Entertainment Pirates: Understanding Piracy Determinants in the Movie, Music and Software Industries

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Abstract
Our research aims at understanding piracy determinants, as well as debating policy issues to fight this phenomenon.
In particular, we search for determinants with a threefold model, supported by theoretical and empirical literature: legal aspects, socio-economic factors and cultural traits.
We show the joint impact of the three facets considered (legal aspects, socio-economic factors and cultural traits) through an in-depth quantitative analysis.
Our results highlight a multi-causality approach to the phenomenon: the three facets show a relevant impact on piracy levels.
Consistent with existing literature, intellectual property rights (IPR) receive a higher level of protection in richer and more advanced nations. Protection of IPR leads to a lower piracy impact on sales. Moreover, the piracy phenomenon is strictly connected to the peculiar cultural traits shown by every country. Societies characterized by flat hierarchies and collectivistic behaviours show higher piracy levels. Illegal copies are less numerous in case of high education levels, strong institutions and severe law enforcement procedures.

Keywords
Piracy, Entertainment, Cultural Industries.

1. Introduction

The “core copyright industries,” business organizations whose primary output is material protected by copyright (software, music, movies, publications, etc.) represent one of the pillars of post-industrial economies. In 2001 in the US alone these industries generated 535 billion dollars, 5.2% of the GDP, with an annual growth rate of 5.8%, far above the average for the economy (3%) (IIPA 2002). Moreover, prospects are for these businesses to play a key role in the future economy, as the intangibility of the aesthetic value of the leisure industry intensifies.

Development in these sectors is becoming more and more entangled in the problem of piracy. We define piracy as, “The unauthorized copying of copyright materials for commercial purposes and the unauthorized commercial dealing in copied materials” (WIPO 2002, World Intellectual Property Organization). Various types of violations of copyright law are encompassed in this definition, from “domestic” piracy by individuals on a “micro” scale, to counterfeiting operations run of criminal organizations, to more recent phenomena such as peer to peer piracy. All involve illegal actions with the common denominator of being detrimental to the interests (economic and non) of copyright holders.

From an economic standpoint, piracy is considered one of the critical threats for the entertainment industry. Estimates for 2002 indicate 4.6 billion dollar losses for the music industry (IFPI 2003) and over 3 billion dollars for the U.S. movies sector (MPA 2003).

There is a great deal of variation in different parts of the world. In terms of software, the weight of the illegal market fluctuates from minimum levels in North America (24%) to peaks in the Pacific zone (55%) and Latin America, running from 49% in the Middle East and Africa to 35% in Western Europe. Within these macro-areas, too, situations in individual countries are quite varied. In Eastern Europe, the piracy rate varies from 45% in Hungary to 90% in Russia; in Latin America from 45% in Puerto Rico to 77% in Nicaragua; in Western Europe from 25% in England to 50% in Spain (BSA 2003). The situation is very similar in the music and movie sectors (Data are fully reported in the section devoted to sample description).

Faced with a phenomenon of such vast proportions, and the varying degree of significance it takes on, experts and researches have attempted to investigate the determinants or causes of piracy. In most studies, the problem is addressed from the viewpoint of a criminal act, on par with many other illegal actions. Causes and responsibility are attributed directly to psychological processes and personality traits of the individual (Husted, 2000). Generally excluded are environmental factors, such as the judicial system, culture, and socio-economic aspects. We believe, instead, that these factors may be better suited to explain the phenomenon from the standpoint of cross-country comparison.

This work focuses on these aspects, starting off from the hypothesis that the problem, complex and multi-faceted as it is, can be explained only by resorting to several fields of analysis taken together. Specifically, three have been identified: legal (referring both to the legislative framework and enforcement of these laws), cultural and socio-economic. The sectors of the creative industry taken into consideration are software, music, and movies. The objective is to understand what factors can explain the differing intensity of the problem in single national contexts, with a “macro” cross-country approach.

2. The Literature on Piracy

Economists agree that innovation plays a key role in promoting the economic and cultural growth of a nation. Moreover, the potential for innovation can not be disassociated from the protection of intellectual work (Gould and Gruben, 1996). Nonetheless, only recently this issue has been taken into serious consideration, prompted by the proliferation of episodes involving violation of intellectual property rights. The existing literature on illegal behaviors can be divided into two streams of analysis: on one hand studies which underscore the ethical side of the problem, and on the other those which take into account intercultural and macroeconomic aspects.

Regarding the former, two theories can be considered forerunners in the stream of studies on ethical behaviors: the Theory of Reasoned Action (TRA), formulated in 1975 by Fishbein and Ajzen, and the Differential Association Theory developed by Sutherland and Cressey (1970). Both analyze the relationship between psychological structures, individual values, and behavior. The TRA is based on the assumption that in the relationship between social forces and individual action, a series of psychological responses come into play. This is the takeoff point for the hypothesis that the act of counterfeiting is preceded in a conceptual sense by an intent to copy something illegally. Precisely on this intention it is crucial to intervene. Sutherland and Cressey, instead, place the role of peer pressure center stage in determining ethical or unethical behavior. The action of individuals is strongly influenced by the perceptions and opinions of the group to which they belong. (For example, teenagers illegally utilize file-sharing applications more often to prove themselves deviant “techies” in the eyes of their group than for any real or specific need.)

The second stream of research, fitting more closely into the framework of this study, dedicates more attention to the “macro” dimension of the phenomenon. The level of investigation shifts from individual behavior to the country system. This being the case, the analysis focuses on the relationship between characteristics of the national community and the dissemination of behaviors running counter to the laws protecting intellectual property. The focus of analysis alternates, in turn, within single areas of action of the community: legal, cultural, and socio-economic.

2.1. Legal Interpretation

With reference to legal variables, experts and researchers measure the level of protection accorded to intellectual property by each nation. Park and Ginarte (1997) have constructed a quantitative index to measure the force of *Intellectual Property Rights* (IPRs) in 60 countries. The index focuses on the protection of patents, and examines five fundamental aspects: *coverage*, *membership in international patent agreements*, *provisions for loss of protection*, *enforcement mechanisms*, *duration*. The two authors come to the conclusion that strong protection of intellectual property embodies the potential for solid economic growth.

More specifically, a wide array of IPRs contributes to promoting investment activities, among this research and development which spurs long-term economic growth. The index shows a positive correlation with average income per capita of the citizens of a country, their level of education, the percentage of GDP invested in R&D, and the freedom of economic initiative. These results are confirmed in a study by Marron and Steel (2000), who compare Park and Ginarte’s index with average software piracy statistics from 1994 to 1997. In doing so, empirical evidence emerged proving the link between the protection of intellectual property, R&D

investments, and counterfeiting levels. In particular, the greater the number of protection operations, the more research investments, and the lower the level of counterfeiting.

Along with the analysis of legal aspects, actual implementation of regulations must necessarily be considered. Ronkainem and Guerriero-Cusumano (2001) start from the hypothesis that the incidence of IPR violations decreases as law enforcement increases. The two authors provide empirical support for this idea by utilizing the *Corruption Perceptions Index* as a concise measuring instrument. This index is compiled every year by *Transparency International* to assess the extent to which laws are obeyed in any given country.

A more in-depth investigation is carried out by Harbaugh and Khemka (2001), who study the link between copyright enforcement, piracy, social welfare and pricing policies. They come to the conclusion that where there are broad-based copyright enforcement strategies,[1] product prices tend to be in line with monopoly levels, with a reduction in piracy rates. On the contrary, where enforcement is concentrated on specific segments of pirates, there is both an increase in price and in the rate of illegal copying. Broadening the base of enforcement targets to "light value buyers", prices tend once again to reach monopoly levels, but at the same time there is a drop in piracy along with potential growth both in profits for producers and in surplus for consumers.

2.2. Cultural Interpretation

A second factor in the equation at the basis of the piracy problem is cultural. In many studies, attention has been focused on the connection between behavioural practices and social norms which distinguish groups. The basic theory is that traits of a culture make it possible to predict practices of the organizations themselves and behaviors most commonly adopted (Bodega 2002).

The foundation for this interpretation lies the pioneering work of the anthropologist Hofstede. This scholar's aim was to understand how personal values and individual ambitions take shape within diverse cultural contexts. Based on answers from a series of questionnaires, Hofstede (1991) postulates the existence of five variables which can explain the structure adopted by a society in economic and social fields: power distance, individualism, masculinity, uncertainty avoidance and Confucian dynamism. Results indicate that nations which are highly developed from an economic standpoint have a very keen focus on individualistic opportunism, while developing and undeveloped countries leverage more heavily on collective values. In addition, less advanced cultures accept higher levels of power distance, showing tolerance for pronounced hierarchical differentiation.

Taking up on Hofstede's work, Husted (2000) investigates the relationship between software piracy and national culture, seeking to understand how violating intellectual property rights correlates to values shared within the society. Results provide full support for the existence of a strong link between software piracy and the individualism/collectivism aspect. Collectivistic countries place great emphasis on social harmony and the well being of the group, insisting that knowledge be shared. On the contrary, communities dedicated to individualism show a preference for the individual aspect. As regards other explanatory cultural aspects, Husted (2000) underscores the lack of correlation between piracy, power distance, uncertainty avoidance, and masculinity, opening the way for the notion that the relationship between culture and ethical practices is very complex, and is influenced by the external environment, as Wines and Napier assert (1992).

2.3. Socio-economic Interpretation

The third field of study regards socio-economic factors and concentrates on the socio-demographic characteristics of the population on one hand, and the structure of entertainment markets on the other. In Rapp and Rozek's work (1990) the fact that emerges most prominently is that IPRs enjoy much better protection in countries with a high per capita income. Developed nations favor severe measures against illegal copying, which translate into piracy rates which are generally lower than underdeveloped areas.

As far as the socio-demographic aspect, Marron and Steel (2000) reveal that high educational levels guarantee growth in demand for IPRs. Some studies also highlight differences between men and women in their view of illegal copying. From research conducted in the US by Sims, Cheng and Teegen (1996) the profile emerged of "info-tech pirates" who are characterized by their masculinity, and that men are more commonly involved in illegal duplication of support systems.

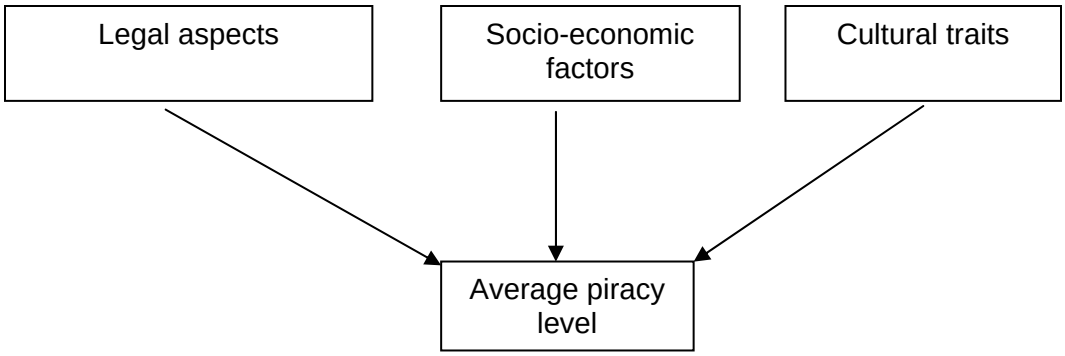
As regards the structure of entertainment markets, numerous factors are relevant: diversification of products/services on offer, transparency of markets, pricing policies, etc. Many studies emphasize this last factor, which is considered central to the process of buying counterfeit products. Slive and Bernhardt (1998) maintain that piracy represents, within certain limits, a form of diversification of products/services offered on the market on the basis of price. A certain segment of consumers, who are not willing spend money to buy an original, take advantage of no-cost products. (This is the story most often heard when talking to young people who use peer-to-peer applications; they claim they're defending their buying power from CDs they consider too expensive.) According to the two authors, this situation has its foundations above all in the field of software, where significant network externalities co-exist along side user groups with varying willingness to pay.

For companies that produce software programs, it proves difficult to implement effective price differentiation strategies in order to optimise profits on each segment. This observation is the basis for the hypothesis that piracy is utilized as a price lever, to diversify the business approach toward various pools of buyers. Only recently have pay-to-download options emerged, easy to access for wide user segments, which allow for legal forms of peer-to-peer. It may be, however, that these methods are not yet sufficiently publicized, and that how to use them it not yet clear, at least for older and wealthier consumers, as well as those who are less familiar with Internet and the use of technological devices.

3. Variables in the Model of Analysis

Our study takes into consideration a wide set of variable which, as mentioned previously, are grouped together in three macro-categories: legal, cultural, and socio-economic (Fig. 1). Single variables utilized in regression analyses and methods used to construct them will be discussed in the following sections.

Figure 1:
Categories of Analysis



3.1. Legal Variables

Index of Membership in International Agreements

Protecting intellectual property presents itself as an international problem for two reasons. First of all, entertainment markets can be defined as global markets. Secondly, the piracy phenomenon, in particular in organized form, systematically crosses national borders, supported by the growing potential for interconnectivity offered by new technologies. Therefore, what seems clear is the inadequacy of regulatory frameworks which center exclusively on national contexts, and the consequent need for agreements and collaboration between several nations simultaneously. Based on this need, conventions have been drawn up with the aim of defining guidelines for action which are widely shared.

To measure the degree of protection provided for IPRs, an index has been created that takes into account the number of agreements that each nation undersigns, and the year of ratification. Nineteen of the twenty-three accords administered by the World Intellectual Property Organization (WIPO) were analyzed. To compile the index, each convention was assigned two points: a point for membership and a weighted point based on when the agreement was ratified. The index as such proves particularly useful because it represents a concise parameter that can rate how each country perceives the need to safeguard intellectual property. Moreover, this index evaluates when each country signed the agreement in question, which allows us to understand if the protection of intellectual property is traditionally considered important in that country or whether this realization is more recent.

The basic hypothesis is that when the index of membership in international conventions records a high number, the level of protection of IPRs is high and piracy rates low.

Law Enforcement

The index described above comes up against an obvious limitation in the sense that conventions are pacts which every nation is free to decide to join. These agreements must then be taken in and applied in a concrete fashion within each country's borders. Often wide gaps arise between what is prescribed in international regulations and what actually happens in each country. It is necessary, therefore, to quantify the degree of law enforcement. In this work we utilize the *Corruption Perceptions Index* (CPI) compiled by Transparency International on a

yearly basis. The supposition is that high CPI values are related to low piracy levels. One can rightly assume that the better able a country is to enforce regulations, the greater the chance that they will be respected.

Strength of Economic Institutions

The strength of economic institutions refers primarily to the level of development of instruments for safeguarding contracts and defending property. The analysis starts off with the hypothesis that the differences in intellectual property rights reflect a greater inequality in terms of social and economic institutions (Marron and Steel, 2000). Some studies offer empirical support for this idea, demonstrating a positive correlation between institutions and economic performance. Knack and Keefer (1995) and Hall and Jones (1996) ascertain that nations with a solid apparatus for the protection of property and contracts can lay claim to growth and productivity levels far superior to countries with weaker structures.

To determine the strength of institutions, data from the Political Risk Services were utilized. This organization drafts reports on the level of socio-economic risk present in each nation. The publication of reference is the *International Country Risk Guide* (ICRG) which provides detailed assessments for a wide range of international investors on the monthly basis. Among the indictors published there are some which regard security of property and contracts. Knack and Keefer (1995) identify five (*Tradition of Law and Order; Government's Propensity to Repudiate Contracts; Quality of the Bureaucracy; Extent of Corruption; Risk of Expropriation*). Consistent with the work by these two authors, in this paper too the same five factors have been taken into account, summed up in a single datum.

3.2. Cultural Variables

Individualism/Collectivism

One of the aspects that most sharply differentiates communities is the relationship between the individual and society. This has to do with one's predisposition toward the social good (collectivism) compared to the tendency to think of one's own personal interest (individualism). In so-called individualistic cultures, each person *takes part in* the society, while in collectivistic cultures, the individual *is* the society (Bodega, 2002). How human beings live with one another has a direct influence on lifestyles, rules shared at community level, and behaviors adopted by individuals. To assess the degree of openness of the people of each country to a group or individual philosophy, Hofstede (1991) proposes an operationalization useful for research purposes. This indicator has been referred to in several other studies, in recognition of the fact that it derives from business studies and can be extended to the evaluation of a country system. Triandis and Bhawuk (1997) emphasize how in countries committed to collectivism, there is little tolerance for behavior that deviates from codes of conduct shared by the group. In addition, the assessment parameter for moral or immoral behavior is constituted by the good of the group, whether it be the family, the work team, or a group of friends. The fundamental value is equality, contrary to individualistic societies where focus lies on fairness or meritocracy.

With fairness theories as the takeoff point, Glass and Wood (1996) study the exchange of illegal copies of software in the United States. The result is that piracy is actually considered a normal transaction which rests on an implicit appraisal of benefits and sacrifices. In an individualistic society, naturally the focal point of this mindset is the individual. The external environment is of little importance. In collectivistic cultures, emphasis is placed on sharing group values. Each

actor tends to reflect on and evaluate actions and choices on the basis of collective benefits or sacrifices.

The hypothesis that derives from this discussion is that illegal products will be more likely to circulate in an environment where a group culture prevails, as a series of studies carried out in Eastern regions of the globe seem to confirm (Ang et al., 2001). This would lead us to an understanding of the school of thought which exists in certain youth-centric circles with progressive ideologies by which getting hold of free music or movies is a sign of freedom in the face of the advance of capitalism.

Power Distance

Hofstede defines power distance as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (Hofstede, 1991, p. 28).

Power imbalance is a common element in all human organizations. In countries where the power distance index is high, hierarchical relations can take the form of paternalism, a mechanism in social relationships by which the superior individual protects, defends and safeguards subordinates in exchange for their loyalty. Hofstede highlights how this type of interaction already exists in primary social institutions such as the family. In countries more prone to accept inequality, parents tend to teach their children to be submissive to authority. In other places there is greater propensity to treat children as equals.

The expectation is that where there are high levels of power distance, there is a greater probability of tolerance toward unethical behavior by superiors. By the same token, one can surmise that in societies where distribution of power is more balanced, there is less tendency to accept morally dubious practices. Cohen, Pant, and Sharp (1996) actually come to the conclusion that subordinates, in a society very strongly orientated toward high levels of power distance, see certain business practices as acceptable which in other national contexts would be considered extralegal.

Orientation toward Human Relationships

The orientation toward human relationships gauges the intensity with which individuals tend to take on altruistic, generous behavior. In this paper, the “Human Orientation” variable is utilized. This parameter, developed by researchers from the *Globe Project*, is defined as, “The degree to which individuals in organizations or societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others” (House et al., 2002). Hofstede and Bond (1988) propose a somewhat different variable, “Kind Heartedness”, while Kluckhohn (1962) develops the aspect of “Human Nature Is Good vs. Human Nature Is Bad”. Reference is also made to Putnam’s analysis (1993) which empirically demonstrates that the success of a democratic government depends on the extent to which citizens approach the ideal of a civic community. Among the variables taken into account by the author, alongside “Civic Engagement”, “Political Equality” and “Associations” comes “Solidarity, Trust and Tolerance”. “Virtuous citizens are helpful, respectful and trustful toward one another, even when they differ on matters of substance” (Putnam, 1993). Orientation toward trust in interpersonal relationships and sharing of resources in the name of solidarity is thought to be the predominant characteristic of civic communities.

Nonetheless, it proves difficult to speculate on what sort of relationship exists between orientation toward human relationships and piracy. One would expect that in societies characterized by marked orientation toward such relationships, a community spirit prevails, for the sake of which people accept extralegal behavior that favors the dissemination of knowledge throughout the population.

Masculinity/Femininity

It is generally accepted in the literature that social communities can be positioned on a continuum with masculine and feminine traits at the two extremes. In masculine communities, there is a pronounced differentiation of roles and duties, according to the idea that it's up to men to handle all situations based on strength and power. In more feminine communities, greater attention is placed on quality of life. Hofstede analyzes these aspects utilizing a masculinity/femininity indicator, arriving at the conclusion that typical of the feminine side is a distinct orientation toward social needs and collaboration, while the focus of a masculine community lies on the individual dimension (Hofstede, 1991). Cohen, Pant, and Sharp (1996), taking off from Hofstede's analysis, point out that the connection between gender differentiation and illegal behavior is quite tenuous. Conversely, Vitell, Nwachukwu and Barnes (1993) theorize that the predominance of masculinity can be associated with a rise in the tolerance threshold and a consequent expansion of the set of extralegal actions accepted by the society.

Referring specifically to the piracy problem, Sims, Cheng and Teegen (1996) conducted a study throughout the United States. They discovered that the profile of a software pirate is characterized by masculine traits, and that men are more often involved in illegal duplication of support systems. Though the research was carried out at an individual level, and clearly the behavior of individuals can not predict a generalized cultural tendency, this data does provide valid support for the theory that piracy positively correlates to masculinity.

3.3 Socio-economic Variables

Average Wealth per Capita and Inequality in the Distribution of Income

The Gross Domestic Product, an extremely concise indicator of average available wealth, measures the capacity of a country to generate wealth and well-being. Widely used in macro-economic studies, the GDP is also referred to in studies centered on piracy and counterfeiting issues (Ronkainem and Guerrero-Cusumano, 2001; Marron and Steel, 2000; Husted, 2000). All studies give credence to the theory that as the GDP increases, attention to IPRs intensifies at the same rate, corresponding with a limited number of violations of intellectual property rights.

In actual fact, piracy is a very peculiar economic problem. Theoretically, the wealthier segment of the population, having strong buying power, has little incentive to buy pirated copies. On the other hand, those people living in poor economic conditions very often do not have access to the equipment necessary to use illegal products. This last consideration is especially true in the case of software piracy. The hardware needed to use it, in underdeveloped countries, is only available to a small circle of people – the elite who have high income and the required technological literacy - to the exclusion of poorer classes.[2]

Traphagan and Griffith (1998) observe that in developing countries, software is only used by an elite group of individuals, not by all citizens. As a result, for a given level of economic development, one would expect that software piracy is prevalent in nations with a larger middle class. In fact, evidence suggests that the phenomenon of illegal copies is particularly common

at universities, a privilege of the middle class. However, an additional hypothesis is also valid: as economic development augments along with the number of people who use software, the State takes more defensive action and there are fewer cases of illegal copying.

Moreover, Sims and others (1996) find that family income is closely correlated to the possibility or impossibility to afford original products, evidence that again leans in the direction of higher levels of piracy in countries with widespread poverty. In the case of music and movie piracy, access to equipment plays a minor role as less expensive technology, with a higher degree of market penetration, is involved.

Orientation Toward Services: the Production Structure

In this paper, the Orientation toward Services index is utilized, which measures the extent to which the economy of a country revolves around industry and the tertiary sector. High index values indicate highly developed countries, where the majority of the population works in industrial and service sectors. Richer economies have production structures built around industry and the tertiary sector, while in less developed countries agriculture is central to the economy. The differences are enormous, especially in view of the number of people who work in the three areas. In the more developed countries in our sampling, an extremely small percentage of the population (3-5%) is able to satisfy the demands of the agricultural sector, while in less advanced economies, this number is more than half of the working population.

This said, it proves complicated to theorize on how the production structure impacts the piracy phenomenon. On one hand, the expectation would be that the problem of illegal copying comes to the fore in national contexts where industry and the service sector dominate. Particularly in terms of software, one would think that its illegal use primarily occurs in work environments where the use of a computer is essential. On the other hand, it seems clear that economies with a structure centered on tertiary sector are also those in which intellectual work plays an important role. At this point the incentive to shore up defence of IPRs comes into play, and consequently it is less likely that the counterfeiting phenomenon will take hold.

Education

Park and Ginarte (1997) point out that as the average level of education of a country's population rises, requests for protection of intellectual property augment at the same rate. High levels of education correlate with a broader range of IPRs and a stronger thrust toward the protection of creative activities (Marron and Steel, 2000). To measure the level of education of a population, the average number of years of schooling for people over 25 was used (Barro and Lee, 1996).

Availability of Technology

A rather ambiguous connection exists between piracy and technological evolution. Technology, on one hand, offers the possibility for new protection mechanisms for creative work, in particular in terms of restricted access and anti-piracy systems. On the other hand, technology is the main vehicle for more advanced forms of counterfeiting and illegal duplication. Technology, moreover, is a prerequisite for the exploitation of a product. In all sectors analysed (music, movies, and software) the product is saved on a support system (digital or magnetic tape) which requires specific equipment in order to be used (computer, cassette or CD player, VCR, DVD player, mobile phone). It is particularly interesting to note the availability of technology in each country so as to understand what correlation exists with the level of piracy there.

Therefore, a synthetic indicator has been compiled that is able to measure the technological evolution of each country, taking into consideration six different areas: personal computers, internet connection, mobile telephony, fixed telephony, radio, television.

Breakdown of the Population by Age Group

Many studies conducted by organizations and associations, both national and international, aim to draw a socio-demographic profile of the people who buy or make pirated materials. What emerges is that young people are most often involved in this type of action, as demonstrated by research carried out by the Federation Against Music Piracy, in collaboration with ACNielsen (in Italy) and Ipsos for BSA (May 2002). Young people are in the front line, above all in newer forms of piracy such as file sharing.

The basic reasons for this situation are three. First of all, young people have limited buying power, which leads to higher tolerance toward extralegal practices that allow them to spend less money. Secondly, at least in more advanced economies, young people represent that segment of the population where know-how regarding information technology is more widespread. The high degree of technological literacy guarantees the set of knowledge necessary to make illegal copies of original products, or to utilize more innovative on-line communication systems, such as peer-to-peer instruments. Thirdly, among young people, rules of the group are very strongly felt, by which members who can get around the rules of the system are rewarded by relatively prestigious status.

3.4 Dependent Variables

In the analytical models that follow, dependent variables are represented by average piracy rates from1999 to 2002 in the three sectors studied: software, music, and movies. The use of an averaged dependent variable is common practice in similar studies (Ronkainem and Guerrero-Cusumano, 2001; Marron and Steel, 2000; Husted, 2000) as this means that the influence of single variations occurring in recent years can be avoided. In terms of the time period, data prior to 1999 was purposely excluded to ensure the reliability of resulting statistics, given the rapid evolution of the phenomenon in question and related technological conditions.

The data source for software piracy is the Business Software Alliance, an American organization whose members are the top computer program producers.[3] Estimates are based on the comparison between numbers of original software packages sold throughout the year and PCs marketed in the same time period. Estimates are in percentages, where 0% indicates the total absence of piracy and 100% the maximum rate of counterfeiting. As regards music and video piracy, instead, the source is the Intellectual Property Alliance (IIPA), an American organization that represents over 1,300 producers and distributors of material protected by copyright worldwide. The reference publication is the *Annual Special 301 Reviews*, compiled in close collaboration with the United States Trade Representative (USTR). For the music business, two other sources are also used: UNESCO and IFPI, the International Music Federation. In this case too the numbers regarding piracy are given in percentages, where 0% means that all supports in circulation are originals, while 100% indicates all are counterfeit.

4. The Analysis: Methodology

4.1. Sample

Our sample consists of 76 countries for software piracy, 73 for music piracy and 64 for movies. Discrepancies in the sample derive from different availability of data sources (calculations based on BSA and IIPA data). Breakdown by macro-geographic areas is as follows: Africa (6); Latin America (18); Asia/Pacific (14); Eastern Europe (13); Middle East (7); North America (2); Western Europe (16). With the exception of Pakistan and Nigeria, which are counted among countries with low human development (138th and 148th place on the *Human Development Index*), all other nations are at a medium (34) or high (40) level of development (UNDP 2002). Table 1 shows the complete list of nations included in the analysis, with the average piracy rate of each.

Table 1:
Countries Included in the Analysis

Country	Average Piracy Levels			Country	Average Piracy Levels		
	SW	Music	Movies		SW	Music	Movies
Argentina	61	47	45	**Lebanon**	81	65	70
Australia	31	7	4	**Lithuania**	66	85	88
Austria	34	5	NA	**Malaysia**	69	61	80
Belgium	33	12	NA	**Mexico**	56	70	55
Bolivia	79	85	100	**Morocco**	61	50	NA
Brazil	57	54	34	**Netherlands**	40	13	22
Bulgaria	75	74	23	**New Zealand**	27	7	NA
Canada	39	3	NA	**Nicaragua**	78	90	95
Chile	51	33	36	**Nigeria**	68	NA	70
China	92	91	90	**Norway**	35	5	6
Colombia	54	63	81	**Pakistan**	82	88	72
Costa Rica	66	43	54	**Panama**	62	56	60
Croatia	63	NA	NA	**Paraguay**	76	95	80
Czech Rep.	42	32	18	**Peru**	61	94	60
Denmark	26	3	5	**Philippines**	66	32	74
Dominican Republic	66	73	65	**Poland**	55	36	27
Ecuador	64	90	95	**Portugal**	44	35	NA
Egypt	60	44	40	**Qatar**	79	22	28
El Salvador	76	40	53	**Romania**	76	70	60
Estonia	62	63	48	**Russia**	88	68	85
Finland	28	15	7	**Saudi Arabia**	56	42	53
France	42	4	11	**Singapore**	50	20	25
Germany	30	4	20	**Slovakia**	46	10	20
Greece	66	52	17	**Slovenia**	63	16	NA
Guatemala	73	60	63	**South Africa**	41	19	16
Honduras	69	80	90	**Spain**	50	30	5
Hong Kong	56	60	20	**Sweden**	33	5	4
Hungary	49	25	38	**Switzerland**	33	5	15
India	66	40	65	**Thailand**	79	43	63
Indonesia	88	63	90	**Turkey**	63	45	55
Ireland	44	5	27	**UAE**	42	6	35
Israel	41	38	50	**UK**	26	2	12
Italy	46	24	21	**Ukraine**	89	75	NA
Japan	35	3	NA	**Uruguay**	65	45	53
Kenya	70	NA	NA	**US**	24	5	5
Korea (South)	51	18	23	**Venezuela**	57	65	65
Kuwait	78	67	88	**Vietnam**	96	100	100
Latvia	70	66	89	**Zimbabwe**	65	18	NA

4.2. Measurements: Independent Variables

Table 2 summarizes sources, standards of measurement, and values of all independent variables.

Table 2:
Independent Variables

Independent Variables	Index	Data Source	Range	Values
Membership in international agreements	Index of Membership in International Agreements	Authors' elaboration of WIPO data	0 (no membership in international agreements) - 38 (membership in all international agreements analyzed)	Data up to 2004
Law enforcement	Corruption Perceptions Index	Transparency International	0 (minimum enforcement) - 10 (maximum enforcement)	Average 1999-2002
Strength of economic institutions	Index of Strength of Economic Institutions	Authors' elaboration of data from Political Risk Services (International Country Risk Guide)	0 (weak institutions) - 10 (strong institutions)	Average 1999-2002
Individualism	Index of Individualism	Hofstede	0 (collectivistic society) - 100 (individualistic society)	Hofstede (early '80s)
Power distance	Index of Power Distance	Globe Project	0 (minimum power distance) - 7 (maximum power distance)	Globe research (1993-2002)
Orientation toward human relationships	Index of Orientation Toward Relationships	Globe Project	0 (minimum orientation) - 7 (maximum orientation)	Globe research (1993-2002)
Masculinity	Index of Masculinity	Hofstede	0 (feminine traits prevail) -100 (masculine traits prevail)	Hofstede (early '80s)
Average wealth per capita	GDP	World Bank	US Dollars (1995)	Average 1999-2002
Income distribution inequality	Gini Index	Gini	0 (total equality in income distribution) - 100 (total inequality)	Average 1999-2002
Orientation toward services	Index of Orientation toward Services	Authors' elaboration of World Bank data	Percentage	Average 1999-2002
Average level of education	Average number of years of education after the age of 25	Barro and Lee (1996)	N° of years for over-25s	Level as of 1996
Available technology	Technology Availability Index	Authors' elaboration of United Nations data (Human Development Report)	0 (minimum available technology) - 6 (maximum available technology)	Average 1999-2002
Weight of 15-29 age group in population	% of 15-29 yr olds in total population	United Nations (Human Development Report)	Percentage	Average 1999-2002

5. Results

Multiple regression analysis is performed in order to compare the relative impact of each factor on piracy levels (our dependent variable). In particular, we separately test the same theoretical model on music, movies and software, with a cross-section approach. Results (see table 3) are robust, with R-square always well over 70% and good variables significance.

Table 3:
Linear Regression Models

	Software			Music			Movies		
Variables	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**T**	**Sig.**
Agreement Membership Index	.017	.22	.821	-.003	-.031	.975	.021	.18	.858
Enforcement (CPI)	**-.474**	**-3.71**	**.000**	**-.542**	**-3.03**	**.004**	**-.518**	**-2.74**	**.008**
Strength of Econ. Inst.	**-.218**	**-2.52**	**.014**	-.132	-1.09	.277	-.083	-.65	.515
Individualism	**-.463**	**-4.94**	**.000**	**-.452**	**-3.43**	**.001**	**-.315**	**-2.11**	**.040**
Power Distance	**-.138**	**-2.12**	**.038**	**-.207**	**-2.22**	**.030**	-.077	-.78	.439
Relationship Orientation	.060	.82	.415	.027	.25	.799	**.237**	**2.17**	**.034**
Masculinity	.089	1.56	.123	.040	.50	.616	.040	.46	.642
GDP per capita	**-.296**	**-2.38**	**.020**	**-.375**	**-2.12**	**.037**	**-.310**	**-1.95**	**.042**
Gini Index	.031	.39	.696	.104	.953	.345	.082	.75	.455
Service Orientation	**-.219**	**-3.40**	**.001**	-.099	-.955	.344	.060	.57	.568
Average N° years education	**-.230**	**-2.67**	**.010**	**-.218**	**-1.79**	**.079**	**-.292**	**-2.31**	**.025**
Technology Availability	.019	.10	.918	.046	.177	.860	-.057	-.21	.834
% pop. aged 15-29	**-.282**	**-2.73**	**.008**	**.288**	**1.89**	**063**	**.255**	**1.73**	**.089**

Four variables take on identical characteristics in the three sectors, maintaining high levels of significance: Individualism, Law Enforcement, GDP, and Average Level of Education of the Population. Evidence suggests that when there is an increase in a) orientation toward individualism, b) the effort dedicated to applying a regulatory framework, c) wealth per capita, and d) levels of education, average piracy rates fall.

The education index warrants special attention. Combined with the GDP, this index proves effective in predicting the phenomenon in question. In this regard, it would be legitimate to

presume that the education factor does not have a direct effect on piracy rates, but one that is mediated by average wealth of the nation, due to the close link with economic development and the degree of access to and quality of the educational system. On the contrary, results call attention to the fact that education carries its own significance, with autonomous impact on dependent variables.

The fifth factor, percentage weight of 15-29 year olds in the total population, produces peculiar results: though maintaining a constant level of significance, this aspect shows a positive correlation with music and video piracy, and a negative one with software. This outcome merits further comment: from studies conducted for the most part in the US, the fact emerges that in the software sector too, the younger segment of the population is more exposed to violations of intellectual property rights. Statistical analysis brings the contrary relationship to the surface. The contrast may be explained by taking what happens in developed and developing countries and considering each separately. In the former, there is a positive causal link between piracy of software programs and a young population. In less developed nations, the relationship is invalidated by extremely high figures on piracy encompassing all segments of the population. Therefore, we can hypothesize that the minus sign in the software model is due to the prevailing influence of developing countries (where illegal use of software programs is more common).

Four variables prove statistically insignificant in the three models: Membership in International Agreements, Inequality in Income Distribution, Index of Technology Availability, Masculinity. The results from the first index highlight that the willingness of governments to participate in large international conventions does not, in and of itself, constitute a guarantee of success in terms of defending intellectual property. Much more important, instead, is the determination with which anti-piracy laws are implemented, as clearly demonstrated by the results obtained with the enforcement index.

Service orientation, which gauges the degree of polarization of the economy of a country around industry and the service sector, proves statistically insignificant only in the regression regarding software piracy. This result fully confirms expectations. The illegal use of software programs is, first and foremost, a problem relating to the business world, while music and movie piracy takes on more “private” connotations. What’s more, the type of relationship shouldn’t be surprising: the more dominant industry and the service sector in a country, the lower the piracy rate. This can be attributed to the fact that societies where these areas carry more weight also are more advance economically, and have more sophisticated systems for implementing IPRs. A causal link between piracy and strength of economic institutions is only evident in the software regression. As the guarantee of respect for property and contracts grows, the illegal software market shrinks.

Lastly, worthy of note are results obtained for two cultural variables that go alongside Individualism/Collectivism: the Power Distance Index and Orientation toward Human Relationships. The first directly impacts piracy levels, but in a way that is contrary to the initial hypothesis. As power distance tolerated in a society increases, the average percentage of non-original product in circulation decreases. The reason can very probably be found in the fact that communities characterized by less hierarchical structures are also those orientated toward a group philosophy. Orientation toward human relationships, on the other hand, proves significant only in the regression regarding movie piracy.

6. Conclusions and Policy Implications

The results of these regression analyses prompt reflection on policy implications. Specifically, four areas can be identified where intervention would reduce the piracy phenomenon.

The first area of intervention is enforcement, which takes on ever greater importance in the less developed zones of the world. Taking action on enforcement means, firstly, attempting to enhance synchronization processes among national systems for the protection of property rights. In other words, reference is made to the type of sanctions applied to offenders, which today varies widely from country to country. In additional closer collaboration should come into play between industry and the authorities responsible for applying the law. Public/private partnerships, through evolved forms of networks and international agencies appear to be the principal route to follow.

The objective is centralization of knowledge, which would lead to a systematic "patrimonialization" of best practices in the battle against piracy, and their dissemination in various countries. Finally, many believe that the solution to the problem of illegal copying lies in granting additional powers to competent authorities. This refers in particular to sentencing offenders and requiring that counterfeiters and pirates reveal all information on sources of illegal support systems, distribution channels and how they work, and the identity of other actors involved in the production and sale of pirated goods (AEPOC 2003).

The second area of intervention relates to consumers, and involves two major courses of action. First, it is necessary to refine instruments for enhancing customer loyalty. The objective is to create a system of evolved relationships between producers and consumers, which also takes advantage of new technologies to boost interactivity between supply and demand, and to come up with a package of contents or added advantages exclusively for people who buy original products. This risk, well known by now, is the defensive positioning of the music and movie industries with respect to new distribution media. If entertainment does not invest in Internet, there is a very good chance that it will not be able to make up for lost time in terms of supporting consumer habits. The second course of action suggest itself from the results obtained through the analysis of the cultural sphere. In this case, what becomes crucial is the framework of community values which characterizes social groups in their entirety. An important example is the aspect of Individualism/Collectivism. In countries with a stronger focus on a group philosophy, the tendency to share creative and intellectual work predominates. To effectively fight the piracy problem in these nations, extralegal behavior must be made to seem damaging to one's image in the eyes of other group members. It would be difficult for an anti-piracy campaign that focuses on the criminal aspect of copying to achieve consistent success.

The third area of intervention is market structures. Data have brought to light the fact that the extent of piracy is significantly conditioned by socio-economic factors. The reality is that young people (the population segment with less money to spend) have a strong propensity toward the illegal use of others' creative work. Likewise, the link between a nation's average income, disproportionate distribution of wealth, and piracy is solid. Several potential methods are available for intervening on the market structure. Among these, particular attention should be focused on diversification and differentiation strategies of products/services offered. The aim is to optimise the willingness to pay of single "clusters", which, depending on the level of analysis, can be sets of nations (e.g. developed or developing), business or home segments (primarily for the software segment), or social groups within single nations.

The final area of intervention is content protection systems. Only indirect, partial reference is made to this aspect; in fact, the level of content protection is seen, in this analysis, as an implicit "static" variable. From a methodological standpoint this decision is justified by the fact that measures undertaken to safeguard product integrity are identical in all distribution channels and outlet markets. However, an interesting observation is that content protection systems (encryption and decryption technologies, copy control devices, etc.) can be a valid means of intervention in the battle against counterfeiting.

The biggest obstacle to the use of such systems is that they inhibit the free use of products which in many regulatory frameworks is allowed, for example, making backup copies of software or duplicating musical and video support systems for personal use. It must also be noted that these devices are constantly under attack by professional pirates, and that such tools do not provide high protection for extended periods of time.

In any case, our study confirms evidence that the piracy phenomenon is extremely complex and multi-faceted, since many factors are involved: individuals' value systems, community cognitive structures, economic context and regulatory frameworks. From this comes the indication that acting on one of the areas presented will not likely lead to exceptional results. The challenge that competent organizations find themselves facing is, instead, to strive for continuous integration among all areas of intervention outlined here, so as to strike a balance between interests and needs of those who produce and those make use of creativity.

Notes

[1] Broad-based copyright enforcement refers to all forms of intervention aimed at taking across the board legal action against the piracy market: taxes on support systems and equipment for reproduction, interception and destruction of illegal copies, penalties for those who distribute counterfeit goods (Harbaugh and Khemka, 2001).

[2] The penetration indices for personal computers provide a very clear picture of the situation: in the US more than 600 people out of 1000 have a PC, while in poorer countries this number rarely reaches into the hundreds.

[3] Regarding the objectivity and impartiality of this source, some doubts could arise due to the fact that the BSA represents its own producers. In this study, however, reference is made to percentage rates of piracy in various countries around the world, giving preference to the comparative rather than absolute aspect. No doubt less exact are figures regarding estimated losses, which do not take into account local pricing policies nor, more importantly, the fact that not all software would be purchased if it were impossible to make illegal copies.

There seems to be no evidence that leads us to believe that the BSA has some specific interest in over- or under-estimating the magnitude of piracy in given areas of the world. Added to this is the fact that data published by the organization are widely accepted by experts and leaders in the sector as the most reliable measurement of the phenomenon (Marron and Steel, 2000).

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