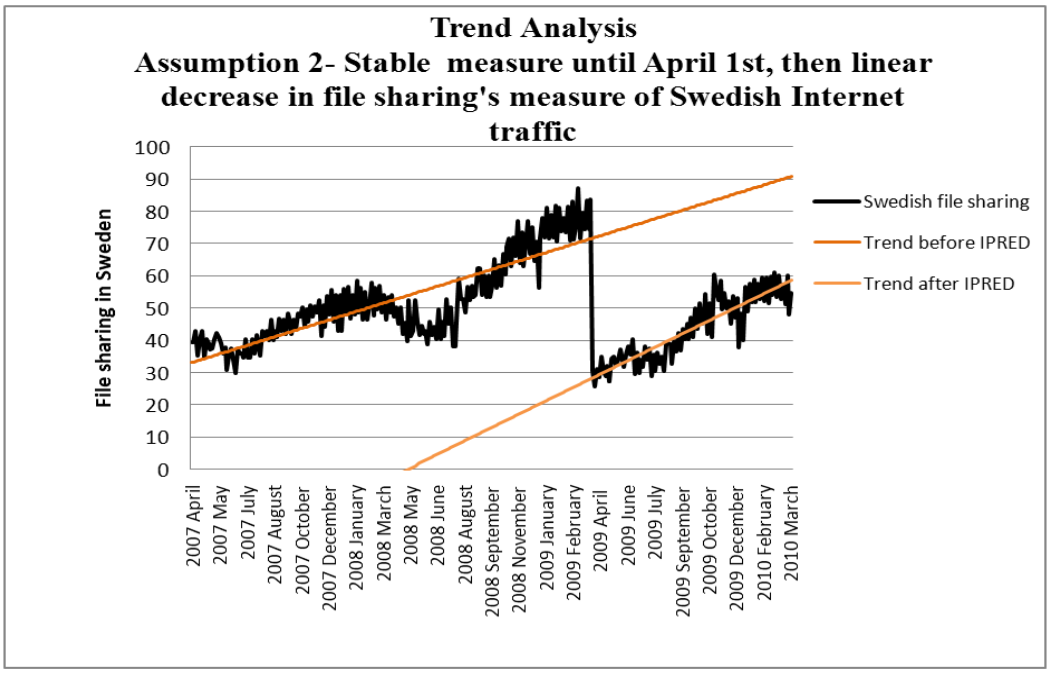
[16] See Appendix C1 for collinearity statistics

[17] See Appendix A7 for the outcome of the test

Assumption 2- Stable measure of 75 percent until April 1st, then linear decrease in file sharing's share of Swedish Internet traffic

When assuming that file sharing is a stable part of total Internet traffic up until the Ipred law was established, it is much more difficult to observe the effect of the law without turning to a regression analysis. Figure 2 shows the two trends before and after the Ipred law under assumption 2[18]. Under this assumption an absolute amount of file sharing is, in March 2010, still lower than file sharing previous to the law, as opposed to Figure 1.

Figure 2- Two trends for Swedish file sharing: before and after the Ipred law (stable measure, then linear decrease)



From an initial regression of time on file sharing under assumption 2, a Breusch-Pagan/Cook-Weisberg test for heteroskedasticity rejects constant variance at a one percent significance level[19]. The collinearity is moderate at 23.39[20]. A histogram of residuals shows slight negative skewness. As such the Breusch-Godfrey test for serial correlation is conducted, as the test does not require

[18] See Appendix A2, and A4-A6 for the raw data on which the graph is based
[19] See Appendix A7 for the outcome of the test
[20] See Appendix C1 for collinearity statistics

normality of standard errors. The null hypothesis of no serial correlation is rejected at a one percent significance level[21]. When correcting for heteroskedasticity and serial correlation the slight skewness of the errors is not worrying, especially due to the large sample size. Asymptotic normality is assumed to hold, and all t-statistics are therefore still valid (Wooldridge, J. M., 2009, pp. 172-175). The regression of time on Swedish file sharing under assumption 2 is shown in table 2[22]. All independent variables are significant at a one percent significance level. The equation is modeled as follows:

$$y_{assump\ 2} = 32.86905 - 67.44583 * After + 0.2027379 * time + 0.1212647 * time * After$$

(1.169657) (6.785204) (0.0131367) (0.0323948)

The regression shows that there is a significant drop in the level of file sharing after the introduction of IPRED, which is larger than the corresponding drop under assumption 1. Just like under assumption 1, the growth of file sharing has a catch-up effect, growing faster than before IPRED. The growth rate is not as high as under assumption one, but positive and significant.

Table 2- Linear regression of time on Swedish file sharing from April 1st 2007 through March 1st 2010 under assumption 2

Prais-Winsten AR(1) regression -- iterated estimates

Linear regression

					Number of obs =	288
					F(4, 284) =	1848.20
					Prob > F =	0.0000
					R-squared =	0.5817
					Root MSE =	5.9523

Sweden_Ass~2	Coef.	Semi-robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-67.44583	6.785204	-9.94	0.000	-80.8015	-54.09016
Time	.2027379	.0131367	15.43	0.000	.1768803	.2285955
Time_Dummy~d	.1212647	.0323948	3.74	0.000	.0575003	.1850292
_cons	32.86905	1.169657	28.10	0.000	30.56676	35.17135
rho	.4057612					

Durbin-Watson statistic (original) 1.186306
Durbin-Watson statistic (transformed) 2.556310

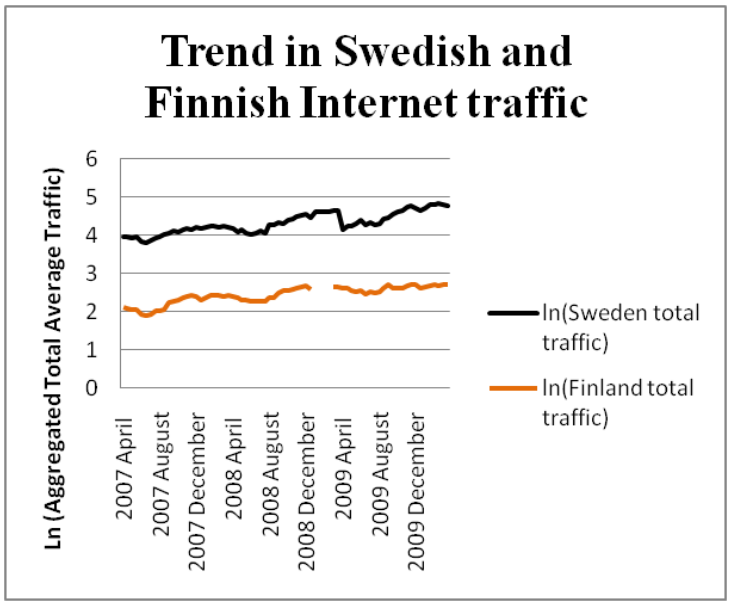
[21] See Appendix A7 for the histogram of residuals and the outcome of the test
[22] See Appendix A7 for the complete regression

Under both assumptions the regressions generate equal results: a short term effect of the IPRED law. The level of file sharing dropped when IPRED was introduced, but displayed an increasing rate of growth. This means that **H1: Significant long term change of file sharing in Sweden after the Ipred law was introduced** is rejected. It cannot be proven that IPRED has had a long run effect upon file sharing in Sweden.

8.1.2 Difference-in-differences between Sweden and Finland

As previously stated the Finnish trend in file sharing has to be equal to the Swedish trend slope-wise, in order to conduct a difference-in-differences analysis. By looking at the two countries' total aggregated average Internet traffic it can be seen that the sets of data appear to be following the same type of trend, indicating that the trend of file sharing would also be similar between the two countries. The total aggregated average Internet traffic for Finland and Sweden is illustrated in figure 3[23].The difference-in-differences analysis shows statistically whether the prerequisite for Finland is fulfilled.

Figure 3- Swedish and Finnish trends in total aggregated average Internet traffic April 2007 through March 2010



[23] See Appendix A2-A6 for the raw data on which the graph is based

Assumption 1

A first difference-in-differences regression generates residuals that are normally distributed. A Durbin-Watson statistic of 1.1469 is rejected at a five percent significance level and a test for heteroskedasticity is accepted a ten percent significance level. There is moderate collinearity in the regression model[24].With a constant variance, only AR (1) correlation needs to be corrected for[25]. The final difference-in-differences regression is given in table 3. The construct of the regressed model:

$$y_{assump\ 1} = 1.106249 - 1.046888 * After - 0.0017315 * time + 0.019592 * time * After$$

(0.0348521) (0.2178647) (0.0012437) (0.003801)

Table 3 -Difference-in-differences between Finland and Sweden under assumption 1

Prais-Winsten AR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs =	68
				F(3, 64) =	30.71
Model	.480120725	3	.160040242	Prob > F =	0.0000
Residual	.333530195	64	.005211409	R-squared =	0.5901
				Adj R-squared =	0.5709
Total	.81365092	67	.012144044	Root MSE =	.07219

DID_Assump~1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.046888	.2178647	-4.81	0.000	-1.482123	-.6116535
time	-.0017315	.0012437	-1.39	0.169	-.0042161	.000753
time_dummy~d	.019592	.003801	5.15	0.000	.0119986	.0271854
_cons	1.106249	.0348521	31.74	0.000	1.036624	1.175874
rho	.4144918					

Durbin-Watson statistic (original) 1.146917
Durbin-Watson statistic (transformed) 1.797853

All independent variables are significant at a one percent significance level except the variable of time before IPRED. This variable is insignificant at a five percent significance level, indicating that the difference between Finnish and Swedish file sharing trends for the entire time period before the introduction of IPRED is the same. This means that we accept **H2: No significant difference between Swedish and Finnish file sharing previous to introduction of Ipred law**.

[24] See Appendix C2 for collinearity statistics

[25] See Appendix A8 for the outcomes of the tests and the total regression

Due to H2 being accepted, the subsequent results from the difference-in-differences analysis are valid from the perspective of Finland being an acceptable control variable. The regression indicates a drop in the level of file sharing when IPRED is implemented (1.046888), but a significant and positive growth in the difference between Finland and Sweden after IPRED (0.019592), representing a short run effect of the law only.

Assumption 2

Under assumption 2, a first difference-in-differences regression offers an estimation of the residuals which, when graphed, display kurtosis. The Breusch-Godfrey test is hence carried out in order to test for serial correlation. It is accepted at a ten percent significance level, concluding no serial correlation. A test for heteroskedasticity is conducted and homoscedasticity is also accepted at a ten percent significance level[26]. A moderate collinearity statistic of 24.80 is found[27]. All assumptions of OLS properties thus hold and due to the relatively large sample size, asymptotic normality holds (Wooldridge, J. M., 2009, pp. 172-175). As such the kurtosis of the residuals is not worrying, and the t-statistics are valid. The results of the difference-in-differences regression under assumption 2 are presented in table 4. The Difference-in-difference equation is modeled as:

$$y_{assump\ 2} = 1.595631 - 1.716109 * IPRED - 0.0025183 * time + 0.0232215 * time * IPRED$$

(0.0355218) (0.2327327) (0.0013218) (0.0039747)

Table 4- Difference-in-differences between Finland and Sweden under assumption 2

Source	SS	df	MS
Model	2.85557554	3	.951858514
Residual	.910067187	64	.0142198
Total	3.76564273	67	.056203623

Number of obs =	68
F(3, 64) =	66.94
Prob > F =	0.0000
R-squared =	0.7583
Adj R-squared =	0.7470
Root MSE =	.11925

DID_Assump~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.716109	.2327327	-7.37	0.000	-2.181046	-1.251172
time	-.0025183	.0013218	-1.91	0.061	-.0051589	.0001223
time_dummy~d	.0232215	.0039747	5.84	0.000	.0152811	.031162
_cons	1.595631	.0355218	44.92	0.000	1.524668	1.666594

[26] See Appendix A8 for outcomes of tests and the complete regression

[27] See Appendix C2 for collinearity statistics

All independent variables are significant at a one percent significance level except the time variable which is insignificant at the five percent significance level. This indicates, just as the results under assumption 1, that the difference between Finnish and Swedish trends is constant before the introduction of the IPRED law. As such, **H2: No significant difference between Swedish and Finnish file sharing previous to introduction of Ipred law** is accepted under assumption 2 and the results of the regression are valid in this respect as well. When the IPRED law is implemented there is a drop in the level of file sharing (1.716109), as the difference between Swedish and Finnish file sharing decreases. There is, however, also an increase in the growth of file sharing (0.0232215) after IPRED, indicated by the growing difference between the Swedish and Finnish file sharing trends. Consequently the IPRED law only results in a short run effect.

For both extremes, assumption 1 and 2, only a short run effect of the IPRED law is observed. That is, under both assumptions the IPRED law has not led to its intended outcomes. File sharing is growing more quickly to reach its past, higher levels. **H3: Significant smaller difference between trends of illegal file sharing in Sweden and Finland after implementation of Ipred law** is hence rejected. Instead a larger difference is witnessed, indicating no long run effect of the IPRED law.

8.2 Results part II

The response rate from the conducted survey is 75 percent but the usable answers were 73percent. A high response rate is important in order to get a representative set of data and to diminish non-response bias. The average response rate found in a study of a large amount of surveys is 60 percent with a deviation of +/- 20 percent (Baruch Y. 1999, p. 434). The response rate in this survey is thus within these limits.

Non-response bias occurs when there is a significant difference between the true value and the value obtained from the respondents. Certain individuals may be more prone to responding to a survey than others, which would make results biased towards these individuals' answers. In order to investigate the possibility of a non–response bias in the results, an assumption must be made about the non-respondents. In this case the assumption made is that the respondents who answered the survey after a reminder was sent out provide results similar to the results of non- respondents

(Colombo 2000 pp. 85-86). Should a significant difference be found between respondents who answered after the reminder and the ones that answered before, one could conclude that there is an indication of non-response bias in the results. A comparison was made between respondents who filled in the survey before and after a reminder was sent out, which showed no significant difference between these two groups in terms of gender, age and illegal downloading[28]. This result and the high response rate imply that non-response bias should be small in the sample data.

The results from the survey of 75 business students can be seen below. The sample for this survey has a mean age of 22 years old, with the youngest individual being 18 years old and the oldest 25 years old. The sample is split up into 56.9 percent females and 43.1 percent males.

To test how ethical morals affect the behavior of file sharing in the sample, individuals' attitudes towards file sharing is compared to other measures for attitudes, namely position on tax evasion, evading payment on communal transportation and avoiding payment of TV-licenses. The results of these tests are illustrated in Table 5, table 6 and table 7.

Table 5-Paired Samples T-test – Testing ethical differences between illegal file sharing and cheating on taxes

Variables	*Mean*	*Std. Deviation*	*t-value*	*Sig (2-tailed)*
I think it is wrong to file share illegally	6.13	Upper: 3.455	-3.923	0.000
It is not ok to cheat on your taxes	7.72	Lower: 0.407		

This test illustrates whether the means of the two variables, cheating on taxes and illegal file sharing, are significantly different. The null hypothesis that the means are the same is rejected at a one percent significance level, which implies that cheating on taxes is seen as more ethically wrong than illegal file sharing[29].

Table 6- Paired Samples T-test – Testing ethical differences between illegal file sharing and evading payment for public transportation

Variables	*Mean*	*Std. Deviation*	*t-value*	*Sig (2-tailed)*
I think it is wrong to file share illegally	6.13	Upper: 3.845	0.552	0.583
I oppose people that evade paying for public transportation	5.88	Lower: 0.453		

[28] See Appendix B1 for the results of the test
[29] See Appendix B2 for the results of the test

Here the null hypothesis that the means for the two variables are similar at a five percent significance level cannot be rejected. This implies that individuals in the sample do not see significantly large ethical differences between illegal file sharing and evading payment for public transportation.

Table 7- Paired Samples T-test – Testing ethical differences between illegal file sharing and paying for a TV-license

Variables	*Mean*	*Std. Deviation*	*t-value*	*Sig (2-tailed)*
I think it is wrong to file share illegally	6.13	Upper: 3.459	2.249	0.028
If you have a TV, the TV-license needs to be paid	5.21	Lower: 0.408		

When the illegal file sharing variable was compared to the TV license variable, the following results were found. At a five percent significance level results lead to a rejection of the null hypothesis that the means of the two variables are the same. Surprisingly enough, not paying for a TV license is considered less ethically wrong than illegal file sharing in the sample.

The sample was then split to test the same results for a group of individuals that considered file sharing less ethically wrong. For this group, all the variables tested above were seen as more ethically wrong than illegal file sharing[30]. The individuals in this group therefore displayed moral tolerance towards file sharing behavior. It is also worthwhile to mention that these individuals consist of 26.7 percent of the sample and that they are significantly more prone to illegal file sharing of music and film/series than the rest of the sample[31].

Subsequently, a Wilcoxon Signed Ranks test is performed to test the extent of illegal file sharing of music and film/series. The results are displayed in table 8.

[30] See Appendix B3 for the graphs of these tests
[31] See Appendix B6, B7 and B8 for the results of this analysis

Table 8- Wilcoxon Signed Ranks Test – Testing if individuals illegally file share music and film/series to the same extent.

Variables	*Median*	*Std. Deviation*	*Z*	*Assym. Sig (2-tailed)*
I file share music illegally through the Internet	5	0.911	-4.195(a)	0.000
I file share film/series illegally through the Internet	4	1.353		

At a one percent significance level the null hypothesis that the medians for file sharing music illegally and film/series are the same is rejected. The median of the variable for file sharing music illegally is significantly higher. Thus, film/series are file shared more frequently than music[32].

Next, a comparison is made of the available substitutes for file sharing for music and film/series. These results are displayed in table 9.

Table 9- Paired Samples T-test – Testing differences between available substitutes to illegal file sharing of music and film /series

Variables	*Mean*	*Std. Deviation*	*t-value*	*Sig (2-tailed)*
There are good substitutes to illegal file sharing of music	8,00	Upper: 3,159	7,521	0.000
There are good substitutes to illegal file sharing of film/series	5,22	Lower: 0,470		

The null hypothesis that the two means are the same is rejected at a one percent significance level. The mean for the variable "substitutes for illegal file sharing of music" is significantly higher than that for film/series. Thus the data implies that there exist better substitutes for illegal file sharing of music than for film/series[33].

A correlation is made between the file sharing of films/series and music and the availability of good substitutes to illegal file sharing[34]. Results show a significant correlation at a five percent significance level between file sharing and substitutes. The more individuals perceive there to be good substitutes to file sharing, the less these individual file share. Yet no significant correlation is found between file sharing and a concern of being charged with infringement on copyright since the introduction of the IPRED law.

[32] These two variable are coded from highest to lowest, meaning a high median implies a less frequent usage.
[33] See Appendix B8 for the result of this test
[34] See Appendix B10 and B11- for the results of these tests

Individuals' downloading habits when the IPRED law was just introduced were also analyzed. Certain measurement error exists in this data, as individuals were asked to look back in time and remember their habits a year back. Results[35] show that a significant part of the sample (60 percent of participants) reported no change in their file sharing behavior when the law was just introduced. Another 38 percent of participants reported that they in fact decreased their file sharing frequency. The results seem to suggest that the IPRED law has had a limited effect on decreasing file sharing behavior in the survey sample.

When differentiating between film/series and music file sharing behavior two years ago in comparison to today[36], 58 percent of the sample reported that they saw no change in their file sharing habits of film/series while 27 percent reported the same result for music. Moreover, 70 percent reported that their file sharing behavior in fact decreased for music, while only 33 percent reported the same for film/series. This result suggests that the decrease in file sharing of music has been larger than the decrease in the file sharing of film/series for the recent two years.

9. Discussion of Results

The estimation of the IPRED law's effect on file sharing in Sweden showed an evident short run effect, where file sharing dropped to a lower level directly after the introduction of the law. For the long run, the regression analysis displayed an increased growth in file sharing, indicating a "catch up" effect. The difference-in-differences analysis also displayed a positive growth in the difference between Finnish and Swedish file sharing after the implementation of IPRED, indicating the same lack of long run effect of the law. Both Hypothesis 1 and Hypothesis 3 were rejected, providing strong evidence against the IPRED law's effectiveness in reducing file sharing in Sweden. These results are in line with those of Bhattarjee et al., (2006) and Liebowitz (2004), who also distinguished an upsurge- a wearing off effect- in file sharing after a certain period of time. There are limitations when applying data from Procera Networks on Netnod Internet traffic statistics due to the two sets of data not being perfectly compatible. Therefore, assumptions have been made about the

[35] See Appendix B9 for the descriptive statistics
[36] See Appendix B12 for the results of this test

broadband connections in Sweden. However, these assumptions were necessary and reasonable, and allowed for the continuation of the analysis.

It is interesting that the results from the limited survey analysis showed that around 38 percent of the sample decreased their file sharing habits since the introduction of the IPRED law. This result, however, is questioned for its validity (see explanation in Results part II) as it does not correspond to the upward file sharing trend derived. This difference in results may be due to the fact that the econometric analysis captures total file sharing in Sweden while the survey analysis is valid for the specific population chosen.

D. W. Drezner's (2004) discussion of the weakened role of the government when it comes to regulating laws on the Internet has been proven by the results generated in the econometric analyses. However, in order to understand the short run effect of the law it is imperative to look at why individuals chose to continue to file share despite the introduction of a new law that implies a larger risk than previously.

To understand this choice, the theory of expected utility can be applied to the specific case of the IPRED law. The theory of expected utility states that an individual's cost of engaging in file sharing activity is largely explained by the quantity of expected new cases brought up in court. The widely discussed "Solna case "lawsuit was filed on the day of introduction of the IPRED law. The fact that this case was filed on the first day the law was put in effect, in combination with the large media coverage, could have had a first significant effect on individuals' perceptions of how many new cases would be filed in the upcoming period. If individuals perceived that an increasing amount of cases would be filed in the near future, they would connect copyright infringement with a higher risk of getting caught and decrease their file sharing behavior. As of today no individual has been convicted of copyright infringement, and all verdicts forcing Internet service providers to release information about their customers have been appealed to the Supreme Court of Sweden. Therefore, it can be anticipated that individuals' expectations of the number of new cases are gradually decreasing, which in turn decreases the risk associated with file sharing. The theory of expected utility also tells us that in order for individuals to constantly decrease their file sharing behavior new cases would need to be brought up in court continuously. This has not been done in Sweden.

There is a barrier that hinders the function of the IPRED law. In order for copyright holders to receive information from Internet service providers about an individual suspected of copyright

infringement, a case must be filed in court. In effect, a costly court battle between the copyright holder and Internet service provider takes place, without much involvement of the actual individual accused of infringement. This, most likely, has had a negative effect on the amount of new cases filed in Sweden. Such a barrier does not exist in the U.S, where subpoenas allow copyright holders to extract information on individuals under suspicion of infringement of the copyright law, without the involvement of a court. However, previous research on the legal threats of the RIAA on file sharing show, as previously mentioned, an overall similar short run decrease in file sharing like the one found in this thesis.

This seems to suggest that there are other factors affecting an individual's decision to file share beside the risk associated with the expected number of cases brought up in court. According to Logston, et al., (1994), file sharing is related to an individual's ethical views on this subject, and if this individual views file sharing as a matter of low moral intensity his behavior cannot be expected to change. Moreover, if file sharing is tolerated to a greater extent in the population, the reputational cost of violation discussed by Oksanen and Valimaki (2007) does not apply.

The moral value of file sharing was found to be extremely low for circa 27 percent of the sample. Results showed that an individual with a low moral value of file sharing also engages more frequently in file sharing than an individual with a high moral value. These results are also in line with E.C Hettinger's (1989, p.35) argument of the non-exclusiveness of file sharing. These individuals can act as an obstacle for the success of the IPRED law as their moral views prevent them from acknowledging the gravity of the law and hence changing their file sharing behavior. If individuals less prone to file sharing are the ones affected by the IPRED law, then total average file sharing traffic may not decrease significantly and a high file sharing trend would continue.

The results of the limited survey analysis revealed that individuals file share more films online than they do music. Results also found that respondents thought there were better substitutes to the file sharing of music than substitutes to the file sharing of films/series. A strong correlation between file sharing and available substitutes was found - the better the substitutes were perceived, the less the individuals file shared. There was no strong correlation found between file sharing and being afraid of the repercussions of infringing on the IPRED law. This seems to suggest that the availability of substitutes to file sharing may have a stronger effect on individuals' file sharing behavior than the introduction of a copyright law such as IPRED.

The total aggregated file sharing traffic used in this thesis does not distinguish between what types of files are being shared. However, since a film/series takes up more space than a music album (a film can take up 1 GB on average while an album can take up 170 MB) a decrease in music file sharing could be masked by a slight increase in the file sharing of films/series -this due to film having a greater impact on total file sharing traffic than music does. Nevertheless, a decrease only found in the file sharing of music does not translate into an effective IPRED law, since all types of downloading is expected to fall in this case.

E. Brousseau (2004) argued that both centralized and decentralized measures are needed in order for there not to be any inefficiency in society. As previously mentioned the music industry has used DRM protection and most recently the introduction of music-streaming sites that have been made available to customers. These examples of decentralized measured may not be enough, according to Brousseau (2004), without a centralized measure in place, such as a copyright law. It may therefore be difficult to rule the IPRED law as completely ineffective. It is also worth noting that perhaps substitutes to music file sharing, such as the free version of Spotify, became very popular during the time of the implementation of the IPRED law precisely because the population had to look for a new way of getting music.

10. Conclusion

The aim of this essay was to determine the effect of the introduction of the IPRED law on file sharing in Sweden. The first research question intended to evaluate whether the IPRED law managed to reduce total aggregated file sharing in Sweden. A distinction was made between the short run and long run effects of the law. Results from both the OLS regression analysis on Swedish file sharing and the difference-in-differences analysis proved that the law had a short run effect in decreasing file sharing in Sweden but that this effect wore off in the long run. The second research question intended to determine the underlying reasons for the observed effect of the law- hence to get a better understanding of the "catch-up" effect.

With contribution from the theory of expected utility it was determined that solely the implementation of the IPRED law would not be effective without actual legal threats in the form of new lawsuits. Individuals' perceived risk of file sharing appears to be diminishing due to the few law suits brought up in Swedish courts. Furthermore, a significant part of a survey sample showed

ethical tolerance towards file sharing, which could explain why the threat of a new copyright law such as IPRED might not have had its intended effect. Decentralized measures in the form of substitutes to illegal file sharing evidently have a significant impact on file sharing behavior. Available substitutes to file sharing hence prove to be important and can be expected to play a significant role in the struggle to reduce file sharing in the future.

11.Further Research

This thesis has been the first in Sweden to draw conclusions of the long run effect of the IPRED law. It has been proven that the law only had a short run effect, and this invites for further research to be made in order to strengthen the results found here.

In order to obtain a full understanding of all the possible variables that may influence the effect of a copyright law such as IPRED on file sharing, further research can be done. Specifically, deeper analysis into the moral values of individuals towards file sharing in Sweden can be made. Furthermore, to generalize what circumstances are needed for a copyright law to function on the Internet, studies of copyright laws in several countries may be interesting. A comparative study between the copyright laws in different countries could establish what factors may be important for a successful law.

It would also be interesting to study the effects of the development of substitutes, such as the streaming of films and music, on file sharing. If a study was made of these developments before and during the introduction of IPRED, the effect on file sharing by the IPRED law would be more distinguishable from the effect of available substitutes.

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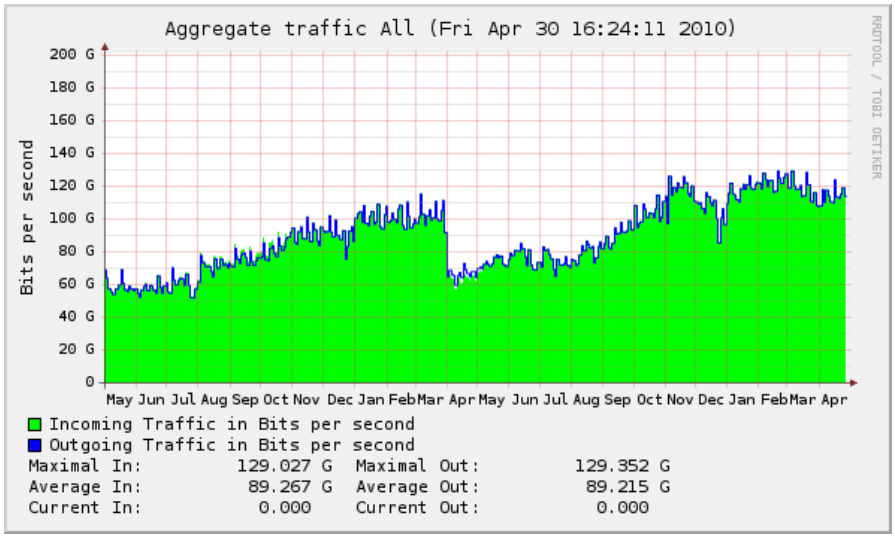
13.Appendix

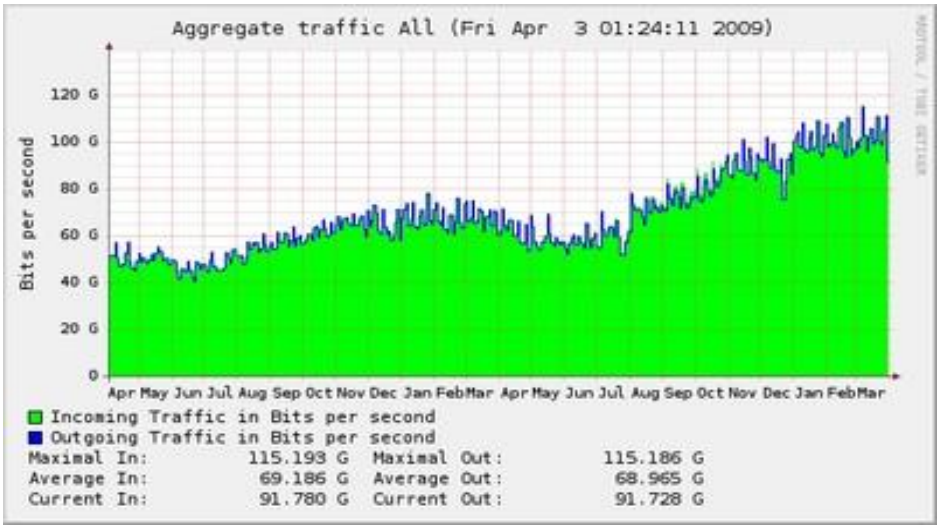
Appendix A

A1) Graphs from Netnod and FICIX

Total aggregate traffic from all Swedish national Internet exchange points measured over a two-year period (May 2008-March 2010) in bits per second[37]

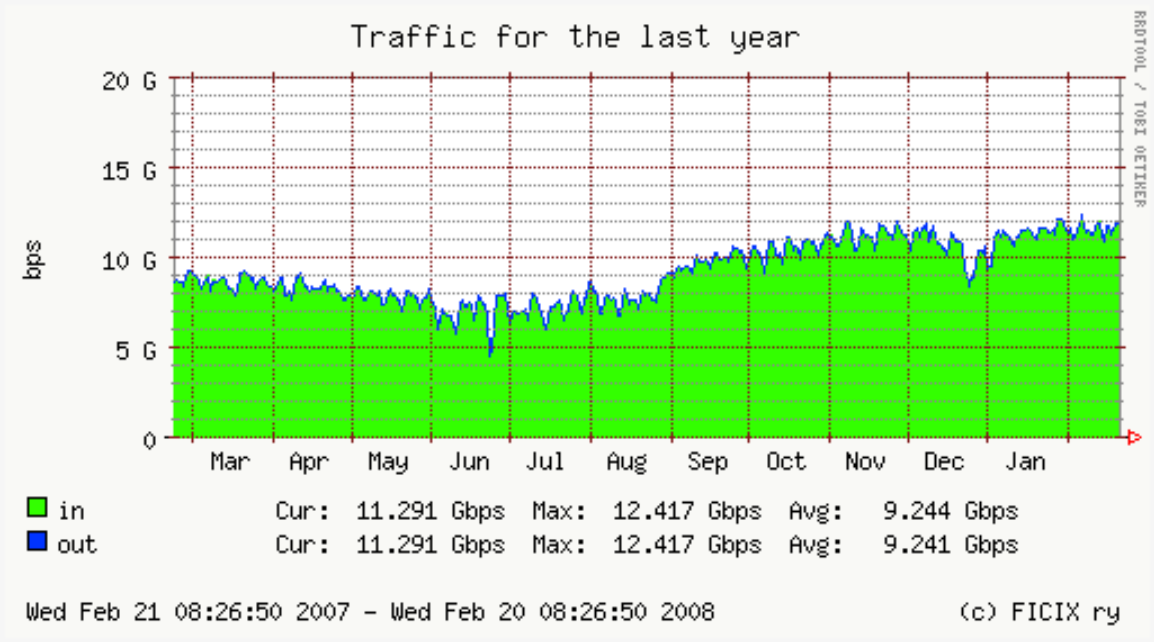


Total aggregate traffic from all Swedish national Internet exchange points measured over a two-year period (May 2007-March 2009) in bits per second[38]

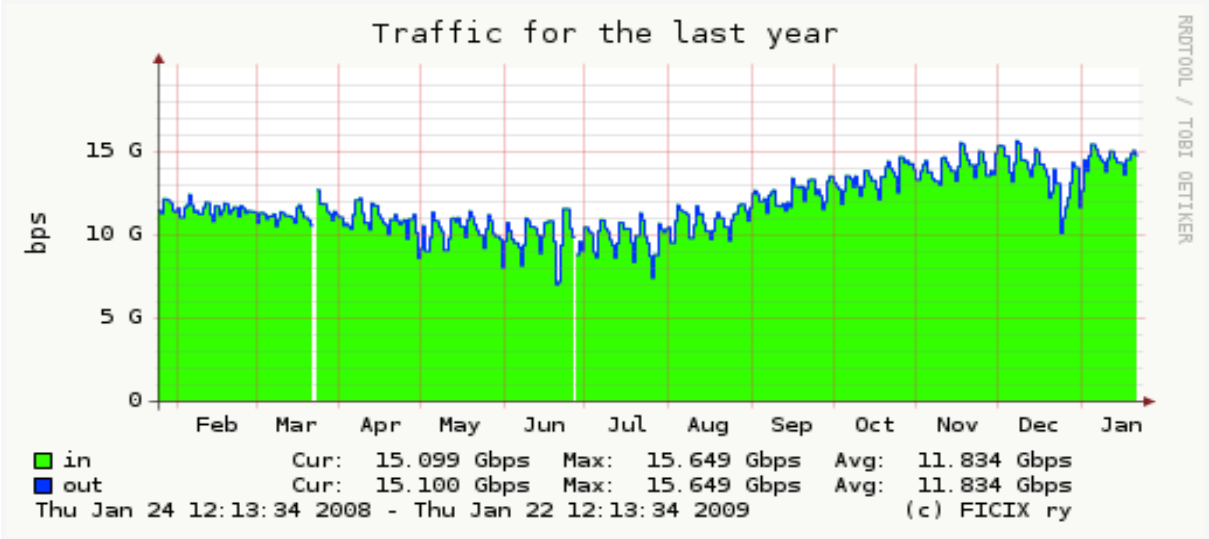


[37] Netnod statistics, http://stats.autonomica.se/mrtg/sums/All.html
[38] Ibid.

Total aggregate traffic from all Finnish national Internet exchange points measured over the period March 2007-January 2008 in bits per second[39]

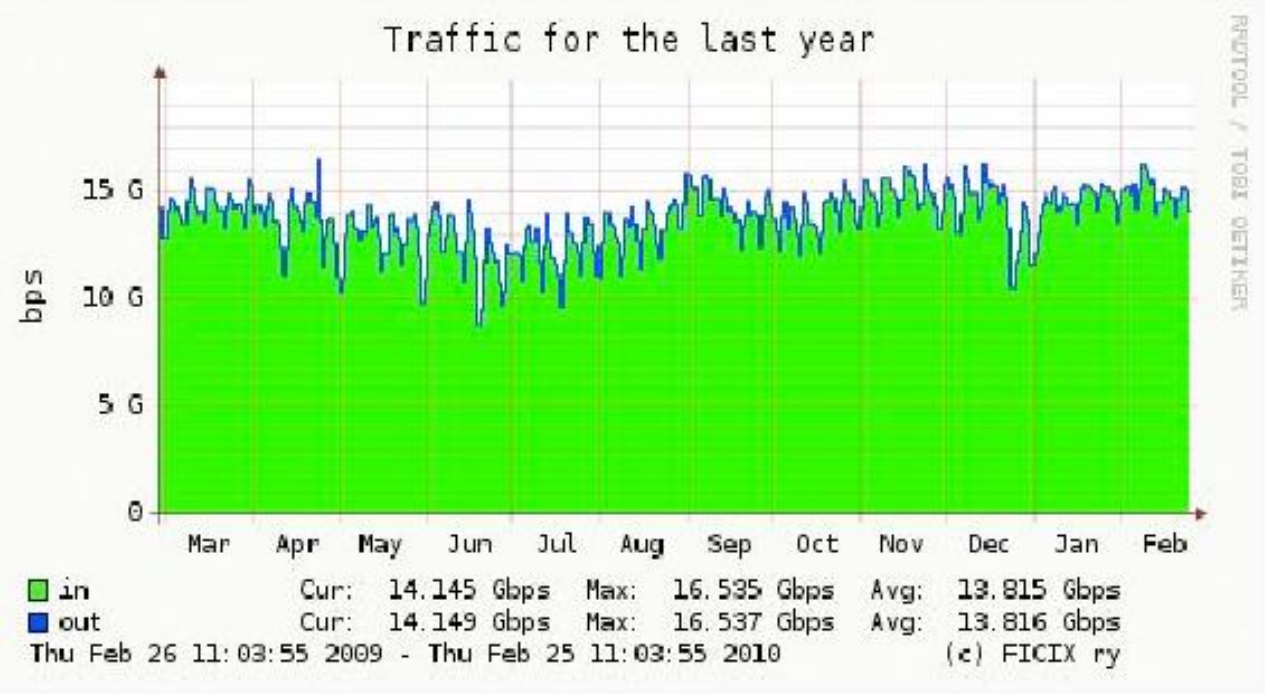


Total aggregate traffic from all Finnish national Internet exchange points measured over the period February 2008- December 2009 in bits per second[40]

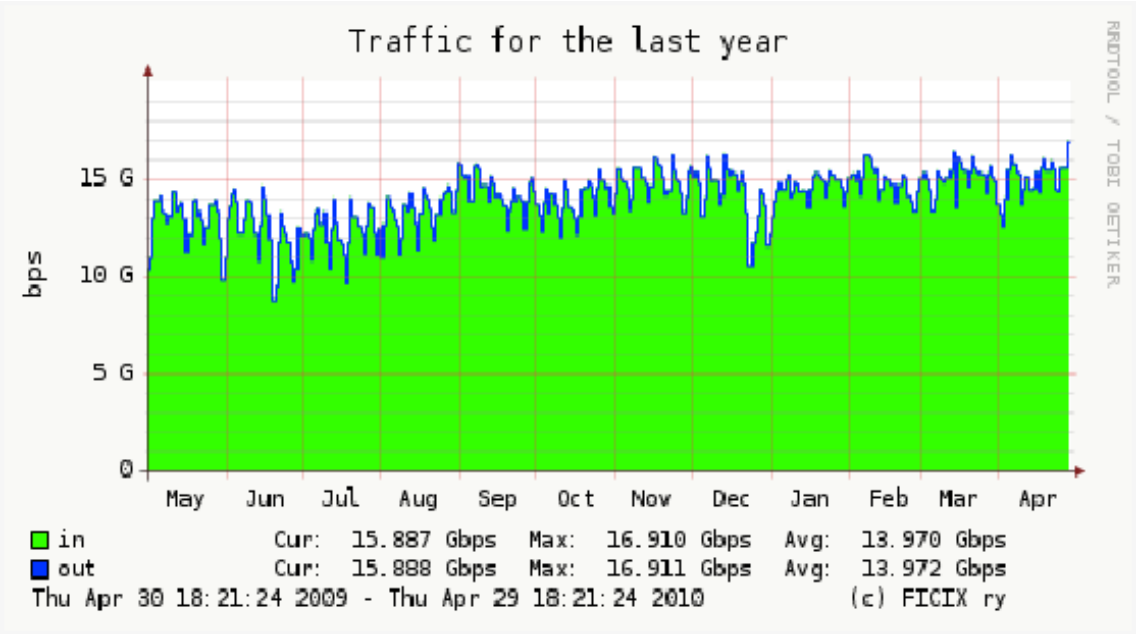


[39] FICIX statistics, http://stats.ficix.fi/
[40] Ibid.

Total aggregate traffic from all Finnish national Internet exchange points measured over the period March 2009- January 2010 in bits per second[41]



Total aggregate traffic from all Finnish national Internet exchange points measured over the period May 2009- March 2010 in bits per second[42]



[41]Ibid.
[42]Ibid.

A2) Raw data from Netnod, aggregated total average traffic in Mbits/sec from April 2007-April 2010

Time	Netnod total traffic	Time	Netnod total traffic	Time	Netnod total traffic	Time	Netnod total traffic
0704_1[43]	52,5	0801_1	57	0810_1	76	0907_1	70
0704_2	52,5	0801_2	74,5	0810_2	87	0907_2	84
0704_3	57	0801_3	64	0810_3	75	0907_3	75
0704_4	47	0801_4	75,5	0810_4	84,5	0907_4	82,5
0704_5	54	0801_5	62,5	0810_5	76	0907_5	64
0704_6	57	0801_6	72	0810_6	89	0907_6	78,5
0704_7	46	0801_7	64	0810_7	80,5	0907_7	67,5
0704_8	54	0801_8	78	0810_8	92	0907_8	80
0705_1	52	0802_1	65	0811_1	95,5	0908_1	72
0705_2	49,5	0802_2	75	0811_2	84	0908_2	77
0705_3	50	0802_3	62	0811_3	96	0908_3	67,5
0705_4	54	0802_4	73,5	0811_4	88	0908_4	85,5
0705_5	56,5	0802_5	62	0811_5	102,5	0908_5	86,5
0705_6	54,5	0802_6	68	0811_6	85	0908_6	85,5
0705_7	52	0802_7	77	0811_7	98	0908_7	72
0705_8	48	0802_8	63,5	0811_8	84	0908_8	88
0706_1	50,5	0803_1	75	0812_1	92,5	0909_1	80,5
0706_2	41	0803_2	66	0812_2	102,5	0909_2	93,5
0706_3	47	0803_3	76	0812_3	89	0909_3	81,5
0706_4	50	0803_4	65	0812_4	100	0909_4	96
0706_5	45,5	0803_5	72	0812_5	86	0909_5	89
0706_6	40	0803_6	62	0812_6	94	0909_6	100
0706_7	49,5	0803_7	71	0812_7	75	0909_7	89
0706_8	48	0803_8	65	0812_8	96	0909_8	104
0707_1	48	0804_1	72	0901_1	104	0910_1	91
0707_2	46	0804_2	63	0901_2	96	0910_2	110,5
0707_3	54	0804_3	67	0901_3	108	0910_3	96
0707_4	46	0804_4	60	0901_4	95,5	0910_4	114
0707_5	46	0804_5	67	0901_5	105	0910_5	100
0707_6	54	0804_6	56	0901_6	96	0910_6	105
0707_7	48	0804_7	60,5	0901_7	109	0910_7	120
0707_8	55,5	0804_8	53	0901_8	94	0910_8	92,5
0708_1	52,5	0805_1	70	0902_1	108	0911_1	114
0708_2	47	0805_2	55	0902_2	98,5	0911_2	90,5

[43] The time variable is coded in the following way: yymm_c, where y= year, m= month and c= time measure within month (eight measures per month)

0708_3	57	0805_3	57	0902_3	104	0911_3	134
0708_4	55	0805_4	70	0902_4	98	0911_4	123,5
0708_5	57	0805_5	61	0902_5	108,5	0911_5	116,5
0708_6	53,5	0805_6	55,5	0902_6	94,5	0911_6	130
0708_7	62	0805_7	59,5	0902_7	110,5	0911_7	110
0708_8	53,5	0805_8	56	0902_8	95	0911_8	121
0709_1	57	0806_1	57	0903_1	100,5	0912_1	111
0709_2	54,5	0806_2	51,5	0903_2	116	0912_2	115,5
0709_3	62,5	0806_3	61	0903_3	95,5	0912_3	100
0709_4	57	0806_4	55,5	0903_4	106	0912_4	119,5
0709_5	62	0806_5	59	0903_5	99	0912_5	104,5
0709_6	56	0806_6	54	0903_6	111	0912_6	117,5
0709_7	64,5	0806_7	66	0903_7	99	0912_7	84
0709_8	60,5	0806_8	54	0903_8	111,5	0912_8	107
0710_1	56	0807_1	61	0904_ 1	67	1001_1	89
0710_2	62	0807_2	55	0904_2	56,5	1001_2	126
0710_3	57,5	0807_3	70,5	0904_3	68	1001_3	109
0710_4	64,5	0807_4	60	0904_4	62,5	1001_4	128
0710_5	63	0807_5	67	0904_5	76,5	1001_5	115
0710_6	67	0807_6	51	0904_6	66	1001_6	130,5
0710_7	59	0807_7	51	0904_7	63,5	1001_7	115,5
0710_8	66	0807_8	61	0904_8	70,5	1001_8	128
0711_1	61	0808_1	79	0905_1	60	1002_1	117
0711_2	68	0808_2	70,5	0905_2	75,5	1002_2	132
0711_3	63	0808_3	70,5	0905_3	76,5	1002_3	116
0711_4	67,5	0808_4	65	0905_4	71	1002_4	132
0711_5	65	0808_5	75,5	0905_5	75	1002_5	114,5
0711_6	70	0808_6	70	0905_6	82	1002_6	133
0711_7	55	0808_7	76	0905_7	74	1002_7	120
0711_8	68	0808_8	71	0905_8	69,5	1002_8	136
0712_1	59	0809_1	72	0906_1	78	1003_1	119
0712_2	71,5	0809_2	83	0906_2	84	1003_2	133,5
0712_3	64	0809_3	83	0906_3	78,5	1003_3	117,5
0712_4	74	0809_4	72	0906_4	89	1003_4	127,5
0712_5	61	0809_5	80	0906_5	65	1003_5	114
0712_6	72	0809_6	71	0906_6	79,5	1003_6	134
0712_7	57	0809_7	80	0906_7	66	1003_7	107
0712_8	72	0809_8	71	0906_8	74,5	1003_8	121,5
						1004_1	109,5

A3) Raw data from FICIX, aggregated total average traffic in Mbits/sec from April 2007-March 2010

time	FICIX total traffic	time	FICIX total traffic2	time3	FICIX total traffic4	time5	FICIX total traffic6	time7	FICIX total traffic
0704_1	8,2	0712_4	11,9	0807_6	10,45	0904_5	11,1	0910_6	13,6
0704_2	8,9	0712_5	10,9	0807_7	8,35	0904_6	15,2	0910_7	12
0704_3	7,9	0712_6	11,8	0807_8	11,4	0904_7	14,4	0910_8	14,95
0704_4	9	0712_7	10,4	0807_9	7,4	0904_8	14,4	0910_9	13,5
0704_5	8,1	0712_8	10,05	0807_10	10,7	0904_9	13,1	0910_10	13,4
0704_6	8,2	0712_9	11,4	0807_11	10,3	0904_10	15	0910_11	12,2
0704_7	8,7	0712_10	10,9	0808_1	10,4	0904_11	13,7	0910_12	14,5
0704_8	8,3	0712_11	8,3	0808_2	9,5	0904_12	16,6	0910_13	14,95
0704_9	7,6	0712_12	10,4	0808_3	11,9	0904_13	11,5	0910_14	13,1
0705_1	8,5	0801_1	9,4	0808_4	11,4	0904_14	13,8	0910_15	15,5
0705_2	7,7	0801_2	11,5	0808_5	9,7	0904_15	11	0910_16	14,5
0705_3	8,2	0801_3	10,6	0808_6	11,85	0905_1	10,2	0910_17	13,25
0705_4	7,9	0801_4	11,5	0808_7	10,2	0905_2	14,2	0911_1	14,25
0705_5	7,2	0801_5	11,6	0808_8	9,65	0905_3	12,8	0911_2	15,5
0705_6	8,3	0801_6	11	0808_9	11,8	0905_4	13,2	0911_3	14,8
0705_7	7	0801_7	11,6	0808_10	9,5	0905_5	14,4	0911_4	13,45
0705_8	8,25	0801_8	11,2	0808_11	11,9	0905_6	13,4	0911_5	15,6
0705_9	7,1	0801_9	12,1	0808_12	10,8	0905_7	13,8	0911_6	14,7
0705_10	8,3	0801_10	11,5	0809_1	12,5	0905_8	11,2	0911_7	13,7
0706_1	7,5	0802_1	11,2	0809_2	12,8	0905_9	11,2	0911_8	14,5
0706_2	6	0802_2	11,1	0809_3	12	0905_10	12,2	0911_9	14,5
0706_3	7	0802_3	12,5	0809_4	11,15	0905_11	14,5	0911_10	16,25
0706_4	5,8	0802_4	11,3	0809_5	12,8	0905_12	13,25	0911_11	15,9
0706_5	7,7	0802_5	12	0809_6	11,4	0905_13	11,6	0911_12	14,3
0706_6	7,2	0802_6	10,8	0809_7	11,9	0905_14	12,5	0911_13	16,4
0706_7	7,25	0802_7	11,8	0809_8	13,45	0905_15	13,8	0911_14	13,25
0706_8	6,5	0802_8	11,2	0809_9	13	0905_16	14,05	0911_15	15,4
0706_9	7,9	0802_9	11,91	0809_10	12	0905_17	9,7	0912_1	15,6

0706_10	4,5	0802_10	11,25	0809_11	13,45	0905_18	13	0912_2	15,4
0706_11	8	0802_11	11,65	0809_12	12,8	0906_1	13	0912_3	13,1
0707_1	6,6	0802_12	11,1	0809_13	11,4	0906_2	14,5	0912_4	16,3
0707_2	7	0802_13	11,75	0809_14	13,5	0906_3	12,25	0912_5	14,95
0707_3	6,5	0802_14	11,45	0810_1	13,2	0906_4	13,9	0912_6	13,6
0707_4	8	0803_1	10,7	0810_2	11,9	0906_5	10,7	0912_7	16,4
0707_5	6	0803_2	11,45	0810_3	13,5	0906_6	12,7	0912_8	15,4
0707_6	7,2	0803_3	11	0810_4	12,25	0906_7	14,7	0912_9	15,25
0707_7	7,6	0803_4	11,35	0810_5	13,9	0906_8	8,8	0912_10	14,3
0707_8	6,4	0803_5	10,5	0810_6	13,4	0906_9	13,4	0912_11	15,4
0707_9	8,1	0803_6	11,4	0810_7	13,3	0906_10	11,8	0912_12	10,5
0707_10	6,9	0803_7	11,2	0810_8	12,05	0906_11	9,65	0912_13	14,5
0707_11	8,8	0803_8	10,7	0810_9	13,5	0906_12	12,55	0912_14	11,6
0708_1	8,7	0803_9	11,9	0810_10	14,5	0907_1	12,1	1001_1	12,2
0708_2	6,9	0803_10	10,5	0810_11	12,4	0907_2	10,8	1001_2	14,9
0708_3	7,9	0803_11	12,8	0810_12	14,85	0907_3	13,55	1001_3	15,3
0708_4	6,7	0803_12	11,9	0810_13	14	0907_4	12,7	1001_4	14,05
0708_5	8	0803_13	10,9	0811_1	13,4	0907_5	13,4	1001_5	14,8
0708_6	7,2	0803_14	11,4	0811_2	14,55	0907_6	10,35	1001_6	14,4
0708_7	7,6	0804_1	11,1	0811_3	13	0907_7	14,05	1001_7	13,5
0708_8	7	0804_2	10,35	0811_4	14,85	0907_8	11,95	1001_8	14,4
0708_9	8,1	0804_3	12,3	0811_5	13,9	0907_9	11,95	1001_9	15,4
0708_10	7,6	0804_4	10,3	0811_6	13,25	0907_10	9,6	1001_10	14,05
0708_11	9,05	0804_5	11,9	0811_7	15,5	0907_11	14,05	1001_11	15,4
0709_1	9,1	0804_6	11,8	0811_8	13,45	0907_12	13,1	1001_12	15
0709_2	9,5	0804_7	10	0811_9	15	0907_13	12,6	1001_13	13,55
0709_3	9	0804_8	11,35	0811_10	13,5	0907_14	11,05	1002_1	15,3
0709_4	10,1	0804_9	11,6	0811_11	13,4	0907_15	13,8	1002_2	14,9
0709_5	9,8	0804_10	9,7	0812_1	15	0907_16	11,05	1002_3	15,45
0709_6	9	0804_11	11,3	0812_2	15,5	0908_1	11	1002_4	14,1
0709_7	9,8	0804_12	8,55	0812_3	13,1	0908_2	14,05	1002_5	15
0709_8	9,4	0805_1	9,25	0812_4	15,6	0908_3	11,05	1002_6	16,3

0709_9	10,35	0805_2	10,55	0812_5	14,5	0908_4	13,7	1002_7	15,5
0709_10	9,9	0805_3	9	0812_6	13,5	0908_5	14,4	1002_8	14
0709_11	10,6	0805_4	11,95	0812_7	15,2	0908_6	11,5	1002_9	15,2
0709_12	9,4	0805_5	9	0812_8	15	0908_7	13,35	1002_10	15,2
0710_1	9,9	0805_6	11	0812_9	14,25	0908_8	14,55	1002_11	15
0710_2	10,7	0805_7	10,5	0812_10	12,2	0908_9	14,1	1002_12	14,7
0710_3	9	0805_8	9,9	0812_11	14	0908_10	11,85	1002_13	13,6
0710_4	10,9	0805_9	11,5	0812_12	10	0908_11	13,3	1002_14	15,3
0710_5	9,6	0805_10	9,1	0812_13	14,4	0908_12	14,6	1002_15	14,2
0710_6	11,1	0805_11	11,3	0812_14	14	0908_13	13,3	1002_16	13,9
0710_7	11,1	0805_12	10	0812_15	11,5	0908_14	15,9	1002_17	13,35
0710_8	10,6	0805_13	8	0901_1	missing	0909_1	15,9	1002_18	14,5
0710_9	9,9	0806_1	9,65	0902_1	missing	0909_2	15,15	1002_19	15
0710_10	11	0806_2	10,8	0903_1	13	0909_3	13,8	1003_1	15,45
0710_11	10,05	0806_3	9,6	0903_2	14,9	0909_4	15,9	1003_2	15
0710_12	11,45	0806_4	8,1	0903_3	13,6	0909_5	14,6	1003_3	14,5
0711_1	11,1	0806_5	11,05	0903_4	15,6	0909_6	13,7	1003_4	13,35
0711_2	10,6	0806_6	10,5	0903_5	14,2	0909_7	15,1	1003_5	15,5
0711_3	12	0806_7	8,8	0903_6	13,6	0909_8	14,8	1003_6	14,95
0711_4	10,3	0806_8	10,85	0903_7	15,3	0909_9	14,1	1003_7	16,5
0711_5	11,6	0806_9	10,9	0903_8	14,25	0909_10	13,6	1003_8	13,45
0711_6	11,2	0806_10	7	0903_9	13,35	0909_11	12,4	1003_9	16
0711_7	11,1	0806_11	11,7	0903_10	15	0909_12	14,55	1003_10	15,9
0711_8	10,3	0806_12	9,9	0903_11	14,4	0909_13	14	1003_11	15,5
0711_9	11,9	0806_13	8,8	0903_12	13,3	0909_14	12,45	1003_12	14,6
0711_10	11	0806_14	9,8	0903_13	14,9	0909_15	15	1003_13	16,1
0711_11	12	0807_1	10,5	0903_14	15,55	0909_16	14,4	1003_14	15,4
0711_12	11,35	0807_2	8,55	0904_1	14,4	0910_1	13,7	1003_15	14,1
0712_1	10,2	0807_3	10,95	0904_2	13,4	0910_2	12,45	1003_16	15,8
0712_2	11,6	0807_4	8,55	0904_3	15	0910_3	14,5	1003_17	15,1
0712_3	11	0807_5	10,8	0904_4	13,65	0910_4	13,3	1003_18	13,65
						0910_5	14,3		

A4) Raw data from Procera Networks on share of peer-to-peer file sharing out of total Internet traffic

Date	Peer-to-peer file sharing % of incoming data
2009-03-25	63,56%
2009-04-01	54,49%
2009-04-08	44,17%
2009-04-15	45,66%
2009-04-22	43,69%
2009-04-29	42,97%
2009-05-06	41,09%
2009-05-13	45,65%
2009-05-20	47,70%
2009-05-27	46,73%
2009-06-03	47,15%
2009-06-10	46,92%
2009-06-24	48,98%
2009-07-01	48,67%
2009-07-08	50,89%
2009-07-15	50,95%
2009-07-22	50,28%
2009-07-29	50,94%
2009-08-05	47,82%
2009-08-12	48,24%
2009-08-19	49,84%
2009-08-26	42,53%
2009-09-02	46,14%
2009-09-09	42,67%
2009-09-16	44,41%
2009-09-23	45,38%
2009-09-30	44,93%

A5) Processed data- the share of peer-to-peer file sharing out of total Internet traffic for Assumption 1 & 2

Time	Assumption 1: Share of P2P file sharing	Assumption 2: Share of P2P file sharing
0704_1	47,0%	75,0%
0704_2	47,0%	75,0%
0705_1	47,0%	75,0%
0705_2	46,9%	75,0%
0706_1	46,9%	75,0%
0706_2	46,9%	75,0%
0707_1	46,9%	75,0%
0707_2	46,8%	75,0%
0708_1	46,8%	75,0%
0708_2	46,8%	75,0%
0709_1	46,7%	75,0%
0709_2	46,7%	75,0%
0710_1	46,7%	75,0%
0710_2	46,6%	75,0%
0711_1	46,6%	75,0%
0711_2	46,6%	75,0%
0712_1	46,5%	75,0%
0712_2	46,5%	75,0%
0801_1	46,5%	75,0%
0801_2	46,5%	75,0%
0802_1	46,4%	75,0%
0802_2	46,4%	75,0%
0803_1	46,4%	75,0%
0803_2	46,3%	75,0%
0804_1	46,3%	75,0%
0804_2	46,3%	75,0%
0805_1	46,2%	75,0%
0805_2	46,2%	75,0%
0806_1	46,2%	75,0%
0806_2	46,2%	75,0%
0807_1	46,1%	75,0%
0807_2	46,1%	75,0%
0808_1	46,1%	75,0%
0808_2	46,0%	75,0%
0809_1	46,0%	75,0%
0809_2	46,0%	75,0%
0810_1	45,9%	75,0%
0810_2	45,9%	75,0%
0811_1	45,9%	75,0%

0811_2	45,8%	75,0%
0812_1	45,8%	75,0%
0812_2	45,8%	75,0%
0901_1	45,8%	75,0%
0901_2	45,7%	75,0%
0902_1	45,7%	75,0%
0902_2	45,7%	75,0%
0903_1	45,6%	75,0%
0903_2	45,6%	75,0%
0904_1	45,6%	45,6%
0904_2	45,5%	45,5%
0905_1	45,5%	45,5%
0905_2	45,5%	45,5%
0906_1	45,5%	45,5%
0906_2	45,4%	45,4%
0907_1	45,4%	45,4%
0907_2	45,4%	45,4%
0908_1	45,3%	45,3%
0908_2	45,3%	45,3%
0909_1	45,3%	45,3%
0909_2	45,2%	45,2%
0910_1	45,2%	45,2%
0910_2	45,2%	45,2%
0911_1	45,1%	45,1%
0911_2	45,1%	45,1%
0912_1	45,1%	45,1%
0912_2	45,1%	45,1%
1001_1	45,0%	45,0%
1001_2	45,0%	45,0%
1002_1	45,0%	45,0%
1002_2	44,9%	44,9%
1003_1	44,9%	44,9%
1003_2	44,9%	44,9%

A6) Processed data – Swedish peer-to-peer file sharing for Assumption 1 & 2 and data of Finnish total Internet traffic

Time	Assumption 1- Swedish P2P file sharing	Assumption 2-Swedish P2P file sharing	Finnish total Internet traffic
0704_1	24,575	39,188	8,42
0704_2	24,795	39,563	8,20
0705_1	24,133	38,531	7,90
0705_2	24,762	39,563	7,79
0706_1	22,107	35,344	6,92
0706_2	21,449	34,313	6,73
0707_1	22,723	36,375	6,82
0707_2	23,820	38,156	7,50
0708_1	24,740	39,656	7,57
0708_2	26,419	42,375	7,87
0709_1	26,985	43,313	9,50
0709_2	28,369	45,563	9,78
0710_1	28,001	45,000	10,20
0710_2	29,731	47,813	10,68
0711_1	30,236	48,656	11,13
0711_2	30,042	48,375	11,28
0712_1	31,244	50,344	11,11
0712_2	30,467	49,125	10,21
0801_1	31,493	50,813	10,75
0801_2	32,111	51,844	11,50
0802_1	31,973	51,656	11,48
0802_2	31,373	50,719	11,51
0803_1	32,687	52,875	11,09
0803_2	31,275	50,625	11,44
0804_1	30,329	49,125	11,19
0804_2	27,359	44,344	10,61
0805_1	29,132	47,250	10,13
0805_2	26,803	43,500	10,04
0806_1	25,977	42,188	9,79
0806_2	26,883	43,688	9,85
0807_1	28,421	46,219	9,87
0807_2	26,501	43,125	9,77
0808_1	32,816	53,438	10,71
0808_2	33,658	54,844	10,73
0809_1	35,648	58,125	12,08
0809_2	34,705	56,625	12,80
0810_1	37,036	60,469	13,03
0810_2	38,733	63,281	13,51
0811_1	41,690	68,156	13,94

0811_2	42,349	69,281	14,02
0812_1	43,981	72,000	14,63
0812_2	40,175	65,813	13,17
0901_1	46,152	75,656	missing
0901_2	46,180	75,750	missing
0902_1	46,665	76,594	missing
0902_2	46,634	76,594	missing
0903_1	47,688	78,375	14,26
0903_2	47,940	78,844	14,41
0904_1	28,938	28,938	13,88
0904_2	31,481	31,481	13,64
0905_1	32,200	32,200	12,90
0905_2	34,168	34,168	12,58
0906_1	37,439	37,439	12,84
0906_2	32,361	32,361	11,82
0907_1	35,346	35,346	12,36
0907_2	32,885	32,885	12,15
0908_1	34,223	34,223	12,62
0908_2	37,597	37,597	13,87
0909_1	39,777	39,777	14,87
0909_2	43,200	43,200	13,81
0910_1	46,506	46,506	13,59
0910_2	47,151	47,151	13,93
0911_1	52,141	52,141	14,56
0911_2	53,854	53,854	15,14
0912_1	50,266	50,266	15,09
0912_2	46,517	46,517	13,59
1001_1	50,877	50,877	14,16
1001_2	55,005	55,005	14,63
1002_1	55,868	55,868	15,08
1002_2	56,563	56,563	14,48
1003_1	55,854	55,854	14,97
1003_2	53,460	53,460	15,13

A7) Log file of regression analysis of time on Swedish file sharing

note: →represents STATA command

Assumption 1

Running regression under assumption 1

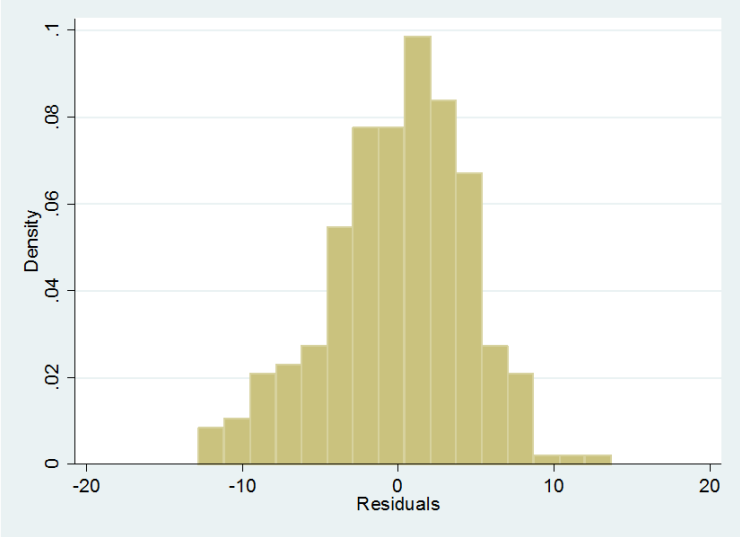
Source	SS	df	MS	Number of obs =	288
Model	23901.2709	3	7967.09029	F(3, 284) =	386.87
Residual	5848.68753	284	20.5939702	Prob > F =	0.0000
				R-squared =	0.8034
Total	29749.9584	287	103.658392	Adj R-squared =	0.8013
				Root MSE =	4.5381

Sweden_Ass~1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-54.05279	4.09937	-13.19	0.000	-62.12179	-45.98379
Time	.1189311	.005909	20.13	0.000	.1073	.1305621
Time_Dummy~d	.2001792	.0177277	11.29	0.000	.1652849	.2350735
_cons	20.79333	.6575793	31.62	0.000	19.49898	22.08768

Investigating if there is normality of standard errors

→predict uhat_1, resid

→histogram uhat_1



(bin=16, start=-12.822021, width=1.6548602)

Testing for AR(1) correlation using the Durbin Watson statistic

→tsset Time

time variable: Time, 1 to 288
delta: 1 unit

→estatdwatson

Durbin-Watson d-statistic(4, 288) = 1.398104

Testing for heteroskedasticity using the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

→estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Sweden_Assumption_1

chi2(1) = 17.48

Prob>chi2 = 0.0000

Correcting for heteroskedasticity and AR (1) correlation (Prais-Winsten AR(1) regression)

→prais Sweden_Assumption_1 Dummy_Ipred Time Time_Dummy_Ipred, robust

```
Iteration 0:  rho =  0.0000
Iteration 1:  rho =  0.2991
Iteration 2:  rho =  0.2993
Iteration 3:  rho =  0.2993

Prais-Winsten AR(1) regression -- iterated estimates

Linear regression                                      Number of obs =       288
                                                       F(  4,   284) =   2601.39
                                                       Prob > F      =    0.0000
                                                       R-squared     =    0.6896
                                                       Root MSE      =    4.3303
```

Sweden_Ass~1	Coef.	Semi-robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-54.28144	5.474804	-9.91	0.000	-65.05778	-43.5051
Time	.1191555	.0069149	17.23	0.000	.1055444	.1327665
Time_Dummy~d	.2006912	.0248045	8.09	0.000	.1518673	.2495151
_cons	20.79559	.6140135	33.87	0.000	19.58699	22.00418
rho	.2993083					

```
Durbin-Watson statistic (original)      1.398104
Durbin-Watson statistic (transformed)   2.406740
```

Assumption 2
Running regression

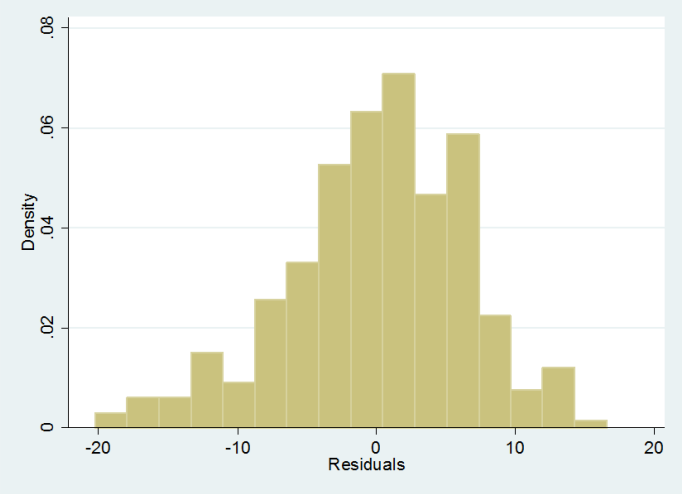
→reg Sweden_Assumption_2 Dummy_Ipred Time Time_Dummy_Ipred

Source	SS	df	MS	Number of obs =	288
Model	36536.7822	3	12178.9274	F(3, 284) =	287.18
Residual	12044.085	284	42.40875	Prob > F =	0.0000
				R-squared =	0.7521
				Adj R-squared =	0.7495
Total	48580.8672	287	169.271314	Root MSE =	6.5122

Sweden_Ass~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-66.15064	5.882674	-11.24	0.000	-77.72982	-54.57147
Time	.2017025	.0084795	23.79	0.000	.1850118	.2183932
Time_Dummy~d	.1174078	.0254395	4.62	0.000	.0673338	.1674818
_cons	32.89118	.9436388	34.86	0.000	31.03376	34.74859

Investigating if there is normality in standard errors

→predict uhat_2, resid
→histogram uhat_2



(bin=16, start=-20.257395, width=2.303097)

Investigating whether AR (1) correlation exists using the Breusch-Godfrey test

→tsset Time

time variable: Time, 1 to 288
delta: 1 unit

→estat bgodfrey

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	47.220	1	0.0000

H0: no serial correlation

testing for heteroskedasticity using the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

→estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Sweden_Assumption_2

chi2(1) = 39.80

Prob>chi2 = 0.0000

Correcting for heteroskedasticity and AR(1) correlation (Prais-Winsten AR(1) regression)

→prais Sweden_Assumption_2 Dummy_Ipred Time Time_Dummy_Ipred, robust

Linear regression

Number of obs = 288
F(4, 284) = 1848.20
Prob > F = 0.0000
R-squared = 0.5817
Root MSE = 5.9523

Sweden_Ass~2	Coef.	Semi-robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Dummy_Ipred	-67.44583	6.785204	-9.94	0.000	-80.8015	-54.09016
Time	.2027379	.0131367	15.43	0.000	.1768803	.2285955
Time_Dummy~d	.1212647	.0323948	3.74	0.000	.0575003	.1850292
_cons	32.86905	1.169657	28.10	0.000	30.56676	35.17135
rho	.4057612					

Durbin-Watson statistic (original) 1.186306
Durbin-Watson statistic (transformed) 2.556310

A8) Log file of Difference-in-differences analysis (→ represents STATA command)

Generating all necessary variables

→gen logFinland=log(Finland)

(4 missing values generated)

→gen logSweden_assumption1= log(Sweden_Assumption1)

(4 missing values generated)

→gen logSweden_assumption2= log(Sweden_Assumption2)

(4 missing values generated)

→gen DID_Assumption1= logSweden_assumption1-logFinland

(4 missing values generated)

→gen DID_Assumption2= logSweden_assumption2-logFinland

(4 missing values generated)

Assumption 1

Running the difference-in-differences regression, under assumption 1

→reg DID_Assumption1 dummy_Ipred time time_dummy_Ipred

Source	SS	df	MS
Model	.541391958	3	.180463986
Residual	.397722196	64	.006214409
Total	.939114155	67	.014016629

Number of obs	68
F(3, 64)	29.04
Prob > F	0.0000
R-squared	0.5765
Adj R-squared	0.5566
Root MSE	.07883

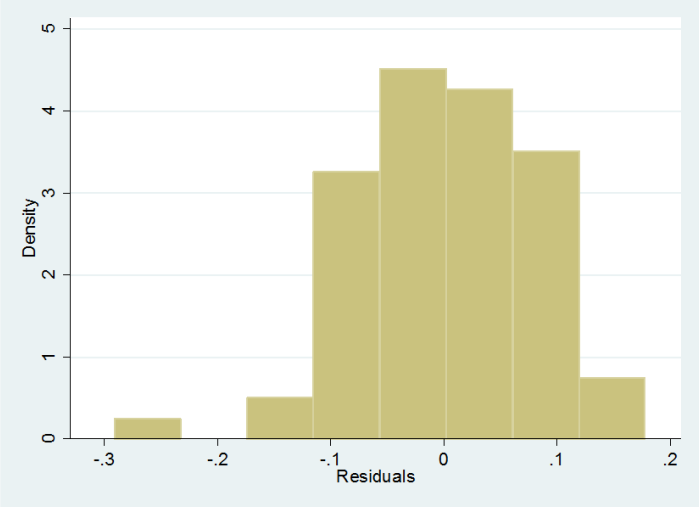
DID_Assump~1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.224639	.1538546	-7.96	0.000	-1.531999	-.9172795
time	-.0016007	.0008738	-1.83	0.072	-.0033463	.000145
time_dummy~d	.022304	.0026276	8.49	0.000	.0170547	.0275532
_cons	1.104161	.0234827	47.02	0.000	1.057249	1.151073

Investigating if there is normality of standard errors

→predict uhat_1, resid

(4 missing values generated)

→histogram uhat_1



(bin=8, start=-.29091072, width=.05864914)

Investigating whether serial correlation exists using Durbin Watson statistic

→tsset time

time variable: time, 1 to 72
delta: 1 unit

→estatdwatson

Number of gaps in sample: 1
Durbin-Watson d-statistic(4, 68) = 1.146917

Investigating whether heteroskedasticity exists using Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

→estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of DID_Assumption1

chi2(1) = 2.62
Prob> chi2 = 0.1058

Correcting for AR(1)correlation using Prais-Winsten AR(1) regression

→prais DID_Assumption1 dummy_Ipred time time_dummy_Ipred

Number of gaps in sample: 1

(note: computations for rho restarted at each gap)

Iteration 0: rho = 0.0000
Iteration 1: rho = 0.3800
Iteration 2: rho = 0.4083
Iteration 3: rho = 0.4133
Iteration 4: rho = 0.4143
Iteration 5: rho = 0.4144
Iteration 6: rho = 0.4145
Iteration 7: rho = 0.4145
Iteration 8: rho = 0.4145
Iteration 9: rho = 0.4145

Prais-Winsten AR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs =	68
				F(3, 64) =	30.71
Model	.480120725	3	.160040242	Prob > F =	0.0000
Residual	.333530195	64	.005211409	R-squared =	0.5901
				Adj R-squared =	0.5709
Total	.81365092	67	.012144044	Root MSE =	.07219

DID_Assump~1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.046888	.2178647	-4.81	0.000	-1.482123	-.6116535
time	-.0017315	.0012437	-1.39	0.169	-.0042161	.000753
time_dummy~d	.019592	.003801	5.15	0.000	.0119986	.0271854
_cons	1.106249	.0348521	31.74	0.000	1.036624	1.175874
rho	.4144918					

Durbin-Watson statistic (original) 1.146917
Durbin-Watson statistic (transformed) 1.797853

Assumption 2

Difference-in-differences under assumption 2

→reg DID_Assumption2 dummy_Ipred time time_dummy_Ipred

Source	SS	df	MS	Number of obs =	68
				F(3, 64) =	66.94
Model	2.85557554	3	.951858514	Prob > F =	0.0000
Residual	.910067187	64	.0142198	R-squared =	0.7583
				Adj R-squared =	0.7470
Total	3.76564273	67	.056203623	Root MSE =	.11925

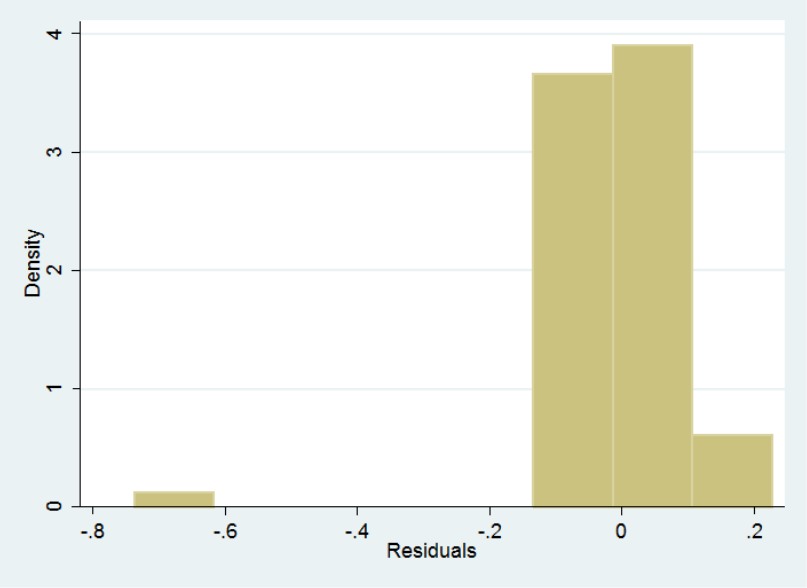
DID_Assump~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.716109	.2327327	-7.37	0.000	-2.181046	-1.251172
time	-.0025183	.0013218	-1.91	0.061	-.0051589	.0001223
time_dummy~d	.0232215	.0039747	5.84	0.000	.0152811	.031162
_cons	1.595631	.0355218	44.92	0.000	1.524668	1.666594

Investigating if there is normality in standard errors

→predict uhat_2, resid

(4 missing values generated)

→histogram uhat_2



(bin=8, start=-.73741913, width=.12052412)

Investigating whether AR(1) correlation exists using Breusch-Godfrey test

→estat bgodfrey

Number of gaps in sample: 1

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	0.866	1	0.3520

H0: no serial correlation

Investigating whether heteroskedasticity exists using Breusch-Pagan/Cook-Weisberg test

→estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of DID_Assumption2

chi2(1) = 2.00
Prob> chi2 = 0.1575

Original regression used

→reg DID_Assumption2 dummy_Ipred time time_dummy_Ipred

Source	SS	df	MS
Model	2.85557554	3	.951858514
Residual	.910067187	64	.0142198
Total	3.76564273	67	.056203623

Number of obs	68
F(3, 64)	66.94
Prob > F	0.0000
R-squared	0.7583
Adj R-squared	0.7470
Root MSE	.11925

DID_Assump~2	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dummy_Ipred	-1.716109	.2327327	-7.37	0.000	-2.181046	-1.251172
time	-.0025183	.0013218	-1.91	0.061	-.0051589	.0001223
time_dummy~d	.0232215	.0039747	5.84	0.000	.0152811	.031162
_cons	1.595631	.0355218	44.92	0.000	1.524668	1.666594

Appendix B
The survey

Nedladdningsvanor1

Generella frågor

Q1 **Jag använder Internet...**

Dagligen | Veckovis | Någon gång i månaden | Aldrig

Nedladdningsvanor musik

Q7 Jag fildelar **musik** illegalt via Internet

Dagligen | Veckovis | Månadsvis | Någon gång per år | Aldrig

Q9 Hur viktiga är följande påståenden för dig som anledning till varför du fildelar **musik** illegalt?

	helt oviktigt 1	2	3	4	5	6	7	8	9	mycket viktigt 10	Jag laddar ej ned illegalt
Det är gratis											
Det finns inget tillräckligt bra alternativ till illegal fildelning											
Tillgången till material som ännu inte kommit ut på marknaden											

Q10 Om du jämför idag med för två år sedan, hur har dina illegala fildelningssvanor vad gäller **musik** förändrats?

Jag fildelar mindre idag än jag gjorde för två år sedan | Jag ser ingen skillnad i mina vanor | Jag fildelar mer idag än jag gjorde för två år sedan

Q11 **Hur väl stämmer följande påståenden in på dig på en skala mellan 1 -10?**
1-Stämmer inte alls
10-Stämmer väl in på mig

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Jag använder mig ofta av Spotify eller andra legala streaming tjänster för musik											
Jag köper ofta CD-skivor i butik eller via Internet											
Jag köper ofta musik i digitalt format (exempelvis via iTunes)											

Nedladdningsvanor film

Q2 Jag fildelar **filmer/serier** illegalt via Internet

Dagligen | Veckovis | Månadsvis | Någon gång per år | Aldrig

Jag fildelar **filmer/serier** illegalt via Internet

Dagligen	Veckovis	Månadsvis	Någon gång per år	Aldrig
○	○	○	○	○

Hur viktiga är följande påståenden för dig som anledning till varför du fildelar **filmer/serier** illegalt?

	helt oviktigt 1	2	3	4	5	6	7	8	9	mycket viktigt 10	Jag laddar ej ned illegalt
Det är gratis	○	○	○	○	○	○	○	○	○	○	○
Det finns inget tillräckligt bra alternativ till illegal fildelning	○	○	○	○	○	○	○	○	○	○	○
Tillgången till material som ännu inte kommit ut på marknaden	○	○	○	○	○	○	○	○	○	○	○

Om du jämför idag med för två år sedan, hur har dina illegala fildelningssvanor vad gäller **filmer/serier** förändrats?

Jag fildelar mindre idag än jag gjorde för två år sedan	Jag ser ingen skillnad i mina vanor	Jag fildelar mer idag än jag gjorde för två år sedan
○	○	○

Hur väl stämmer följande påståenden in på dig på en skala mellan 1 -10?
1-Stämmer inte alls
10-Stämmer väl in på mig

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Jag använder mig ofta av legala streaming tjänster för TV / film såsom TV3Play, Voddler osv.	○	○	○	○	○	○	○	○	○	○	○
Jag köper ofta filmer i butik eller via Internet	○	○	○	○	○	○	○	○	○	○	○
Jag hyr ofta film i butik eller via Internet	○	○	○	○	○	○	○	○	○	○	○

Påståenden

Hur väl stämmer följande påståenden in på dig på en skala mellan 1 -10?
1-Stämmer inte alls
10-Stämmer väl in på mig

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Det finns bra substitut för illegal fildelning av musik	○	○	○	○	○	○	○	○	○	○	○

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Det finns bra substitut för illegal fildelning av filmer/serier	○	○	○	○	○	○	○	○	○	○	○
Spotify är ett bra substitut för illegal fildelning av musik	○	○	○	○	○	○	○	○	○	○	○
Voddler är ett bra substitut för illegal fildelning av filmer	○	○	○	○	○	○	○	○	○	○	○
Det känns fel att fildela illegalt	○	○	○	○	○	○	○	○	○	○	○

Ipred-lagen

I april 2009 infördes den såkallade Ipredlagen, som innebär att skivbolagen har rätt att få ut namn och adress bakom en IP-adress på en fildelare. En ertappad fildelare kan få kravbrev på skadestånd.

Hur väl stämmer följande påståenden in på dig på en skala mellan 1 -10?
1-Stämmer inte alls
10-Stämmer väl in på mig

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Jag är orolig för att åka fast nu när lagen trätt i kraft	○	○	○	○	○	○	○	○	○	○	○
Lagen drabbar bara dem som fildelar mycket, det gör inte jag	○	○	○	○	○	○	○	○	○	○	○
Jag har god kunskap om Ipred-lagens innebörd	○	○	○	○	○	○	○	○	○	○	○
Jag har sett många artiklar i media om Ipred-lagen	○	○	○	○	○	○	○	○	○	○	○
Jag tycker att det är bra att lagen infördes	○	○	○	○	○	○	○	○	○	○	○
Att använda tjänster som ändrar min IP-adress gör det mer säkert för mig att fildela illegalt	○	○	○	○	○	○	○	○	○	○	○
All musik och film borde vara tillgänglig för gratis fildelning	○	○	○	○	○	○	○	○	○	○	○
Jag tycker att det är okej att skattefuska	○	○	○	○	○	○	○	○	○	○	○
Jag motsätter mig folk som plankar på tunnelbanan/pendeltåget	○	○	○	○	○	○	○	○	○	○	○
Har man TV bör man betala TV-avgiften	○	○	○	○	○	○	○	○	○	○	○

När Ipred-lagen precis infördes, hur förändrades dina illegala fildelningsvanor?

Q14 **I april 2009 infördes den såkallade Ipredlagen, som innebär att skivbolagen har rätt att få ut namn och adress bakom en IP-adress på en fildelare. En ertappad fildelare kan få kravbrev på skadestånd.**

Hur väl stämmer följande påståenden in på dig på en skala mellan 1 -10?
1-Stämmer inte alls
10-Stämmer väl in på mig

	stämmer inte alls 1	2	3	4	5	6	7	8	9	stämmer väl överrens 10	Vet ej
Jag är orolig för att åka fast nu när lagen trätt i kraft	○	○	○	○	○	○	○	○	○	○	○
Lagen drabbar bara dem som fildelar mycket, det gör inte jag	○	○	○	○	○	○	○	○	○	○	○
Jag har god kunskap om Ipred-lagens innebörd	○	○	○	○	○	○	○	○	○	○	○
Jag har sett många artiklar i media om Ipred-lagen	○	○	○	○	○	○	○	○	○	○	○
Jag tycker att det är bra att lagen infördes	○	○	○	○	○	○	○	○	○	○	○
Att använda tjänster som ändrar min IP-adress gör det mer säkert för mig att fildela illegalt	○	○	○	○	○	○	○	○	○	○	○
All musik och film borde vara tillgänglig för gratis fildelning	○	○	○	○	○	○	○	○	○	○	○
Jag tycker att det är okej att skattefuska	○	○	○	○	○	○	○	○	○	○	○
Jag motsätter mig folk som plankar på tunnelbanan/pendeltåget	○	○	○	○	○	○	○	○	○	○	○
Har man TV bör man betala TV-avgiften	○	○	○	○	○	○	○	○	○	○	○

Q20 **När Ipred-lagen precis infördes, hur förändrades dina illegala fildelningsvanor?**

Jag fildelade mindre illegalt ○ Ingen förändring ○ Jag fildelade mer illegal ○

Q21 **Jämför nu dina illegala fildelningsvanor när Ipred-lagen precis hade införts med hur de är idag, hur har dessa förändrats?**

Jag fildelar mindre illegalt idag ○ Ingen förändring ○ Jag fildelar mer illegalt idag ○

Personlig information

Q15 **Jag är...**

○ kvinna
○ man

Q16 **Hur gammal är du? (Vänligen svara endast i siffror)**

Q18 **För att ta del i tävlingen om ett presentkort hos SF bio på 200 SEK, vänligen skriv ned din e-mail adress nedan. Adressen används endast för att lotta ut vinnaren av presentkortet.**

B1) Wilcoxon Signed Ranks test- testing whether there are differences in file sharing behavior of film/series and music

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
I file share music illegally through the Internet	73	4,32	,911	2	5
I download film/series illegally through the Internet	73	3,68	1,353	1	5

Ranks

		N	Mean Rank	Sum of Ranks
I file sharing film/series illegally through the Internet - I file share music illegally through the Internet	Negative Ranks	29(a)	19,45	564,00
	Positive Ranks	6(b)	11,00	66,00
	Ties	38(c)		
	Total	73		

a I file share film/series illegally through the Internet < I file share music illegally through the Internet
b I file share film/series illegally through the Internet > I file share music illegally through the Internet
c I file share film/series illegally through the Internet = I file share music illegally through the Internet

Test Statistics(b)

	I file share film/series illegally through the Internet - I file share music illegally through the Internet
Z	-4,195(a)
Asymp. Sig. (2-tailed)	,000

a Based on positive ranks.
b Wilcoxon Signed Ranks Test

B2) Paired Samples Statistics – testing individual's ethical inclination towards file sharing in contrast to cheating on taxes

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	I think it is wrong to file share illegally	6,13	72	3,039	,358
	It is not ok to cheat on your taxes	7,72	72	2,098	,247

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	I think it is wrong to file share illegally & It is not ok to cheat on your taxes	72	,134	,263

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	I think it is wrong to file share illegally - It is not ok to cheat on your taxes	-1,597	3,455	,407	-2,409	-,785	-3,923	71	,000

B3) Paired Samples Statistics– testing individuals' ethical inclination towards file sharing in contrast to avoiding payment for public transportation

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	I think it is wrong to file share illegally	6,13	72	3,039	,358
	I oppose people that avoid paying for public transportation	5,88	72	3,094	,365

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	I think it is wrong to file share illegally & I oppose people that avoid paying for public transportation	72	,214	,071

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	I think it is wrong to file share illegally - I oppose people that avoid paying for public transportation	,250	3,845	,453	-,653	1,153	,552	71	,583

B4) Paired Samples Statistics– testing individuals' ethical inclination towards file sharing in contrast to paying for the TV-license

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	I think it is wrong to file share illegally	6,13	72	3,039	,358
	If you have a TV, the TV-license needs to be paid	5,21	72	3,215	,379

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	I think it is wrong to file share illegally & If you have a TV, the TV-license needs to be paid	72	,389	,001

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	I think it is wrong to file share illegally - If you have a TV, the TV-license needs to be paid	,917	3,459	,408	,104	1,729	2,249	71	,028

B5) Mann-Whitney test- Comparison of ethically inclined to file share and ethically non inclined to file share (music)

Descriptive Statistics(a)

top 25 think ok to file share		N	Minimum	Maximum	Mean	Std. Deviation
not ethical prone to file share	I file share music illegally through the Internet	53	2	5	4,47	,823
	Valid N (listwise)	53				
ethically prone to file share	I file share music illegally through the Internet	20	2	5	3,90	1,021
	Valid N (listwise)	20				

Test Statistics(a)

	I file share music illegally through the Internet
Mann-Whitney U	354,500
Wilcoxon W	564,500
Z	-2,419
Asymp. Sig. (2-tailed)	,016

a Grouping Variable: top 25 think ok to file share

Significant difference at a 2% significance level found. Null hypothesis that the medians are the same is rejected.

B6) Mann-Whitney test - Comparison of ethically inclined to file share and ethically not inclined to download (film/series)

Descriptive Statistics(a)

top 25 think ok to file share		N	Minimum	Maximum	Mean	Std. Deviation
not ethical prone to file share	I file share film/series illegally through the Internet	53	1	5	4,15	1,133
	Valid N (listwise)	53				
ethically prone to file share	I file share film/series illegally through the Internet	20	1	5	2,45	1,099
	Valid N (listwise)	20				

Test Statistics(a)

	I file share film/series illegally through the Internet
Mann-Whitney U	168,500
Wilcoxon W	378,500
Z	-4,695
Asymp. Sig. (2-tailed)	,000

a Grouping Variable: top 25 think ok to file share

Significant difference at a 1% significance level found. Null hypothesis that the medians are the same is rejected.

B7) Wilcoxon Signed Ranks test- Analyzing differences in ethical inclination for individuals that are ethically inclined to illegally file share

A Wilcoxon Signed Ranks tests is made (due to N<30) for the lower quartile of individuals that consider illegal file sharing not ethically wrong we find even greater differences between the this variable and the three other variables.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
I think it is wrong to file share illegally	20	2,05	,826	1	3
It is not ok to cheat on your taxes	20	7,75	1,682	3	9

Ranks

		N	Mean Rank	Sum of Ranks
It is not ok to cheat on your taxes - I think it is wrong to file share illegally	Negative Ranks	0(a)	,00	,00
	Positive Ranks	20(b)	10,50	210,00
	Ties	0(c)		
	Total	20		

a It is not ok to cheat on your taxes < I think it is wrong to file share illegally
b It is not ok to cheat on your taxes > I think it is wrong to file share illegally
c It is not ok to cheat on your taxes = I think it is wrong to file share illegally

Test Statistics(b)

	It is not ok to cheat on your taxes - I think it is wrong to file share illegally
Z	-3,943(a)
Asymp. Sig. (2-tailed)	,000

a Based on negative ranks.
b Wilcoxon Signed Ranks Test

The medians between the two variables are significantly different at a 1% significance level. Thus cheating on taxes is considered much more ethically wrong than illegal file sharing.
A t-test is made comparing ethical morals of avoiding payment for public transport and illegal file sharing.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
I think it is wrong to file share illegally	20	2,05	,826	1	3
I oppose people that avoid paying for public transportation	20	4,80	2,668	1	9

Ranks

		N	Mean Rank	Sum of Ranks
I oppose people that avoid paying for public transportation - I think it is wrong to file share illegally	Negative Ranks	1(a)	1,50	1,50
	Positive Ranks	13(b)	7,96	103,50
	Ties	6(c)		
	Total	20		

a I oppose people that avoid paying for public transportation < I think it is wrong to file share illegally
b I oppose people that avoid paying for public transportation > I think it is wrong to file share illegally
c I oppose people that avoid paying for public transportation = I think it is wrong to file share illegally

Test Statistics(b)

	I oppose people that avoid paying for public transportation - I think it is wrong to file share illegally
Z	-3,214(a)
Asymp. Sig. (2-tailed)	,001

a Based on negative ranks.
b Wilcoxon Signed Ranks Test

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
I think it is wrong to file share illegally	20	2,05	,826	1	3
If you have a TV, the TV-license needs to be paid	20	3,70	2,598	1	10

Ranks

		N	Mean Rank	Sum of Ranks
If you have a TV, the TV-license needs to be paid - I think it is wrong to file share illegally	Negative Ranks	3(a)	4,50	13,50
	Positive Ranks	11(b)	8,32	91,50
	Ties	6(c)		
	Total	20		

a If you have a TV, the TV-license needs to be paid < I think it is wrong to file share illegally
b If you have a TV, the TV-license needs to be paid > I think it is wrong to file share illegally
c If you have a TV, the TV-license needs to be paid = I think it is wrong to file share illegally

Test Statistics(b)

	If you have a TV, the TV-license needs to be paid - I think it is wrong to file share illegally
Z	-2,484(a)
Asymp. Sig. (2-tailed)	,013

a Based on negative ranks.
b Wilcoxon Signed Ranks Test

B8) Paired Samples Statistics - testing substitutes to illegal file sharing of music and film/series

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	There are good substitutes to illegal file sharing of music	8,00	73	2,217	,260
	There are good substitutes to illegal file sharing of film	5,22	73	3,047	,357

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	There are good substitutes to illegal file sharing of music & There are good substitutes to illegal file sharing of film	73	,312	,007

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		Mean	Std. Deviation	Std. Error Mean
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Pair 1	There are good substitutes to illegal file sharing of music - There are good substitutes to illegal file sharing of film	2,781	3,159	,370	2,044	3,518	7,521	72	,000

B9) Descriptive Statistics - individuals file sharing behavior right when the IPRED law was introduced

How did your illegal file sharing habits change when the IPRED law was just introduced?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I file shared less illegally	27	22,9	37,5	37,5
	No change	43	36,4	59,7	97,2
	I file shared more illegally	2	1,7	2,8	100,0
	Total	72	61,0	100,0	
Missing	System	46	39,0		
Total		118	100,0		

B10) Correlations – testing correlations between file sharing of music and film and substitutes

			I file share film/series illegally through the Internet	There are good substitutes to illegal file sharing of film
Spearman's rho	I file share film/series illegally through the Internet	Correlation Coefficient	1,000	,281(*)
		Sig. (2-tailed)	.	,016
		N	73	73
	There are good substitutes to illegal file sharing of film	Correlation Coefficient	,281(*)	1,000
		Sig. (2-tailed)	,016	.
		N	73	73

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

			I file share music illegally through the Internet	There are good substitutes to illegal file sharing of music
Spearman's rho	I file share music illegally through the Internet	Correlation Coefficient	1,000	,326(**)
		Sig. (2-tailed)	.	,005
		N	73	73
	There are good substitutes to illegal file sharing of music	Correlation Coefficient	,326(**)	1,000
		Sig. (2-tailed)	,005	.
		N	73	73

** Correlation is significant at the 0.01 level (2-tailed).

B11) Correlations – testing correlations between file sharing of music and film and risk of being caught infringing on the copyright law

Correlations

			I file share music illegally through the Internet	I am worried about getting caught since the IPRED law was introduced
Spearman's rho	I file share music illegally through the Internet	Correlation Coefficient	1,000	,096
		Sig. (2-tailed)	.	,423
		N	73	72
	I am worried about getting caught since the IPRED law was introduced	Correlation Coefficient	,096	1,000
		Sig. (2-tailed)	,423	.
		N	72	72

Correlations

			I am worried about getting caught since the IPRED law was introduced	I file share film/series illegally through the Internet
Spearman's rho	I am worried about getting caught since the IPRED law was introduced	Correlation Coefficient	1,000	,167
		Sig. (2-tailed)	.	,160
		N	72	72
	I file share film/series illegally through the Internet	Correlation Coefficient	,167	1,000
		Sig. (2-tailed)	,160	.
		N	72	73

B12) Descriptive Statistics- individuals file sharing behavior of film and music two years ago in comparison to today

If you compare today with two years ago, how have you file sharing habits of music changed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I file share less than I did two years ago	51	43,2	69,9	69,9
	I see no difference in my habits	20	16,9	27,4	97,3
	I file share less than I did two years ago	2	1,7	2,7	100,0
	Total	73	61,9	100,0	
Missing	System	45	38,1		
Total		118	100,0		

If you compare today to two years ago, how have your file sharing habits of film/series changed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I file share less than I did two years ago	24	20,3	32,9	32,9
	I see no difference in my habits	35	29,7	47,9	80,8
	I file share more than I did two years ago	14	11,9	19,2	100,0
	Total	73	61,9	100,0	
Missing	System	45	38,1		
Total		118	100,0		

Appendix C

C1) Collinearity Statistics for the regression on Swedish file sharing- both for assumption 1 and assumption 2

CollinearityDiagnostics(a)

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
		(Constant)	time	Dummy variable for introduction of Ipred law	Time* Dummy variable for Ipred law	(Constant)	time
1	1	3,354	1,000	,01	,01	,00	,00
	2	,587	2,390	,16	,01	,00	,00
	3	,053	7,930	,77	,91	,02	,00
	4	,006	23,385	,07	,07	,98	,99

a Dependent Variable: Swedish filesharing when linear trend

C2)Collinearity Statistics for Difference-in-differences-both for Assumption 1 and Assumption 2

CollinearityDiagnostics(a)

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
		(Constant)	time	dummy variable for Ipred law	time*dummy variable for Ipred law	(Constant)	time
1	1	3,371	1,000	,01	,01	,00	,00
	2	,574	2,424	,17	,01	,00	,00
	3	,050	8,223	,76	,92	,02	,00
	4	,005	24,796	,06	,07	,98	,99

a Dependent Variable: did_ass2