

# Pay TV Piracy and its Effects on Pay TV Provision

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**ABSTRACT** This article explores how pay TV piracy in Europe affects the legal providers of pay TV services. It describes the main players in the European pay TV market, the Conditional Access Systems (CAS) used in the European Union (EU 15), the European pay TV piracy market, and the most important technologies used. The authors then discuss the effects of pay TV piracy on CAS providers and pay TV providers and conclude with some proposed anti-piracy measures for more effective protection against pay TV piracy in Europe.

**KEY WORDS:** intellectual property rights, piracy, television, pay TV

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Piracy means illegally accessing copyright-protected content to generate financial profits and reap other non-financial benefits, such as personal prestige.<sup>1</sup> Pirates are unauthorized users of copyrighted works (European Commission, 2003b). The unauthorized reception of television signals, generally, is widely seen as a violation of property rights.<sup>2</sup>

The fast-growing European pay TV market, similar to the rapidly spreading Internet, has promoted the growth of pay TV piracy across Europe. In Italy, for instance, Italmedia Consulting (2002) counted more than 4.1 million households in 2002, but only approximately 1.9 million legally paying Stream and Telepiù subscribers. If illegal Italian viewers were added to Italian legal subscribers in 2001, the pay TV share of the Italian TV market would have jumped from 11% to 27%, giving Italy the highest pay TV ratio in the EU (Davies, 2002c). Within the European

Copyright © 2005 Journal of Media Business Studies. Claudia Loebbecke and Matthias Fischer, "Pay TV Piracy and Its Effects on Pay TV Provision," 2(2):17-34 (2005).

Union<sup>3</sup> as a whole, pirate pay TV subscriptions were estimated to be about 30% of legal subscriptions at the end of 2003 (Davies, 2001; see also European Commission, 2003b).

Pay TV piracy has four main effects on the European pay TV industry and the companies within it: 1) It leads to financial losses for the European pay TV industry, 2) it substantially damages the image of transmitters and content rights holders (AEPOC, 2003), 3) it reduces the allure and payback of investing in the industry (Merges, 1995), and 4) it hurts the industry and its innovation capabilities (European Commission, 2003b).

Pay TV piracy also affects European governments. The European Association for the Protection of Encrypted Works and Services (AEPOC)<sup>4</sup> estimates that annual revenues from pirate cards and manipulated set-top-boxes in the EU amount to at least one billion Euros (AEPOC, 2003). Manufacturers of pirate cards pay no taxes, and pay TV providers and CAS providers pay lower taxes because of their reduced profits (European Union, 2003). The European Parliament (2003) calculates the annual taxation loss to be several million Euros and the annual average job loss to 17,000 jobs across the EU.

Finally, beyond the pay TV industry, piracy also distorts the markets for audio-visual works because it negatively influences content producers, the cinema industry, and the rental of video tapes and DVDs (e.g., Lehman & Weinberg, 2000).

## RESEARCH SCOPE AND APPROACH

We investigate the current pay TV piracy situation and its effects focusing on the following four questions:

- 1) Who are the key players in the European pay TV market and what are the main market characteristics?
- 2) How do pay TV coding systems (Conditional Access Systems, CAS) function?
- 3) Who are the main players in the European market of pay TV coding systems and what are the characteristics of this market?
- 4) Which effects of pay TV piracy on CAS providers and on pay TV providers can be specified?

The article introduces the main CAS used in the European Union, the main pay TV market players, and the technology essentials underlying CAS evasion. It then briefly analyzes the attractiveness of European pay TV piracy (there is significant profit potential) and elaborates on the effects of piracy on CAS providers and pay TV service providers. The paper concludes with proposing measures to reduce pay TV piracy in the European Union.

Between December 2003 and February 2004, we undertook a literature search and in-depth phone interviews as well as e-mail exchanges with pay TV companies and with the AEPOC, whose members include 35 major players in the European digital TV and telecommunications industry. AEPOC tracks piracy of encrypted works and services and researches legal, organizational, and technological methods for increasing security and protection of CAS (AEPOC 2005). We also attended presentations (Berbinau, 2004; Goudsmits, 2004; Kuik, 2004; Loup, 2004; Lowther, 2004; Rietkerk, 2004; Rossi, 2004; van Eijk, 2004) given at the 2nd AEPOC Anti-Piracy Symposium in Amsterdam in October 2004 and held follow-up discussions with the speakers to verify the correctness and timeliness of our data.

## **THE EUROPEAN PAY TV MARKET**

Pay TV has long been divided into subscription TV and pay-per-view TV (EBU, 1995). For subscription TV, the most attractive programs are packaged as monthly subscriptions. For pay-per-view TV, by contrast, individual TV transmissions, usually sporting events, concerts, or blockbuster movies, are sold individually.

The first European pay TV provider was Canal+ in France in 1984. In 1989, British Sky Broadcasting (BSkyB) followed in the UK. Until the end of the 1990s, most European member states had their own country-wide pay TV provider. But by 1999, their national quasi-monopolistic positions had become eroded by regulation, standardization, and new market entries. Since then, Europe's national pay TV markets have been continually moving toward more competition and more innovative offers using digital technologies, i.e., pay-per-view, video-on-demand, and online services.

From 1995 to 2001, the number of pay TV subscriptions in the EU grew annually by 10%, reaching 68.5 million households in 2001. The growth in investments by European pay TV providers mirrored this subscription growth (Wilkinson, 2003). In 2004, the European pay TV market accounted for more than 150 million households. For 2008, Major (2003) forecasts European pay TV revenues to reach more than €77 billion.

However, European pay TV providers will only realize significant economies of scale and thus high profit margins if the market consolidates. After mergers in Italy and Spain in 2003, others seem to be on the horizon, primarily in France and Scandinavia. In some countries, legal constraints, culture, and language barriers limit competition to national companies (Boucqueau & Verians, 2004). Table 1 summarizes European pay TV providers in mid 2004.

**Table 1: Pay TV Providers in the EU 15**

Market	Pay TV Provider	Main Stockholder	Launch	Subscribers	Minimum Subscription (€/Month)
Germany	Premiere	Permira (Germany)	1991	2,910,000	5.00
Greece	Nova	Multichoice Hellas (Greece)	1999	223,000	12.30
France	ABSat	AB Group (France)	1995	25,200,000 <sup>1</sup>	n/a
	Canal+	Canal+ Group (France)	1984	4,900,000	28.80
	CanalSatellite	Canal+ Group (France)	1992	2,700,000	11.00
Italy	TPS	TF1 (France)	1996	1,200,000	11.00
	Sky Italia <sup>2</sup>	News Corp. (USA)	2003	2,400,000	22.00
Portugal	TV Cabo	PT-Multimédia (Portugal)	1994	1,400,000	13.49
Scandinavia	Canal Digital	Telenor (Norway)	1997	710,000	20.50
	Viasat	MTG (Sweden)	1991	600,000	13.29
Spain	Canal+	Sogecable (Spain)	1990	1,930,000	24.97
	Digital+ <sup>3</sup>	Sogecable (Spain)	2003	1,800,000	22.00
UK	BSkyB	News Corp. (USA)	1989	7,200,000	20.20

Sources: New Media Markets: Cable Satellite Europe; ABSat, 2004; Canal+ Group, 2004; MTG, 2003; News Corp., 2004; Premiere, 2004; PT-Multimédia, 2004; Sogecable, 2004; Telenor, 2004; authors' calculations

Notes:

<sup>1</sup> Also includes non-pay TV because figures are not separable.

<sup>2</sup> In 2003, Stream and Telepiù merged to become Sky Italia.

<sup>3</sup> In 2003, Vía Digital and Canal Satélite Digital became Digital +.

Concerning the economic situation, several pay TV providers have reported losses for the past few years due to rising costs for content, competition with other pay TV providers on the national market, and falling revenues caused by pay TV piracy (Bajon, 2002). Furthermore, in countries with strong free-to-air offerings, such as Germany, pay TV providers face strong competition from free television or ad TV. Recently, pay TV providers have concentrated on intensifying their business relationships with their good customers and thus increasing their Average Revenue Per User (ARPU). Table 2 shows the ARPU figures for selected pay TV providers during 2000 to 2003.

**Table 2: ARPUs of European Pay TV Providers from 2000 to 2003**

Pay TV Provider	ARPU (€/Month)						
	2000	Δ	2001	Δ	2002	Δ	2003
BSkyB	37.40	+ 6.2%	43.46	+2.9%	44.71	- 1.0 %	44.02
Canal Digital	28.50	- 2.1%	27.90		n/a		n/a
Canal+ France	26.00	+ 7.7%	28.00	+ 1.1%	28.30	- 7.1%	26.30
Canal-Satellite	27.50	+ 4.0%	28.60	- 3.8%	27.50		n/a
Premiere	n/a		24.99	+ 0.8%	25.20	+13.3%	28.55
Sogetel	38.00	- 3.2%	36.80	+ 10.7%	40.75	+ 2.0%	41.55
TPS	n/a		n/a		n/a		37.10
TV Cabo	17.50	+ 4.0%	18.20	+ 4.4%	19.00	+ 4.2%	19.80
Viasat	44.40	+34.0%	59.50	+ 9.1%	64.90	+ 4.4%	67.75

Sources: Canal+ Group, 2001; Canal+ Group, 2003; News Corp., 2001; News Corp., 2003; Premiere, 2001; Premiere, 2003; Sogetel, 2001; Sogetel, 2003; Telenor, 2001; Telenor, 2003; authors' calculations

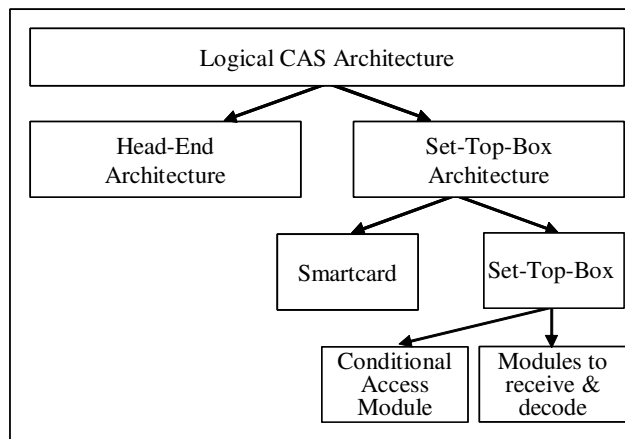
## PAY TV CONDITIONAL ACCESS SYSTEMS

### Technical Considerations

Conditional Access Systems (CAS) prevent or at least limit uncontrolled access to pay TV content by encoding TV signals (Jain, Joshi & Mitra, 2002). They only give access to users who have special access information, generally a decoding key.

The logical CAS architecture (see Figure 1) can be divided into two essential components, the head-end architecture and the set-top-box architecture (for a more detailed technical description, see, for instance, de Santis & Soriente, 2004).

**Figure 1: Logical CAS Architecture**



After: Boucqueau & Verians, 2004.

The head-end architecture describes the equipment used by the pay TV providers, while the set-top-box architecture describes the hardware used by pay TV viewers to decode content. To evade payment, pirates generally manipulate the set-top-box architecture, particularly the smart card and the set-top-box itself.

The set-top-box has two logical components, the conditional access module, into which the smart card is inserted, and the modules that receive and decode transmitted content.

The connection between the conditional access module and the smart card is the most difficult to protect against piracy. Therefore, pay TV providers have resorted to frequently changing the decoding key used by their set-top-boxes to reduce piracy (Motorola, 2002).

Different set-top-boxes have different data interfaces. Those *with* an integrated common interface are CAS-independent, which means they can be operated with smart cards from different CAS providers (Jain, Joshi & Mitra, 2002). Set-top-boxes *without* an integrated common interface only support a specific preloaded CAS, called Unicrypt. These boxes do not have a conditional access module. While these boxes are less flexible, some set-top-box producers still use them because they are simpler and less costly to produce (Boucqueau & Verians, 2004). Other set-top-box producers (such as Motorola) include both interface options in some set-top-boxes for maximum flexibility.

Overall, though, CAS security is higher with set-top-boxes that use a conditional access module because they offer more electronic countermeasure options (EBU, 1995). However, this superior security has higher CAS costs (Motorola, 2002).

Most pay TV providers grant legal access to their encrypted pay TV programs by requiring that the smart card, the set-top-box and the conditional access module (if included) all provide authorization. Without such mutual authorization, a computer with hacking software can simulate a set-top-box and operate it with an original or modified smart card (Pits Security, 2000).

### **European CAS Market**

Table 3 shows the different European CAS encoding schemes, their providers, their main customers (pay TV providers), and the respective market shares of each scheme, based on number of smart cards and/or set-top-boxes in use. All CAS encoding schemes in Table 3 use the architecture described earlier, with a smart card and a set-top-box.

Until the end of 2002, national CAS providers had a monopoly in their own country. The pay TV providers only used their national CAS provider. For instance, from 2001 until 2003, Premiere (Germany's pay TV provider) used Germany's CAS provider, Betacrypt (BetaResearch, [www.betaresearch.de](http://www.betaresearch.de); now: [comvenient](http://comvenient.com), [www.comvenient.com](http://www.comvenient.com)). However, since 2003, the continuing piracy problems have decreased the

**Table 3: Encoding Schemes and Providers in the European CAS Market**

CAS	CAS Provider	Main Customers / Pay TV Providers	Market Share
@Sky crypt	Neotion (France)	Free-XTV	n/a
Conax	Conax (Norway)	Canal Digital	1%
CryptoWorks	Philips CryptoTec (Netherlands)	Cyfra+	1%
Irdeto	Irdeto Access (Netherlands)	Nova, Sky Italia	9%
MediaGuard	Canal+ Technologies (France)	ABSat, Canal+, CanalSatellite, Cyfra+, Digital+, Sky Italia	16%
Nagravision	Nagravision (Switzerland)	Premiere, TV Cabo	28%
Viaccess	Viaccess (France)	ABSat, Canal+, CanalSatellite, TPS, Viasat	5%
VideoGuard	NDS (Great Britain)	BSkyB, Sky Italia, Viasat	33%

Sources: European Commission, 2003a; Boucqueau & Verians, 2004; authors' calculations

loyalty of pay TV providers to their CAS providers (Thomson, 2003). So the European CAS providers have expanded their offerings internationally.

## Pay TV Piracy Market in the European Union

### *Different Pirate Groups*

We distinguish three groups of pay TV pirates: 1) professional pirates, 2) local manufacturers of pirate cards, and 3) home industry pirates.

*Professional pirates* use professional technical equipment and produce large quantities of pirate cards. They produce and sell the cards in a highly professional manner using profit-oriented processes (European Commission, 2003b).

*Local manufacturers*, on the other hand, use far less industrial production methods, but they still cause damage to the pay TV industry. They either produce pirate cards from scratch or use commercially available blank smart cards and do-it-yourself hardware, e.g., Season Interfaces.<sup>5</sup> Manuals for manipulating smart cards, for building programming devices, and for decoding keys can be downloaded from the Internet (European Commission, 2003b). The URLs are deemed illegal, so they are changed frequently, but they continue to exist.

Besides selling pirate cards, local manufacturer pirates generate profit by selling blank smart cards, programming devices, or complete satellite-reception systems that include pirate cards. Moreover, organized crime often uses local manufacturers as distribution channels for professionally manufactured pirate cards (European Commission, 2003b).

*Home industry pirates* crack coding systems mainly for their own pleasure or as an intellectual challenge. Technically experienced pay TV viewers act as hobby pirates, using the same hardware as professional pirates and exploiting information from hacker websites. These self-made pirate cards are used in the pirate's own living room or sold or offered free in small quantities to friends, neighbors, and colleagues. In return, hobby pirates usually receive pirated copies of software, music CDs, or DVDs (European Commission, 2003b). As long as they do not publish or sell their approach, they have a small effect on the industry.

With the exception of some professionals, pirates depend on private hacker websites to obtain keys, evasion hardware and software, and manuals. These hacker websites—without commercial support—provide the main exchange point for many players and thus are the Achilles tendon of most non-professional piracy trades (European Commission, 2003b).

### **Market Situation**

Pay TV piracy significantly affects the various players offering legal pay TV, even though one cannot take for granted that all pirates would otherwise legally acquire the products.

With an average pirate subscription ratio of about 30% of legal pay TV subscriptions in the EU (Davies, 2001) and about 33 million pay TV customers, one can assume that about 10 million pirate cards are in use throughout the EU. According to the European Parliament (2003), the sale of products for committing piracy related to CDs, DVDs, pay TV, and pay-per-view TV in the EU rose 900% between 1998 and 2001 (Boucqueau & Verians, 2004). Table 4 presents prices and the number of pirate smart cards of selected pay TV providers.

The pay TV piracy market is characterized by high demand for piracy products, high profit margins on piracy products, and lack of fear of legal consequence on behalf of the pirating manufacturers and consumers (Nagravision, 2003). While Directive 98/84/EC by the European Commission in 1998 (European Commission, 1998) aims to strengthen the rights of the European Union pay tv industry and right holders as well as increase the effectiveness of counter-measures, Davies (2001) believes the Directive contributes to relocating the criminal activity rather than removing it: An increasing number of the websites for pirate cards now originate from Eastern Europe or Africa.

**Table 4: Prices and Numbers of Piracy Smart Cards of Selected European Pay TV Providers**

Pay TV market	Pay TV provider	Price of Pirate Smartcards	Number of Pirate Smartcards	Piracy Ratio of Legal Subscriptions
Germany	Premiere	€20.00 – 60.00	1,500,000	52%
Italy	Sky Italia	€28.90 – 43.30	1-2 mill.	83 – 125%
Scandinavia	Viasat	€20.00 – 60.00	250,000	25%
Spain	Sogecable	€30.00 – 90.00	100,000 - 300,000	6 – 17%

Sources: Davies, 2001; Davies, 2002d; Sellgren, 2002; Wynn 2003; authors' calculations

<sup>1</sup> More than 4.1 million HH in 2002 compared to approximately 1.9 million legally paying Stream and Telepiù subscribers.

### **Technical Approaches to Circumventing Pay TV CAS**

Pay TV CAS schemes are cracked mainly by taking advantage of the implementation errors in smart cards, errors in conditional access modules, and weak CAS security protocols (Goudsmits, 2004). Moreover, numerous web pages and virtual communities describe in detail how to decode CAS encryption schemes and obtain decoding keys. Programming hard- and software as well as blank smart cards can be acquired legally (European Commission, 2003b). These are used to build pirating equipment. Table 5 shows various ways to evade CAS security safeguards.

While expired and programmable smart cards used to be for sale on the Internet (Davies, 2001), to the best of our knowledge, in 2004, dealers no longer publicly sell pirate cards or piracy software on the Internet. However, blank smart cards and programming devices, such as UCAS set-top-boxes, Season Interfaces, and multi-conditional access modules for decoding several different CAS are still on the market (see also Boucqueau & Verians, 2004).

### **ATTRACTIVENESS OF THE PAY TV PIRACY MARKET**

The high profit margins of pay TV attract pirates. Some piracy product dealers sell €8,000 to €16,000 worth of products in one day (Boucqueau & Verians, 2004). Skillful pirates even bill viewers a monthly fee of approximately €16, providing them with updated decoding keys. To avoid having to pay dealers each time the decoding key changes, some savvy viewers acquire a programming device and other evasion hardware and software to maintain their own system (Boucqueau & Verians, 2004).

By comparing legal subscription fees to pirate card production costs, we estimate that pirate card manufacturers have a margin of more than 30% during the first year of a subscription. They achieve a positive cash flow if they sell only eight pirate cards for €30 each. If, on the other hand, they simply sell a card, not a subscription for updating the decoding

**Table 5: Technical Possibilities for Illegally Decoding CAS Encryption**

<b>Accessory</b>	<b>Description</b>
Modified Original Smart Card (MOSC)	Modifying a deactivated or expired original smart card of pay TV provider with programming device and appropriate software so that entire program offers can be decoded. Needed equipment: Set-top-box, computer, original smart card, programming device, special software, and decoding key.
Digital Pirate Smart card (DPSC)	Making pay TV card out of a legal blank smart card with specific programming device and appropriate software. Needed equipment: Set-top-box, computer, blank smart card, programming device, special software, and decoding key.
Season Interface	Using a PC to emulate the interface by means of special emulator software; no smartcard required. Needed equipment: Set-top-box, computer / paddle / Personal Digital Assistant (PDA), Season Interfaces, special emulator software, and decoding key.
Universal CAS (UCAS)	Pentacrypt or similar software loaded by Magic Module Programmer on chip (manufactured by company SIDSA, <a href="http://www.sidsa.es">www.sidsa.es</a> ) of UCAS set-top-box or UCAS conditional access module emulating up to six different conditional access systems at a time. Needed equipment: UCAS set-top-box / set-top-box with common interface and UCAS conditional access module, computer, if necessary, pirate card, if necessary, programming device, special software, and decoding key.
FreeCAM	Emulating pay TV card by manipulating conditional access module with special software; Pay TV card then becomes unnecessary. Needed equipment: Set-top-box with common interface, computer, conditional access module, special software, and decoding key.
DVB Card	Decoding pay TV program by modifying the pay TV card operating software using a PC; no smart card, no common interface, and no conditional access module necessary. Needed equipment: DVB card, computer, freeware as a substitute for card operating software with special driver file, and decoding key.

Source: Pits Security, 2000

keys, they only need to sell two pirate cards to amortize their production costs. Purchase of pirate cards saves 88% of a subscription cost if pirate card owners update the decoding keys themselves.

Pirates sell programmable blank smart cards, such as the FunCard PCB, for €2.50 up to €19.95, achieving an average margin of almost 360%.

Despite high profit margins for pay TV marketers and lower subscription rates for consumers, pirate products have disadvantages as well. Illegal pay TV consumers often encounter program interruptions as a decoding key change. They need an update to capture the signal again. These interruptions might encourage formerly illegal viewers to legally subscribe to avoid the complicated and expensive process of obtaining regular updates (Boucqueau & Verians, 2004).

Finally, the interaction between pay TV providers and set-top-boxes is becoming increasingly automated as interactive TV services spread. It may render pay TV piracy less attractive because pay TV providers can

identify pirate cards or pirate set-top-boxes faster and more easily.<sup>6</sup> Consequently, pirates may switch to non-interactive offerings. Assuming limited attractiveness of such content, pirate pay TV providers may retire from the market in the short to medium term (Boucqueau & Verians, 2004).

## **ECONOMIC EFFECTS OF PAY TV PIRACY**

Pay TV piracy redirects revenues of pay TV providers to pay TV pirates (even though many illegal users probably would not otherwise buy the product and therefore do not directly lead to industry losses). Moreover, revenues to writers, screenwriters, artists, actors, musicians, and other content producers are reduced by piracy due to the decreased rivalry and demand for pay TV content (see also Picard, 2004).

### ***Economic Effects on CAS providers***

Pay TV piracy requires CAS providers to invest substantially in integrating complex anti-piracy mechanisms into their system and continually upgrading their system's general security (European Union, 2003). These companies employ, on average, ten experts for investigation, observation, legal prosecution, analysis of piracy activities, and development of counter measures and smart card technology. Maintaining technical security alone requires annual investments of approximately €5 to €10 million per provider (Boucqueau & Verians, 2004).

The demand for illegal UCAS set-top-boxes, which can be easily manipulated, is increasing in the consumer market (Mueller, 2004). To avoid decreasing their licensing fees, CAS providers are integrating their systems into the set-top-boxes. The average annual loss to CAS providers from piracy has been calculated to amount to 5% of their total revenues, depending, of course, on the number of subscribers who manipulate their smart cards (Boucqueau & Verians, 2004).

Indirectly, CAS providers also suffer losses from piracy when they gain a bad reputation, and consequently lose their customers, the pay TV providers (Boucqueau & Verians, 2004). To keep their customers, most CAS providers now offer anti-piracy insurance where they agree to exchange all smart cards for free if those cards have been hacked by pirates. For example, the company Irdeto ([www.irdetoaccess.com](http://www.irdetoaccess.com)) offers a regular exchange of its current generation of smart cards every twelve to eighteen months, so that in case of piracy, only the cards of the hacked generation must be swapped (Thomson, 2003). Without such insurance, pay TV providers must bear the cost of swapping their smart cards.

### ***Economic Effects on Pay TV Providers***

As pointed out above, the use of the pirated products only reduces demand and revenue only if we assume that the pirates would alternatively pay for the subscription (e.g., Picard, 2004; Waterman, 2004).

Pay TV piracy leads to lower average subscription rates and annually falling pay TV revenues caused not only by having fewer subscribers, but also by pirate viewers replacing premium subscriptions with cheaper basic packages, which they then enhance with illegally bought premium content (European Commission, 2003b; Boucqueau & Verians, 2004).

As a result of the decreasing profitability, pay TV providers invest less in program content (Nagravision, 2003), close channels, or postpone planned premium channels (Wynn, 2002a). Piracy thus threatens program and service quality due to the revenue losses and costs increases along the pay TV value chain (Nagravision, 2003).

If CAS usage cannot reduce piracy to an acceptable level, the only technical measure left to pay TV providers is to regularly swap smart cards or even upgrade entire systems. Obviously, both measures significantly increase their operating costs. Swapping one rented set-top-box costs about €11. Exchanging or upgrading a smart card costs €0.04 to €0.20 per month. Moreover, personalizing smart cards (i.e., connections with individually subscribed pay TV channels with personalized access for end-consumers) costs about €10. Another €10 have to be taken into account for the smart card itself. For example, a swap of smartcards for one million subscribers would amount to some €20 million altogether (Davies, 2002b). Also, large swap actions may cause compatibility problems with existing smart cards and the set-top-box. Furthermore, viewers who legally subscribe to basic TV services and, on top of this, illegally receive premium services, may quit completely when they are notified of the upcoming card swap (Davies, 2002a; Waterman, 2004). Due to the high enforcement efforts and costs, several pay TV providers continue to use their systems without exchanging smart cards, although they know have been hacked (Boucqueau & Verians, 2004).

## PROPOSED ANTI-PIRACY MEASURES

Pay TV providers deciding between enforcing anti-piracy measures and tolerating copyright infringements need to take a decision on the expected return on investment (Waterman, 2004). The economic rationale behind such a decision is profoundly analyzed by authors like Conner and Rumelt (1991), Slive and Bernhart (1998), Shy and Thisse (1999), or Banerjee (2003).

With a decision to somehow combat pay TV piracy, a bouquet of measures comes into play:

Although enforcement efforts and results in audio-visual industries have not been systematically studied (Waterman, 2004), our analysis suggests that the most powerful force encouraging anti-piracy

enforcement is technology. Overall, *technical measures* aim at making CAS piracy more difficult and thus more expensive. Admittedly, they have been only somewhat successful in increasing excludability in pay TV consumption (Picard, 2004).

*Economic measures* partially build on technical measures. They intend to render the sale of piracy products unprofitable and thus unattractive on a long-term basis. Virtual pirate communities and hacker websites should be detected on the Internet and closed. By exclusively offering set-top-boxes for rent, pay TV providers could control the market for legal set-top-boxes, thus create a basis for excludability (e.g., Gausted, 2002; Picard, 2004). Alternatively, the number of customers for piracy products could be lowered by pay TV providers mounting stronger sales efforts, decreasing their subscription prices, and more frequently upgrading and changing their decoding keys (Boucqueau & Verians, 2004). Finally, offering more international pay TV services across the EU might reduce the incentives for otherwise law-abiding citizens to use piracy products (European Union, 2003).

*Legal measures* cannot be effective unless they can be enforced (e.g., Gausted, 2002) and no property rights can be perfectly enforced (North, 1990). Nevertheless, even theoretically sub-optimal copyright measures increase the opportunity and the probability for profitable pay TV distribution (for a general analysis of the economics of copy right law see also for instance Besen & Kirby, 1989; Besen & Raskind, 1991).

Legal provisions should go beyond prohibiting commercial production and distribution of pirate cards and illegal devices. Also private use of unauthorized intellectual property (European Commission, 2003b; Thomson, 2003; Waterman, 2004) and direct and indirect distribution of decoding keys and illegal devices should be forbidden. Blank smart cards and programming devices are rarely classified as unlawful; new legal provisions should be established (European Commission, 2003b).

European national laws should allow for international co-operation among the EU, the European Commission, law enforcement agencies, and market players (Thomson, 2003). The latter are important as enforcement is heavily dependent on corporate initiatives, coordinated partly through industry trade associations.

*Ethical measures* aim to impose a bad image on illegal pay TV consumption. Information campaigns could explain why piracy is harmful to the industry and ultimately to legal subscribers. A certified anti-piracy logo could be attached to official set-top-boxes and other pay TV equipment, thereby making legal pay TV products easily recognizable.

## CONCLUSION AND OUTLOOK

At present, pay TV consumers decide between a cheaper, illegal pirate card and a more expensive, legal monthly subscription.

Over time, new sophisticated technical security solutions implemented by CAS providers make piracy more expensive and thus less attractive. Further, the increase in interactive services could lead to less piracy as soon as CAS architectures and technologies currently designed for one-way satellite broadcast will be enhanced to handle two-way communications.

Global cooperation in the pay TV industry, among the legal bodies and the technical laboratories is also expected to significantly reduce pay TV piracy. A higher percentage of legal pay TV subscribers causes economies of scale which should trigger decreasing subscription prices. Lower subscription prices, in turn, could draw even more people to legal subscriptions.

However, the dilemma is not foreseen to be solved any time soon. Even though new technical security solutions make decoding of pay TV encoding more expensive and complex, experts assume a never-ending battle between the pay TV industry and pay TV pirates (European Commission, 2003b; Boucqueau & Verians, 2004; Wynn 2002b).

Nevertheless, overall market developments are moving in the right direction. Since 2002, mergers and integrations in the European CAS market have impaired the relationships between national pay TV providers and their respective CAS providers. Foreign entrants have arrived on the European CAS market with new technologies and services, leading to lasting competition on the market. Jointly, the players are working towards the economically most promising balance between pay TV piracy tolerance and anti-piracy measures.

## ENDNOTES

<sup>1</sup>Following Picard (2004), the main categories of appropriation of products protected by intellectual property are theft, infringement, and piracy, where piracy “is a term applied to infringement for commercial gain” (p. 210).

<sup>2</sup>Differently, Fulda (1995) stresses the ill-founded claims of providers in what he considers to be common domains (pay TV and also library privileges or computer resources).

<sup>3</sup>The designation European Union (EU) refers to the EU 15 (before 2004-05-01).

<sup>4</sup>Association Européenne pour la Protection des Œuvres et services Cryptés ([www.aepoc.org](http://www.aepoc.org)).

<sup>5</sup>Season interfaces replace the smartcard in the conditional access module. The pay TV smartcard connected with a Personal Computer can be emulated by means of special software.

<sup>6</sup>In 1993, Warner's Staten Island cable system (USA) offered a free T-shirt to subscribers during a pay-per-view boxing match, but all authorized set-top-boxes were programmed to blank the advertisement. Only those receiving the match illegally could see the advertisement. 400 people responded to the advertisement and were determined to have been receiving the signal without paying (Waterman, 2004).

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