

**AN ASSESSMENT OF COPYRIGHT ACT TO THE
BUSINESS ENVIRONMENT OF SOFTWARE
INDUSTRY IN MALAYSIA**

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Software Industry in Malaysia**

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Software Industry in Malaysia**

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TABLE OF CONTENTS

	Page
Copyright Page	iv
Declaration	v
Acknowledgments	vi
Table of Contents	vii
List of Tables	xi
List of Figures	xii
Abstract	xiv

CHAPTER 1 INTRODUCTION

1.0 Research Overview.....	1
1.1 Background of Study.....	5
1.2 Problem Statement.....	7
1.3 Research Objectives	11
1.4 Hypothesis of Study.....	11
1.5 Importance of Study.....	13

1.6 Scope and limitation.....	16
1.7 Organisation of Study.....	16
1.8 Conclusion.....	17

CHAPTER 2 LITERATURE REVIEW

2.0 General Information.....	18
2.1 Theoretical Analysis.....	18
2.2 Cross-sectional Regression Analysis.....	24
2.3. Panel Data Analysis.....	30
2.4. Significance Development.....	31
2.5 Conclusion.....	38

CHAPTER 3 RESEARCH METHODOLOGY

3.0 Introduction	40
3.1 Research Designs	40
3.2 Data Collection Methods	41

3.3 Sampling Design.....	44
3.4 Research Instruments.....	47
3.5 Construct Measurements.....	50
3.6 Data Processing.....	51
3.7 Data Analysis.....	53
3.8 Chapter Summary.....	56

CHAPTER 4 RESEARCH RESULT

4.0 Introduction.....	57
4.1 Descriptive Analysis.....	57
4.2. Proposed Regression Analysis and Expected Results.....	77
4.3 Empirical Analysis.....	78
4.4 OLS Results Interpretation.....	81
4.5 Panel Regression.....	83
4.6 Panel Regression Interpretation and Summary.....	90

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.0 Introduction	93
5.1 Discussion	93

5.2 Recommendation	94
5.3 Limitation of study.....	96
5.4 Conclusion and Implication for Further Research.....	96
References.....	98
Appendix.....	110

LIST OF TABLES

	Page
Table 1: Quantity of PCs used in Klang Valley.....	2
Table 2: Demographics of Malaysia and Some Other Countries.....	3
Table 3: Rules of Thumb about Correlation Coefficient Size.....	54
Table 4: Gender of the Respondents.....	58
Table 5: Ethnicity of the Respondents.....	59
Table 6: Age Group of the Respondents.....	60
Table 7: Ethnicity of the Respondents.....	61
Table 8: Descriptive Statistics.....	63
Table 9: Correlogram.....	68
Table 10: Ordinary Least Squares Regression Results.....	78
Table 11: Fixed Effects and Random Effects Regression Results.....	85
Table 12: Fixed Effects Regression Results.....	88

LIST OF FIGURES

	Page
Figure 1: PC Market Share in Malaysia as in December 2013.....	7
Figure 2: Frameworks to Assess the Impacts of the Copyright Act 1987.....	10
Figure 3: Frameworks to Assess the Impacts of the Copyright Act to Business Environment of Malaysia Software Industry.....	15
Figure 4: Profits, surplus from targeted enforcement with extent q^e	22
Figure 5: Software market in the presence of piracy.....	33
Figure 6: The effect of piracy costs change.....	34
Figure 7: The effect of the software price change.....	34
Figure 8: The effect of computerisation in case of high valuation user's number increase.....	35
Figure 9: The effect of budget constraints change.....	36
Figure 10: Scatter Plot with Fitted Line for Piracy Rate and Broadband Penetration Rate.....	70
Figure 11: Scatter Plot with Fitted Line for Piracy Rate and Internet Penetration Rate.....	71
Figure 12: Scatter Plot with Fitted Line for Piracy Rate and $\ln(\text{rGDP})$	72
Figure 13: Scatter Plot with Fitted Line for Piracy Rate and IPR	73

Figure 14: Scatter Plot with Fitted Line for Piracy Rate and HDI.....74

Figure 15: Scatter Plot with Fitted Line for Piracy Rate and Gini.....75

Figure 16: Scatter Plot with Fitted Line for Piracy Rate and ROL.....76

ABSTRACT

In Malaysia, Multimedia Super Corridor (MSC - Malaysia's equivalent to Silicon Valley) was set up in 1995. Since then Malaysia has overhauled its copyright law to provide a legal landscape of software piracy on competition between a non-free proprietary type of software and a free and open-source type of software. The present study has three major policy implications. Firstly, the findings imply that improving economic development may play an important role in lowering rates of piracy. Secondly, it appears that, whereas some piracy is inevitable during the stage of development, the rate of piracy may be minimised at a later stage through the incentives provided by the development itself. Thirdly, the results indicate that policies aimed at guaranteeing legal provision of the tools necessary to protect software would certainly contribute to curbing the software piracy problem. The study used an on-line survey which collected a total of 150 responses from individuals involved in the software industry in areas surrounding Kuala Lumpur and its conurbations using non-probability sampling. In the benchmark model with no piracy there are two types of software: one free (e.g. open-source) and one non-free type (i.e. proprietary). It shows that under certain conditions the proprietary software type may strategically take advantage of network externalities by reducing the price in order to prevent users from choosing the free type of software. In this way the proprietary software developer may avoid that the free software type generates sufficient network externalities in order to create high demand for the free software type. In pursuing this study, the researcher provides empirical evidence that supports of the free and open-source software usage is negatively affected by the extent of software piracy. The main conclusions of this study are that piracy affects demand for free and open-source software negatively and that piracy may contribute to market dominance by the non-free proprietary software type when network externalities are present. The results of the study are compared to the available relevant studies. The implication of the findings for software business are discussed and recommended to help piracy mitigates the competitive advantage of free software (the price) in competition with non-free software. Future studies are also noted to add to the body of literature concerning software piracy mitigates in a Malaysian context.

CHAPTER 1

INTRODUCTION

This chapter presents the explanation of the topic chosen for this study. The discussion in this chapter would begin with an introductory explanation of the background of research. Subsequently, the problem statement of this study is explained, followed by the research questions, objective of study, and significance of the study.

1.0 Research Overview

Computing technology mediates now in the daily life of, almost, everybody. The rapid advance of computing technology has provided an excellent opportunity for the study of technological invention, innovation, transfer, diffusion and use. Computers are not just circuits, transistors, memories and wires. The functions of the computers are performed and controlled through what is now called 'software'· something that has no physical existence--at least not nearly as apparent as the physical existence of 'hardware'. Scholars have pointed out that it is software as embedded in socio-technical systems that turns "computer" into "applications" (Landauer, 1995: 104). Malaysia is now changing from the central planning economy to the market economy. In the growth of the Malaysia market economy, the legal protection of private property rights including intellectual property rights has been the key factor to encourage the foreign direct investment, transfer technology and to impetus local industry. Particularly, the transfer of information technology is very important because it is essential bases for all development process. In recent years, in the transition to market economy, one of the most rapidly developing markets is the market of personal computers. As there are many governmental offices, research institutes, schools, hospitals and individuals buyers in need of computer equipment, many business and companies specialising in selling computers have been founded.

Table 1: Quantity of PCs used in Klang Valley

Place	Number of PCs (Unit)				
	2009	2010	2011	2012	2013
Malaysia	7,500	13,500	25,000	40,000	100,000

Source: Malaysia Informatics Association, Issue January 2014

According to the Malaysia Informatics Association 2014, approximately 100,000 PCs are currently in use in Klang Valley as at January 2014, averaging 744 people per computer, in which Klang Valley contributed the highest numbers where having most of PCs of Malaysia being the reason a center of major business hub. (Source: Malaysia Intellectual Property Association, 2014).

However, from regional perspective, these foregoing figures are quite humble, and indicative of Malaysia's backwardness in information technology as compared with other countries: Singapore 6.4 people/PC and Thailand 90.5 people/PC). Furthermore, an analysis of demographics provides an interesting insight. In spite of its high growth rate of GDP and PC market, the living standard is still relatively low in comparing with regional ones, represented in number of people per TV (and per telephone), that show exceptional long-term potential market, especially in individual customer sectors, it is likely for people to purchase first television and telephone instead of personal computer. (CIA World Factbook, 2013)

In this digital age, and with the emphasis on the knowledge economy, the challenge is to maintain an acceptable and appropriate level of balance. Copyright owners are concerned that technology has put into the hands of the users the ability to copy and to distribute copies of their copyright works without any financial benefit to themselves. They want greater protection. Users would like to have easy and cheap, if not free access to information and copyright works, and if technology offers that prospect, are not unwilling to utilise it. They want less or no protection. On the one hand, there is the expectation of the copyright owner to benefit financially from the

wider dissemination of his work; on the other, there is the expectation on the part of the user to be able to access information and cultural products cheaply and readily.

Table 2 shows the demographics numbers of Personal Computer in Malaysia and comparison to some other countries. Through the Table 2, Personal Computer still shows the significance important in the usage by the people as compare to other electronics gadget in daily life. Therefore, Malaysia in average has 38 people/PC which is using PC to dealing in the business.

Table 2: Demographics of Malaysia and Some Other Countries

Country	Population (M)	GDP/Capita (PPP)	GDP Growth	People per TV	People per Telephone	People per PC (2013)
Australia	18.1	\$19,007	3.7%	2.1	1.5	3.6
Hongkong	6.2	\$22,527	5.9%	3.6	1.5	8.0
India	923.0	\$1,280	5.3%	28.6	93.5	841.9
Indonesia	195.5	\$3,388	7.4%	16.7	75.2	183.0
Japan	125.4	\$21,328	3.1%	1.6	1.5	9.5
Korea	45.0	\$10,534	9.9%	4.8	2.3	11.7
Malaysia	29.0	\$8,763	9.3%	6.7	6.8	38.0
New Zealand	3.5	\$16,840	5.5%	2.3	1.4	4.2
Philippines	67.3	\$2,660	4.9%	20.8	44.0	174.3
PRC	1,210.1	\$2,660	10.3%	32.3	43.7	528.1
Singapore	3.1	\$21,493	8.1%	2.6	2.0	6.4
Taiwan	21.4	\$13,235	6.5%	3.1	2.4	16.5
Thailand	60.4	\$6,816	8.5%	8.8	24.0	90.5
Vietnam	74.4	\$1,263	8.5%	24.4	163.9	744.0
U.S.	263.4	\$25,900	1.1%	1.2	1.3	N/A

Source: CIA World Factbook as of December 31, 2013

Armed with the imperfect intellectual property legislation that declared software piracy outside the law, but did not provided exact descriptions of corresponding legal procedures, police forces started to raid institutional users such as internet cafes, game clubs, hardware retailing firms and

other non-government organizations involved in different kinds of computer business. If pirated software was discovered installed on the computers, all hardware became subject to immediate confiscation. The legal reason for such a procedure was explained to be the expert examination of hardware involved in the crime. However, due to unsettled legislation, the term of this expertise as well as the consequent procedures, is not fixed. This opens up rent-seeking possibilities for the policemen. Indeed, the questioned businessmen confirmed, that the “fix up” possibility existed; however the size of the bribe for the hardware rescue was told to be extremely high. Meanwhile, the pirated software markets still flourished and no price increase was noticed.

This indicated that no harming actions were performed directly on pirated software producers and distributors, because the demand hardly went down enough to compensate for the possible supply contraction that might be expected in case of successful anti-piracy activities (Willison and Siponen 2008). From the theoretical point of view, this situation is very close to the case of targeted enforcement, however, with some reservations. Since the police decreased the costs of action, raiding only the institutions with very high probability of illegal software discovery, the coverage of the activities hardly was wide enough. Moreover, the state organizations, which in most countries are very active (if not most active) software users, were not subject of the check.

Since the hardware market has presented good business, opportunities for PC software are less clear. The absence of sufficient recognition and enforcement of copyright is a major reason why foreign companies have been reluctant to import high technology including computer software into Malaysia. In brief, the essential problem is to strike a balance: enough protection to sustain incentives to the innovator, but not too much protection to allow for the maximisation of the social good. In developing nations, many intellectual properties are held by foreigners than by domestic citizens, and the control of health-related technologies by foreign interests is viewed with concern. Overall, developing countries are drawing a balance between the ‘free’ use of ideas and incentives to the inventors.

The theoretical analysis is one of the possibilities to assess the possible result of anti-piracy actions. During the last few years a number of mathematical models for the economics of

software piracy and enforcement have been developed. However, they produce different results concerning the outcome of anti-piracy activities. For example, the Chen and Png (1999) argue, that extensive monitoring leads to the decline of total surplus (copyright holder's and consumer's) producing ineffective outcome. On the other hand, Harbaugh and Khemka (2000) claim that both sides can benefit from extensive enforcement.

1.1 Background of study

In the regional perspective, these foregoing figures are quite humble, and indicative of Malaysia's backwardness in information technology as compared with other countries: Singapore 6.4 people/PC, Vietnam 38 people/PC, and Thailand 90.5 people/PC. Furthermore, an analysis of demographics provides an interesting insight. In spite of its high growth rate of GDP and PC market, our Malaysian living standard is still relatively low in comparing with regional ones, represented in number of people per TV (and per telephone). It is likely for people to purchase first television and telephone instead of personal computer. As in the emerging stage, a very low-end product mix is common and it is predominantly a desktop dominated market, and large scale involvement by the world's leading PC vendors is limited, local producers and clone manufacturers are more successful in this stage of development. In sum, Malaysia currently represents one of the least-developed markets in Asia. (*Malaysia Intellectual Property Association, 2013*)

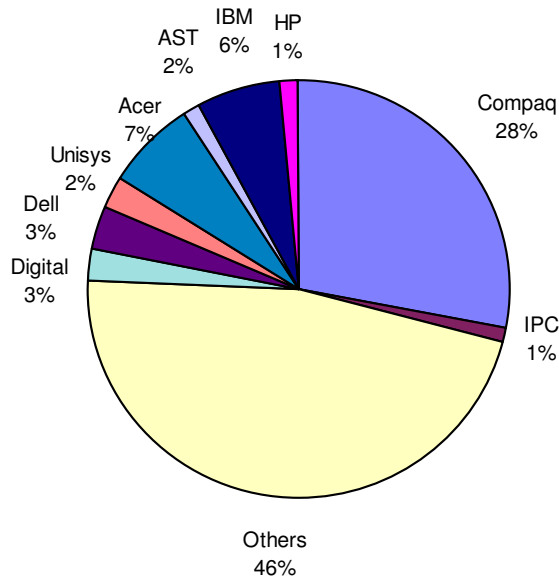
However, while the hardware market has presented good business, opportunities for PC software are less clear. The lack of sufficient recognition and enforcement of copyright is a major reason why foreign companies have been reluctant to import high technology including computer software into Malaysia. Most firms already switched to the licensed commercial software or to the freeware packages. The theoretical analysis is one of the possibilities to assess the possible result of anti-piracy actions. During the last few years a number of mathematical models for the economics of software piracy and enforcement have been developed. However, they produce different results concerning the outcome of anti-piracy activities. For example, the Chen and Png

(1999) argue, that extensive monitoring leads to the decline of total surplus (copyright holder's and consumer's) producing ineffective outcome. On the other hand, Harbaugh and Khemka (2000) claim that both sides can benefit from extensive enforcement.

From the view point of Malaysian government, they also recognise the absence of Copyright Law it is also an obstacle for the long-term development of Malaysian software industry: without an effective Copyright Law (*Khaw, LT, "The Anti-Circumvention Provision of the Malaysian Copyright Act 1987" [2005] EIPR 53*), the domestic software producers cannot survive and have to change toward trading rather than producing software. There are almost surely that innovations would not occur or that would be delayed in the absence of computer software protection.

In 1st December 1987, the Copyright Act was coming into operation which is certainly, it is certainly a step into the right direction. The Business Software Alliance (BSA) estimated that 58 percent of software used in Malaysia are pirated, costing the Western companies US\$ 290,000 in lost business. That matter caused BSA brought Malaysia into its "watching list". As time is short from backwardness in IT, Malaysia needs to implement the Copyright Act in a comprehensive right way. Figure 1 shows the PC Personal Computer (PC) as in December 2013. Each of the Personal Computer (PC) has great potential in terms of market share in Malaysia market. In term of genuine software by the major key player in the market, it is likely the 46% of shares are dominance by others software market.

Figure 1: PC Market Share in Malaysia as in December 2013



Source: Malaysia Informatics Association, Issue January 2014

1.2 Problem statement

Each year, the world has become increasingly more advanced and digital technologies permit faster distribution and more exact copies of original works to be distributed with ease. Piracy of copyrighted works has been a longstanding issue, even before the advances of modern computers. Today, people access many forms of media with computers.

The characteristic of the Internet has out-performed the law, thus the question arises whether Copyright is shaken by the advancement of technology and that it is significant in the digital era. Undoubtedly, the current Copyright laws do provide protection to Copyright owners but it has some drawbacks. Some doubts have been raised on the effectiveness of Copyright protection being enforced onto people. The borderless nature of Internet, calls for a more encouraging relationship in other jurisdiction and close cooperation with the international organisations. The society must be educated on the necessity of Copyright protection to prevent any unauthorised use.

Legislation can provide a basis for Copyright owners to seek redress or pursue an action in the event of an infringement or breach. This is due to the Law having a symbolic power which codifies values in society in which if ignored, becomes a breach. When society no longer respect IP protection as a unique reasoning of creating expression, then the moral infrastructure previously legislated becomes unregulated. Initially, the Internet surge was just dial-up connections but in the past ten years, broadband Internet access and usage has seen huge growth worldwide as well in Malaysia, growing from 14 million users or six percent of the world's population in 2013. (CIA World Factbook as of December 31, 2013).

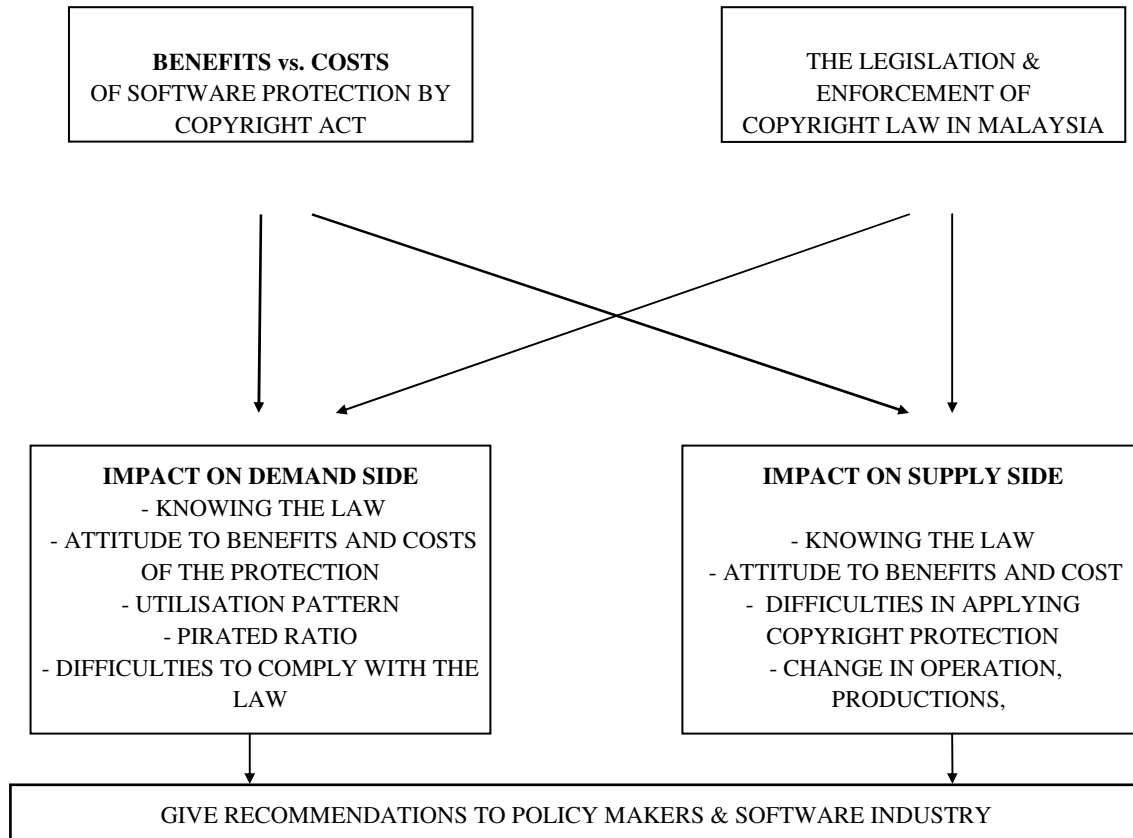
The study of software piracy has a relatively young but growing body of literature. The vast majority of research has been conducted within the past two decades and has been most intensely scrutinised within the past ten years. Research has covered nearly every type of digital content piracy but the most reliable and consistent sources of data focus upon computer application software. Even within just this category, research includes theoretical and empirical studies. Many times the theoretical studies help guide the empirical research. Furthermore, empirical research includes micro level data and macro level data. As mentioned, past empirical research has utilised cross-sectional data to discover determinants of piracy or measure the effect of software piracy on other economic variables. An even smaller but growing subset of literature employs panel data techniques to provide empirical analysis of software piracy.

The emergence of the Internet has been a boon for advancements in communications and productivity. Along with the positive influences of the Internet is the ability to trade copyrighted data more freely without a loss of quality. Earlier literature focuses largely on cross-sectional

data and large datasets using many explanatory variables to determine rates of piracy. This study instead makes use of panel data analysis and opts for fewer explanatory variables, as the fixed effects will control for many variables, which do not change much over time. The focus here is also much sharper, focusing specifically on the effect of broadband and Internet penetration rates on software piracy rates, rather than attempting to identify a structural model with many more explanatory variables as is seen in the literature.

However, controlling for country effects changes the signs of broadband Internet penetration rates when specified linearly. In opposition to the pooled Ordinary Least Squares Regression (OLS) regressions, the fixed effects regressions suggest that as broadband penetration rates increase, the rate of software piracy decreases. Internet penetration rates still share an inverse relationship with piracy rates as seen in the pooled OLS regressions. This point is counterintuitive in that broadband Internet allows for easier distribution of pirated software. The reversal of the sign on broadband penetration rates from pooled regressions to panel regressions may result from fundamental differences in the developed countries and their developing counterparts. These differences are controlled in the panel regressions but not in the pooled regressions, resulting in differing signs due to the presence of omitted variable bias in the pooled OLS regressions.

Figure 2: A Framework to Assess the Impacts of the Copyright Act 1987



1.3 Research Objectives

This study is an academic study in order to assess impacts of Copyright Act to the business environment of computer software industry in Malaysia concerning to market demand and supply. The permitted acts must be for the purposes of private study, non-profit research, criticism, review or reporting of current events, and apparently no other. Acts done even if it could be considered to be fair dealing are not permitted if they do not fall within any of the prescribed purposes.

Therefore, the main objectives of this research study are:

- 1.2.1 To assess the possible impact of the Copyright Act to the business environment of software industry in Malaysia
- 1.2.2 To study the legal issues concerning to the protection of computer software in Malaysia
- 1.2.3 To recommend for the enforcement of the Copyright Law and software industry

In order to attain the above-mentioned purposed of this study, the following hypotheses were developed to answer the questions:

1.4 Hypothesis

- i. Business environment of software industry**

H_1 = There is a significant positive relationship between business environment and software industry profitability.

H_2 = There is a significant positive relationship between legal protection and computer software profitability.

H_3 = There is a significant positive relationship between business environment size and computer software profitability.

H_4 = There is a significant negative relationship between copyright law and enforcement impact

ii. Macroeconomic Factors

H_5 = There is a significant positive relationship between computer software interest rate and business profitability.

H_6 = There is a significant positive relationship between computer software market rate and software business profitability.

H_7 = There is a significant positive relationship between real software business industry growth and business profitability.

iii. Financial Factors

H_8 = There is a significant positive relationship between legal issues concerning computer software and business profitability.

1.5 Importance of study

In this chapter, we aim at developing a framework to assess the impacts of the copyright law toward the business environment of software industry concerning factors as producer, vendor, purchaser, R&D institutes or university laboratories. A set of very crucial governmental factors are also included, that are legislation, enforcement of the Copyright Act.

It is widely reckoned that there is a conflict between the consumer and the copyright holder, i.e. piracy in any case harms the producer. However, Takeyama offered a theoretical framework, which allows consumers' and producers' interests to coincide (Takeyama 1994). The author studied the effect of the demand network externalities on the welfare outcome of illegal copying. The results acquired have shown not only the possibility of increase of copyright holders profits as an illegal copying result, but also a potential Pareto improvement in social welfare. All three parties involved, including producers, users of illegal copies and legitimate copies buyers could benefit from piracy in this case (Gopal and Sanders 1998; 2000) (Husted 2000).

Such a conclusion undermined the standard measures of the harm to producers and society from illegal reproduction of intellectual property. These measures usually do not take into account the possible demand network effects and thus was claimed to be overestimated. The author also suggested a possibility of the long-run gains from illegal copying even if the firm's short-run profits are less than that without copying. Such a not obvious conclusion rested on the and an increase in valuation of the product by the legal users. In this case, the presence of copying could be a mean of achieving long-run strategic goals by the firm.

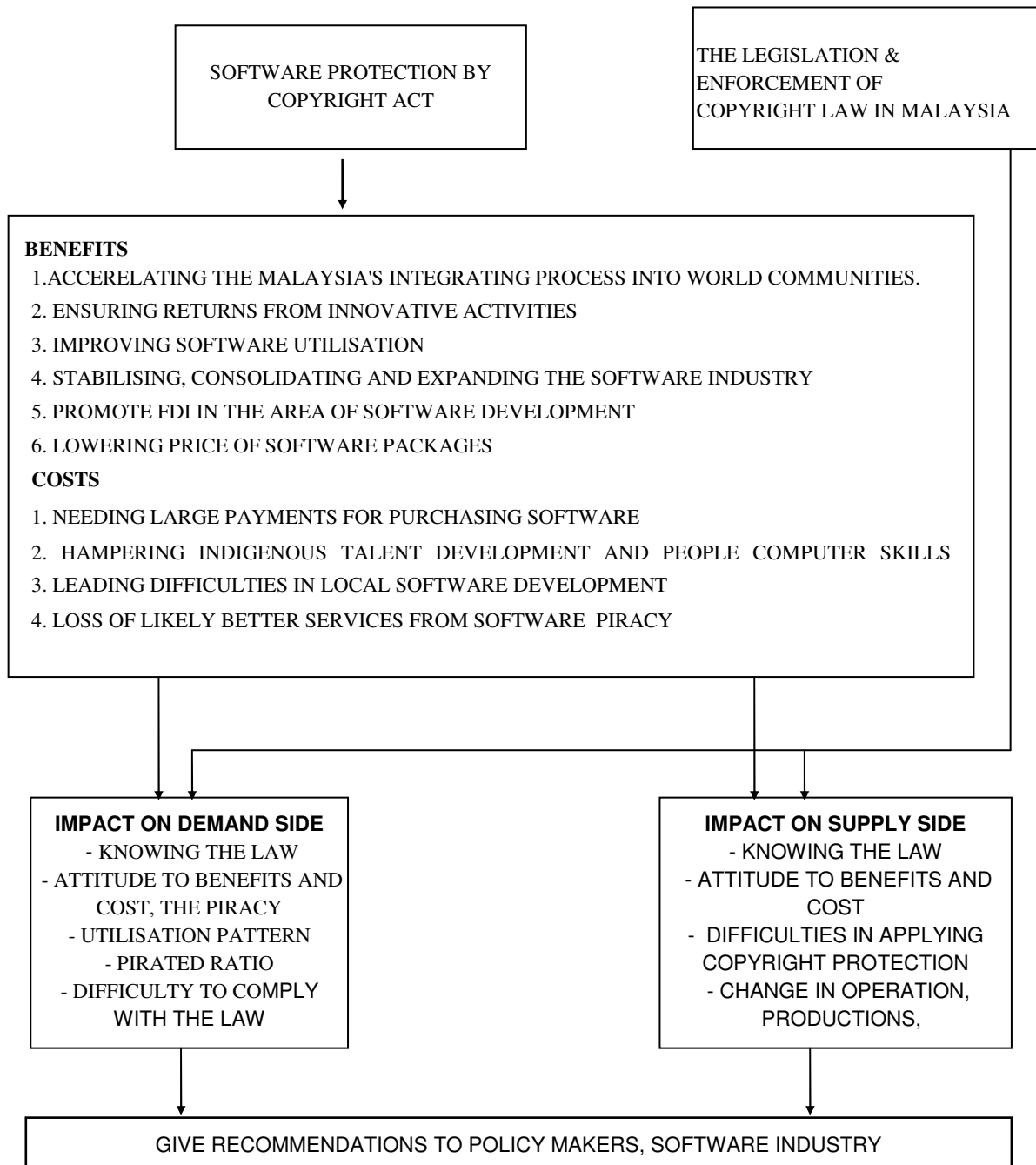
Unfortunately, author's research disregarded the analysis of different antipiracy activities. While Takeyama implicitly assumed the potential harm from the anti-piracy enforcement in the presence of network demand externalities, the analysis of corresponding welfare effects was left out of scope of research.

However, Takeyama's model offers an important benchmark view that has to be taken into account during the development of anti-piracy policy. The idea that the piracy could be beneficial for software producer is also supported by the Slive and Bernhardt (1998). They viewed piracy as a form of price discrimination when producers sell certain amount of software for zero price. Since the dominating majority of bootleggers have low willingness to pay for software, the losses from this action are not significant. However, in the presence of significant network externalities this could dramatically increase the demand for software by business users. Thus, the situation when the limited piracy is allowed is beneficial for all parties.

As mentioned above, benefits and costs of the copyright protection impact upon awareness of the necessity of the copyright protection, and their willingness to comply with provisions of the copyright law. Furthermore, because of the difference between elements of business environment, each of them has its own concerns on the copyright protection.

However, such likely impacts cannot take place unless the copyright protection is effectively enforced. In other words, government play a crucial role in developing intellectual property protection and enforcement. The adequate protection is unsigned by the three areas of legislation, enforcement (Francis, 1990). In order to obtain that information, questionnaires and survey have been developed based on a framework. In this study, three environmental components of software industry including supply side, demand side are involved which are as below:

Figure 3: A Framework to Assess the Impacts of the Copyright Act to Business Environment of Malaysia Software Industry



1.6 Scope and Limitation

With regards to scope of this study, it is that data will be collected in the Klang Valley including: Kuala Lumpur, Petaling Jaya, Subang Jaya, Cyberjaya based on the strategic location of Klang Valley as a business hub of the variety business software industries. In addition, since most of computers used in Malaysia is personal computer, this research only focus on personal computer software industry and its environment in Malaysia.

Besides, this research has a limitation, which is due to the artificiality of the nature of such survey as this, customer behavior can never be exactly predicted, especially, when it concerns legal issues, where people feel very personal and easily hurt. This kind of problem is partly avoided by self-administered questionnaires by which people are left alone to answer at spot. Hence it did not very much affect the results.

1.7 Organisation of the Study

This research project has been organised into five chapters.

Chapter 1-Introduction: Provides aim and objectives of this study, research methodology, scope and limit.

Chapter 2- Literature Review: This chapter presents literature review including definition and classifications of software, the applicable laws for software protection, software protection under the Copyright Act 1987, international copyright laws and international copyright laws convention and difficulties in implementation of copyright laws in software protection.

Chapter 3- Research Methodology: This chapter illustrates the research design, data collection, sampling design, research instrument, constructs measurement, data processing, and method of data analysis.

Chapter 4- Research Findings: Analyses the benefits and costs of software protection under Copyright Act and related laws, develop a framework to assess the Impact of the Copyright Law to the business environment of software industry in Malaysia. Based on the framework, assess the laws and enforcement of the Copyright Law for software protection in Malaysia.

Chapter 5- Discussion and conclusion: Give recommendation for policy makers on the enforcement of the Copyright Law, and other components of software industry.

1.8 Conclusion

Chapter one outlined the foundation for the research project. It also acts as an introductory chapter that presents the research project background, describes the research that will be solved in the research project and addressing the research project's objectives. Finally, the importance of this study and the outlines of each chapter will be presented in the research project.

Next, chapter two will further elaborate a review of the associated literature relevant to the themes of the research project.

CHAPTER 2

LITERATURE REVIEW

2.0 General Information

In legal terms, intellectual property covers three distinct sets of rights: copyrights, patents, and trademarks. However, economics differentiates between copyright and patent on the one hand and trademark on the other based on the following rationale. Copyright refers to two types of commodity – information or intellectual property goods– having certain characteristics. Information goods have two important public goods characteristics. First, their consumption is inherently non-rival. That is, the use that one person makes of a piece of information or intellectual property goods does not decrease the possibility of use by others. Second, information or intellectual property goods may be non-excludable in the sense that the producer of intellectual property goods is often unable to exclude non-payers from consuming goods without due authorisation (Takeyama 1994).

2.1. Theoretical Analysis

It will be helpful to start the theoretical part of the work with brief outline of the two existing models in order to reveal the key assumptions and to attempt to shed the light on the reason of difference in results the models produce. Then the simple diagrammatic framework based on the modification of the Harbaugh and Khemka model with particular focus on the dynamic aspects of software piracy is presented.

It is widely reckoned that there is a conflict between the consumer and the copyright holder, i.e. piracy in any case harms the producer. However, Takeyama offered a theoretical framework, which allows consumers' and producers' interests to coincide (Takeyama 1994). The author studied the effect of the demand network externalities on the welfare outcome of illegal copying. The results acquired have shown not only the possibility of increase of copyright holders' profits as an illegal copying result, but also a potential Pareto improvement in social welfare. All three parties involved, including producers, users of illegal copies and legitimate copies buyers could benefit from piracy in this case. Such a conclusion undermined the standard measures of the harm to producers and society from illegal reproduction of intellectual property. These measures usually do not take into account the possible demand network effects and thus was claimed to be overestimated. The author also suggested a possibility of the long-run gains from illegal copying even if the firm's short-run profits are less than that without copying. Such a not obvious conclusion rested on the potential price increase that could take place after the distribution of the product and an increase in valuation of the product by the legal users. In this case, the presence of copying could be a mean of achieving long-run strategic goals by the firm. Unfortunately, author's research disregarded the analysis of different anti-piracy activities. While Takeyama implicitly assumed the potential harm from the anti-piracy enforcement in the presence of network demand externalities, the analysis of corresponding welfare effects was left out of scope of research. However, Takeyama's model offers an important benchmark view that has to be taken into account during the development of anti-piracy policy. The idea that the piracy could be beneficial for software producer is also supported by the Slive and Bernhardt (1998). They viewed piracy as a form of price discrimination when producers sell certain amount of software for zero price. Since the dominating majority of bootleggers have low willingness to pay for software, the losses from this action are not significant. However, in the presence of significant network externalities this could dramatically increase the demand for software by business users. Thus, the situation when the limited piracy is allowed is beneficial for all parties.

Harbaugh and Khemka (2000) arrived at different theoretical results that have other policy implications. Under the settings of this model, it was possible to derive the existence of a limited range of extensive targeted enforcement that could lead to increase in both producer's profits and consumer surplus. The enforcement from this range was strong enough to increase

copyright holder's profits but not so extensive, that low-value consumers who would never buy a legitimate copy at the monopoly price were prevented from buying an illegal copy. Within this range, the legal users benefited from more extensive enforcement, because the copyright holder lowered the price in order to capture new customers. In order for those gains to exceed the losses to consumers, who were forced to switch from the illegal copy to the legal one, bootleg copies should be "sufficiently poor substitutes". The authors claimed that even if legal and illegal copies are close substitutes, the mentioned optimal enforcement range still exists. If the firm is allowed to determine the amount of resources, devoted to enforcement, Harbaugh and Khemka's model allows the possibility of inefficiently low enforcement. This result also differs from the Chen and Png (1999), where the firms choose inefficiently intense monitoring. Harbaugh and Khemka concentrated on comparison of the targeted enforcement and broad-based one. They found out, that if enforcement targets at restricted number of high-level buyers, the outcome would be more piracy than in case of no enforcement at all. They claimed, that "for a reasonable class of demand functions" any targeted enforcement, calculated to maximize some combination of copyright holder's profits and consumer surplus will always lead to more piracy. However, this conclusion was based on the assumption that the firm competes with bootleggers when it is more profitable than maintaining the monopoly price. Thus, as applied to Malaysia, this model does not rule out the possibility of effective piracy reduction through targeted enforcement, since software copyright holders do not compete with the retailers of illegal software. Leaving aside the distinguishing between targeted and broad-based enforcement, Harbaugh and Khemka's model, contrary to the Chen and Png's model offers extensive enforcement as a good remedy to piracy problem.

It is already possible to find works that try to fill the empirical gap in intellectual piracy researches. One such attempt was done by Holm (2000). He applied a contingent valuation method to study the willingness of research subjects to pay for original software in the presence of software piracy. He used a sample of 330 Swedish students. The results acquired confirmed the point that illegal copies and originals are not perfect substitutes. However, the majority of subjects refused to pay the retail price for the original. The author managed to estimate a demand schedule for the original software packages. The price elasticity of piracy was found to be quite low for most price intervals. This had an important implication for the anti-piracy policy, showing the probable inefficiency of

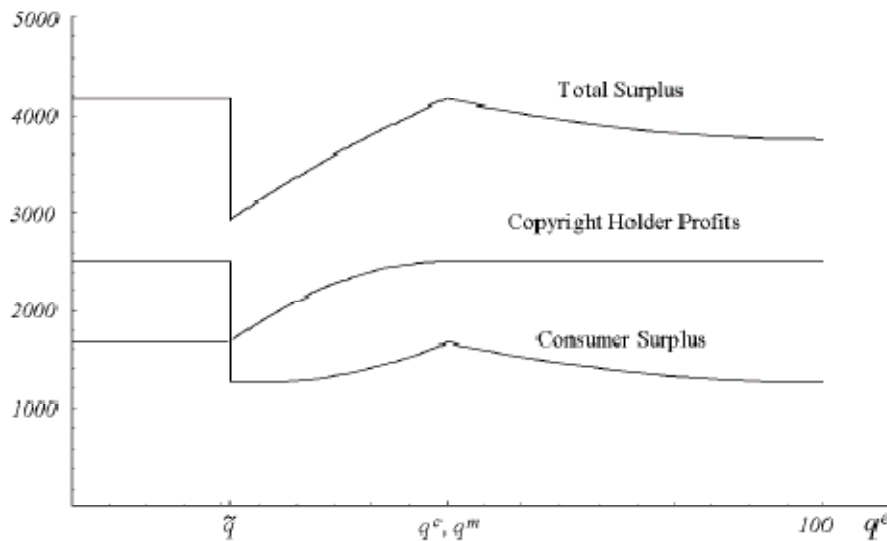
price cuts as an anti-piracy activity. The subject sample used by the author was very limited and specific to make generalisations, but it casts some shadow on the Takeyama's and especially Chen and Png's models. Each user faces a choice between three options: buying the legal product, copying the software and risking undergoing enforcement action or not using the software at all. The net benefit of the potential user in case of legal purchase is $v - p$. In case of abandoning from software usage, the net benefit for the user is 0. If the user chooses to commit the act of piracy, he will incur the cost k and will be detected with probability α . In case of detection, the software is seized and the user has to pay a penalty f (which is exogenous). The net expected benefit from use of pirated copy is $(1 - \alpha)(v - k) - \alpha f$. All users maximise their net expected benefit from choosing among three alternatives. In case of equal values the user is assumed to prefer legal version to illegal and buying or copying to not using. From the maximising behavior of users the authors derive and proof the following quite natural proposition: "the demand for copying is increasing in the price of the legitimate product, and decreasing in the monitoring rate, cost of copying and penalty of copying".

The following proposition about the producer's behavior is derived and proved: "An increase in the penalty for copying will lead the publisher to increase both price and monitoring rate. An increase in the cost of making copies will lead the publisher to increase the price, but reduce monitoring". Finally, the authors deduce and proof the following proposition that is the key theoretical result of their work: "Provided that the publisher's monitoring rate is positive, the price and monitoring rate can be reduced in a way that would rise welfare without affecting the publisher's sales". This means that the lower price can substitute the monitoring and the monitoring has much more negative impact on social welfare. Chen and Png notice, that such a substitution might reduce the publisher's profit. However, they assert that in case of possibility of the lump sum transfer there still will be a way to make a Pareto-improvement by reducing simultaneously price and monitoring. Summarizing, it is important to note that the type of enforcement used in this model is broad-based. Indeed, the change in enforcement variables reduces the expected benefits from using the counterfeit software for all users, with no regard to their valuation v . The conclusion about the high enforcement as an inferior way to deal software piracy in comparison with price reduction indicate the possible problems with broad-based enforcement.

Harbaugh and Khemka model (2000) explicitly compares the broad-based enforcement with the targeted one.

If the targeted enforcement takes place, only the highest value buyers undergo enforcement. In Harbaugh and Khemka model of targeted enforcement the intensity of enforcement is not considered. Instead, they assume that the enforcement extent q^e ensures that all users with high valuation $q \leq q^e$ must purchase from the copyright holder. This means that producer can charge $v^l \cdot q$ for quantities less than q^e . For quantities higher than q^e the producer competes with unrestricted pirated copies market. Recollecting zero marginal costs and competitive nature of the bootleg copy market, the copyright holder can charge no more than $v^l \cdot q - v^b \cdot q$.

Figure 4. Profits, surplus from targeted enforcement with extent q^e .



Source: Harbaugh, Khemka (2000)

Harbaugh and Khemka have shown the existence of the efficient range of enforcement meaning that the extent of enforcement which lies in this range leads to higher consumer surplus or copyright holder profits than less extensive enforcement. Figure 4 shows the changes

in producer's, consumers and total surpluses as a function of the extent of enforcement. As enforcement extent q^e grows, initially producer will continue to follow the competition strategy, since the number of enforced users is not high enough to produce monopoly profit greater than competitive one. When the level of enforcement reaches q , producer switches to monopolistic strategy and increase prices. There is no conflict between the producer and consumers, since as the enforcement level increases, producer lowers the prices to capture new customers. Both producer profits and consumer surplus increase in this range. However, the further increase of enforcement extent will harm consumers, since producer will maintain the optimal profit - maximizing quantity q^m , but buyers with low valuation will lose the ability to buy bootleg copies, but will not buy the legal copy.

The authors proved the following proposition: "More extensive enforcement in the efficient range (i) lowers the legitimate copy price, increases copyright holder profits and reduces piracy generally and (ii) increases consumer surplus if q^e is sufficiently close to q^m or bootleg copies are sufficiently poor substitutes for legitimate copies".

2.2. Cross-sectional Regression Analysis

Holm (2003) seeks to test economic theories based upon a simple model of piracy developed by Besen and Kirby (1989) using the results of a survey. The survey consists of five subject areas; covering piracy behavior, net willingness to pay for an original copy (of music, games, or software), computer skills, ethical concerns, and income. Piracy behavior and ethical concerns both used only multiple choice questions whereas the other subject areas allowed for open-ended answers. This survey serves to guide additional research in this thesis in regards to persons with low net willingness to pay being more likely to pirate and also those persons with higher computer skills are more likely to pirate. The former helps to support the notion that those persons with high willingness to pay acquire the best quality copy of the software, game, or music in question due to either liability reasons or productivity reasons. The latter supports the inclusion of computer related variables in regression analysis of international piracy rates.

Nations with high rates of computer usage should, in theory, be more skilled at using a computer compared to those with low computer usage. If the evidence from Holm (2003) stands, then computer use may increase piracy rates.

Holm (2003) also included a brief macro level analysis of piracy rates. Much less work appears to have been put into this section of the analysis as the model includes only two variables in a cross-sectional regression of 75 countries in 2000. These two variables are gross national income (GNI) per capita and the rule of law, an index obtained from Kaufmann et al. (1999).¹ The results of this macro level analysis are similar to the micro level analysis in that income has a negative relationship with piracy, as income increases piracy rates decrease. Both of the variables used in this second model will be included in the thesis research as they both influence piracy rates in theory and empirical results. An updated rule of law index from Kaufmann et al. (2009) will be used in this thesis to allow for more years of data and also for current data.

More recently, Fischer and Andrés (2005) further investigated the relationship between income and piracy rates. Fischer and Andrés (2005) include a cross-section of 71 countries and variables that include income, cultural influences, inequality of income, and enforcement of property rights. The models use either the Gini coefficient or income quintiles as the measure of income inequality in different specifications of the regression. The inclusion of so many more variables provides a more complete analysis of the influences of piracy rates when compared to Holm (2003), which was simple by comparison. Additionally, including results for multiple regressions in this research allows for evaluation of the robustness of the regression results.

The key findings of Fischer and Andrés (2005) are how piracy relates to income, income inequality, and individualism (i.e., a measure of social-connectedness within a society). The empirical results show that income inequality is inversely related with piracy. However, the effects of income inequality differ across regional subsamples. Results on income inequality using the Gini coefficient differ from those using quintile measures. The results provide evidence

¹ The Kaufmann et al. research originally used by Holm (2003) was published in 1999 but has since been updated many times. The version used in this thesis was published in 2009. The updates simply add additional observations for each New Year.

that GDP per capita has a non-linear relationship with piracy rates. In each model, the natural logarithm of real GDP per capita (lnGDP) had a positive and significant coefficient while the lnGDP squared had a negative and significant coefficient. The coefficients then indicate that GDP per capita has an inverted u-shaped relationship with piracy rates. As suggested by Cremer and Pertieau (2009), increasing levels of income will lead to increased rates of piracy until a maximum is reached and then piracy rates begin to fall with increasing income. This relationship adds empirical support to the theory of limited liability presented in Chang et al. (2008). Individualism is found to lead to lower rates of piracy and is robust and significant in each of their specifications. Fischer and Andrés (2005) note that piracy is an activity that typically is conducted in groups and the theory is that more individualistic societies will have fewer group connections with which to participate in piracy.

Unlike other regressions, Piquero and Piquero (2006) used a censored model since the values of piracy rates are continuous but limited to values between 0 and 100. While the model in Piquero and Piquero (2006) is still subject to the limitations of cross-sectional data, the use of trajectory analysis allows for additional analysis and insight into determinants of piracy.

With this model, GDP was included without scaling for the population size and also without using a polynomial specification. Despite this shortcoming, once again high levels of GDP are found to lead to decreased rates of piracy. This finding is consistent with other available literature. The number of Internet users and computer users have a negative relationship with piracy rate, though not statistically significant. These effects, as well of the effect of GDP on piracy rates, will be examined in greater detail in this study. Finally, Piquero and Piquero (2006) include variables to measure democratic institutions and civil liberties. In both cases, these variables are found to share a negative relationship with piracy rates.

The study by Piquero and Piquero (2006) presents a model not seen in any of the available literature. While Piquero and Piquero provide justification for the use of a censored model in

their research as opposed to a standard OLS regression, the argument is not very strong or well-constructed. Censored models are designed for use when behavior is observed but limited to an upper or lower bound, or possibly both when the data is recorded. In the case of software piracy, observable values are between zero and 100. Rates of piracy below zero or above 100 are not valid since the Business Software Association defines piracy as the number of licensed software applications installed divided by the total software applications installed. A more in depth discussion of piracy definitions is presented in the next chapter.

Yang and Sonmez (2007) examine social and economic influences on intellectual property violations. They use data that summarize cultural differences from 76 countries, including educational expenditures, individualism, religion, and language. The fifth independent variable used in their study is per capita gross domestic product, which is used as an economic control variable. One of the shortcomings of their work is that the data they collected were averages across time, to allow for a cross-sectional analysis rather than panel analysis since they only consider the final average of each variable. Furthermore, the data used in the analysis have varying time frames within the 1994 to 2003 time period. As an example, piracy rate is the average piracy rate within each country between 1994 and 2002 whereas education expenditures are averaged from 1998 to 2003. Significant changes may occur during the years that do not match, causing some concerns regarding internal validity.

Yang and Sonmez (2007) find that culture, as measured by four variables including education expenditures, individualism, religion, and language, is important in determining piracy rates. The regression models they generated are capable of explaining as much as 76 percent of the variations in piracy by including just four of the five variables (per capita GDP, educational expenditures, individualism, and religion). Furthermore, a model with just individualism and per capita GDP is capable of explaining 73 percent of the variation in piracy rates. The study by Yang and Sonmez (2007) helps to direct the focus of this study towards greater internal validity by using panel data analysis with unbalanced data.

Goel and Nelson (2009) use a similar approach to determining software piracy, as do Yang and Sonmez (2007). However, Goel and Nelson (2009) use more independent variables to explain piracy rates using cross-sectional data of 57 countries. The authors here use data from a single year, 2004, rather than averages across mismatched time periods, as did Yang and Sonmez (2007). The data set includes as many as 21 independent variables to explain piracy rates such as indices of economic freedom, civil liberties, property rights, and corruption perceptions. Other variables include technological controls such as Internet penetration, computer usage, networked readiness, and price baskets for telecom and Internet access. The variables are chosen to fit four specific categories: economic factors, institutional factors, technological factors, and other factors.

The key findings of Goel and Nelson (2009) are that both economic and non-economic factors are important in determining piracy rates. Interestingly, the findings imply that greater literacy, market size, economic freedom, and corruption lead to increased rates of piracy. While corruption and economic freedom seem likely to lead to increased rates of piracy due to a surrounding culture that is accepting of corruption and likely other unethical practices and economic freedom affords persons the choices to act in their own best economic interest, which may include piracy when income is low. Increased piracy rates linked with the literacy rate may be due to a basic education being necessary to effectively operate a personal computer. The influence of market size on piracy rates is unclear as to why this would lead to increased piracy rather than decreased piracy.

With a larger market, the expectation would be that the software is more readily available and possibly attainable at lower prices. In opposition, greater economic prosperity, political freedom, Internet and phone charges, and diffusion of computer technologies reduce the rate of piracy. The influence of economic prosperity on decreasing piracy rates is likely tied to limited liability, which has been presented in much of the reviewed literature. The influence of political freedom on piracy rates is unclear. Increased Internet and phone charges may lead to decreased rates of piracy as they increase costs for distributing or obtaining pirated content through the Internet.

While many of these findings are expected, it appears surprising that diffusion of computer technology reduces piracy rates as a greater diffusion of computer technology means that there are a greater number of persons with the opportunity to participate in piracy. However, a greater diffusion of technology may also bring with it a greater emphasis on enforcement of copyright law. Anecdotally, if the computer market is small, there is not much to be lost or gained from high levels of anti-piracy efforts.

Depken and Simmons (2004) also explore the social and economic influences of software piracy. Their data are cross-sectional and span 65 countries. Variables unique to this research are the inclusion of a polynomial term for the literacy rate as well as a variable to measure a person's accessibility to his or her superiors in society. The authors explain this as a measure of the vertical distance of relationships in society as opposed to the horizontal relationships as measured by the individualism index. The key findings are the direction and significance of economic variables that influence piracy such as GDP per capita (negative), dependence on trade with the United States (negative), the squared literacy rate (negative), and inflation rate (negative). However, the social factors of individualism (negative), power-distance (varies) and interaction of the two (positive) are found to be significant in some models but not others. These findings will help to guide which variables will be used in this study and the expected signs of those variables. Particular attention is paid to GDP per capita and the inflation rate as these are common economic control variables that can help to explain the conditions in a country that may lead to higher rates of piracy. While the social factors will likely not be relevant in panel data analysis later in this thesis due to the factors remaining relatively constant over time, however, the economic factors present more possibilities in panel data analysis given they change over time and across countries.

Additional research by Kovačić (2007) focused on economic and cultural variables but also included legal variables. A total of 69 countries are included in a cross-sectional analysis. Similar to Depken and Simmons (2004) an individualism index is used to measure social relationships within each country. Another variable, power-distance, is a way to measure the

vertical relationships within society. The vertical relationships are those relationships with persons above or below you in social or political standing. An example of power-distance is how much direct communication is present between government officials and the people they serve. Also present is the rule of law measurement as seen in many of the earlier studies of piracy. The new variables presented in Kovačić (2007) are the ones that measure masculinity in the society and the uncertainty avoidance index. The results are much the same as the results from the previous research: increased income, individualism, and rule of law lead to decreased piracy rates while power distance leads to an increase in piracy rates.

The importance of Marron and Steel (2000) is that it is among the first studies that seek to find determinants of piracy in international data. Much of the available research on determinants of software piracy is based upon the work done in this paper by Marron and Steel. The work done by Marron and Steel (2000) consist initially of a series of univariate regressions with each independent variable by itself to explain the dependent variable, piracy rate. Each of the univariate regressions finds negative relationships between each independent variable and piracy. Following the univariate regressions are five multivariate regressions. The multivariate regressions indicate that the negative relationships of each variable are robust across all specifications though in some specifications the variables are not statistically significant. Additional findings of Marron and Steel (2000) are that the inclusion of regional dummy variables is statistically significant for Europe and the Middle East in two of the specifications.

The significance of these regional variables may be representative of an omitted variable that these regions share in common and which contributes to higher rates of software piracy such as social or economic factors that are unique to the area and that contribute to piracy rates. The key finding from this work is that countries with higher levels of intellectual property protection and higher levels of income have lower levels of piracy. Additionally, cultural influences play an important role in piracy rates as countries with more individualistic tendencies have lower rates of piracy than those with collectivist tendencies.

2.3 Panel Data Analysis

Andrés (2006) is among the first studies to use panel data to determine software piracy rates. His research focuses upon 23 nations in Europe and seeks to determine the role that copyright software protection plays in reducing piracy rates. He includes data from three different years, 1994, 1997 and 2000. Given the slow changing nature of some of the variables used, such as the property rights index and secondary school enrolment, his choice of years allows for greater change to take place between each observation. He includes just five explanatory variables, a stark contrast to the 21 used in the cross-sectional study conducted by Goel and Nelson (2009). The other included variables are: GDP, research and development expenditures, and the percentage of a nation's exports to the United States. Although some explanatory power is lost due to the decreased number of variables in comparison, the model used by Andrés (2006) still produces reliable and meaningful results because of the ability to control for country fixed effects across European nations. He also employs a model that differs from the others as he includes the natural logarithm of piracy rate as the dependent variable as opposed to just the piracy rate. He also includes a squared term of the natural logarithm of GDP, another indication of the non-linear relationship of $\ln(\text{GDP})$ with piracy rates.

Bezmen and Depken (2005) also utilise panel data regression analysis. The purpose of their research is to use piracy rates as an independent variable in determining economic development. The theory behind this connection is that software piracy is a sign of weak enforcement of intellectual property rights and better enforcement of intellectual property rights encourages individuals and business to create and innovate more. This additional creation and innovation then leads to economic development. An important distinction between this study and the many others in the body of literature is the use of the human development index (HDI), a composite index of many factors that lead to improving life in each country. Among the components of HDI are gross national income per capita, life expectancy, mean years of schooling, and expected years of schooling.

The argument in using the HDI is that income levels alone do not give a full picture of economic development within a country since economic well-being encompasses more than a single measure of income. In response to potential endogeneity issues, Bezmen and Depken (2005) use instrumental variables to explain piracy rates and then use piracy rates as one of three variables to explain the HDI. The results of the two stage least squares regression is a statistically significant and negative relationship between the instrumented piracy and HDI.

A separate study by Bezmen and Depken (2006) focuses on socio-economic influences of piracy rates in a panel data regression. Similar to their work in 2005 for the first stage of the two stage least squares regression, variables such as income and freedom are used. However, the panel data for this study are for the fifty US states and not country-level. The panel data spans three years - 1999-2001. Also included in the panel analysis are unemployment, tax burdens, and year fixed effects. As with other studies, income has a negative relationship with piracy in the regression and the sign remains the same across six specifications though not always statistically significant. Interestingly, higher tax burdens influence piracy in a negative way across all specifications and are statistically significant in OLS and random effects models. Only in the fixed effects models is tax burden insignificant.

2.4 Significance Development and Software Piracy in Dynamics

Since the problem of software piracy does not have the quick solution and the extent of piracy is determined not only by the consumer preferences, firm behavior and enforcement, it is useful to determine additional important factors that may as well change over time and change the effect of anti-piracy activities. One of the main sources of pirated software is Internet. If the Internet connection is fast enough, the user can download the software with disabled copy protection mechanisms even not leaving his work place. So, the Internet availability in the country may have the important influence on the software piracy.

Another channel of bootleg copies distribution is the direct exchange between software users. The larger is the concentration of computers in the country, the easier is to find the partner to

perform the exchange of bootleg copies. Computerisation also increases the profits of institutional bootleg copies distributors such as illegal CD retailers because of the increasing demand for the media with illegal products. However, computerisation could also change the software valuation pattern because of the changes in composition of software users' pool. It could also lead to the increase in valuation of the software products due to demand network externalities effects. (Bezmen and Depken, 2006)

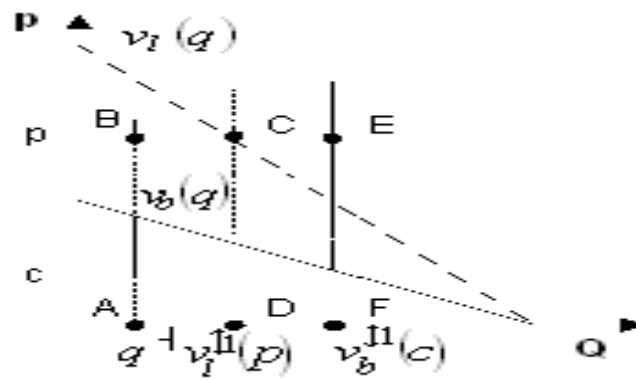
One more factor is the budget of the software users. The changes in the budget may increase the piracy if consumers will spend the additional income on acquiring the illegal software. However, consumers may also switch to the legal software, which was unaffordable before the price increase.

In order to take into account the factors listed above, the simple diagrammatic framework will be offered, following the spirit of Harbaugh and Khemka model (2000). It is hard to model the influence of the Internet access availability, so this will be left out of the scope of this model, but it will be accounted for in the empirical part. This model concentrates on the consumers' behavior and assumes producer to maintain fixed price of product p . This assumption seems to be reasonable in the case of small country importing the software (this is exactly the case of Ukraine). For example, in case of Ukraine, the monopolistic software producers do not compete with bootleggers. They maintain the price that they offer on the world market and use the political pressure to increase the enforcement efforts. Thus, this model can give useful insights despite of its simplicity. Assume there are a total of Q individuals interested in possessing of the software product and sort them by their valuation of software in descending order.

The corresponding numbers, assigned to individuals are numbers from 0 to Q . The function $v_l(q)$, $q \in [0; Q]$ represents the valuation of q^{th} individual. Individual 0 has the highest valuation, while individual Q has zero valuation. The (inverse) demand function faced by the software producer is, thus, $v_l(q)$. So, in the absence of piracy, the revenue of producer on this market will be $p v_l^{-1}(p)$ where $v_l^{-1}(p)$ is the demand function. Let to introduce the bootleg software now. It is valued lower by the consumers, so $q \in [0; Q] v_b(q) < v_l(q)$, only for the last buyer Q : $v_b(Q) = v_l(Q)$

$(q)=0$. The bootleg copies are costly to acquire and their users must also bear costs of enforcement. For simplicity the probabilistic aspect of enforcement is not considered. The total costs of bearing the enforcement and acquiring the bootleg copy is denoted as c . Consumers, thus, have to choose between purchase of legal copy and illegal one. Individual q will buy a legal copy, if $v_l(q) \geq p \geq v_b(q) + c$, and buy a bootleg copy otherwise. This assumption simply states that for the users with higher valuation of software the difference between valuation of legal and bootleg copies is larger than the valuation difference of low end users. The case of linear demand functions is depicted on the Figure 5.

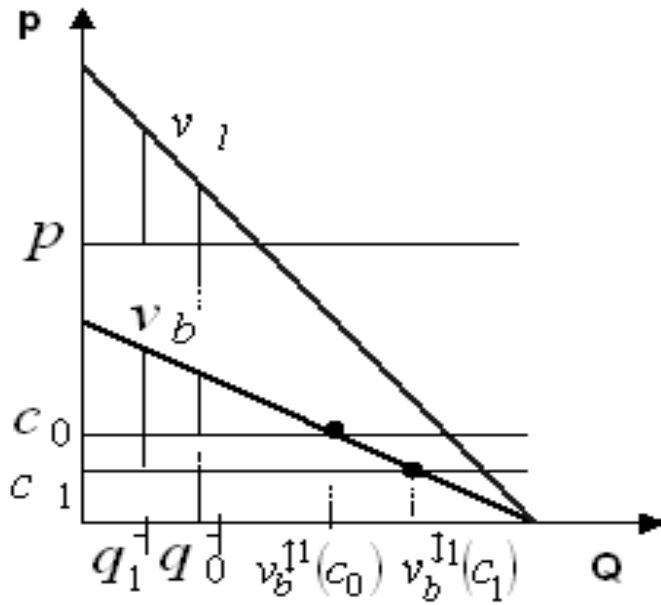
Figure 5. Software market in the presence of piracy



The lost producer revenue due to piracy is the area ABCD. However, the methodology used by BSA to calculate the losses from piracy reports the revenue lost as the value of the software that is used in the country, but was not bought from the legal retailers. In terms of the Figure 2 this number is ABFE. This means that there is a significant upward bias in BSA estimations of losses from piracy. The reason of this bias is the fact that BSA does not account for users, which use software only because of piracy and will not use it if enforced. However, as these numbers are used for policy decisions, we will study the behavior of losses from piracy according to BSA. In order to make the numbers comparable across countries the variable of interest will be the losses from piracy per personal computer (that is, per user of software).

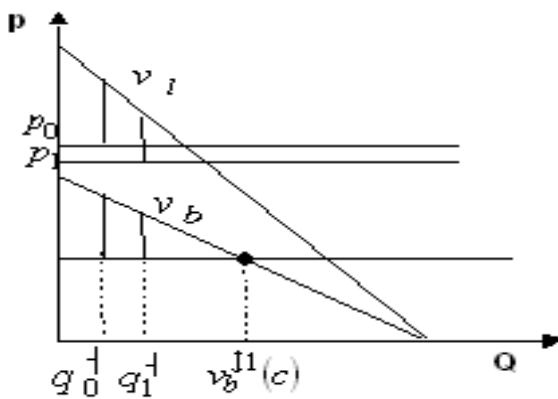
Now the reaction of this variable to the changes of other variables will be described. First, the case when the piracy cost c changes is described. Figure 5 depicts the situation when the cost of piracy changes from c_0 to c_1 .

Figure 6. The effect of piracy costs change



Now consider the situation when the producer decided to change the price, for example, to lower it from p_0 to p_1 . This situation is depicted on Figure 7.

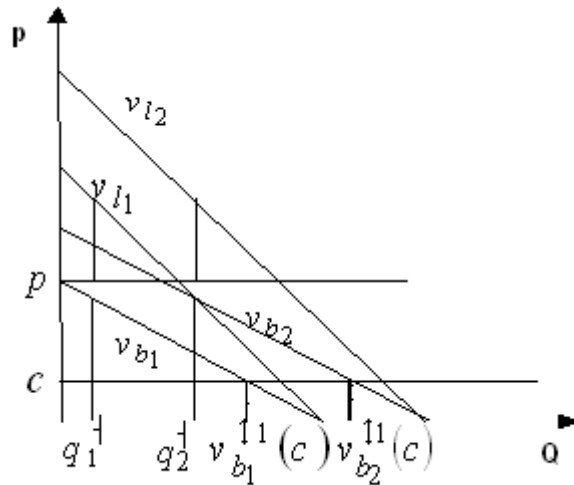
Figure 7. The effect of the software price change



After the price drops the position of the indifferent buyer shifts to the right. Thus, number of the users of legal software increases. Under assumption that prices never drop sufficiently low to stop everybody from making illegal copies, the number of total users stays at the level of $v_b^1 \cdot c$.

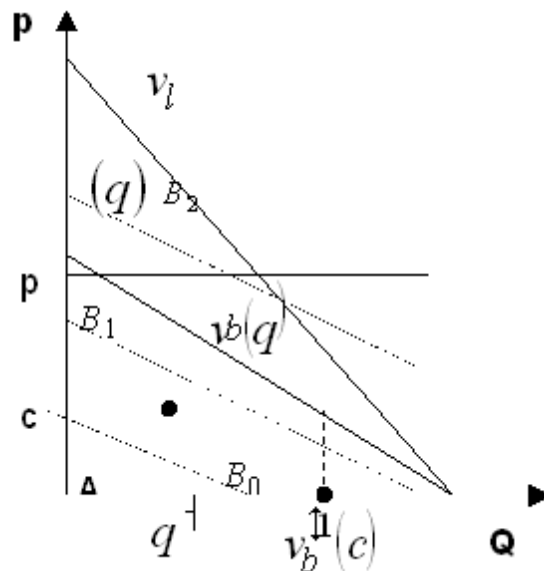
As the price of legal copies decrease, the losses per software user decreases and vice versa. Note, that if the demand for the legal software is elastic, producers will collect more revenue as a result of price decrease. If it is unit elastic, the producer's revenue will not change and finally, if the demand is inelastic, the revenue will drop after the price decrease. The number of high-valuation software users can increase if, for example, the computerization occurred as a result of business technology adoption. Both demand curves in this case make a parallel shift to the right. This situation is depicted on Figure 8.

Figure 8. The effect of computerization in case of high valuation users number increase



All the analysis above assumed that users were able to afford the software (either legal or illegal) they prefer. Now it will be instructive to assume back the budget constraints and look at the effect they have on our variables of interest. For the sake of exposition simplicity the quasi-linear preferences are assumed. As Varian (1992) shows, in this case the reservation price for the discrete good (and software is the discrete good) does not depend on the consumer's income. Let $B(q)$ represent the part of user's q income he is ready to spend on the software purchase. If we assume that this proportion is constant for each user then the changes in users' income will be proportionally transferred to the $B(q)$. Figure 8 shows the valuation (reservation price) lines for legal and bootleg software together with prices and budget constraint lines. The budget constraint lines are drawn in a way, that users with high valuation of software have higher incomes. This conforms to reality, since the high-valuation users usually are the businesses and institutions, which can usually spend more on software. However, the conclusions that will be drawn do not depend on the particular form of the $B(q)$.

Figure 9. The effect of budget constraints change



Assume that initially the budget constraint line is B_0 . No user can afford the software, neither legal copy nor the bootleg one because of this tight budget constraint. As the Bq line moves outward to B_1 representing the increase of consumers income, the high-end users will start to acquire the software. Despite the fact, that user's $q \leq q^*$ prefer to buy the legal software as the previous analysis shows, they cannot afford it and acquire the illegal copy, which they can afford. Thus, initially the increase in consumers' income leads to increase in number of total users, but that increase is due to the rise of piracy. So, the losses from piracy per user will jump from zero level to value p , since all of the users will be bootleggers on this stage. As the shift of Bq outwards continues, at some stage it will cross the p line and the high-end users will buy the licensed software instead of bootleg one. Now the three cases are possible. If the Bq curve is above the point $(v_b^{-1}(c), c)$ when it crosses the p curve, then the consequent outward shift of Bq will not lead to increase of the number of total users and only the substitution of illegal software for legal one will take place. This will lead to decrease in the losses from piracy per software user. When the level of income above (q^*, p) is reached (like B_2), all of the users $q \leq q^*$ will use a legal copy, and $q > q^*$; $v_b^{-1}(c)$ will use a bootleg copy. The further increase of income will change nothing on the market for this software.

In the second and third case Bq curve is below the $(v_b^{-1}(c), c)$ when it crosses the p curve. This means that the further shift of Bq will lead to increase in the number of total users which will be equal to the increase in the number of legal users, so the number of the bootleggers will stay constant. On this stage the losses from software piracy will also decrease, but less rapidly than in case 1. The behavior of losses per user during the further movement of $B(q)$ will depend on the slope of this line. If it is flat enough, that it comes above point $(v_b^{-1}(c), c)$ before it comes above (q^*, p) , then the following changes will be the same, as in case 1. Thus, there will be further decline in losses per user. However, if $B(q)$ is steep enough to come above point (q^*, p) before it comes over $(v_b^{-1}(c), c)$, then the following outward shift of $B(q)$ will hold the number of legal users constant, while increasing the number of total users and, thus, the losses per software user.

The exact behavior of the losses will, of course, depend on the shapes of the valuation and budget constraint lines. But if many markets for different kinds of software and total losses on all markets are considered, the general pattern will be the same as one studied here. As income rises, the losses from piracy per user will initially increase, but then decrease. In case where steep budget constraint curves will be on the majority of markets with high software prices, the third case behavior will occur and further income rise will bring increasing losses from software piracy. However, the most important finding here is actually the first two cases, since they seem to be more probable than the third one. In any case if budget line shifts outwards, initially the losses per capita should increase and then decrease. Only on the next stage the uncertainty arises. It also worth noting, that relaxation of the quasi-linear preferences assumption will bring some complication to the analysis but will not change the general result.

2.5 Conclusion

This study follows in a similar manner to the cross-sectional and panel data literature in an attempt to find determinants of piracy using international data. However, the strengths and weaknesses of the current body of literature influence the decisions of model-selection for this research. Many of the studies done using cross-sectional data have failed to use consistent data. For example, the data set may contain variables from a different year or averaged using mismatched years from the other included variables. While in some cases this may not prove to bias the results, some of the potential variables may change enough from year to year that this practice can provide less clear results. Instead, data will have matching time periods and panel data techniques will be used in an effort to provide more explanatory power to the model versus cross-sectional data.

Additionally, the independent variables chosen will incorporate the ideas from each of these past studies in an attempt to have a sounder theoretical basis for the choices made in the model.

The information found in the Chapter 2 is useful to give a comprehensive view and understanding of this study. In the next chapter, the entire objectives will be tested based on the respondents with appropriate research method.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

Methodology will served as a guideline and to be carried out in this research project to answer the research questions. According to Hocking, Stacks and McDermott (2003), methods and procedures should be stated clearly so that it could be replicated and evaluated by others. This chapter will present the research design, research methods, instruments, and construct measurements used for data collection and data measurements. Moreover, sampling topics will also be discussed such as sampling design, sample size, and other sampling related aspects. This chapter will also explain on the way data will be processed and analysed.

3.1 Research Design

Research design is a “blueprint” of the project to collect the desired information in the best possible way (Malhotra, as cited in Polonsky & Waller, 2005). Therefore, it is an important backbone to conducting this research efficiently and organized. There are several research designs recommended by academics and this study will use both descriptive and casual research. In this research, the reviews on other researcher studies and findings has provided knowledge on research variables.

These secondary data gathered will then be applied and adopted while developing questionnaire for survey purpose. On the other hand, casual research is designed for cause-and-effect relationships type of research (Polonsky & Waller, 2005). Similar to descriptive research, this type of research design also worked on structured approach and is suitable for research that intend to examine on the relationship of two or more variables (Ghauri & Gronhaug, 2005). Churchill (as cited in Polonsky & Waller, 2005) suggested that the primary method for casual research is hypotheses testing. In this research, hypotheses will be developed based on the understanding of the topic that was obtained through the study of other researchers' findings.

3.2 Data Collection Methods

After deciding on the research design, the following step for this research project is to choose the appropriate methods to collect the required data. Since the research design applied to this research are descriptive and casual research that require understanding on the topic and structured approach; both primary and secondary data will be as the main source for data collection. The data collection process took place around areas in Kuala Lumpur and its conurbations as there would be a high probability of respondents due to the presence of central business hubs in the area. The use of online questionnaires served as an alternative for collecting data from the respondent as the expenditure is expected to be 35-50 percent less for an e-survey than a mail survey, while the Data collection time can be reduced by 50-70 percent with an online survey. The questionnaire will be conducted in English, which is a widely used language in Malaysia. The researcher is confident that participants are able read, understand and respond to the survey questions in English accurately.

A total 150 of survey responses were received out of the 285 emails sent via Facebook and forwarded links using Google Documents Survey Online from respondents involved in any area of the Service Industry. Despite their busy schedule, there was an estimate 59.69 percent response rate of the research survey. Non-probability sampling method was applied during the data collection process.

3.2.1 Primary Data

The primary data referred to the first hand data that will be obtained from a huge pool of respondents through the quantitative research method. As mentioned by Dillon, Madden, and Firtle (as cited in Polonsky and Waller, 2005, p. 112), quantitative research methods involved “relatively huge numbers of respondents [and are] designed to generate information that can be projected to the whole population.” Therefore, quantitative research method would be most suitable for this research that targeted to reach as much participants as possible. Among several quantitative research methods, electronic surveys will be used in this research. According to Ghauri and Gronhaug (2005, p. 124), survey is “an effective tool to get opinions, attitudes and descriptions as well as for getting cause-and-effect relationships.” Therefore, using survey as the data collection method will be suitable for this research, which aimed to examine the relationship of the independent and dependent variables.

In order to conduct the survey, an electronic questionnaire will be designed using the online survey software, namely Survey Gizmo. This particular tool enable user to create online questionnaire easily, run pilot survey, generate survey link that user could invite potential respondents to answer the questionnaire, and also helped to consolidate and tabulate responses data. User could then export the report in SPSS software or Microsoft Excel for further analysis.

For this particular research, the survey link generate through Survey Gizmo will be distributed through email with a short description of this research project and enclosed with the survey link as invitation to potential respondents. In addition, the survey link will also be shared through social networking site, such as Facebook and Windows Live Messenger. As this survey is targeted to only Malaysian working individuals; hence, this criterion will be stated clearly in the message to respondents, in order to avoid confusion and invalid responses from the wrong participants.

3.2.2 Secondary Data

On the other hand, secondary data referred to the information obtained from the research findings done by other researchers that were published in books or journal articles. According to Polonsky and Waller (2005), secondary data is somehow useful in a research project as it assists the researcher to resolve and answer the research problem, and is more efficient in terms of cost and time. The analysis and findings done by previous researchers on the similar topic will served as references for researchers understanding and ease the research process. These data are useful in developing the research framework and hypotheses.

The secondary data in this research will be collected through the study of journals and articles that are related to the research topic. These data can be obtained from printed materials such as academic reference books, professional magazines, and newspapers. Nevertheless, electronic materials are also widely available nowadays and will be selected as the main channel to obtain secondary data in this research.

The electronic materials include electronic books, academic e-journals, e-magazines, professional's reports and PhD dissertations, which can be found from various online databases.

The most frequently visited online databases will be ProQuest, EBSCOhost, ScienceDirect, and other databases that are available on the online library portal of Universiti Tunku Abdul Rahman. Data from these online databases are as sufficient as those available in faculty library. Online databases can be accessed at anytime and anywhere conveniently. Therefore, it is more time and cost efficient.

3.3 Sampling Design

The sampling process is important because as Wimmer and Dominick (2003, p. 84) described, a sample is a “subset of the population that is representative of the entire population.” Therefore, if the sample is selected correctly and the process is conducted appropriately, the sample will be able to represent the entire population.

According to Gliner and Morgan (2000), using samples in research is more cost and time efficient because researchers could avoid interviews or observations that are expensive and take lesser time to study the participants compared to using the whole population.

3.3.1 Target Population

Target population is “the entire group of people, events or things of interest that the researcher wishes to investigate” (Cavana, Delahaye, & Sekaran, 2001, p. 252). This research aimed to examine and assessment of Copyright Act to the business environment of software industry in Malaysia context.

Therefore, the targeted population of this research are all Malaysians software industry in Klang Valley which are provided the highest population group of interest in this research. Based on the data provided by Department of Statistics Malaysia, the population (as at 18 January 2014) in the Klang Valley is approximately 6,942,355 (“Key Data – Malaysia,” 2014, www.statistics.gov.my). Looking at the large pool of possible participants, this research will narrow down to target population whom are currently located in Klang Valley only. This is to reduce the time and cost involve for the research, and at the mean time, increase the credibility of data collected.

3.3.2 Sampling Frame and Sampling Location

Sampling frame, also referred as population frame, is a listing of participants who meet the criterion and are accessible by researcher through various resources such as telephone or membership directory, university registration listing, and others (Cavana et al., 2001; Gliner & Morgan, 2000). However, sampling frame may not be applicable in this research because non probability sampling method will be applied for samples selection. Target population from Klang Valley will be conveniently chosen as samples for the research.

3.3.3 Sampling Elements

Sampling element is explained as “a single member of the population” (Cavana et al., 2001). In other words, each individual from the targeted population is considered as an element. However, in this research, the sampling element is relatively wide because the population that are relevant to the study comprised of business individuals/group, from all age group, gender, education background, and industry.

The sampling element of this research could be from any demographic profile as long as they have experienced in software business environment.

3.3.4 Sampling Techniques

As mentioned, non probability sampling method will be used in this research to conduct the samples selection because of the limited time and cost. Moreover, due to the unavailability of sampling frame, the research samples will be conveniently chosen. The samples will be chosen regardless of their age, gender, education background, job title and position, and other criteria in order to avoid bias responses.

An electronic survey link will be sent through email to accessible contacts of 150 individuals. These individuals are encouraged to forward the survey link to their available contacts as well. Thus, the ultimate reach of the survey may not limit to 150 individuals only, assuming individuals of the initial phase will forward the survey link to their other friends and relatives.

On the other hand, the research samples may consist of volunteer sample as well because those who received the survey invitation link can choose to answer the questionnaire based on their willingness. Nevertheless, there were critics on how close non probability sample is to represent the population (Adams, Khan, Raeside, & White, 2007) because the participants were not selected through proper and systematic procedure. Yet, Wimmer and Dominick (2003) believed that convenient sampling could still help in collecting exploratory information and useful data.

3.3.5 Sample Size

According to Wimmer and Dominick (2003), the sample size for a research is mostly based on the type and purpose of the research, time and financial constraints, and other possible factors; therefore, there are no specific formulas or methods to determine a sample size for every research method or statistical procedures. Generally, qualitative research requires small numbers of participants because of the in-depth of information required while quantitative research requires as many participants as possible to gain more confidence in the research results (Hartas, 2010).

An estimation of sample size was done by Cresswell (as cited in Hartas, 2010) on different types of researches, where 30 participants is an acceptable sample size for correlational study that explores the relationship between variables while approximately 250 participants for survey research. Since this research involved both types of research nature, 150 participants will be determined as the adequate sample size, considering the range of 30 to 250 participants. The total number of 150 participants is also further confirmed by taking age group as the subsample (below 25, 25-34, 35-44, 45-54, 55 and above), where a sample size of 30 is applied for each age group. As Roscoe (as cited in Cavana et al., 2001) proposed, sample size can be determined by breaking them into subsamples and it is usually necessary to have a minimum of 30 samples for each category. Meanwhile, the decision on sample size for this research has also taken into consideration on the time and financial constraint.

3.4 Research Instrument

To carry out survey as the method of data collection, questionnaire has been decided as the research instrument for this quantitative research. This particular instrument will be used as the tool to collect data and responses, which will be analysed in the following chapter.

3.4.1 Purpose of Using Questionnaire

Questionnaire is one of the most commonly used instruments in survey research. This is mainly because the ability of questionnaire in collecting large amount of data at a reasonable cost and without geographical constraint (Wimmer & Dominick, 2003). Moreover, questionnaire could provide a variety of statistics for data analysis because it allows researchers to collect and examine variables such as demographic information, attitudes and behavior of the respondents (Wimmer & Dominick, 2003).

Looking at the research objectives set for this research while considering the financial and time constraint, questionnaire seems to be the most suitable tools to reach out to large number of respondents within Klang Valley, and collect necessary data to resolve the research questions. Furthermore, this research will use electronic questionnaire, which is more convenient and able to reach respondents from any parts of Klang Valley within a short time period. With the help of available Internet tools, the electronic questionnaire can reach a large pool of samples very quickly. Distributing the questionnaire in electronic format will reduce the time and overall research cost compared to having researcher to hand the printed questionnaires to respondents personally or distribute through mails, which is more time consuming and may encounter geographical boundaries. Although there may be a risk that the response rate may be low and respondents may have security concern or less computer literate, electronic survey is still practical because it is faster, easy to administrate, less expensive, and allows respondents to complete the questionnaire in their own time and at their convenience (Polonsky & Waller, 2005; Cavana et al., 2001). Therefore, electronic questionnaire will be used as the main instrument for data collection in this research. Moreover, looking at the current context of Internet usage, there should be less concern on the respondents' literacy to computer or Internet.

3.4.2 Questionnaire Design

The survey questionnaire will be constructed in five sections. Before any questions were asked, an introduction of this survey will be placed on the top part of the questionnaire. This is to explain the survey objective to the respondents and also to express courtesy and appreciation for their participation.

The main type of question used for section two to five is the Likert scale, which featured five different categories of answer that ranged from 1 to 5 in a question. For example, 1 = never and 5 = always or 1 = strongly disagree and 5 = strongly agree. Respondents will be asked to choose the range that is most applicable to their experience or opinion. Furthermore, all questions will be designed as close-ended questions for the ease of answering and lesser time consumption. According to Wimmer and Dominick (2003), close-ended questions allow respondents to answer from the list of choices uniformly where the responses can be easily quantified in later stage. At the same time, questions are also constructed in short and precise format so that respondents could easily read and understand what is being asked.

3.4.3 Pilot Test

Pilot test is important to find out whether the questionnaire is designed appropriately to the study and to discover the areas of misunderstanding for rectification (Wimmer & Dominick, 2003). To ensure the questionnaire is wellstructured and will obtain useful results effectively, a pretesting is done before the survey was actually launched. The pilot test was conducted on 10 respondents by sending them the electronic survey link. This is also to ensure that the survey link can be accessed and results can be submitted upon completion without any interference. The pretesting process was carried out 1 week before the actual launched date of the survey to allow sufficient time for necessary amendments.

Fortunately, the results of pilot test were adequate and no major problem was encountered. This may be due to the adoption of other researchers' or scholars' questionnaire, which helped to reduce the occurrence of errors during the questionnaire construction.

3.5 Construct Measurements

Measurements are often implied in empirical research as it can be considered as the assigned numerals to empirical properties, events, or objects based on certain rules (Ghauri & Gronhaug, 2005; Wimmer & Dominick, 2003). In this research, measurements were constructed and used to determine and evaluate the responses on the research variables. Measurements are important because the quality of information gathered through data collection is highly depends on the measurement procedures (Ghauri & Gronhaug, 2005).

3.5.1 Scale of Measurement (Reliability Test)

There are several scales that will be used in this research to quantify and measure the data collected from the survey research. Nominal and ordinal scales will be both applied in the first section of the questionnaire, which asked about the respondents' demographic profile. Generally, nominal scales use letters or numbers to categorise variables that are only in descriptive names while ordinal scales categorised variables according to an ordered relationship such as low to high or objects that are ranked along certain dimensions (Gliner & Morgan, 2000; Adams et al., 2007; Wimmer & Dominick, 2003). In the survey questionnaire, nominal scales will be used to categorise the data for questions on gender, education, and the industry that respondents are working in. On the other hand, ordinal scales will apply to other questions such as age, work experience of the respondents, and the working duration of respondents in current company.

Meanwhile, the questions in section two to five of the questionnaire are designed for respondents to rate their opinion on each statement, from never (1) to always (7) and strongly disagree (1) to strongly agree (7). Therefore, the scale of measurement used in these sections is interval scale.

Interval scale is similar to ordinal scales that categorised variables in ordered relationship, but with equal intervals between them (Gliner & Morgan, 2000). The analysis will be based on Hair et al. (2006) study where each item needs to score a minimal agreed reliability value for Cronbach's Alpha, which is 0.70, to be verified as reliable.

3.6 Data Processing

Data processing is necessary before the gathered data are being analysed. This is to check through and filter any invalid or incomplete data that will affect the outcome of the data analysis.

3.6.1 Questionnaire Checking

Before the questionnaire is launched and distributed to the targeted samples, it was checked to ensure the questions are appropriate, well-structured, and feasible to the respondents. According to Adams et al. (2007), the response rate and quality and reliability of responses could be affected by the administration of survey. Hence, checking of questionnaire is one of the important steps in this research.

As this is an electronic survey that has no face-to-face interaction between the respondents and researcher, all questions were developed in simple language and straight forward format so that the respondents could understand easily.

This is also to increase the response rate as to avoid respondents to abandon the survey due to difficulty in understanding the questions. Moreover, the pilot test also helped in questionnaire checking, where errors were discovered and amended.

3.6.2 Data Editing

After data is collected through the survey, they will be processed and edited, if necessary. As all the questions structured for this survey are close-ended questions, data editing may not need to be done too much in this research. This is because respondents will not provide any other information or answers in their own words, which require data editing for categorising them and applying codes for further processing. Moreover, to avoid respondents from intentionally or accidentally missed out any questions; one precaution has been set on the electronic questionnaire. All questions were formatted as mandatory in the online survey software to ensure respondents answer each of the listed questions before they can proceed to submit the questionnaire. In addition, the online survey software will also categorise the responses into complete or partially complete. Responses that are incomplete, which is also refer as partially complete; will be rejected and removed from the overall data that will be analysed later.

3.6.3 Data Coding

Section two to five of the questionnaire had adopted the five point Likert scale as measurement. Therefore, data coding will only be done on the demographic questions, which are structured in the first section of the questionnaire. Numerical coding from one to nine will be inserted into the Statistical Package Social Science (SPSS) Version 17.0 software that is used for data analysis. Data will be categorised such as 1 for male and 2 for female in the gender question and 1 to 5 for each of the age group respectively.

3.6.4 Data Transcribing

Data transcribing for this research is rather simple and fast. The online survey software that used to carry out the electronic survey will be able to compile and tabulate the collected data systematically. These tabulated data can then be exported to SPSS software for further analysis.

3.7 Data Analysis

As mentioned earlier, the software Statistical Package Social Science (SPSS) Version 17.0 will be used to analyse the data collected from the survey research. Since this is a quantitative research, the analysis will be done on a relatively large number of responses, which will be valuable information that could represent the targeted population (Malhotra et al., as cited in Polonsky & Waller, 2005). Hence, data analysis procedures must be planned cautiously.

3.7.1 Descriptive Analysis

Descriptive analysis allows researchers to gain more understanding of the data and is often the basis for more complex analyses (Polonsky & Waller, 2005). This basic analysis will be carried out on the data gathered from section one of the questionnaire, which focused on the respondents' demographic profile. These data are more of self explanatory data; therefore, the analysis outcome is to provide a summary of the respondents' profile.

3.7.2 Internal Reliability Test

Reliability is defined by Hair, Black, Babin, Anderson, and Tatham (2006, p. 137) as “an assessment of the degree of consistency between multiple measurements of a variable.” Reliability test on measurements is one of the important procedures in this research. As according to Wimmer and Dominick (2003), any scale of measurement that has not undergone reliability test is a poor research because unreliable measures are unable to detect the relationship between variables. As such, Cronbach’s Alpha reliability analysis will be used in this research to examine the reliability of the items used as measurement, specifically for the research variables. The analysis will based on Hair et al. (2006) study where each items need to score a minimal agreed reliability value for Cronbach’s Alpha, which is 0.70, to be verified as reliable.

Table 3: Rules of Thumb about Correlation Coefficient Size

Coefficient range	Strength of Association
±0.91 to ±1.00	Very strong
±0.71 to ±0.90	High
±0.41 to ±0.70	Moderate
±0.21 to ±0.40	Small but definite relationship.
±0.01 to ±0.20	Slight, almost negligible

Source: Hair, Jr., Money, A. H., Samouel, P., and Page, M. (2007). *Research Methods for Business*. West Sussex: John Wiley Sons.

3.7.3 Inferential Analysis

According to Cavana et al. (2001, p. 414), inferential analysis is often used to find out (1) the relationship between two variables; (2) differences in a variable among different sub-groups; and (3) how several independent variables might explain the variance in a dependent variable. In this research, inferential analysis will be carried out to discover the relationship between independent and dependent variables; and to conduct the hypotheses testing.

Pearson's Correlation analysis will be performed as the initial process in inferential analysis. This is to provide an overall understanding on the relationship between the independent variables and both dependent variables respectively. Data will be analysed based on two parameters, which are *Pearson r value* and the significance level. As stated by Lind, Marchal, and Wathen (2008), any correlation coefficient that is within -1.00 or +1.00 indicates a perfect correlation between the variables. Therefore, variables that are found with *Pearson r value* that is closer to -1.00 or +1.00 will be identified as significantly related. Nevertheless, the significance of relationship between variables is also determined by the significance level, which is less than .05, an indication that most researches used.

Multiple regression analysis is a statistical technique that used to analyze the relationship between one dependent variable and several independent variables, and at the same time, predicts the dependent variable by using the independent variables whose values are known (Hair et al., 2006).

In this research, multiple regression analysis will be used to examine the relationship between independent variables and both dependent variables. Furthermore, multiple regression analysis will also lead to the hypotheses test that aimed to resolve the research questions.

3.8 Chapter Summary

Research methodologies were used in collecting, analysis, and interpreting data. Computer software, such as SPSS, was used to assist in doing the analysis and interpretation. First, questionnaire survey is used to obtain more accurate information from the larger group of respondents. Other than primary data, secondary data such as case studies and journals were used to help researchers to better understand the topic being investigated. Target population, sampling frame and location, sampling elements, sampling techniques, and sample size were discussed in the earlier parts. Scales used in constructing the measurement were also explained. Other than that, data preparation processes such as checking, editing, coding, and transcribing were discussed.

In the next chapter, the data that have been analysed will be interpreted and explained to readers to help them understand the respondents' demographic profile, including the results, as well as the hypotheses as to whether they are or are not accepted.

CHAPTER 4

RESEARCH RESULTS

4.0 Introduction

This chapter presents the results of the data analysis and reveals the finding of the study. The discussion will be structured around the objectives and hypotheses as detailed in Chapter one and two. Data were analysed by using descriptive statistics and inferential analysis.

4.1 Descriptive Analysis

Descriptive statistics refers to a meaningful way to present data, especially those in a large amount. It summarized a data where a meaningful pattern will emerge for easy understanding. It is easier for researcher to interpret the data when it is presented using descriptive statistics. Generally there are two measures used to describe data, which are measures of central tendency and measures of spread. Measures of central tendency are used to determine the central position of the frequency within a group of data collected. These include mean, median and mode.

Measures of spread refer to the spread of scores when conducting the data summary. It provides information on the possible scores that differs from the mean score, some may be lower or higher, and it will be presented in range, variance, standard deviation, quartile and absolute deviation (Lund & Lund, 2013).

Some of the importance of central tendency includes obtaining a representative value (average) to describe the data in general. It also allows using the central tendency figure to make comparisons between different groups being studied.

Central tendency is also important in order to use further statistical analysis, to generate more in depth result for explaining the concept, such as to run T-test or correlation analysis (Karuna, 2012). Measures of spread will usually be used alongside measures of central tendency. Measures of spread provide information on how well the central tendency represents the population. If there is a big value for the spread, it may indicate that the central tendency is not representative of all the data collected, as there may be a large difference among individual score (Lund & Lund, 2013).

Table 4: Gender of the Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	69	46.0	46.0	46.0
Female	81	54.0	54.0	100.0
Total	150	100.0	100.0	

Source: Developed for research

In the questionnaire survey, each respondent was asked questions regarding their profile. This part provides an analysis of the demographic characteristics of the respondents based on frequency analysis. In other words, from the 150 respondents, 81 of them are female while 69 of them are male.

Table 5: Ethnicity of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chinese	119	79.3	79.3	79.3
	Malay	14	9.3	9.3	88.6
	Indian	16	10.7	10.7	99.3
	Others	1	0.7	0.7	100.0
	Total	150	100.0	100.0	

Source: Data generated by SPSS version 17.0

Table 5 shows that the highest proportion of respondents are Chinese (79.3% or 119 respondents), followed by Indian (10.7% or 16 respondents), Malay (9.3% or 14 respondents), and others (0.7% or 1 respondent). Majority of the respondents are Chinese, because most respondents in the demographics are Chinese. Taking location in consideration, most of the respondents involved resides in major business hub like Kuala Lumpur city, Petaling Jaya and Subang Jaya. Classifying by field, sample is drawn from industries, in which personal computers are widely used such as body agencies, banks, education, oil exploitation, trading, services, and manufacturing.

Table 6: Age Group of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 years old and below	1	0.7	0.7	0.7
	21 - 23 years old	91	60.7	60.7	61.4
	24 - 26 years old	41	27.3	27.3	88.7
	27 - 29 years old	14	9.3	9.3	98.0
	30 years old and above	3	2.0	2.0	100.0
	Total	150	100.0	100.0	

Source: Data generated by SPSS version 17.0

Table 6 shows age groups of the respondents. The majority of the respondents falls under the age group 21 – 23 years old (accounted for 60.7% or 91 respondents), followed by the age group of 24 – 26 years old (27.3% or 41 respondents), 27 – 29 years old (9.3% or 14 respondents), 30 years old and above (2% or 3 respondents), and 20 years old and below (0.7% or 1 respondent). Most respondents are 21 to 23 years old.

Table 7: Ethnicity of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chinese	119	79.3	79.3	79.3
	Malay	14	9.3	9.3	88.6
	Indian	16	10.7	10.7	99.3
	Others	1	0.7	0.7	100.0
	Total	150	100.0	100.0	

Source: Data generated by SPSS version 17.0

Table 7 shows that the highest proportion of respondents are Chinese (79.3% or 119 respondents), followed by Indian (10.7% or 16 respondents), Malay (9.3% or 14 respondents), and others (0.7% or 1 respondent). Majority of the respondents are Chinese, because most respondents in the selected areas are Chinese. Taking location into consideration, most of respondents is in Kuala Lumpur city, Petaling Jaya, Subang Jaya. Classifying by field, sample is drawn from industries, in which personal computers are widely used.

Table 8: Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
piracy	361	0.5886	0.2144	0.20	0.95
rGDP	346	10,932.61	12,456.46	374.98	56,624.73
IPR	361	5.2828	1.8829	1.8	8.8
broadband	349	0.1124	0.1111	0.0001	0.4119
Internet	361	0.3889	0.2643	0.0029	0.9346
HDI	352	0.7270	0.1424	0	0.937
Gini	293	0.3942	0.0982	0.247	0.630
ROL	259	0.3222	1.0211	-1.81	2.04

Table 8 presents the descriptive statistics of the variables collected. The data used in this study analysis are from the years 2006 through 2009 and includes variables for piracy rate, Internet use, broadband use, real per capita GDP (rGDP), an index of intellectual property rights (IPR), an index for human development (HDI), a measure of income inequality (Gini), and an index for rule of law (ROL). Additionally, country and time fixed effects will be included in the analysis to control for unobserved country and time effects. A discussion of quantitative variables appearing in the regression follows.

The dependent variable, piracy, is the measured rate of business software piracy for Malaysia in each year between 2006 and 2009. Additional years are available but not included here due to large numbers of missing observations among the independent variables prior to 2006. However, due to missing data in select years the number of country observations in a given year range from 67 in 2006 to 102 in 2009. The unbalanced data provide for up to 361 observations dependent on which of the independent variables are included in each regression model. These data are collected as part of an annual survey conducted by the Business Software Alliance (BSA), a trade group organization that is largely responsible for international software piracy research.

The calculation used by the BSA is the number of unlicensed software packages installed divided by the total number of software packages installed. This variable can be between zero (when no piracy is present, 0%) and one (when all software is pirated, 100%), although in the sample used in the analysis the minimum observed value is 0.2 (Klang Valley in 2007-2009) and the maximum is 0.95 (Kuala Lumpur in 2009). The mean is 0.5886 with a standard deviation of 0.2144. Following is an excerpt from the most recent report by the BSA covering 2009 data, released in May of 2010, explaining the methodology used by International Data Corporation (IDC) in gathering data for calculating the piracy rate (Business Software Alliance 2013):

The independent variables are: Internet use, broadband use, real per capita GDP, the index of intellectual property rights, the human development index, the Gini coefficient, and the rule of law index. Internet use is the number of persons within country that have access to the Internet divided by the total population.

These data are available from the International Telecommunications Unit (ITU), an organization associated with the Ministry of Multimedia Technology, from 1999 until 2009 though as mentioned only 2006-2009 data are used. This variable can take on values between zero and one, representing the ratio of persons with Internet access to the population. Similarly, broadband use data are collected from the ITU, available from 1999 until 2009 but again only 2006-2009 data are used, and can take on values between zero and one and represent the ratio of persons with broadband Internet access to total population.

The minimum values of Internet and broadband are 0.0029 and 0.0001 respectively. The maximums are 0.9346 and 0.4119 and the means are 0.3889 and 0.1124. The standard deviations of 0.2643 and 0.1111 suggest that there exist large variances in the availability and use of the Internet and broadband access. Many of the nations that have the highest rates of Internet and broadband penetration are the advanced economies in Europe, Asia and North America. Alternatively, many of the nations that continually have the lowest rates of Internet and broadband penetration are the under-developed or developing nations found in South America, Africa and Asia.

Real per capita GDP (rGDP) measures the gross domestic product per capita for each country converted to U.S. dollars using purchasing price parity and adjusted for inflation to 2000 dollars. rGDP data are taken from the World Bank for nearly all of the countries included in the BSA's survey of software piracy. Those countries present in the BSA data but do not have rGDP available from the World Bank have been excluded. The rGDP data are available from 1960 through 2009 even though data used for this analysis only spans 2006 through 2009. For the regression analysis GDP is transformed into natural logarithms. This transformation allows for analysis of the effect of percentage changes in GDP on piracy rates.

The index of intellectual property rights (IPR) is designed to quantify the level of intellectual property rights and their enforcement within each country. The index is calculated by the Property Rights Alliance. This alliance is an American advocacy group founded on the intent to protect physical and intellectual property rights domestically and internationally.

The IPR index combines three indices into a final index. The three input indices are intellectual property protection, patent protection, and copyright piracy level. The intellectual property protection index is a survey asking participants to rank intellectual property protection and anti-counterfeiting measures within their own country in terms of the laws and enforcement of those laws on a scale of one (worst) to seven (best). The Property Rights Alliance then rescales this index to be between one and ten for the computation of the IPR. Patent protection is a ranking based upon many elements of patents on a scale of one (worst) to five (best). This index is also rescaled to be between one and ten before being included in the IPR. Finally, copyright piracy level is part of the Special 301 annual review process by the International Intellectual Property Alliance and is measured as a percentage.

The IPR index ranges in values between zero and ten. Ten represents very complete and well-enforced intellectual property rights while zero represents incomplete and ill-enforced intellectual property rights. In the sample used from 2006 to 2009, the minimum value of 1.8 is calculated in 2007 and 2008 and also in 2009. The maximum value of 8.8 is calculated in 2006. The mean value of IPR is 5.2828 and suggests that the average in the sample has neither fully complete nor incomplete property rights.

The human development index (HDI), a multi-dimensional composite index, uses components to capture human development in each country and is compiled and published each year. The index consists of three dimensions of human development: health, education, and living standards. Life expectancy is used to approximate health standards. Mean years of schooling and expected years of schooling are used to approximate education standards. Gross national income per capita is used to approximate living standards. Although these measures are not perfect for measuring human development, as realistically human development encompasses more than four components, they are relatively easily accessible information that can be used to get a clearer outlook of conditions within each country.

The HDI values are between zero and one, zero being associated with very low levels of human development and one being associated with very high levels of human development. The minimum value of zero is in 2008 with the next lowest value of 0.118 also in 2009. The maximum value of the HDI is 0.937 in 2007, 2008 and 2009. The Gini coefficient is a statistical measure of income inequality originally created by Corrado Gini (Gini 1921). The Gini coefficient is compiled and published by the United Nations each year. The coefficient measures the difference in the income levels of the five-quintile shares from a perfectly equitable distribution. The equitable distribution is that which has the poorest quintile earning 20% of total income while the wealthiest quintile also has a 20% share of total income and likewise for the remaining quintiles. In this perfect case of equality there is no difference in income and the Gini coefficient would measure zero while a completely inequitable distribution would mean that the wealthiest quintile earns all of the income and would be associated with a Gini coefficient of one. All other values of the coefficient would fall between zero and one. Lower values of the coefficient means more equitable distributions of income are present. The highest coefficient of 0.630 observed in 2007. Once again, the Gini coefficients are generally grouped similarly to the Internet, broadband and HDI variables. The lowest variables are generally in advanced economies while the higher values are found in under-developed and developing nations.

Rule of law (ROL) is the final independent variable and it is an index that has been commonly used in other research studies concerning software piracy. The index is compiled and published by the World Bank each year in an ongoing series of working papers, most recently updated in 2009 by Kaufmann et al. (2009). From the latest update from this paper, the authors state that the rule of law is:

“capturing perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.”

The index can range from -2.5 to 2.5 with larger numbers indicative of better conditions. The minimum value of rule of law is -1.81 and is observed in 2008. The maximum value is 2.04 and is observed in 2007.

The rule of law index currently is only available through 2008 as the most recent report was released in 2009. As a result of this, use of the index will limit the available observations for panel regression analysis; especially considering that piracy rates are most abundantly available in 2009.

Once again, as with earlier measures of economic and human development, many of the highest values of rule of law are found in advanced economies while under-developed and developing economies typically have the lowest observed values of rule of law.

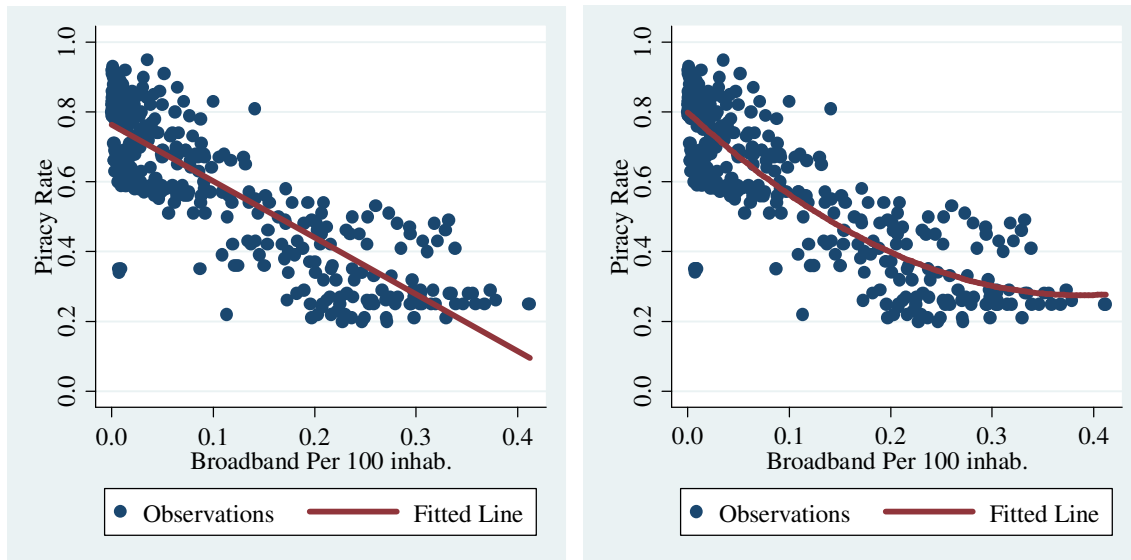
Table 9: Correlogram

	piracy	ln(rGDP)	IPR	broadband	Internet	HDI	Gini	ROL
piracy	1.00							
ln(rGDP)	-0.86	1.00						

IPR	-0.92	0.84	1.00						
broadband	-0.86	0.85	0.85	1.00					
Internet	-0.88	0.86	0.82	0.93	1.00				
HDI	-0.80	0.92	0.76	0.82	0.86	1.00			
Gini	0.43	-0.33	-0.34	-0.54	-0.54	-0.44	1.00		
ROL	-0.88	0.84	0.89	0.87	0.87	0.79	-0.46	1.00	

The correlogram shown in Table 9 provides some insight into the behavior of the variables. The majority of the variables are very highly correlated with piracy. This correlation suggests that these variables will be able to explain variation in the piracy rates. However, the variables are also highly correlated with each other which may lead to issues of imperfect multi collinearity. Some care will be taken when performing regression analysis as to consider the trade-offs between multi collinearity problems and omitted variable bias if an independent variable is dropped from the regression. The only variable not to be very highly correlated with piracy is the Gini coefficient, though it also does not suffer from high correlation with the other independent variables. Following the work by Holm (2003) and Fischer and Andrés (2005), the Gini coefficient will still be included for some models in the regression analysis that follows.

Figure 10: Scatter Plot with Fitted Line for Piracy Rate and Broadband Penetration Rate



Scatter plots with fit lines as seen in Figures 10 provide an illustration of the behavior of each independent variable (x-axis) with the dependent variable, piracy rate (y-axis). Figure 10 is a scatter plot between piracy rate and broadband use. The graphs here suggest that a negative relationship exists but the linearity of the relationship is not clear. Largely, the relationship appears to be linear in nature but as broadband penetration rates move about 20% it appears that a polynomial relationship may exist. No matter the linearity of the relationship, as the penetration rate of broadband Internet increases, the rate of piracy decreases. This scatter-plot and fitted line guides this research to explore the possibility of a non-linear specification and to make the final decision to include or exclude the non-linear term in later regressions only after an initial regression has been completed and analysed. In either case, the expected sign of broadband is negative.

Figure 11: Scatter Plot with Fitted Line for Piracy Rate and Internet Penetration Rate

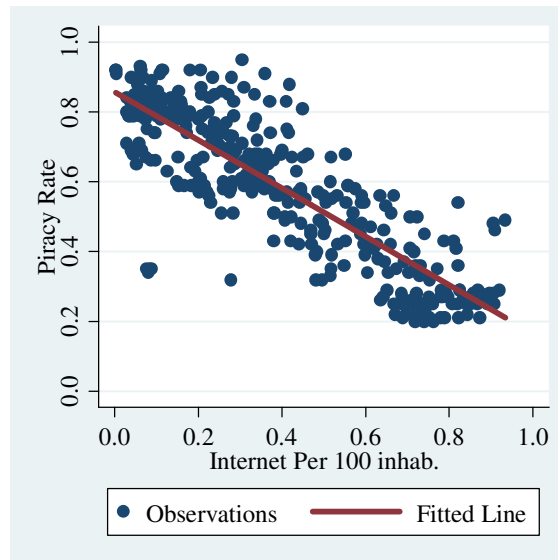


Figure 11 shows the relationship of piracy rate with Internet. As with broadband, there is a negative relationship between the two variables. However, there does not appear to be the possibility of a polynomial relationship. The scatter plot is much more clearly defined by a linear relationship.

Figure 12: Scatter Plot with Fitted Line for Piracy Rate and $\ln(\text{rGDP})$

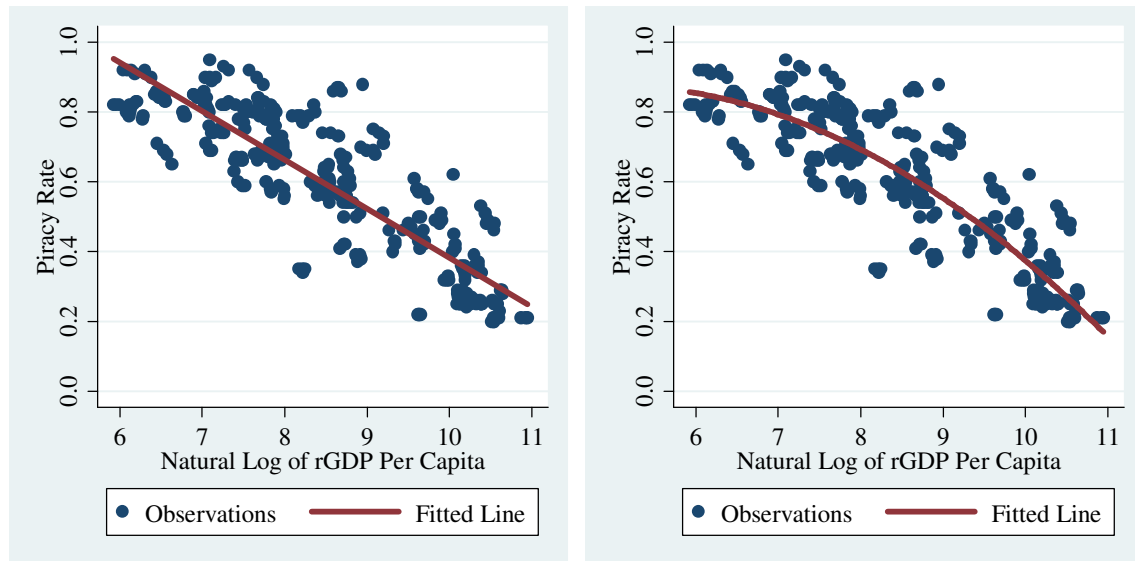


Figure 12 illustrates the relationship between piracy rate and $\ln(\text{rGDP})$. Once again, the data seem to show a negative relationship. As with broadband the linearity of the relationship is not clear. The scatter plot suggests that either a linear relationship or a polynomial relationship may be present between piracy and the natural log of GDP per capita. This relationship will be explored further when considering models as the available literature supports both possibilities.

Figure 13. Scatter Plot with Fitted Line for Piracy Rate and IPR

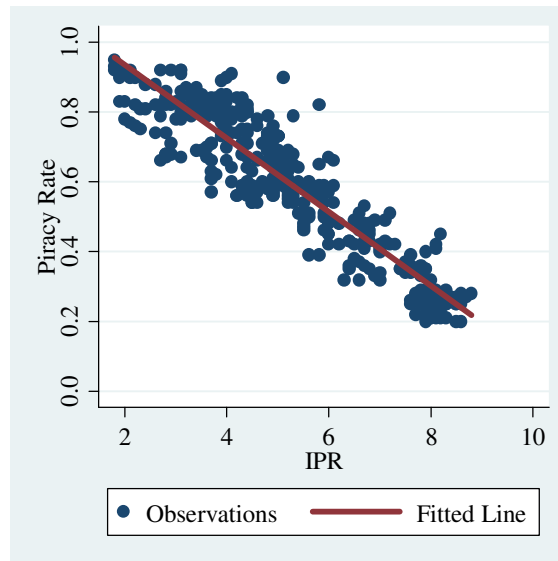


Figure 13 shows the relationship between piracy rate and the intellectual property rights index (IPR). Once again the relationship is negative. This graph indicates, as suspected, that as the index of intellectual property rights increases the rate of piracy decreases. This relationship is clearly linear in nature.

Figure 14. Scatter Plot with Fitted Line for Piracy Rate and HDI

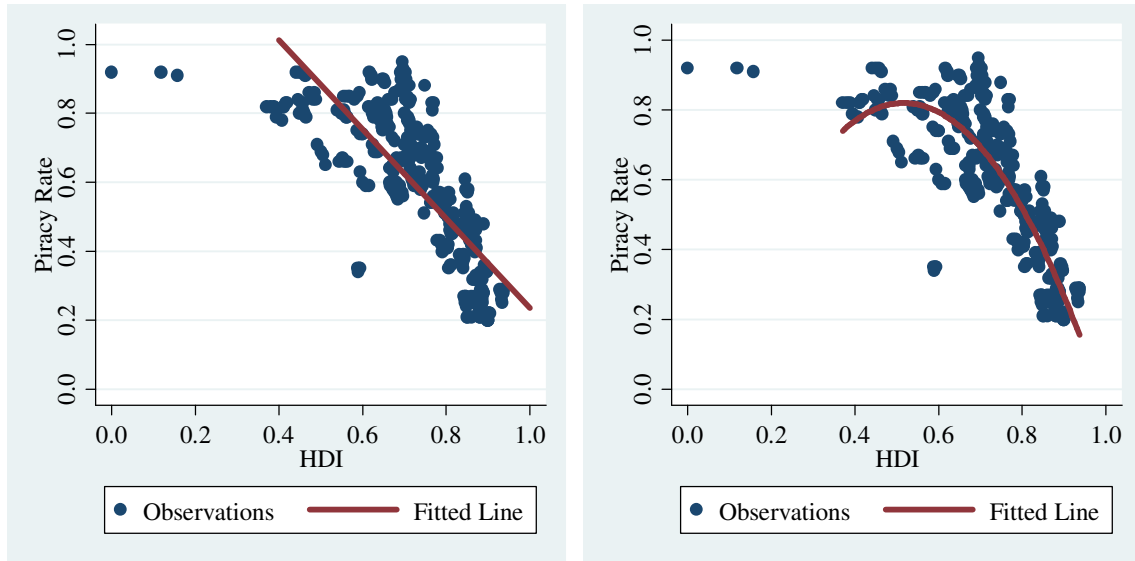


Figure 14 illustrates the relationship between piracy and the Human Development Index. As with the other variables the correlation is negative. Lower rates of piracy under 60%, seem to be linear but higher rates of piracy are not as clearly linear even after adjusting for the three outliers with very low values of HDI.

Figure 15. Scatter Plot with Fitted Line for Piracy Rate and Gini

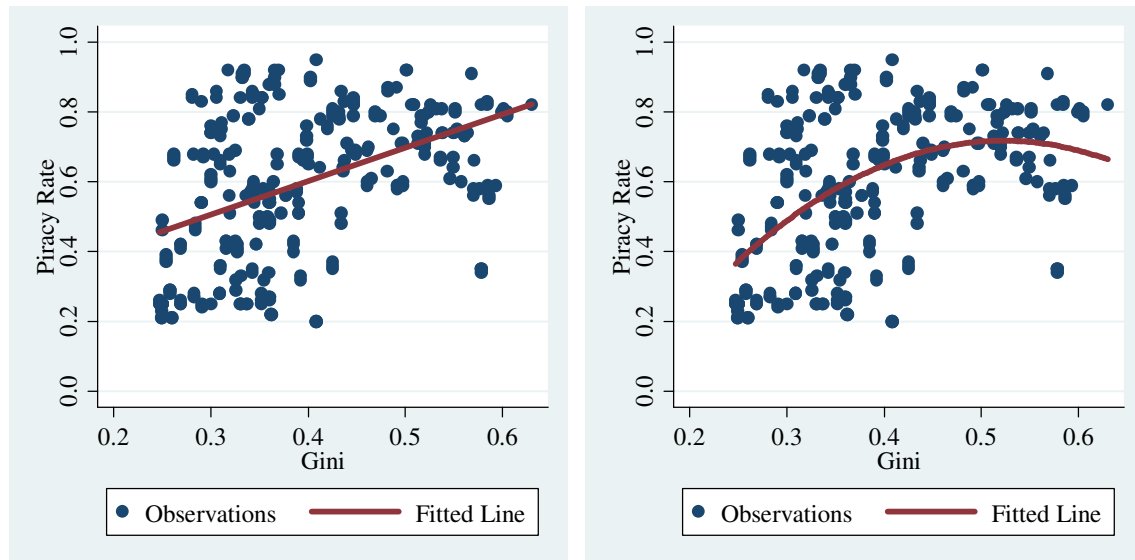


Figure 15 illustrates the relationship between the piracy rate and the Gini coefficient. The Gini coefficient graphs are unique from the other independent variables in that the relationship is positive instead of negative. This suggests that as the income inequality grows that piracy should increase. The work by Fischer and Andrés (2005) suggests that the Gini coefficient could influence piracy rates either negatively or positively. Their work found that the choice of subsamples of countries chosen by region would lead to differing results with regard to the relationship between piracy rates and the Gini coefficient. Another difference between this graph and the previous graphs is that the scatter plot is less concentrated and as such makes the determination between a linear and a polynomial relationship more difficult to isolate. This is expected though because of the lower correlation with piracy rates. Both cases will be investigated further.

Figure 16. Scatter Plot with Fitted Line for Piracy Rate and ROL

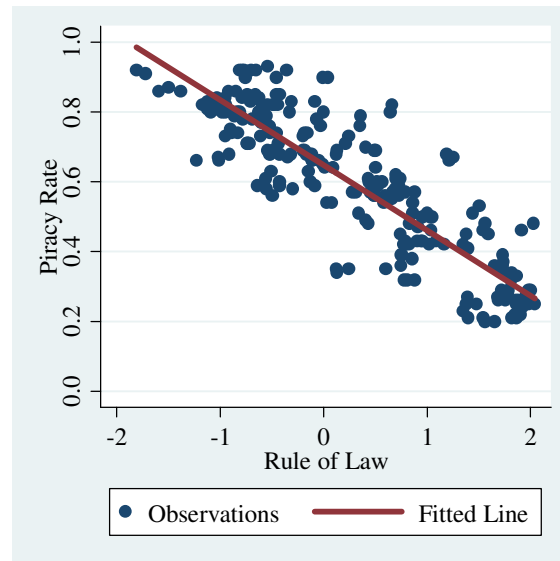


Figure 16 is a scatter plot of piracy rates and the rule of law index. The relationship between the two is negative and looks to be primarily linear in nature. The negative relationship makes sense as piracy rates are expected to decline when the legal systems are better established and more far reaching. This presents to the citizens of the country that crimes of piracy can and will be punished, a strong deterrent from participating in the activity.

4.2. Proposed Regression Analysis and Expected Results

The collected data allows the analysis to consider panel data techniques. The estimation procedure is able to control for fixed effects across countries, time (years), or both together. Theory suggests that fixed effects will provide a better model because of the varying social, political and economic characteristics that are observable and unobservable within each nation and time period. Regressions will include Internet, broadband, IPR, $\ln(\text{rGDP})$, HDI, Gini coefficient, rule of law, time fixed effects, country fixed effects, and two-way fixed effects. Following estimation of an ordinary least squares specification, additional models are estimated including a time fixed effects model, a country fixed effects model, a time and country fixed effects model, a random effects model, and models excluding selected independent variables. A random effects model is estimated to test whether the fixed effects are systematically different or just randomly different from country to country. F-tests will be conducted on the time and country coefficients to determine if they explain variation in piracy rates. Hausman test is also conducted to determine if the fixed effects model is preferred to the random effects model. The signs on the coefficients for Internet, broadband, the natural log of GDP, HDI, and rule of law should all be negative after regression analysis.

The previous correlogram and scatter plots indicate that this is the relationship that all the independent variables share with the dependent variable. Earlier research from Goel and Nelson (2009) suggest that the broadband penetration rates and Internet penetration rates are negatively correlated with the piracy rate. However, it seems possible that if the proper controls are in place that increased Internet availability and increased broadband availability would lead to increased rates of piracy due to the decreasing cost and difficulty of transferring pirated software great distances. For this reason, there may be an omitted variable that is correlated with Internet and broadband penetration rates that would be significant enough to change the signs on these coefficients. The expected sign of the Gini coefficient is the only one that should be positive.

4.3 Empirical Analysis

The empirical model is shown in Table 10. Where piracy_{it} is the rate of piracy in country i during year t, α_{it} represents the constant for country i and year t, Internet_{it} is the Internet penetration rate of country i in year t, broadband_{it} is the broadband penetration rate of country i in year t, ln (rGDP_{it}) is the natural log of real GDP for country i in year t, IPR_{it} is the intellectual property rights index for country i in year t, HDI_{it} is the human development index in country i in year t, Gini_{it} is the Gini coefficient of country i in year t, ROL_{it} is the rule of law index of country i in year t, and ε_{it} is the standard error term in regression analysis.

Table 10:
$$\text{piracy}_{it} = \alpha_{it} + \beta_1 \text{Internet}_{it} + \beta_2 \text{broadband}_{it} + \beta_3 \text{broadband}_{it}^2 + \beta_4 \ln(\text{rGDP}_{it}) + \beta_5 \ln(\text{rGDP}_{it})^2 + \beta_6 \text{IPR}_{it} + \beta_7 \text{HDI}_{it} + \beta_8 \text{HDI}_{it}^2 + \beta_9 \text{Gini}_{it} + \beta_{10} \text{Gini}_{it}^2 + \beta_{11} \text{ROL}_{it} + \varepsilon_{it}$$

Table 10. Ordinary Least Squares Regression Results

Variable	1	2	3	4
Internet	-0.2496*** (0.6780)	-0.2536*** (0.0676)	-0.2143*** (0.0497)	-0.1964*** (0.0484)
broadband	0.2745 (0.2915)	0.3953*** (0.1288)	0.3606*** (0.1020)	0.2795*** (0.1048)
broadband ²	0.2784 (0.5597)	-	-	-

ln(rGDP)	-0.1200 (0.0863)	-0.1296 (0.0866)	-0.1848** (0.0762)	-
ln(rGDP) ²	0.0052 (0.0048)	0.0057 (0.0048)	0.0089** (0.0042)	-
IPR	-0.0705*** (0.0085)	-0.0707*** (0.0084)	-0.0737*** (0.0060)	-0.0822*** (0.0053)
HDI	1.5868*** (0.5349)	1.6512*** (0.5506)	1.8000*** (0.4565)	0.1551 (0.1334)
HDI ²	-1.1550*** (0.3876)	-1.2167*** (0.3989)	-1.3085*** (0.3298)	-0.3033** (0.1347)
Gini	1.2486** (0.4981)	1.2050** (0.4897)	1.2052*** (0.4045)	1.0560*** (0.3937)
Gini ²	-1.2782** (0.5933)	-1.2217** (0.5792)	-1.2214** (0.2180)	-1.1212** (0.4555)
ROL	0.0029 (0.0149)	0.0030 (0.0148)	-	-
Constant	0.8572*** (0.2557)	0.8889*** (0.2504)	1.0723*** (0.2180)	0.8952*** (0.0880)
Observations	181	181	267	278

Adjusted R ²	0.9029	0.9033	0.9107	0.9046
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Note: Robust standard errors are in parentheses. Level of significance: * is 10%, ** is 5%, and *** is 1%.

Regression number one in Table 10 includes each of the variables in the dataset. As can be seen in the table, the results of this pooled OLS regression show that six of the 11 independent variables are significant at either the five percent or one percent level of significance. The questionable terms here are broadband and its polynomial term, $\ln(\text{rGDP})$, $\ln(\text{rGDP})^2$, and ROL. An F-test for broadband and broadband^2 produces an F-value of 5.12 and a p-value of 0.0070. This test suggests that the coefficient for one of these terms is not equal to zero though the current specification results is not statistically significant coefficients. This suggests broadband has a linear relationship with piracy rates. Using these facts in conjunction with the doubt presented regarding the linearity of broadband, broadband^2 is removed from further specifications. The next OLS regression includes all of the previous variables except for the non-linear term for broadband.. The adjusted R² increases slightly from 0.9029 to 0.9033. Despite decreasing the number of independent terms, the number of significant coefficients increases to a total of eight from the previous seven, as in regression one. Again each of these coefficients is significant at either the five percent or the one percent level. The remaining variables that continue to be insignificant are $\ln(\text{rGDP})$, $\ln(\text{rGDP})^2$, and ROL.

Given the nature of the IPR and ROL, it is possible that these two variables suffer from imperfect multicollinearity. Additionally, the availability of data for ROL is more limited than the remaining variables and has restricted the number of observations to only 181, which limits the reliability of the model due to a relatively small number of observations. Due to the limited availability, potential multicollinearity, and seemingly empirical evidence of that multi collinearity ROL will be excluded from subsequent regressions.

The third OLS model results in another improvement in terms of adjusted R^2 and statistical significance of the included variables. The adjusted R^2 has increased to 0.9107 and now each remaining coefficient is statistically significant at the five percent level. Additionally, the number of observations included in the regression has increased to 267 allowing for more information to be included in regression analysis. Though each coefficient is statistically significant, the signs for $\ln(\text{rGDP})$ and $\ln(\text{rGDP})^2$ term contradict available literature and theory. The results here suggest that as real GDP per capita increases, piracy will decrease. However, as real GDP per capita grows larger, piracy rates will decrease at a decreasing rate. These results contradict the micro theory of limited liability in the pirate software markets of Chang et al. (2008) and the empirical results found in Fischer and Andrés (2005). Instead, these studies suggest the opposite relationship exists, where increasing GDP per capita initially increases but begins to decrease as GDP per capita becomes increasingly large. These results, though statistically significant, are likely the results of multi collinearity with HDI as seen in chapter 3. The human development index uses gross national income per capita as one of the included components.

Excluding GDP per capita from regression four leads to mixed results. The number of included observations increases to 278, providing more information for regression analysis. All the coefficients are statistically significant at the five percent level except for HDI and each coefficient has the expected sign. However, a decreased adjusted R^2 does suggest a small amount of explanatory power has been lost in the model by removing GDP per capita though the adjusted R^2 of 0.9046 is higher than all regressions thus far except for regression three.

4.4 Ordinary Least Square Results Interpretation

The results of the four Ordinary Least Square (OLS) regressions provide robust results for most of the included variable coefficients. In each regression Internet is negative and statistically significant at the one percent level. Increased Internet access within a country leads to decreased piracy. In contrast to Internet, increased broadband usage leads to higher rates of piracy and is also robust across all specifications though it was not significant in the first regression, which

included a non-linear specification for broadband. The difference between the two can be reconciled by understanding the nature of the types of Internet access. The empirical results show that increased Internet access, inclusive of all types, leads to lower piracy rates. Increasing Internet access rates are likely a sign of an economy that is growing and a society that is developing. It is not hard to imagine that the connectivity provided by the Internet also leads to more open communication and new avenues of commerce in which to obtain software legally.

However, the increased bandwidth that comes with broadband Internet access greatly expands the ease of trading files and lowers the costs of transferring those large files from one computer to another, even across vast distances.

As mentioned previously in the results, the coefficients on $\ln(\text{rGDP})$ and $\ln(\text{rGDP})^2$ are contrary to theory and prior empirical results though here they are robust across all specifications and even statistically significant in one of the specifications, regression three. Due to the contrary results of GDP per capita and the likely multicollinearity with HDI, $\ln(\text{rGDP})$ nor $\ln(\text{rGDP})^2$ will not be used in the upcoming panel regression analysis.

The coefficients for IPR are robust and significant across all specifications. The sign for IPR is negative as expected. Since IPR is the variable for intellectual property rights enforcement, it is expected that increased enforcement of property rights will lead to lower rates of piracy. In each successive regression, the coefficient on IPR only becomes more significant. This is a sign that some of the variables removed are imperfectly multi collinear with IPR such as ROL and $\ln(\text{rGDP})$.

Gini and HDI in each regression are also robust across all specifications. Additionally, only HDI is not statistically significant in one regression but the HDI^2 term is still significant in that same regression (regression four). The sign of the coefficients also match expected results as piracy is expected to initially rise with HDI as computer ownership would be expected to be very low with low values of HDI thus not allowing people in that country to pirate software at all. As HDI rises, if limited liability is present then, people would be deterred from engaging in piracy as potential costs grow. Similar theories can apply for the signs on the Gini. Rising levels of

income inequality would initially increase piracy but eventually piracy rates begin to fall with very high levels of inequality. Once again, with these high levels of inequality we would expect that many persons in that country would be unable to own a computer and thus not be able to engage in piracy.

4.5 Panel Regression

The results of six panel regressions can be seen in Table 11. The results from the OLS regressions in the previous section lead to the initial specifications of panel regressions. The following variables are included in the first panel regression: Internet, broadband, IPR, HDI, HDI², Gini, and Gini². Additionally, Table 4.2 indicates the type of panel regression technique used. These panel regressions include fixed effects for time, fixed effects for countries, two-way fixed effects, and random effects.

The first panel regression (overall regression number five) includes only time fixed effects. In this regression, each coefficient is statistically significant except for HDI. The sign of each coefficient matches previous results from the OLS regressions and the adjusted R² increases from the final OLS regression of 0.9046 to 0.9048. However, an F-test of the time fixed effects variables results in a p-value of 0.2985, so the null hypothesis of at least one of the time dummy variables not being equal to zero cannot be rejected and results in the conclusion that time fixed effects are not present in the panel data.

The next panel regression includes country fixed effects instead of time fixed effects. Including the country fixed effects increases the adjusted R^2 to 0.9983. However, the statistical significance of the coefficients suffers from the inclusion of country fixed effects though conducting an F-test for the validity of country effects returns an F-value of 2,885.05 and a p-value of 0.0000. The results of the F-test indicate that country effects are valid and should be included in the model specification. Only two variables are now statistically significant, broadband and HDI^2 . Compared to the final pooled OLS regression, this is a decrease of four variables that are statistically significant. After controlling for country effects, broadband has changed signs but is still significant and the coefficients on HDI and HDI^2 have also changed signs though HDI^2 is still significant.

Regression seven includes both time and country effects. Much of the results appear similar to the country effects model in regression six. The magnitudes of the coefficients has changed and broadband is no longer statistically significant. The adjusted R^2 value does not change from 0.9983. Testing the fixed effects coefficients using an F-test again results in failure to reject that the time effects are different from zero with a p-value of 0.5123. The country effects test again allows for rejecting that the country effects coefficients are equal to zero with a p-value of 0.0000. The results of these two tests suggest that time effects are not present but that country effects are present in the data.

Table 11. Fixed Effects and Random Effects Regression Results

Variable	5	6	7	8	9	10
Internet	- 0.2075*** (0.0489)	-0.0250 (0.0205)	-0.0183 (0.0222)	-0.0092 (0.0224)	-0.0349* (0.0199)	-0.0350* (0.0197)
Broadband	0.2773*** (0.1064)	-0.1050** (0.0491)	-0.0689 (0.0593)	-0.1516** (0.0647)	0.1246*** (0.0353)	0.1244*** (0.0350)
IPR	- 0.0826*** (0.0054)	-0.0009 (0.0027)	-0.0016 (0.0029)	- 0.0122*** (0.0030)	-0.0001 (0.0021)	-
HDI	0.1480 (0.1334)	0.0491 (0.0412)	0.0585 (0.0527)	0.2086* (0.1126)	0.0721** (0.0320)	0.0722** (0.0315)
HDI ²	-0.2796** (0.1342)	- 0.7129*** (0.1562)	- 0.7081*** (0.2117)	- 0.8978*** (0.1077)	- 0.8163*** (0.1632)	- 0.8180*** (0.1572)
Gini	1.0554*** (0.3958)	-0.4338 (0.2945)	-0.3740 (0.3073)	-0.2389 (0.2637)	-	-
Gini ²	-1.1015** (0.4555)	0.4390 (0.3144)	0.3622 (0.3310)	0.2691 (0.3024)	-	-

Constant	0.8575*** (0.0918)	1.1940*** (0.0888)	1.1714*** (0.1165)	1.0647*** (0.0770)	1.1416*** (0.0640)	1.1422*** (0.0625)
Observations	278	278	278	278	340	340
Adjusted R ²	0.9048	0.9983	0.9983	0.7672	0.9974	0.9974
Robust Error	Yes	Yes	Yes	No	Yes	Yes
Time effects	Yes	No	Yes	No	No	No
P-value	0.2985		0.5123			
Country effects	No	Yes	Yes	No	Yes	Yes
P-value		0.0000	0.0000		0.0000	0.0000
Random effects	No	No	No	Yes	No	No

Note: Robust standard errors are in parentheses, except for regression 8, which lists standard non-robust errors. Level of significance: * is 10%, ** is 5%, and *** is 1%.

Regression eight uses a random effects model instead of fixed effects as seen in the previous three regressions. The result of the random effects model is similar to the country effects model only in the sign of the coefficients but the magnitudes have changed dramatically. Additionally, the random effects model has four statistically significant coefficients now, compared to only two in the country effects model. The significant coefficients are broadband, IPR, HDI and HDI². While the adjusted R² listed is only 0.7672.

A comparison to the country effects model (regression six) is needed since the results of the random effects regression (regression eight) appear to be relevant,. The test available for this comparison is the Hausman test. Conducting a Hausman test on these two regressions, the null hypothesis of the difference in coefficients not being systematic can be rejected. The p-value of this test is 0.0000. This indicates that the random effects model is not the correct specification but rather that including country effects is the proper model to use.

The introduction of country effects improves the overall explanatory power of the model but affects the results on the coefficients for Gini and for IPR. Gini is no longer significant and the sign has changed. The coefficient for Gini is likely no longer significant as income inequality is relatively constant over time within each country. As a result, Gini is controlled by the inclusion of country fixed effects. Based on this finding, regression nine will exclude Gini. Also, in the earlier pooled OLS regressions the coefficient for IPR was negative and significant. However, the fixed effects model decreases the magnitude of the coefficient on IPR and renders it statistically insignificant. Regression ten will exclude both Gini and IPR. For much the same reason that Gini is excluded, IPR can be excluded when controlling for country fixed effects, as IPR does not vary much from year to year within a single country, especially when the time period is only four years. Changing intellectual property rights protection is likely a lengthy process that would require additional years of data to observe the slow-changing effects.

By removing Gini from the fixed effects regressions, results appear to be more reliable. Even though the adjusted R^2 has dropped slightly from 0.9983 to 0.9974, each variable is now statistically significant except for IPR. The number of observations has also increased to 340, as Gini is not available for as many countries as the remaining variables are. The signs of the coefficients for each variable also match the previous results of the fixed effects regressions and, except for broadband, the results of the pooled OLS regressions. An F-test for the time fixed effects once again returns a p-value of 0.0000, reaffirming that fixed effects are appropriately present in the regression.

The final panel regression results in Table 4.2 are largely similar to regression nine. Since IPR has been removed, all variables are now statistically significant and the magnitudes and signs match that of previous fixed effects regressions and pooled OLS regressions, again with the exception of broadband. The adjusted R^2 is also unchanged from regression nine at 0.9974, further suggesting that IPR is accounted for in the fixed effects of the model and not needed as a separate control variable. Another F-test for the country fixed effects supports that country fixed effects are correctly accounted for in the model.

Table 12. Fixed Effects Regression Results (Continued)

Variable	11	12
Internet	-0.0053 (0.0219)	-
Broadband	-0.2397** (0.0972)	-0.2514** (0.1001)
broadband ²	0.4045** (0.1651)	0.4211** (0.1721)
HDI	0.0223 (0.0536)	0.0225 (0.0540)

HDI ²	-0.4376** (0.1903)	-0.4402** (0.1906)
Constant	0.9871*** (0.0740)	0.9871*** (0.0740)
Observations	340	340
Adjusted R ²	0.9975	0.9975
Robust Error	Yes	Yes
Time effects	Yes	Yes
P-value	0.0628	0.0389
Country effects	Yes	Yes
P-value	0.0000	0.0000

Note: Robust standard errors are in parentheses. Level of significance: * is 10%, ** is 5%, and *** is 1%.

The results of two additional fixed effects regressions are presented in Table 12. Potential omitted variable bias in the pooled OLS regressions presented in the previous section of this thesis may lead to incorrectly rejecting the non-linear specification of broadband. Additional panel regression analysis is conducted to confirm this. Following from the results of regression ten in Table 12, regression 11 includes Internet, broadband, broadband², HDI, HDI², and two-way fixed effects.

The results of regression 11 leads to different conclusions than the prior panel regressions. The inclusion of a non-linear broadband specification leads to Internet becoming statistically insignificant. Both broadband and broadband² are statistically significant at the five percent level. The significance of both terms is a strong indication that broadband is non-linear in its true relationship to piracy. HDI has lost statistical significance while HDI² remains significant at the five percent level. For this reason, HDI will continue to be specified as non-linear. This specification is the first to reject that the time effects are not statistically different from zero, and it does so at the ten percent level with a p-value 0.0628. An F-test on country effects gives a p-value of 0.0000 and confirms that the country effects are correctly specified. An improvement in adjusted R² values from 0.9974 to 0.9975 is seen from regression 10 to 11.

Regression 12 removes Internet from the specification as this variable was not statistically significant after including a non-linear specification for broadband with fixed effects. Removal of this insignificant variable leads to little change from regression 11. The signs and significance of all remaining independent variables remains the same with only minor changes in magnitude. An F-test for the time fixed effects results in a p-value of 0.389 while the country effects again have a p-value of 0.0000.

4.6 Regression Interpretation and Summary

The signs and magnitudes of the coefficients of the independent variables are robust across nearly all the panel regression specifications. Internet is negative in each of the panel regressions with linear specifications of broadband and statistically significant, as well, once Gini has been removed from the specification. Given the robustness of Internet access in relation to piracy rates, it appears that increasing access to the Internet within a country will lead to lower rates of software piracy. Similar results are found for linear specifications of broadband Internet access once country effects are controlled. HDI is also robust in its results across all specifications and is statistically significant in later regressions as well.

The results here suggest that increases to HDI lead to decreasing piracy and it does so at an increasing rate. This relationship is consistent with the theoretical literature as well as the empirical literature when considering that the gross national income is one of the four components of the index and is very closely related to gross domestic product, the variable most commonly used in piracy studies to measure income. When comparing the fixed effects regressions to the pooled data regressions, the results are very similar. The addition of fixed effects incorporates the variation in Gini and IPR and thus explains these variables no longer being statistically significant in the fixed effects models. The most prominent change in direction from OLS to fixed effects is broadband. Not only does broadband change signs once country effects are controlled but it remains statistically significant which suggests that omitted variable bias may be present in the pooled data regressions but that the omitted variable is incorporated in the country effects.

Based upon these empirical results, increases in Internet and broadband rates both lead to decreased rates of software piracy despite the faster and less costly exchange of unlicensed software. The change in the sign and significance of broadband may be due to omitted variable bias. Of particular interest to piracy rates but not controlled for in pooled regressions but possibly controlled for in panel regressions is the availability of software publishers to sell a digital only version of their product directly to consumers. This direct marketing of digital content may allow for the publisher to reach a market not easily accessible with a physical product or may simply allow the consumer to gain easier and quicker access to software products. The final regressions present broadband as non-linear to correct the omitted variable bias introduced in both the pooled OLS regressions and the earlier panel regressions. In the pooled OLS, many contributing variables are omitted which are controlled by including time and country fixed effects in regressions 11 and 12. In the first set of panel regressions, omitted variable bias is due to the linear specification of broadband. Once, these biases are corrected for in the final regressions, increased broadband penetration rates lead to increased rates of piracy at an increasing rate. The time fixed effects are able to control for international anti-piracy efforts which are implemented in a given year.

These efforts may include fighting piracy by use of legal systems or by introduction of a licensed version of the software into markets previously served only by pirates. The first regression is a simple regression of the *PR* variable on real GDP per capita. As shown in Table 12, the GDP variable, together with the set of fixed effects, captures 54 percent of the variation in piracy rates across countries, thus indicating good performance by the regression model. The estimated coefficient for per capita income is significant and negative. That is, higher levels of economic development are correlated with lower levels of piracy. This finding is consistent with most previous econometric analysis of piracy (e.g., Burke, 1996; Marron and Steel, 2000). As shown in column 1, as one standard deviation increase in per capita income reduces piracy by a 3.57 standard deviation. Nevertheless, the degree of economic development may be correlated with judicial and policing maturity, and it is possible to interpret it as a proxy variable for property right enforcement.

As the second regression (see column 2) reveals, it is not only the economic development that influences national piracy rates but also the current state of laws. The explanatory power is improved if the indicator of copyright software protection is included in the model. The R² increases from 54 to 56 percent. With respect to this variable of interest, as expected, the index of copyright software protection (*INDEX*) is negatively and significantly associated with piracy at conventional significance levels, supporting the hypothesis that the legal framework impacts piracy rates. That is, countries that provide stronger protection through copyright law for computer programs tend to have lower piracy levels. Comparing these figures with those in column 1, the income coefficient drops almost 36 percent from -1.769 to -1.156, even while maintaining its significance at the 99 percent level. Column 2 also shows that a one standard deviation increase in *INDEX* decreases piracy by a 0.26 standard deviation. This negative effect is also observed in recent cross-sectional studies employing membership dummy variables as proxy for IPR protection (Van Kranenburg and Hogenbirk, 2005). It is also worth noting that the strength of software protection has the lowest standardised effect.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

This chapter summarises and discusses the research results which include descriptive and inferential analysis which have been presented in the previous chapter. Furthermore, reasons or evidences will be given to support hypothesis. Implications and recommendations are also highlighted. In addition, the limitation of research study will be mentioned in. In the last section of this chapter, will be the overall conclusion of the entire research project.

5.1 Discussion

This study examines how piracy affects competition between a non-free proprietary type of software and a free and open-source type of software. Furthermore, examine more specifically how software piracy may have an impact on prices, profits as well as strategies towards the free competitor for the non-free proprietary software vendor.

In approaching these issues, a model has been developed where a proprietary software vendor faces competition from a free and open-source type of software. When the proprietary software has a relatively large constant installed user base (“enthusiasts”) and differences between the two software types are not too large in the presence of network externalities, a pricing scheme driving the free software type out of competition is usually not optimal. Rather, profits will be higher by taking advantage of the users with strong preferences for the proprietary software and

consequently set fairly high prices. When this is the case, the proprietary software developer can enjoy high profits, and users are free to choose the software of their liking.

The present study has three major policy implications. Firstly, the findings imply that improving economic development may play an important role in lowering rates of piracy. Secondly, it appears that, whereas some piracy is inevitable during the early stage of development, the rate of piracy may be minimised at a later stage through the incentives provided by the development itself. Thirdly, the results indicate that policies aimed at guaranteeing legal provision of the tools necessary to protect software would certainly contribute to curbing the software piracy problem.

In all, this exercise should be seen as a first attempt at a more comprehensive understanding of copyright systems across countries. In addition, the study helps to identify the data limitations that need to be addressed in future work. Specifically, future research should use a larger panel dataset that includes more countries and time periods so as to derive more solid conclusions on the impact of software protection on piracy levels. In addition, future studies that attempt to estimate the impact of software protection on piracy rates must carefully consider other forms of IPR (such as trade secrets and patents). Another natural extension would be to carefully consider the weights attached to each component in the index constructed because these assumptions may impact the results. Even though addressing this question in detail is beyond the scope of this study, it is suggested that statistical techniques like principal component analysis might help researchers obtain appropriate weights. Therefore, future studies should make it a priority to examine the link between legal protection and piracy in multiple copyright industries.

5.2 Recommendation

As empirical estimations show, Malaysia is currently far to the left of the “maximum piracy” points both on income and Internet hosts concentration axis. The location of these maximum points is based on the non-linear dependence results reported above. Therefore, the growth of economy and increasing Internet availability will create significant downward pressure on the

piracy costs. Computerization of the country will also make a contribution to the increase in the losses from piracy.

As piracy enters competition, the proprietary software vendor can react either by increasing prices and extract revenues from those still willing to purchase software and let the rest copy software for free *or* by reducing prices as a measure of fighting piracy. If the latter strategy is optimal, the free/open-source type of software may lose a fairly large user share to both piracy and purchasers of the proprietary software type. Furthermore, the optimal strategy for the proprietary software vendor may be a pricing scheme where the free and open-source software type is deliberately prevented from getting sufficient network externalities in order to be competitive, whereas this is not necessarily the optimal pricing scheme had piracy not existed. Even though piracy may lead to market dominance whenever network externalities are strong, profits, at least in a static environment, are still likely to decline in the presence of piracy.

In contrast to the broad-based enforcement, targeted enforcement effectiveness does not depend much on the costs of acquiring the pirated software. Targeted enforcement by its nature is able to prohibit usage of pirated software by users with high valuation even when the obtaining of pirated software is costless. These kinds of anti-piracy actions will not significantly reduce the software consumption, since almost all institutional users can afford to buy the legal software. Moreover, targeted enforcement could be efficient in the meaning of maintaining the pre-enforcement level of total surplus. Of course, computerization will require increasing effort to police the appearing new institutional users, but those additional efforts will be significantly lower than in case of broad-based enforcement. Thus, Malaysia policy-makers should consider the targeted enforcement as a most appropriate tool to fight the software piracy.

Taking into account all the factors mentioned above, software copyright holders should not expect the quick improvement of software copyright protection environment in Malaysia. Therefore, they should consider the option of competing with software pirates, since the theory shows that in case of severe piracy this may lead to the higher profits, than maintaining the monopolistic price.

5.3 Limitation of Study

The most critical limitation to the model is perhaps the lack of dynamics, which may have implications for the results. Piracy may lead to consumer lock-in as well as providing an instrument of quality revelation. In turn, piracy may increase sales as locked-in consumers of pirated software may end up as legitimate users. Also, due to word-of-mouth effects, pirates may help reveal quality to non-users, who in turn may end up purchasing the software.

The empirical analysis provided in this paper supports the main prediction from the theoretical model: that usage of open-source software is negatively affected by the prevalence of piracy. Irrespective of how piracy affects prices and firm profits, one thing seems certain: piracy hurts free software, and open-source software in particular. Open-source software may represent a threat to segments of the proprietary software industry, but similarly represent a great opportunity for firms and consumers to increase productivity and may even be important for economic growth. Advocates for open-source software thus have good reasons to fight piracy. (Multimedia Malaysia Internet Case Study, 2002).

5.4 Conclusion and Implication for Further Research

Further studies may consider increasing the sample size as currently for this research project only in major cities of Klang Valley was only focused and outside Klang Valley were left out. Therefore, the findings of this study were unable to be generalising to all business environment of Malaysia at all.

Further research should focus primarily on the potential problems with this research such as differences in developed and developing countries. This research is unable to separate the observations into those countries that are developed and those that are developing. The

differences between the two types of countries are likely significant and may affect the outcomes of the regressions. In order to control for this, use of a slope-shifting specification can be employed by creating a dummy variable for developed nations and interacting that variable with the remaining independent variables. This allows for a change in intercept by incorporating fixed effects but also a change in how the independent variables relate to piracy in each of the two country types.

REFERENCES

- Anderson, B. J. 1997. Malaysia: General Legal and Business Conditions: Current Administrative and Judicial Structure, IP Laws of East Asia, Sweet & Maxwell Asia.
- Andrea B Engelman et al. December 1999. Experts say Internet will lead to more Asian copyright piracy. *The Journal of Proprietary Rights*. Vol.11 No. 12
- Andrés, A.R. (2006). The relationship between copyright software protection and piracy: evidence from Europe. *European Journal of Law and Economics*, 21, 29-51.
- Bradley, C., 1992, *The Role of GATT in Intellectual Property*, Copyright Bulletin, UNESCO, Vol. XXV: 11-15
- Baker, Matthew J., and Brendan M. Cunningham, "Court Decisions and Equity Markets: Estimating the Value of Copyright Protection", *Journal of Law and Economics*, forthcoming 2006.
- Baker, Matthew J., and Brendan M. Cunningham, "Law and Innovation in Copyright Industries", U.S. Naval Academy, November 2005.
- Baltagi, B. (2001). *Econometric Analysis of Panel Data*, 2nd edition, Chichester: John Wiley & Sons.
- Bard, Robert L., and Lewis Kurlantzick, *Copyright Duration: Term Extension, the European Union and the Making of Copyright Policy*, San Francisco: Austin & Winfield, 1999.
- Becker, G.S. (1968). Crime and punishment: An economic approach. *Journal of Political Economy*, 76, 169-217.

- Becker, G.S., & Stigler, G.J. (1974). Law enforcement, malfeasance, and the compensation of enforcers. *Journal of Legal Studies*, 3, 1-19.
- Besen, S.M., & Kirby, S.N. (1989). Private copying, appropriability, and optimal copying royalties. *Journal of Law and Economics*, 32(2), 255-280.
- Besen, S.M. & Raskind, L.J. (1991). "An Introduction to the Law and Economics of Intellectual Property." *Journal of Economic Perspectives*. 5, 3-27.
- Bezman, T.L., & Depken II, C.A. (2005). *The impact of software piracy on economic development*. Conference paper, Academy of Economics and Finance. Retrieved February 19, 2011, from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.101.3489&rep=rep1&type=pdf>
- Bezman, T.L., & Depken II, C.A. (2006). Influences on software piracy: Evidence from the various United States. *Economics Letters*, 95, 356-361.
- Boldrin, Michele, and David K. Levine, "The Case Against Intellectual Property", *American Economic Review, Papers and Proceedings*, Vol. 92 No. 2, May 2002, 209-212.
- Bowyer, K. 1996. *Ethics & Computing*, Section 8.7. Los Alamitos, California: IEEE Computer Society Press.
- Burke, A.E. (1996). "How Effective are International Copyright Conventions in the Music Industry?" *Journal of Cultural Economics*. 20, 51-66.
- Business Software Alliance, *Third Annual BSA and IDC Global Software Piracy Study*, May 2006, <http://www.bsa.org/globalstudy/upload/2005%20Piracy%20Study%20-%20Official%20Version.pdf> [Accessed, July 27, 2006].

- Business Software Alliance (2010). *Seventh annual BSA/IDC global software: 09 piracy study*. Retrieved September 8, 2010 from <http://www.bsa.org/country/Research%20and%20Statistics.aspx>.
- Chang, M.C., Lin, C.F., & Wu, D. (2008). Piracy and limited liability. *Journal of Economics*, 95, 25-53.
- Chen, Yehning, and Ivan Png. 1999. "Software Pricing and Copyright: Enforcement Against End-Users". [working paper on-line], National University of Singapore, available from <http://comp.nus.edu.sg/~ipng/>, accessed 25 September 2001.
- Conner, K.R. & Rumelt, R.P. (1991). "Software Piracy: An Analysis of Protection Strategies." *Management Science*. 37, 125-139.
- Cremer, H., & Pestieau, P. (2009). Piracy prevention and the pricing of information goods. *Information Economics and Policy*, 21, 34-42.
- Daniel P. Harris, 1995, *Who Really Owns Your' Software Programs?*, Journal of Systems Software, Vol. 29: 191-193
- Davidson, D. & MacKinnon, J.G. (1993). *Estimation and Inference in Econometrics*, Oxford University Press.
- De Vany, A.S., & Walls, W.D. (2007). Estimating the effects of movie piracy on box-office revenue. *Review of Industrial Organization*, 30(4), 291-301.
- Depken, C.A. & Simmons, L.C. (2004). "Social Construct and the Propensity for Software Piracy." *Applied Economics Letters*. 11, 97-100.
- Ehrlich, I. (1973). "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *Journal of Political Economy*. 81, 521-567.

- Elliat, Y. & Zinnes, C. (2000). "The Evolution of the Shadow Economy in Transition Countries: Consequences for Economic Growth and Donor Assistance." CAER Discussion Paper No. 83, Harvard Institute for International Development.
- Evenson, R. (1990). "Survey of Empirical Studies." In W.E. Siebeck (ed.) *Strengthening Protection of Intellectual Property in Developing Countries: A Survey of the Literature*, World Bank Discussion Paper 112, World Bank, Washington, DC.
- Frame, J.D. (1987). "National Commitment to Intellectual Property Protection." *Journal of Law and Technology*. 2, 209-227.
- Fischer, J.A.V., Andrés, A.R. (2005). *Is software piracy a middle class crime? Investigating the inequality-piracy channel*. (USG Discussion Paper 2005-18). Retrieved February 19, 2011, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=803244.
- Gallegos, F. (1999). "Software Piracy: Some Facts, Figures, and Issues." *Information Systems Security*. 8, 34-56.
- Ginarte, J.C. & Park, W. (1997). "Determinants of Patent Rights: A Cross-national Study." *Research Policy*. 26, 283-301, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=803244.
- Gini, C. (1921). Measurement of Inequality of Incomes. *The Economic Journal*, 31(121), 124-126.
- Goel, R.K., & Nelson, M.A. (2009). Determinants of software piracy: economics, institutions and technology. *The Journal of Technology Transfer*, 34(6), 637-658.
- Gopal, R.D. & Sanders, G.L. (1998). "International Software Piracy: Analysis of Key Issues and impacts." *Information Systems Research*. 9, 380-397.

- Gopal, R.D. & Sanders, G.L. (2000). "You Can't Get Blood Out of a Turnip." *Communications of the ACM*. 43, 83-89.
- Gould, D.M. & Grubben, W. (1996). "The Role of Intellectual Property Rights in Economic Growth." *Journal of Development Economics*. 48, 323-350.
- Grossman, G.M. & Krueger, A.B (1995). "Economic Growth and Environment." *Quarterly Journal of Economics*. 110, 353-377.
- Hausman, J. (1978). "Specification Tests in Econometrics." *Econometrica*. 46, 1251-1277.
- Holm, Hakan J. 2000. "The Computer Generation's Willingness to Pay for Originals when Pirates are Present – A CV study;" [working paper on-line], Department of Economics, Lund University; available from http://swopec.hhs.se/lunewp/papers/lunewp2000_009.pdf; Internet; accessed 20 September 2001.
- Holm, H.J. (2003). "Can Economic Theory Explain Piracy Behavior?" *Topics in Economic Analysis & Policy*. 3, article 5.
- Holt, H.D., 1992, *Entrepreneurship: New Venture Creation*, Englewood Cliffs, New Jersey, Prentice Hall
- Hsiao, C. (2003). *Analysis of Panel Data*, 2nd edition, Econometric Society Monographs, Cambridge University Press.
- Hotchkiss, C., 1994, *International Law for Business*, New York, McGraw-Hill, Inc., 1994
- Hui Kai-Lung, and Ivan Png, "Measuring Piracy of IP-Protected Goods: A Methodology", World Intellectual Property Organization: Working Group of Experts on Developing a Methodology for Measuring Copyright Piracy, November 1-4, 2005, http://www.econaa.com/resources/methodology_piracy_rate_sector.pdf [Accessed, July 27, 2006].
- Husted, W.H. (2000). "The Impact of National Culture on Software Piracy." *Journal of Business Ethics*. 26, 197-211.

- IPRC (2003). Eighth Annual BSA Global Software Piracy Study. Trends in Software Piracy 1994-2012.
- Johnson, W.R. (1985). "The Economics of Copying." *Journal of Political Economy*. 93, 158-174.
- Kanwar, S. & Evenson, R. (2003). "Does Intellectual Property Protection Spur Technological Change?" *Oxford Economic Papers*. 55, 235-264.
- Khan, B. Zorina, "Does Copyright Piracy Pay? The Effects of U.S. International Copyright Laws on the Market for Books, 1790-1920", Working Paper 10271, National Bureau of Economic Research, Cambridge, January 2004.
- Landes, W.M. & Posner, R.A. (1989). "An Economic Analysis of Copyright Law." *Journal of Legal Studies*. 38, 325-363.
- Lanzi, Diego (2009), "Competition and Open Source with Perfect Software Compatibility", *Information Economics and Policy*, Vol. 21, No. 3, pp. 192-200.
- Lesser, W. (2001). "The Effect of TRIPS Mandated Intellectual Property Rights on Economic Activities in Developing Countries," World Intellectual Property (WIPO) Studies, 1-24, Geneva, Switzerland.
- Liebowitz, S.J. (1985). "Copying and Indirect Appropriability: Photocopying of Journals." *Journal of Political Economy*. 93, 945-957.
- Lomio, J. P., 1990, *Intellectual Property Law and the Protection of Computer Programs*, Database, June: 31-35
- Marron, D.B. & Steel, D.G. (2000). "Which Countries Protect Intellectual Property?. The Case of Software Piracy." *Economic Inquiry*. 38, 159-174.

- Maskus, K.E. & Penubarti, M. (1995). "How Trade-Related are Intellectual Property Rights?" *Journal of International Economics*. 39, 227-248.
- Maskus, K.E. (1998). "The International Regulation of Intellectual Property." *Weltwirtschaftliches Archiv*. 134, 186-208.
- Maskus, K.E. (2000a). "Intellectual Property Rights and Foreign Direct Investment." University of Adelaide, Centre for International Economics, Discussion Paper 0022. Adelaide.
- Maskus, K.E. (2000b). "The Global Effects of Intellectual Property Rights: Measuring What Cannot Be Seen." In *Intellectual Property Rights in the Global Economy*. Washington, DC: Institute for International Economics.
- Mazeh, Yoav, and Mark Rogers, "The Extent and Significance of Copyright Cases: An Analysis of Large UK Firms", Oxford Intellectual Property Research Centre, December 2005.
- Moorehouse, J.C. (2001). "Property Rights, Technology, and Internet Distribution." *Journal of Technology Transfer*. 26, 351-361.
- Nelson, R.R. & Phelps, E.S. (1996). "Investment in Humans, Technological Diffusion, and Economic Growth." *American Economic Review*. 56, 59-75.
- Nicholas Taylor, *Open Source Dual Licensing as a Business Model: How a Flexible IP Strategy Helped Create the World's Most Popular Open Source Database Company*, 37 AIPLA Q.J. 321 (2009)
- Ostergard, R.L. (2000). "The Measurement of Intellectual Property Rights Protection." *Journal of International Business Studies*. 31, 349-360.

- Papadopoulos, T. (2003). "Determinants of International Sound Recording Piracy." *Economics Bulletin*. 10, 1-9.
- Park, W. (2001). "Intellectual Property and Economic Freedom." In J. Gwartney and R. Lawson (eds.), *Economic Freedom of the World*, Vancouver: Fraser Institute.
- Park, W. & Ginarte, J.C. (1997). "Intellectual Property Rights and Economic Growth." *Contemporary Economic Policy*. 15, 51-61.
- Peitz, Martin, and Patrick Waelbroeck, "The Effect Of Internet Piracy On Music Sales: Cross-Section Evidence", *Review of Economic Research on Copyright Issues*, Vol. 1 No. 2, December 2004, 71-79.
- Plant, Arnold, "The Economic Aspects of Copyright", *Economica*, Vol. 1 No. 2, May 1934, 167-195.
- Png, I.P.L., and Qiu-hong Wang, "Copyright Duration and the Supply of Creative Work", Department of Information Systems, National University of Singapore, April 2006.
- Png, Ivan P. L. (2010), "On the Reliability of Software Piracy Statistics", *Electronic Commerce Research and Applications*, Vol. 9, No. 5, pp. 365-373.
- Primo Braga, C. (1996). "Trade Related Intellectual Property Issues: The Uruguay Round Agreement and Its Economic Implications." In W. Martin and A. Winters (eds.), *The Uruguay Round and the Developing Countries*, Cambridge University Press.
- Poddar, S. (2005). *Why software piracy rates differ – a theoretical analysis* (NUS Working Paper 0515). Retrieved February 19, 2011, from <http://nt2.fas.nus.edu.sg/ecs/pub/wp/wp0515.pdf>.

- Rapp, R.T. & Rozek, R.P. (1990). "Benefits and Costs of Intellectual Property Protection in Developing Countries." *Journal of World Trade*. 24, 75-102.
- Richardson, R.S. & Gaisford, J.D. (1996). "North-South Disputes over the Protection of Intellectual Property." *Canadian Journal of Economics*. 29, S376-S381.
- Ronkainen, I.A. & Guerrero-Cusumano, J.L. (2001). "Correlates of Intellectual Property Violation." *Multinational Business Review*. Spring, 59-65.
- Rushing, W. F. , Brown, C.G., 1990, *Intellectual Property Rights in Science, Technology, and Economic Performance*, Boulder, San Francisco & London, West view Press
- Samuelson, P. (1999). "Implications of the Agreement on Trade Related Aspects of Intellectual Property Rights for Cultural Dimensions of National Copyright Laws." *Journal of Cultural Economics*. 23, 95-107.
- Scalise, (1997). "Natural Intellectual Property Protection Reform." Ph.D dissertation, University of Chicago, Graduate School of Business.
- Schaffer, R., Earle. B., Agusti, F., 1990, *International Business Law and Its Environment*, St. Paul, West Publishing Company
- Schankerman, M. (1998). "How Valuable is Patent Protection? Estimation by Technology Field." *Rand Journal of Economics*.32, 77-100.
- Schneider, F. (2005). "Shadow Economies Around the World: What Do We Really Know?." Forthcoming in the *European Journal of Political Economy*.
- Shadlen, K., Schrank, A. & Kurtz, M. (2005). "The Political Economy of Intellectual Property Protection: The Case of Software." Forthcoming in *International Studies Quarterly*.

- Shavell, S. & Van Ypersele. T. (2001). "Rewards versus Intellectual Property Rights." *Journal of Law and Economics*. 44, 525-547.
- Sherwood, R.M. , 1990, *Intellectual Property and Economic Development*, West view Press
- Shipley, H.H., 1987, *Software Licensing - The Effect of Law and Regulation*, Int. J. Technology Management, Vol. 3: 63-69
- Shy, O. & Thisse, J.F. (1999). "A Strategic Approach to Software Protection." *Journal of Economics and Management Strategy*. 8, 163-190.
- Takeyama, L.N. (1994). "The Welfare Implications of Unauthorized Reproduction of Intellectual Property Rights in Presence of Network Externalities." *Journal of Industrial Economics*. 62, 155-166.
- Traphagan, M., Griffith, A. (1998). "Software Piracy and Global Competitiveness: Report on Global Software Piracy." *International Review of Law Computer*. 12, 431-451.
- Tysver, D.A. (2000). *Bitlaw: A Resource on Technology Law*. Minneapolis: Beck & Tysver, P.L.L.C.
- UNCTAD (2004). *UNCTAD Handbook of Statistics*. United Nations. Geneva.
- USTR (2001). *National Trade Estimate Report on Foreign Trade Barriers*. Washington, D.C.
- Van Kranenburg, H.L. & Hogenbirk, A.E. (2005). "Multimedia, Entertainment, and business Software Copyright Piracy: A Cross-national Study." Forthcoming in the *Journal of Media Economics*.
- Varian Hal R. 1992. *Microeconomic analysis*. W.W. Norton & Company, Inc.

Varian, H.R. (1988). "Markets for Information Goods." Mimeo. University of California, Berkeley.

Varian, H.R. (2000). "Buying, Sharing and Renting Information Goods." *Journal of Industrial Economics*. 48, 473-488.

Verbeek, Marno. 2000. *A Guide to Modern Econometrics*. Chichester, England: John Wiley and Sons, Ltd.

Watt, R. (2001). "Prices in Cultural Markets: A Theoretical Introduction for Beginners," <http://www.serci.org/documents/pricing.pdf>.

White, H. (1980). "A Heteroscedasticity Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity." *Econometrica*. 48, 817-838.

World Bank (2003). *World Development Indicators*. Washington, DC: World Bank.

Yang, D., & Sonmez, M. (2007). Economic and cultural impact on intellectual property violations: A study of software piracy. *The Journal of World Trade*, 41(4), 731-750.

Yin, R. K. (2003). *Case study research: Design and methods*, (3rd Ed), Sage Publication, Thousand Oaks, California.

Yin, R. K. (1994). *Case study research: Design and methods* (2nd Ed), Sage Publications, London, United Kingdom.

Articles and other supplementary materials with explicit author

Brett Smith, *A Quick Guide to GPLv3*, FSF, at <http://www.gnu.org/licenses/quick-guide-gplv3.html> (accessed 4 August 2013)

Brett Smith, *FSF Settles Suit Against Cisco* (20 May 2009), at <http://www.fsf.org/news/2009-05-cisco-settlement.html>

Elena Blanco, *Dual-licensing as a business model*, OSS Watch (2006) at <http://www.oss-watch.ac.uk/resources/duallicence2.xml> (accessed 4 August 2013)

Eric Boehm, *Open source licensing suits settle in short order*, The Lawyers Weekly (30 May 2008), at <http://www.lawyersweekly.ca/index.php?section=article&articleid=691>

Eric Raymond, *The Cathedral and the Bazaar* (1997), at <http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/index.html> (accessed 10 August 2013)

Linus Torvalds, *GPL only modules*, linux-kernel mailing list (2006) at <https://lkml.org/lkml/2006/12/17/79> (accessed 3 September 2013)

Linus Torvalds, *linux/kernel/COPYING*, The Linux Kernel Archives, at <http://www.kernel.org/pub/linux/kernel/COPYING> (accessed 23 August 2013)

Matthew Langham, *The business of open source*, OSS Watch (2009), at <http://www.oss-watch.ac.uk/resources/businessofopensource.xml> (accessed 4 August 2013)

Richard Stallman, *The GNU Project*, at <http://www.gnu.org/gnu/thegnuproject.html> (accessed 4 August 2013)

Rowan Wilson, *GPL v3 - What's New?*, OSS Watch (2007), at http://www.oss-watch.ac.uk/resources/gpl3final.xml#body.1_div.6 (accessed 4 August 2013)

Sean Kerner, *Microsoft's Linux Patent Scare Trumps SCO*, InternetNews.com (4 March 2010), at <http://www.internetnews.com/skerner/2010/03/microsofts-linux-patent-scare.ht ml>

Thomas Hoeren, *The first-ever ruling on the legal validity of the GPL - A Critique of the case*, at http://www.oii.ox.ac.uk/resources/feedback/OIIFB_GPL3_20040903.pdf 71
(accessed 3 August 2013)

APPENDIX A: SURVEY QUESTIONNAIRE

Research Topic: An Assessment of Copyright Act to the Business Environment of Software Industry in Malaysia

Dear Sir/Madam

I am Vincent Ng Kim Sheng, an MBA student of Universiti Tunku Abdul Rahman (UTAR). I am doing a research study about "**AN ASSESSMENT OF COPYRIGHT ACT TO THE BUSINESS ENVIRONMENT OF SOFTWARE INDUSTRY IN MALAYSIA**". This research study aimed at fulfilment of the requirements for the degree of Master of Business Administration. The results of this research will be kept by UTAR as for students' reference.

Therefore, I would like you to spend little bit of your time to answer the following questions. Please tick, circle or number the correct answer. I am sure that your answers will be kept confidential. Your help will be very helpful to contribute to the development of software industry in Malaysia.

Thank for your cooperation.

Regards,

Vincent Ng Kim Sheng

Postgraduate Student, Universiti Tunku Abdul Rahman

I. GENERAL INFORMATION

Name of the company :

Address : Telephone :

Year of foundation :

1.1 Scope of activities (please tick all that apply)

- Assembling PC
- Selling PC and accessories
- Developing software as per order
- Developing prepackaged software
- Training

1.2 Ownership of the company

- State-owned
- Private
- Joint-venture
- 100% foreign-owned

- 1.3 a. Number of people involved software development
- b. Number of employees

II. ATTITUDES TOWARD THE COPYRIGHT ACT AND ITS ENFORCEMENT

2.1 Do Malaysia have any regulations or law on copyrights?

Yes No

2.2 Are computer software protected by copyrights in?

Yes No

2.3 Please state your opinion about the benefit or cost of copyright protection of computer software

2.3.1. *toward the development of the software industry in Malaysia.*

Strongly inhibit

Strongly facilitate

1 2 3 4 5 6 7

2.3.2. *toward foreign investment in the area of software development in Malaysia.*

Strongly inhibit

Strongly promote

1 2 3 4 5 6 7

2.3.3. *toward R&D activities in the area of software development*

Strongly inhibit

Strongly promote

1 2 3 4 5 6 7

2.3.4. *returns from R&D activities in Malaysia*

Strongly be detrimental

Strongly ensure

1 2 3 4 5 6 7

2.3.5. *the competitive edge of local software producers against foreign ones*

Strongly decrease

Strongly increase

1 2 3 4 5 6 7

2.3.6. *toward the exportation of locally made software*

Strongly disagree

Strongly agree

1 2 3 4 5 6 7

2.3.7. *toward the price of software in the long term in Malaysia*

Strongly decrease Strongly increase

1 2 3 4 5 6 7

2.3.8. *toward royalty fees to be paid to foreign owners of software*

Strongly decrease Strongly increase

1 2 3 4 5 6 7

2.3.9 *toward the development of people's computer skill*

Strongly inhibit Strongly facilitate

1 2 3 4 5 6 7

2.3.10 *leads to the conflict between software producers and software distributor because software producers are who will gain more beneficial*

Strongly disagree Strongly agree

1 2 3 4 5 6 7

2.3.11 *toward the harm which might incur to us since we would grasp any software without careful selection*

Strongly decrease Strongly increase

1 2 3 4 5 6 7

2.3.12 *the integration of Malaysia toward world community*

Strongly inhibit Strongly accelerate

2.4 Which is the best description of the current enforcement of the Copyright Act in Malaysia?

- very effective
- effective
- ineffective
- has not implemented yet

2.5 Please rank the following activities according to how important they are to make the Copyright Law effectiveness (1 = most important, 2 = second most important, 3= third most important.)

- Educate people’s awareness of buying copyrighted software
- Enact the Copyright Decree to implemented the law
- Enforce strictly the Copyright Ordinance
- Joint International Convention on Copyright
- Establish association of software developers to participate to the enforcement

2.6 Do you wait for an effective enforcement of the Copyright Act?

Yes No

III. INFORMATION ON SOFTWARE DEVELOPMENT

3.1 What are your products?

No.	Name	Function	Year of publication	Number of issues	Price	Lock
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

3.2 Which regimes has your company applied to protect your in-house software form piracy ?

- Use contractual terms
- Use object code
- Lock
- Copyright

3.3 How do you rate methods of protection ?

	Very bad			Very good	
	1	2	3	4	5
Contractual terms					
Use object code					
Lock					
Copyright					

3.4 What are your target customer ?

- Body agencies
- State-owned companies
- Education
- Private companies
- Foreign-owned companies /Joint-venture
- Individuals
- Export

3.5 In your opinion, what are those accept to purchase licensed software?

- Body agencies
- State-owned companies
- Education
- Private companies
- Foreign-owned companies /Joint-venture
- Individuals

3.6 Please state if you agree or disagree with the following statement :

3.6.1 To cope with software piracy means to deal with illegal distributors rather than users of pirated software

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.2 By the Copyright Law, we can effectively protect our products

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.3. We will continue to apply technical protect for our products, because of the current ineffective enforcement of the Copyright Law

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.4. Although locking has no long-term effect, it helps to protect products in a certain period of time needed to sold out packages'

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.5. Together with other software producers, we will establish an association of software producers to enhance the capabilities to detect violators

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.5.6. Because of the low income of Malaysian people, prices of our products must be more cheaper than price of the equivalent imported products, so that the customers buy our products

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.7. We provide the older version of our products of free of charge basis to potential customers to make them our existing customers, then they can upgrade to new versions at lower price

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

3.6.8 We rely on international market, where the Copyright Act is effective. For the Malaysia market, we have to wait for the time when the enforcement of the Copyright Act become effectively

Strongly disagree

Strongly agree

1 2 3 4 5 6 7

3.7 How many cases did you claim for compensation of violation in 2012?

3.8 How many cases did you get the compensation of violation in 2012?

Thank for your cooperation

Observation

I What is extent of software piracy?

- Distribute only licensed software
- Hard disk loading
- Hard disk loading + copying services
- Hard disk loading + copying services + reproduction

II. Number of pirated software in the shelf Price :/dvd/cd

III. Do they do sell illegal copy DVD/CD ?Price :/dvd/cd

IV. INFORMATION ON DEMOGRAPHY

4.1. What is your gender?

Male Female

4.2 What is your age?

Less than 20
20-30
30-40
40-50
Over 50

4.3 What is your monthly income (in RM)?

Less than 2000
2001-2500
Above 2501

Thank for your help