

Easy Skins, Easy Life:

A Chronological Case Study of Loot Boxes and Transferable Cosmetic Items in the Video

Game Counter-Strike: Global Offensive

by

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The above committee determined that the thesis is acceptable in form and content and that a satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate during an oral examination. A signed copy of the Certificate of Approval is available from the School of Graduate and Postdoctoral Studies.

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STATEMENT OF CONTRIBUTIONS

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication. I have used standard referencing practices to acknowledge ideas, research techniques, or other materials that belong to others. Furthermore, I hereby certify that I am the sole source of the creative works and/or inventive knowledge described in this thesis.

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Dedication

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Introduction

Video game publishers have continually developed novel methods of maximizing revenues from video game titles. Modern gaming customarily involves paid downloadable content that further monetizes a base game. Loot boxes, which are virtual chests that contain cosmetic upgrades unlocked for a small monetary fee, are an example of such a phenomenon. The academic literature surrounding loot boxes and related skin gambling is in its infancy: these items debuted in 2010, and little had been published prior to 2017. This study seeks to add to this body of literature by charting the history of virtual skins and loot boxes in Counter-Strike: Global Offensive (CS:GO). Through a chronological exploratory case study, this thesis examines loot box mechanics, match-fixing, and skins gambling in Counter-Strike: Global Offensive. This analysis also highlights potentially problematic and unlawful behaviours of actors within this unregulated space and the associated various governmental responses to loot boxes. Valve's actions and response to the iBUYPOWER match-fixing scandal are analyzed in the context of deterrence theory and stakeholder roles, outlining why their response was ineffective in curtailing future instances of match-fixing.

Academic peer-reviewed content on the skin gambling phenomenon was scarce prior to 2017 although content from other sources, such as journalists and independent research companies outside the academic sphere existed earlier than this. Sue Schneider (2015) was the first author that published academic work linking professional Counter-Strike matches to gambling sites that accept wagers via fiat currency in her piece entitled "eSport Betting: The Intersection of Gaming and Gambling." Popular press began highlighting the phenomenon in 2015, when a piece written by Andy Chalk of *PC Gamer* covered the first recorded instance of match-fixing related to skin betting: a defining event discussed in later sections (Chalk, 2015). Since then, the topic has gained some mainstream coverage on outlets like Bloomberg (Melbourne & Campbell, 2015; Brustein & Novy-Williams, 2016) and BBC News (BBC News, 2016).

Though there has been some academic exploration into the field of loot box studies, there remains a gap with regard to application of a criminological perspective. This inquiry utilises a chronological case study, combined with a general framing around the criminological concept of deterrence to explore loot box dynamics and potentially illicit or legally grey behaviours surrounding them, and establish approaches future research can take to further understand this topic. This work aims to contribute a novel perspective of loot boxes and skin gambling by incorporating my experiences of opening loot crates, participating in skin gambling, and playing CS:GO, where relevant, in an attempt to enrich the perspectives and information gleaned from this thesis and help frame the perspective and analytic approach to the case study framework herein.

The following sections will examine the extant academic literature on loot boxes and gambling, considering their role in monetization strategies, links between gaming and gambling, the legality of loot boxes, and how criminology has or might approach these research questions.

Literature Review

History of Loot Boxes

Microtransactions (see more on p. 12) have become increasingly prevalent in the past decade and have been adopted by some of the largest developers and publishers. EA, Blizzard-Activision, and Valve, have each released products that include the loot box mechanism and microtransactions. Integral in this discussion, and the topic of virtual monetization more broadly, is the term 'loot box' which is used to describe a virtual container that can be opened for a randomized reward (Drummond & Sauer, 2018). Often, the rewards found in these containers are cosmetic upgrades to a character model or weapon (Figure 1). Loot boxes are most often obtained through gameplay, but their contents are only accessible by purchasing a virtual key from the developers. Video games that utilize loot boxes often debut seasonal iterations, with each version containing cosmetic upgrades unique to that release. Loot box openings are accompanied by flashy animations and graphics which are reminiscent of a slot machine (Figure 2). This same mechanism is expressed in online collectible card games though 'card packs' within this space. It is important to note here that the term loot box is synonymous with loot crate.

The introduction of microtransactions as a new stream of video game monetization began in the Asian region with the Chinese video game 'Zhengtū Online' (Burns, 2017). Released in 2007, this free-to-play game was initially popular at Internet cafes as PCs were not yet commonplace within a household. With most of the player base renting computer time, the founding company, Zhengtū Network, found that offering in-game progression, through the form of character experience and items, for a low cost was extremely effective in generating revenue. This model was immediately profitable, with the developers reporting monthly profits of over fifteen million US dollars at the end of 2007 (Koo, 2007).

Western regions, specifically Europe and North America, first saw the appearance of the loot box mechanism in Valve's 2010 "Mann-conomy" update to their game Team Fortress 2 (TF2) (Valve, 2010). This update introduced the "Mann Co. Supply Crate series #1," the first of many TF2 loot boxes to be collectively referred to as "Supply Crates" by players (Team Fortress 2 Official Wiki, 2013). Also newly added were the Steam Wallet, a virtual wallet to hold funds that can be spent only on the platform; the "Mann Co. Store & Catalog," an in-game store where users could buy items, crates, or keys using the currency in their Steam Wallet; and the ability to directly exchange items with other players on the Steam platform (Valve, 2010).

Two years later in 2012, this update was bolstered by the introduction of the Steam Community Market (SCM): a virtual marketplace that allows users to purchase or sell in-game items on the Steam platform. Users are able to purchase in-game items from the SCM through a variety of payment options, including conventional online payment methods (VISA, MasterCard, American Express, and PayPal); Steam gift cards; or pre-existing account balances derived from the sale of items on the SCM. As opposed to historical video game transaction mechanisms, the SCM is more reminiscent of real-world financial markets in a few ways. Users are able to search for any tradeable item on the SCM using the built-in search bar and can filter for items by game (Figure 3). Users are then able to view current buy and sell orders for a given item, and at what price specific Steam users have recently sold or purchased the item for - parallel to real-world stock or bond trading (Figure 4). Further, each item's page lists the historical median sale prices of an item, and the cumulative number of buy and sell orders for the item at a given price point (Figure 5). The features of the SCM play a role in transforming the landscape of virtual trading, turning the items and unopened loot boxes into pseudo-commodities.

The inclusion and success of loot boxes, peer-to-peer trading, and the SCM in TF2 led Valve to integrate this monetization model in Counter-Strike: Global Offensive (CS:GO). Skins, which are virtual

cosmetic upgrades to player models and in-game items, in CS:GO originate from the 2013 game update entitled "The Arms Deal Update" – the first recorded instance of the loot box mechanism entering the Counter-Strike scene, wherein the developers advertised that users could collect, buy, sell, and trade the newly-released decorative items (Valve Software, 2013). Unlike items and weapons in TF2, which confer some amount of specialized abilities to the player, items acquired in CS:GO are only cosmetic: they do not affect in-game play. These cosmetic upgrades can be obtained in different ways: randomly during gameplay, as a promotional item given out by the developers, via loot boxes that are obtained during gameplay, by trading with other users, or by purchasing them on either the SCM or third-party platforms (Holden, 2018).

This thesis attempts to survey the loot box landscape by addressing the following research questions: what events have transpired following the emergence of loot crates and transferrable virtual skins in CS:GO and what behaviours have emerged with the introduction of these transferrable items? This thesis explores the ways these tradeable items are utilized as a result of their commodification and lack of regulation. For instance, individuals have been motivated to fix professional CS:GO matches in exchange for these cosmetic skins.

There is no uniform framing surrounding the legality of virtual item trading, loot boxes, and skin gambling. This leads to the next question explored in this thesis: what rules, if any, are being transgressed and how have third-parties, including government agencies, responded to the emergence of this new market economy? In this regard, there are two primary topics of interest to international regulatory bodies. The first is whether or not the mechanics of loot boxes themselves constitute gambling. Responses differ between countries based on internal assessments done by the countries' respective gambling commissions. Some commissions, such as the Belgian Gaming Commission and Netherlands Gaming Authority, have taken the position that loot boxes constitute gambling and have

threatened legal action (Belgian Gaming Commission, 2018; Netherlands Gambling Authority, 2018). Others, like the United Kingdom Gambling Commission, have identified that loot boxes are problematic but have yet to formally pursue legal action against publishers that utilize loot crates in their games (UK Gambling Commission, 2017). The second topic of interest relates to the legality of devoted skin gambling websites and their operation within cyberspace. Valve's introduction of exchangeable virtual cosmetic items in 2013 presented an opportunity for profit-seeking individuals to establish third-party websites hosting games of chance. Some individuals quickly capitalized on the situation – e.g., the domain name for a popular betting site was registered one day after Valve's release of tradeable skins (DomainTools, 2019).

The two main areas of concern with respect to skins-gambling websites are the verification of user's age and identity, and how skins are converted into credits. According to the Steam Subscriber Agreement, for example, users cannot create accounts if they are under the age of thirteen (Valve Corporation, 2019). This age limit remains much lower than international thresholds for participating in lotteries or casinos. These domains are often registered and operated out of countries that do not have formal regulations against loot boxes and skins. Operating in a legal grey-area, they are not compelled to verify the identity and age of every user that wants to utilize the website. Some jurisdictions, such as the Isle of Man, formally recognize skins as convertible virtual currencies and allow these gambling websites to incorporate within the territory and operate legally, provided the operators properly verify the identities of their users and pay the requisite taxes on earnings (Isle of Man, 2019).

The current inquiry's findings suggest that most popular gambling websites do not independently verify the identities and ages of their users. This is done through the use of Steam's public Application Program Interfaces (API) which allows website developers and third-party applications to fetch information about a Steam account, such as the items in a user's inventory. The

successful login of an individual's existing Steam account is accepted as the unique user identifier. The skin-gambling website has a link to "Sign In Through Steam" which is a gate to a Valve-owned domain, and upon entering the login information there, the Steam API will return a response which says whether the login was successful or not. After a successful login, skin-gambling websites are able to initiate trades with the user for their skins. Gambling websites price skins based on the SCM price and utilize trade bots to accept skin trades for site-wide gambling credits – almost identical to how both real-world and online casinos operate.

The availability of mechanisms that emulate games of chance, or in many instances third-party websites that offer games of chance in exchange for in-game currencies, are problematic for a number of reasons. At its core, games of chance may take away from the primary gameplay – whether the game is an MMORPG, first-person shooter, or team-based game – by focusing on the gambling-like content instead of the main game. Additionally, video games largely do not verify player ages, making inclusion of gambling-like activities particularly troublesome and potentially predatory. Different countries and their regulatory bodies already delineate and define acceptable content in video games released within their borders on the basis of harsh language and mature content. On a broader level, the monetization of gameplay elements may also incentivize, or at the very least, open the door to profit-motivated match fixing and potentially problematic behaviours surrounding loot (e.g., gun skin) exchanges.

The Legal Landscape of Loot Boxes

Some scholars in the legal field have recognized the emergence of loot boxes and skins gambling and have begun to study the applicability of current laws to this virtual behaviour. It is important to note that it can take years for the law to recognize, address, and govern new behaviours.

John Haskell's work outlines the skin gambling problem in Counter-Strike: Global Offensive and provides a brief history on the legal background of gambling within the U.S. Haskell (2017) suggests that if operators of skin gambling businesses are seeking long term survival, they will have to implement more stringent age and user verification systems. He states that in the US, there are no established case laws or statutes to govern this relatively new industry. Haskell points to four primary sources of statute law that may be applicable to this marketplace, which are: (1) The Wire Act; (2) The Illegal Gambling Business Act; (3) The Unlawful Internet Gambling Enforcement Act; and (4) The Professional and Amateur Sports Protection Act. He suggests that the most appropriate things for the game developers to do are implement more controls over the Steam API and curtail the ease of transferability in CS:GO's skins (Haskell, 2017). At the legislative level, Haskell argues that recognizing esports as a legitimate sport and players within this domain as athletes would allow for the federal government to regulate skin gambling.

Andrew Kim has also written about the legality surrounding loot boxes and skins, and skin gambling within the United States. Kim (2017) discusses the current laws surrounding skin gambling and how the courts have addressed them up to this point, utilizing a lawsuit to illustrate his point. This case addresses the legal approach of secondary markets in gambling liability. In this lawsuit, McLeod alleged that Valve facilitated illegal gambling by allowing these third party sites to exist. At that point, Valve Corp. states that they had not given any gambling site their blessing; rather, they sent cease-and-desist letters to twenty-three sites asking for this activity to stop. This court case was ultimately dismissed, as

the plaintiff had not been able to establish the requisite claim that Valve Corporation was engaging in illegal gambling.

The current laws surrounding digital gambling presume that the developers are offering prizes of value. The reality is, in the eyes of U.S. law these virtual items do not currently have a value, and it is others that are assigning values to these otherwise-worthless prizes (Kim, 2017). Kevin Liu (2019) explains that there are three elements that must be present in an activity for it to qualify as gambling in the U.S. They are: chance, consideration, and a prize of value. Multiple legal scholars have written that they believe skin gambling falls under the U.S. federal determination of gambling (Hardenstein, 2017; Liu, 2019). As it exists when betting on a professional sporting event, the element of chance exists on match betting websites like CS:GOLounge and casino-style websites like CSGOatse. Consideration, which can be monetary or non-monetary, exists in the form of virtual skins where they act like casino chips. Although the payouts differ between online skin gambling sites and casinos – skins and cash, respectively – what is won is considered the prize and fulfills the final criteria (Hardenstein, 2017). Liu (2019) posits that loot boxes could fall under this categorization because customers pay for loot boxes with real money, have random odds, and may win a random virtual prize.

Kim (2017) suggests that there are three steps states can take to alleviate the problem of online skin gambling. The first recommendation is that the states should approach the definition of gambling as a binary choice - chance should predominate or not matter at all. Second, states should adopt laws to clear developers of liability for the unintended consequences stemming from these activities, only holding them liable if they designed their game as a means of covert gambling. Finally, Kim advocates for states to be informed about digital gaming trends so as to pre-empt any nefarious and possibly illegal activities (Kim, 2017). In early 2018, advocates from six states had taken some form of action against loot boxes: Hawaii, Washington State, New York, Michigan, Indiana, and California (Liu, 2019).

Washington State Senator Kevin Ranker tabled a bill to highlight three major concerns: whether loot box

mechanics constitute gambling under Washington law, whether these mechanics belong in games and apps, and whether minors should have access to these games and apps. Hawaii, New York, California, Michigan, and Indiana have all introduced bills to protect consumers from loot boxes, as advocates from these states separately claim that loot boxes are designed to exploit addiction in human psychology (Liu, 2019).

Liu also examines the reactions from countries around the world and isolates four different responses to the behaviour. Governments may: 1) ban the loot boxes entirely; 2) regulate them in various ways; 3) investigate them further; or 4) decline to recognize the practice as gambling and take no further action (Liu, 2019). The UK Gambling Commission Office, French Online Gaming Regulation Authority, and the New Zealand Gambling Compliance Office have so far concluded that the opening of loot boxes do not qualify as gambling and currently requires no further action.

South Korea and Japan have moved towards regulating loot boxes, though the regulation boards of each country have not specifically targeted online loot boxes as of the writing of this piece. China's Ministry of Culture has required all online game operators to disclose the probabilities of all virtual items and to establish two-step payment confirmations when purchasing an in-game item or service a progressive step for both transparency and consumer protections (Gartenberg, 2017). The Netherlands and Belgium banned loot boxes to varying degrees within their respective countries. The Dutch Gaming Commission declared in a 2018 research report that loot boxes were a form of gambling if the virtual prizes could be traded outside the game for real-world currency and went on to ban them in April (Netherlands Gambling Authority, 2018). Enforcement of the loot box ban in the Netherlands began two months later. Shortly thereafter, Belgium followed suit by establishing in its own analysis that loot boxes constituted gambling and subsequently banned them as well (Geens, 2018). With this finding, Australia's Senate passed a motion to further investigate loot boxes with their inquiry finding that loot boxes could

lead to problem gambling, though this has not yet resulted in formal legislation against the inclusion of loot boxes (Deblaquiere, Carroll, & Jenkinson, 2018).

Liu (2019) concluded by proposing changes that would mitigate the current harms of loot boxes and in some cases render them near-negligible. One suggestion is that the ability to 'cash out' could be removed if all virtual items obtained from loot boxes were locked to the account. Another suggestion is the elimination of any virtual content that provides a competitive edge. Liu also proposes enacting parental controls on spending, as well as enforcing the disclosure of the odds of winning. Liu believes a middle-ground could be reached with these alterations, where personal harms can be mitigated and the additional revenue stream from microtransactions can still exist for publishers. This may be a legitimate direction the industry is headed, as Apple requires any games with loot boxes or other outlets that provide random virtual items on their App Store must disclose the probabilities of receiving each item type prior to purchase (Kuchera, 2017).

Other Monetization Strategies in Video Games

Loot boxes are by no means the only form of monetization in video games, and though many video game publishers have embraced microtransactions, they remain a contentious presence for many gamers and industry observers. The current literature recognizes the success of microtransactions and their associated mechanisms from a profit-maximisation perspective, but calls into question their fairness to consumers.

Perks (2019) asserts that the reality of monetization has shifted from 'blockbuster' monetization, where players pay a high initial capital cost to purchase the game, to 'free-to-play' monetization, in which access to games is at a lower initial cost – and sometimes free – but small incremental purchases are incentivized over time. Perks describes five monetization methods within the 'free-to-play' umbrella: premium, which is reminiscent of the blockbuster model; 'freemium', in which the user can download the initial product for free and later purchase the fully unlocked version; advertising-supported, where the product is free but advertisements appear during gameplay; subscription, in which users can download the game for free but must pay a monthly fee to retain access; and microtransactional, where users can play the game for free but have the additional option to purchase content within the game. The appearance of microtransactions as a monetization method could lead to future video game releases whereby publishers price their games at high 'blockbuster' price levels and induce further spending by including loot boxes as additional paid content.

A major challenge for regulating products offered through the online gaming space is the differing regulatory recognition between countries. For example, regulators in Belgium and the Netherlands recognize the loot box mechanism as a form of gambling, while governments and gambling commissions of other countries, such as the United States and Canada do not categorize loot boxes in the same manner.

King et al. (2019) analyze thirteen patents submitted by various companies which establish proprietary ownership of different monetization mechanisms as they relate to consumer protection measures in Australia. In these patents, it was found that some in-game purchase systems contained modifiable experiences based on an individual consumer and population-level behavioural data. The authors find that in-game purchases and virtual assets effectively have no protections compared to tangible consumer goods, even though the Australian Competition and Consumer Commission (ACCC) and the Australian Communications and Media Authority (ACMA) state that purchased virtual goods must comply with Australian laws and regulations.

Daniel King and Paul Delfabbro (2018) advocate for social responsibility within contemporary video game design and in particular how features of loot boxes are implemented. Some purchasable in-game content bear striking resemblances to gambling products and can be considered predatory, even if they do not fall under the strict legal scope of gambling. They create a four-step blueprint for responsible microtransaction conduct, advocating for corporations to: minimize predatory features of loot boxes; be transparent about the monetization system; present measures to protect young consumers; and accurately display the product in all advertising (King & Delfabbro, 2018). King and Delfabbro's recommendations fall in line with modern definitions of corporate social responsibility – the concept of holding corporate actions accountable to both the shareholder and the general public (Moir, 2001).

McCaffrey (2019) details management strategies that companies can utilize to mitigate the damage caused by loot boxes and microtransactions. He asserts that publishers and developers must divert more resources into navigating this uncertain regulatory space, maintaining that firms must transparently self-regulate in this space by publishing the probabilities of various prizes contained within loot boxes. McCaffrey further suggests that offering untradeable loot boxes could aid in addressing

regulatory and consumer complaints, and that practices aimed at promoting consumer confidence could benefit the long term health of the industry.

The connection between monetization and player behaviour leads to another research question addressed in this thesis: how can deterrence theory inform understanding of monetary-related behaviours within this virtual space? Furthermore, to the extent that enforcement relates to deterrence, what consequences arise from the reality that the amount of coordination required between law enforcement agencies makes it particularly difficult to resolve international crime in the online space. Traditional police are generally unequipped to handle online cases with the same rigour as in-person investigations. This results in a security deficit where many crimes perpetrated online go either unreported or ignored (Huey, Nhan, & Broll, 2012). In the case of loot boxes, these likely fall under the purview of the gambling commissions to pre-emptively identify this behaviour and determine if it contravenes local or national laws.

Criminological Framing

As discussed above, legal scholars and policy makers have made some attempts to understand and frame connections between video games, gambling and e-commerce, but few criminological studies have addressed these issues. A starting point for such inquiry would be to apply a criminological theory lens to such an analysis. In this study, deterrence theory serves this role. Deterrence theory is broadly framed within a rational choice context, suggesting that some offenders consider variables such as likelihood to be apprehended, given their available opportunities to offend, the presence or absence of guardians, and other social forces such as peer group involvement and past history with offending and interaction with law enforcement (Cornish and Clarke, 2014; Grabosky, 2001). The invention of the Internet has been a boon for international commerce, but it has also created new opportunities for crime. Some scholars contend that the core motivations for crime transcend the physical-digital divide (Grabosky, 2001). Other scholars (Wall, 1998) posit that some real-world criminal activities translate directly onto the internet, though there are other Internet specific criminal activities that have emerged as novel.

In general, the risk-reward ratio of cyber criminality operates as an incentive for preferring cyber to traditional offending. That is to say, a challenging aspect of policing cybercrime is that the perpetrator and victim often reside in completely different locales, resulting in what often amounts to a fruitless transnational endeavour to prosecute the offender (Grabosky, 2001). Attempting to mobilize two police forces in different countries to investigate a routine crime like consumer fraud will, in all likelihood, receive no serious consideration. Cybercrime costs the global economy nearly \$600 billion dollars a year and yet, perpetrators of major cybercrime activities often go unprosecuted (Lewis J., 2018).

A seminal text in the field of criminology, Cesare Beccaria's (1986) *On Crimes and Punishment* asserted that for punishments to be effective deterrents, they needed to be swift, severe, and certain.

Certainty meant that there was a high chance the offender would be caught; severity referred to the balancing act of levying a punishment that was sufficiently severe enough to deter future offenders, but not so severe that it went above and beyond what would deter most would-be offenders; swiftness relates to how quickly the punishment was administered after the crime was committed. Further, criminological theory dictates that for a sanction to serve as a deterrent, individuals must be made aware of the consequences prior to committing an offense (Wright, 2010). Deterrence theory states that there are two types of deterrents, general and specific. General deterrence occurs when a would-be criminal does not commit a crime because of the possibility of apprehension and the judicial punishments associated with the illicit act; specific deterrence dissuades repeat offenders from committing another criminal activity because of the fear of being caught and punished again (Loughran, Paternoster, & Weiss, 2016). Nagin & Pogarsky (2001) analyzed the calculus behind crime through an expected utility model and surmised that for a crime to occur, the direct and indirect benefits of crime must outweigh the probability of being caught and the resulting legal and extralegal costs.

Deterrence theory continues to inform contemporary criminology research. Cornish and Clarke (2014), for example, compile a robust set of studies pointing to the continued value of rational choice perspectives in understanding specific criminal motivations and policy responses. Other contemporary examples include Matsueda, Kreager, and Huizinga's (2006) study of youth offending, in which they utilized data collected from the Denver Youth Survey, a longitudinal study of drug use and delinquency within high risk Denver neighbourhoods, and found that self-reported theft and violent crime were associated with perceptions of arrest. Within this youth cohort, Matsueda's model found that an increase in perceived risk of punishment projects a corresponding reduction in self-reported rates of theft and violent crime. In other words, respondents were less likely to report engagement in theft or violent criminal behaviour when they believed there was a high chance of being caught.

The issue surrounding loot boxes and unregulated gambling in CS:GO can be analyzed through both rational choice and deterrence theory. Both theories assume that the basis of human action is informed by the possible consequences from such decisions (Akers, 1990). The premise of rational choice theory is that actions and decisions are made based on an individual's internal risk versus reward calculus – it is a consideration of what the individual gains from the criminal activity compared to the likelihood of the contemplative criminal being caught plus the associated penalty (Akers, Sellers, & Jennings, 2016). According to deterrence theory, criminal laws serve to discourage would-be offenders from committing illegal acts by assigning punishments that are harsh enough to offset gains from crime, but not unjustly punitive. Helfenstein & Saariluoma (2014) propose that criminal intention can be identified by evaluating the difference between the anticipated personal benefit and possible undesirable personal disadvantages from the criminal act.

Studying Video Gaming and Gambling

Though not necessarily criminological, some academic research has analyzed primary data in order to assess risks associated with youth gaming and loot boxes. Continued analysis of this field is important as interest and market size continue to expand. Sweeny, Tuttle, and Berg (2019) contend that the size of the esports market is rapidly growing, with \$7.4 billion US dollars having been wagered in 2018, and that number is projected to grow to anywhere between \$13 and \$23 billion by 2020. Meanwhile, the total legal U.S. betting market is roughly \$40 billion dollars in size.

Researchers have used a variety of approaches to explore video game-connected gambling. Zendle and Cairns (2018) conducted a large online survey of adult gamers on the topic of problem gambling in the context of amount spent on loot boxes. Problem gambling was established using the nine-item Problem Gambling Severity Index (PGSI). With a sample of 7,422 respondents, they found that this relationship was statistically significant with a small-to-medium effect size, and noted that the observed relationship was stronger than these other important risk factors such as depression and major drug problems. They contend that the regulation of loot boxes is necessary, given the demonstrated relationship between loot box spending and problematic gambling. A replication of their 2018 study was conducted one year later with a new 1,172 group of surveyed participants and found that a significant link was determined between problem gambling, again established by the PGSI, and loot box spending (Zendle & Cairns, 2019). A small-to-medium effect size was again demonstrated in the mean amount spent per month on loot boxes, which ranged from \$11.14 by non-problem gamblers to \$38.24 for problem gamblers. The authors note that the results of the studies cannot confirm a direct causal relationship; either loot boxes act as a gateway to problem gambling, or individuals with gambling problems are drawn to spend more on loot boxes (Zendle & Cairns, 2019).

Brooks and Clark (2019) also analyzed the associations between loot boxes and problematic gambling. They conducted studies using results obtained through online surveys with two samples of

the population: one sample was composed of 144 adults aged twenty-one or older, each having experience and familiarity with both video games and loot boxes; the other sample consisted of 113 undergraduate students from the University of British Columbia that were nineteen or older and had familiarity with loot boxes. Brooks and Clark used Principle Axis Factoring to create a five-item scale of variables associated with problematic loot-box usage which they labelled the "Risky Loot-Box Index" (RLI) (Brooks and Clark, 2019). In the first study, Brooks and Clark conducted a hierarchical regression with four blocks of predictors containing eleven independent variables in total. Their model was statistically significant, with gambling-related variables accounting for 37.1% of the variance in the RLI; the overall model predicted 49.1% of the variation in the RLI. These authors advocate for further research of the harms associated with loot boxes, transparency with respect to loot box odds, and the ability to self-exclude from microtransactions.

Macey and Hamari (2019) utilized an open survey link posted on social media sites, national esports associations, and esports discussion forums to recruit participants for their study. They sought to answer three research questions: what are the demographics of esports spectators who gamble; to what degree are spectators of esports participating in traditional or video game-related gambling and what activities are favoured, and; what are the rates of problematic gambling behaviour among esports spectators compared to those that participate in traditional methods of gambling. They found that for their first research question, the vast majority of their sample was male which was in line with previous findings in the literature (Macey & Hamari, 2019). Respondents in this survey were mostly young, with 27% being under the age of 18 and an additional 31.3% between the ages of 18 and 21. They also found that the more engaged a spectator was with esports, the higher the number of channels used to access gambling. In their sample of 383 valid respondents, loot boxes and video-game related betting were the most popular with 46.2% and 30% of respondents respectively answering that they participated in these activities. In their analysis of respondent data, Macey and Hamari (2019) identify that increased

spectatorship of esports is associated with increased levels of online and video game-related gambling. They also found that rates of problematic and potentially-problematic gambling were substantial among esports spectators, with a combined rate of over fifty percent of respondents demonstrating problematic or possibly-problematic gambling tendencies. This reaffirms the results of previous studies, which found higher rates of problematic gambling among online gamblers compared to offline gamblers.

Some authors studied the intersection of loot boxes and gambling within a specific country. Udesen, Lenskjold, and Niclasen (2019) investigated how Greenlandic adolescents perceived gambling through semi-structured focus groups. In total they recruited thirty-one adolescents to participate in their study. The authors report that several participants spontaneously detailed their experiences with virtual currencies and skins when asked about their experiences with gambling, with one participant acknowledging that their purchase of CS:GO skins would not be approved by their parents, illustrating that loot boxes and skins have become increasingly associated with gambling.

Likewise, Wardle (2019) conducted a secondary analysis on survey data collected by Ipsos on UK children and their gaming habits, in particular the convergence of engagement in traditional games of chance and skin gambling. The survey participants consisted of 2,881 youth between the ages of eleven and sixteen, and in the month prior to participating in this survey seven percent of all surveyed youth had engaged with skins betting, and sixteen percent of all surveyed youth had participated in other forms of gambling. In this survey, male youth had higher self-reported rates of engagement with betting compared to female youth: fifteen percent of boys and one percent of girls participated in skins gambling, whereas twenty-one percent of boys and ten percent of girls participated in any form of gambling excluding wagers with skins. Heightened risk levels appear with the convergence and concordance of online and other forms of gambling. Wardle (2019) found that rates of at-risk and problem gambling were highest among gamblers who also engaged in skin gambling. It can be said that

some youth engage in both skin gambling and other forms of gambling – though it must be said that there are many youth that do not participate in gambling activities at all, and that some youth participate in one activity but not the other (Wardle, 2019).

While this research focuses on loot boxes in CS:GO, other in-game economic models also have ties to traditional finance (e.g., Real Money Trading [RMT]). Two examples are found in *Runescape* and *Eve Online*.

Griffiths and King (2015) highlight mini-games that contain gambling mechanics within the massively multiplayer online role-playing game (MMORPG) RuneScape. They point out that Squeal of Fortune, which was introduced into the game in 2012, and its 2014 successor, Treasure Hunter, which each consist of mechanisms that emulate gambling. Griffiths and King (2015) note that, in addition to the daily free plays each user was able to redeem, players were able to purchase additional spins (Squeal of Fortune) or keys (Treasure Hunter) using real-world currency. Users received items from these mini-games which were then able to be converted to the in-game currency, Gold Pieces (GP). With GP users were able to purchase 'Bonds' that could be redeemed for two weeks of the games' subscription content, or real life services such as attendance to offline RuneScape events, hotel rooms, or even airfare to these events (Griffiths & King, 2015).

The currency system within EVE Online, a space-based MMORPG, lent itself to allow for third-party gambling content to appear. In EVE Online, players can purchase an in-game item called a Pilot's License Extension (PLEX) that can pay for the cost of accessing pay-to-play sections of EVE, character services, and be traded for InterStellar Credits (ISK), the in-game currency. PLEX can be purchased from the game developer for real-world currency. The prices and amounts range from \$4.99 USD for 110 PLEX to \$99.99 USD for 2860 PLEX (CCP Games, 2019). According to EVE Marketdata, one PLEX can be sold on the in-game marketplace for roughly 3.2 million ISK (EVE MarketData, 2019). The existence of real-world

trading had prompted the developers of EVE Online to issue a public statement, asking users not to engage in this conduct (EVE Dev-Blogs, 2007). But, the nature of liquidity between in-game and real-world funds within EVE Online means that there are ample opportunities to trade in-game items for credits on a third-party gambling website, or for real-world money. As Steven Messner reports, a site named 'IWantISK' was the largest online casino for EVE Online, created by three users notorious for their amount of in-game wealth (Messner, 2016). CCP, the developers of EVE Online were cognizant of IWantISK's existence and subsequently modified the games' End User License Agreement (EULA) to formally address this behaviour (CCP Games, 2016). In this announcement, they cited extensive infractions against the existing EULA and, consequently, banned the three founding members of IWantISK, confiscating all in-game currency found on these accounts.

The Current Inquiry

The above two sections have established that while empirical analysis of loot box dynamics is useful, there still remains a gap from a criminological perspective. In the contemporary video game context, free-to-play games, especially those designed for all ages, have risen in popularity. As such, loot boxes may be available to a segment of the population unequipped to fully understand and process the potential risks and ramifications that come with gambling-adjacent content. This will be done by identifying stakeholders and discussing the role of the video game player as a consumer of microtransactional goods, how developers and third-party platform creators uniquely benefit from this, and the differing responses regulatory bodies have to this phenomenon of tradeable virtual goods and the gambling of such items.

This thesis concentrates on the events surrounding the introduction of virtual skins and loot boxes, as well as the resulting underground gambling that occur around CS:GO and its skin-driven economy. This work attempts to demystify and define the liminal spaces that loot boxes and skin gambling currently occupy within the video game industry. The conclusion of this thesis will map out the tumultuous journey of the skins and loot boxes available in CS:GO as a monetization mechanism for Valve. Additionally, based on these assessments, this thesis provides a projection of what the video game industry might next develop as a next major revenue stream.

Methodology

Chronological Case Study

The current inquiry draws on a chronological case study approach. Historically, qualitative research methods, such as the case study, were relegated to a secondary role compared to quantitative research, but Stoecker (1991) argues that the strength of the case study lies in its explanatory ability. Robert Stake (1978) suggests that the target of inquiry does not need to be a person or enterprise – an institution, programme, responsibility, a collection, or a population can encompass a case. In the case of the current inquiry, CSGO represents a case in which many stakeholders interact with one another, as well as game-related mechanics, concepts and artefacts. Stake's interpretation underscores what many academics that utilize the case study have come to realize: there is no clear delineation of what constitutes a case study, though there are general guidelines. As Hammersley and Gomm (2000) note, case studies take many forms and are not restricted to an academic context – lawyers, doctors, and law enforcement all deal with cases. In a research context, case studies refer to the modality of research that investigates few cases, often one case, in extreme depth (Hammersley & Gomm, 2000). Charles Ragin (1992) argues that case analysis and case study are terms that are generally not well defined within the social sciences, even though their use within the discipline is widespread. Miles and Huberman (1994) define a case as an event or phenomenon occurring in a bounded context. In a bounded context, there is a focus on what will be studied and what will be omitted within the case. This current study examines the contemporary applications of tradeable cosmetic items, or 'skins', within video games. The purpose of this analysis is to document the introduction of loot boxes and cosmetic skins within the modern video game cycle, specifically through the lens of the game Counter Strike: Global Offensive. To that end, this thesis utilizes a bounded chronological case study model to explore and document transferrable items and cosmetic skins.

In discussing what constitutes a case study, Stoecker (1991) believes that the term should be reserved for research endeavours that attempt to wholly explain a historical period of a particular social unit and the dynamics that surround the subject. Likewise, Ragin (1992) leans on the comparative social sciences and states that boundaries around places and time periods define cases. Noor (2008) contends that the case study method is not meant to be used as a study of an entire organization, but rather that the intention of a case study is to focus on a particular issue, feature, or unit of analysis. Yin's (2018) definition of what constitutes a case study borrows from Stoecker and is twofold – it investigates a present-day phenomenon in depth and within its real-world context, and it relies on multiple sources of evidence with the data converging in a triangulating fashion.

Triangulation, as Yin (2018) describes in the context of social science research, is the establishment of evidence through multiple sources. The validity of claims based on one piece or source of evidence may be lacking, but the use of multiple sources of evidence helps strengthen the case study's finding (Yin, 2019). Yin (2018) additionally notes that triangulation helps strengthen what he refers to as the construct validity of a case study – the accuracy with which a case study's measures reflect the concepts being studied (Yin, 2018, p. 350). Each piece of data and the accompanying source is treated as one piece of a “puzzle”, where the researcher is attempting to create a complete understanding of the studied phenomenon (Baxter & Jack, 2008). The majority of this study focuses on the non-gameplay elements surrounding Counter Strike: Global Offensive. While multiplayer gameplay is addressed within this study, the focus is on materials surrounding the game, also known as “paratexts.” The term paratext was originally developed by Gerard Genette in 1997, where he used this term to describe the extra accompanying materials of books that provide additional context such as forewords, footnotes, and epilogues (Genette, 1997). Mia Consalvo utilizes Genette's conception of paratext and applies it to game studies. Consalvo (2007) suggests that video game paratexts such as gaming strategy guides, gaming magazines, fan art, and fan websites work to shape the overall

gameplay experience. She contends that these paratextual materials have a pedagogical function within the gaming world; teaching players the culture surrounding a specific game, how to play the game, and what conduct is acceptable or unacceptable (Consalvo, 2007). This study highlights and documents paratexts that surround Counter-Strike: Global Offensive, some examples include: gaming news sites, fan posts, and blog posts from the developers, along with the researcher's own experiences with the studied game and marketplaces.

Sample

This thesis focuses on CS:GO as the analyzed case, bounding it temporally through the game's lifespan beginning with the game's first introduction of loot boxes in 2013 to the end of 2019. This analysis draws on a variety of data sources, including non-academic articles and reports from gaming news sites, journalistic pieces published by traditional media outlets, blog posts from game developers and government rulings related to loot boxes and gambling and match-fixing. The sampling frame for these sources emerged through a combination of naturalistic presence in the CS:GO community and ecosystem and the author's familiarity with sources frequently linked to CS:GO.

Chronological Framework

This thesis utilizes a chronologically-bounded case as its reference point, beginning in August of 2013 with the first appearance of loot boxes in CS:GO, and following the case to the end of 2019. Yin (2018) suggests that analyzing data points in a chronological fashion is common practice in case studies. When interrogating a phenomenon, a chronology can serve to bound the case and the data comprising its analysis in space and time.

Analysis

The former portion of this thesis explored and outlined the current academic literature on loot boxes and explained the sampling methodology of this work. The latter portion of this thesis will delve into the subject of loot boxes and skin gambling through the lens of the video game CS:GO. The timeline below chronologically frames important events in CS:GO, beginning with CS:GO's inception in 2012 and outlining how the game is played. Afterwards, this section will gradually outline the role loot boxes and skins have served in CS:GO, demonstrating how some actors have capitalized on the transferrable nature of these items and introduced out-of-game uses for skins. It will highlight the different websites, platforms, and games of chance that exist on such websites and also explore the different stakeholders and organizations involved within this space. Finally, it will outline laws surrounding gambling differ between countries, and how some of these countries have responded to the appearance of skin gambling.

Timeline of Important & Major Events in CS:GO

Date	Event
2012-08-21	Initial release of CS:GO
2013-08-14	Arms Deal Update
2014-08-21	iBUYPOWER match fixing scandal
2015-01-26	Valve Levies Lifetime Bans for iBUYPOWER match fixing scandal
2015-11-25	Trade hold for players without two-factor authentication (2FA)
2016-01-05	Valve reaffirms iBUYPOWER bans
2016-03-02	Trade hold duration increase for users without 2FA
2016-06-13	CSGODiamonds admits to giving advanced notice on outcomes to sponsored streamer Mohamad "M0E" Assad
2016-07-05	YouTubers "TmarTn" and "Syndicate" found to have undisclosed ownership of a skin gambling site they were promoting on their channels
2016-07-13	Valve state they have no partnership with skin gambling; issue warning to gambling sites
2016-07-16	Evidence released of Twitch Streamer Jason "Phantoml0rd" Varga's undisclosed ownership and rigged outcomes on skin gambling website CSGOShuffle
2016-07-19	Valve send out cease-and-desist to 23 skin gambling sites
2016-10-05	Washington State Gambling Commission orders Valve to stop skin gambling
2017-10-11	Game rating agency ESRB does not consider loot boxes to be gambling
2017-11-22	Hawaiian State Rep. Chris Lee announces action to combat predatory loot boxes
2017-11-22	Victorian (Australia) Gambling Commission announces that loot boxes constitute gambling

2018-03-29	To combat fraud and skin gambling Valve introduces a 7-day trade restriction on CS:GO items
2018-04-19	Dutch Gaming Authority rules that four of ten loot boxes studied contravened Betting and Gaming Act
2018-04-25	Belgium declares FIFA 18, Overwatch, CS:GO loot boxes contravene Belgium gambling laws
2018-06-08	OPskins releases feature to circumvent the 7 day trade hold on CS:GO items
2018-06-09	Valve issues cease and desist to OPSkins, states their trade bots will be seized on June 21st
2018-06-21	OPskins trade bots are decommissioned by Valve, an estimated \$2M USD of skins are lost
2018-08-23	YouTuber Trevor "McSkilllet" Heitmann dies in vehicular accident, likely because his Steam account was trade-banned; loss of skins valued at over \$100,000 USD
2018-12-08	Valve releases CS:GO on Steam for free, suggesting that future revenues will be mostly from microtransactions
2019-10-28	To combat global fraud networks, Valve tradelocks CS:GO loot box keys to the purchasing account

The following section will discuss notable and important events within CS:GO, beginning with the release of loot boxes in 2013 and ending with Valve's decision in late 2019 to lock loot box keys to the purchasing account. This case study highlights the actions different actors in this space took as it evolved from the simple introduction of aesthetically pleasing cosmetic items into a multi billion-dollar industry.

Utilizing the above timeline as temporal guideposts, the headings found in the following section detail important concepts and events within the CS:GO landscape vis-à-vis loot boxes and skin gambling. The section concludes with an exploration on how major countries have acknowledged or responded to the introduction of loot boxes and the changes to CS:GO loot boxes governing bodies have prompted from Valve.

What is Counter-Strike: Global Offensive?

Counter-Strike: Global Offensive was released in 2012 and is the fourth game in the Counter-Strike series, the successor to the long-standing game Counter-Strike: Source. It is a first-person team-based shooter with multiple gameplay modes and maps available for play. Online competitive gameplay, “competitive matchmaking”, is the most popular game type. In competitive matchmaking players are able to choose the maps they want to play. The most popular and balanced maps are found in the ‘active duty’ pool, a collection of seven maps that are used in professional play (Counter-Strike Wiki, 2019). When a game is found ten players are randomly split into two teams of five, one side acting as the attackers and the other as defenders. The attackers win a round by planting a timed explosive and destroying one of two sites on the map or eliminating all defenders before the round timer expires. The defenders win a round if they eliminate all attackers, successfully defuse the planted explosive, or if the round timer expires before the attackers are able to plant the timed explosive. After fifteen rounds the teams switch roles, with the attackers becoming defenders and vice-versa. To be victorious, a team must win sixteen out of thirty rounds.

What are Loot boxes, loot crates, and card packs?

“Loot boxes”, also known as “lock boxes” and “loot crates”, all refer to a polyonymous digital item found in many modern video games. A player acquires loot boxes through a variety of means, some of the most common being: promotional events, gameplay progression, completion of timed objectives, purchased with in-game currencies, and purchased with real-world funds. Loot boxes are unlockable after acquisition, though some require a key to open them (see Table 1 for a list of popular games that contain loot boxes). Most loot boxes contain cosmetic upgrades to a player’s in-game characters. These digital skins change the way a character or item look, but do not alter their capabilities when applied. Some games, such as Middle-Earth: Shadow of War, implemented loot boxes that contained items that aid the player’s progression through the game. Facing public criticism over the loot boxes the developers of the game, Monolith Productions, promised to rework the microtransactional economy and removed them from the game in July of 2018 (Hall, 2018). This was not the first time a game developer experienced widespread criticism over microtransactions and their ability to affect gameplay. Star Wars Battlefront II initially contained purchasable loot boxes which held items that strengthened a player's in-game character when used. The beta version of this game was released to the public in 2017 and it was found that the progression system seemed to incentivize microtransactions over regular gameplay (Gamespot, 2017). During the beta version’s release, players were able to purchase 'Crystals' which were exclusively used to open loot crates. These packs were available in the smallest increments of 500 Crystals for \$4.99 US dollars, up to 12,000 Crystals for \$99.99. Prior to the game's official launch, EA disabled all microtransactions in an attempt to rework their loot crate system (Gabrielson, 2017). The overhaul came in two waves, one in March and the other in April, where EA re-released the concept of loot boxes as a non-purchasable daily login bonus. The items obtained through the loot crates are cosmetic-only and the progression system has been reworked so that it is not contingent on microtransactions to rapidly progress through the game (Grubb, 2018a). Crystals are still available for

purchase where, in conjunction with the in-game currency, they are used to individually purchase cosmetic upgrades.

Collectible card games (CCGs), such as Hearthstone and Magic: The Gathering Arena, incorporate the loot box mechanic as a means of amassing the cards necessary to fully enjoy the game. Similar to trading card games, players are able to purchase “card packs” which contain cards of varying rarities. Accumulating enough cards to be casually competitive in these CCGs is not impossible, but frequent play to complete quests and objectives that provide in-game currency to purchase card packs is necessary. Unlike many other types of video games, CCGs release new card sets roughly three times a year (Blizzard Entertainment, 2019a). This means that the most popular cards and decks change with these updates and older cards are relegated to different gameplay formats. A player must constantly open packs of the newest ‘expansion’ to keep their collection up to date. For many users, a free-to-play experience is onerous, and this promotes spending real-world money on pre-purchasing card packs of upcoming expansions.

Card packs can be purchased with earned in-game currency, or real-world money. In Magic: The Gathering Arena players can buy packs of ‘gems’ which can be used for entry into different game formats, or purchasing card packs directly. The smallest allocation of purchasable gems is 750 for \$4.99 USD, and the largest package of gems is 20,000 for \$99.99 USD (Wizards of the Coast, 2019). In Hearthstone users are able to purchase card packs for any released expansion, with two card packs costing \$3.75 CDN, up to sixty card packs for \$87.99 CDN (Blizzard Entertainment, 2019b). When players receive the same card over a maximum allowable amount – in Magic: The Gathering Arena it is four, and in Hearthstone it is two, except for ‘legendary’ cards which are the rarest and have a limit of the single card – they are able to be disassembled into parts which the player can then use to create any card they wish to have (Mlakar, 2019; Hearthstone Wiki, 2019).

Loot Box Mechanics and Gambling

Loot boxes are often included in many modern video games, whether they are branded as chests, crates, cases, or card packs. These items are all functionally identical – the user pays real world money in exchange for randomized items found within the loot boxes. Some gamers and game publishers, such as Warner Brothers, argue that loot boxes are just an option in the game and players do not have to consume them if they choose not to, though the evidence suggests that it is not that simple (Hood, 2017). Game developers often design the opening of loot crates to be satisfying – for instance, the in-game animation for opening a Counter-Strike: a Global Offensive loot box is reminiscent to that of a slot machine or roulette wheel (Figure 6). Additionally, developers will layer the case opening experience with exciting music and visual effects, emulating the output of a modern slot machine. In Overwatch, another popular video game, the unboxing mechanic is coupled with exciting music to help the player elicit positive feelings when opening loot crates (refer to Figure 2).

The underlying mechanism of loot boxes, the unpacking of a digital crate containing unknown items and accompanied by music and visual effects, satisfies the need for reward and can be compared to the outputs of a slot machine. Coined by B. F. Skinner, the term ‘variable ratio schedule’ rewards individuals at random intervals for their behaviour – in this case, opening loot boxes – so as to maximize their participation in this behaviour (Ferster & Skinner, 1957). For example, when players open loot boxes they are generally seeking the rarest items. Applying Skinner's model to loot boxes, the player could purchase four loot boxes and receive an extremely rare item. Then they would not be rewarded again until the fifteenth loot box opened. After that, they could go another ten loot boxes before being rewarded – this pattern continues randomly for an indefinite number of trials. A mechanism that has demonstrated the potential to reward a highly desired item at random intervals may lend itself to forming addictive tendencies.

A number of professionals from varying disciplines have weighed in on the impact of loot boxes and their mechanics. Jamie Madigan, a psychologist and author of *Getting Gamers: The Psychology of Video Games and their Impact on the People Who Play Them*, states that when the negative impact of spending money and the derived pleasure of receiving something is obfuscated, people tend to spend more and are more likely to lose track of their spending (Ore, 2017). Additionally, Madigan asserts that when an individual opens a loot box the brain attempts to predict a good outcome from a completely random event. The rewards system in the brain does not realize that it cannot predict randomness and therefore continues to search for a pattern where one does not exist (Hood, 2017). Gabe Zichermann, an expert in gamification and people's addiction to technology believes that this mechanic is "literally, exactly, a slot machine", where individuals cannot predict when the favourable outcomes will occur and thus continue to engage well past the point of rationality (Ore, 2017). Betsy Brey, games researcher and editor of the online game studies periodical *First Person Scholar*, believes that the mechanics of loot-boxes are a form of gambling citing the 'Gambler's Fallacy', where a person incorrectly believes that a random event is more or less likely to happen given the previous outcomes of this random event (Kenton, 2019). Players may be incentivized to keep opening loot boxes thinking their chance of receiving a favourable item grow as they continue to open boxes.

Some players open an enormous amount of loot boxes for the chance to receive an extremely rare and unique item. Players that spend exorbitant amounts of money on these virtual cases are what Manveer Heir, a game designer that previously worked at EA for twelve years, refers to as a 'whale' – an individual that spends much more money on a game than the average person (Purchase, 2017). Heir has seen users spend close to fifteen thousand dollars on Mass Effect loot packs (Riendeau, 2017). A Reddit user with the online pseudonym 'OrelStealth' created a website, Convars.com, which mimics CS:GO case openings and allows users to engage with and observe the loot box probabilities without having to actually purchase and open them in the game (OrelStealth, 2014). The website allows users to open any

loot box that exists in CS:GO, tracks the cost of opening the loot crate, and displays the price of the skin within. This gives users the ability to track the average cost of opening a loot box, without having to spend real money to do so.

Introduction of Transferrable Skins

Beginning with the Arms Deal Update, Counter Strike: Global Offensive saw the introduction of skins, purely cosmetic upgrades, into the game. Players received a decorative skin through timed weapon drops during gameplay or by opening dropped cases also earned through gameplay. The cases are able to be opened by purchasing a 'key' from Valve for the associated weapon case. Once opened, the player has a chance of obtaining a decorative weapon skin from the case which can be equipped, enhancing the cosmetic appearance of the in-game weapon. Each key is \$2.50 US and keys can be purchased in different currencies, where they are converted and benchmarked to the cost in US Dollars. The skins can be sold on the SCM, redeemable for money on the player's Steam Wallet.

The First Reported Instance of CS:GO Match-Fixing: iBUYPOWER vs. NetcodeGuides

On August 22nd 2014, Richard Lewis, a journalist, published an article which alleged that a match played on the previous day between iBUYPOWER and NetcodeGuides was fixed (Lewis, 2014). A follow-up report released on January 16th, 2015 presented evidence that further substantiated the claim that the result of the 2014 match between iBUYPOWER and NetcodeGuides was predetermined (Lewis, 2015a). This report was released after a winter where a couple of top Counter-Strike professional players were implicated in match-fixing and cheating (Milovanovic, 2014). According to Lewis, the fixed match involved the five players on iBUYPOWER, NetcodeGuides owner Casey Foster, and two other professional players, Derek Boorn and Duc Pham. Using multiple accounts, Pham and Boorn placed multiple maximum bets, each bet was roughly \$240 USD of value in CS:GO skins, against iBUYPOWER. Each wager returned nearly \$1200 USD of skins value which was slowly dispensed to the eight individuals involved in this match-fix (Lewis, 2015a). An investigation spearheaded by Valve and CSGOLounge identified the multiple Steam accounts used to place the wagers and linked them to Foster, Pham, Boorn, and the iBUYPOWER team (Valve Corporation, 2015a). Valve subsequently banned the seven individuals involved in the scandal for an indeterminate amount of time from all Valve-sponsored events with one player, Tyler Latham, the only individual not banned because he did not accept any skins from the match-fix.

Event organizers compete amongst themselves for the opportunity to host Valve-sponsored events, as it is considered a prestigious honour to host a Valve-sponsored event. Valve officially asking affiliated tournament organizers and leagues to not allow these players to play effectively banned them from all professional play, as event organizers were extremely hesitant to transgress this boundary, as this was the first verified instance of a professional CS:GO match being fixed. In 2016, Valve released a statement clarifying that the bans resulting from the iBUYPOWER scandal were permanent, and that

future players proven to have taken part in match-fixing would also be permanently banned (Valve Corporation, 2016a).

The levied punishments to the iBUYPOWER squad were meant to act as deterrent to future match-fixers; however, the way Valve approached their eventual judgement drew consternation from multiple parties, including Lewis, the journalist that published the initial report on the iBUYPOWER scandal.

The Beginning of Trade Restrictions

The beginning of trade restrictions between Steam accounts started on November 25th 2015, as Valve made an effort to combat trade scams and the hacking of Steam accounts for their skins (Valve Corporation, 2015b). In an update Valve urged the CS:GO player base to utilize two-factor authentication by installing the Steam authentication application onto mobile devices and announced that trades with a user who does not have two-factor authentication will have the items held for up to a week to allow both parties an opportunity to review the trade and cancel them. An exception to this exists for long-time Steam friends, where the trade hold would only last one day.

On March 1st 2016, roughly six months later, Valve announced that they would increase the trade hold on accounts without two-factor authentication to fifteen days, though the trade hold remains at one day for long-time friends (Valve Corporation, 2016b). This change was part of an attempt to address an item duplication exploit. Previously, in some instances, Valve would restore stolen skins to accounts that filed a support request after they recovered their compromised account. Valve's item restoration process would create a duplicate of the stolen item and restore one copy to the original account. A scammer would steal a user's most valuable skins, creating duplicates of these extremely rare and expensive skins, thereby affecting its scarcity and price. Additionally, some individuals could fake account hijacks in an attempt to get their expensive items replaced, effectively doubling their inventory. With roughly ninety-five percent of daily trades being confirmed by two-factor authentication, Valve saw this as an opportunity to discontinue rare-item duplication.

On March 29th 2018, roughly two years after Valve enforced two-factor authentication for trading, they implemented a seven-day trade restriction on items received in trade matching the already-present seven-day cooldown on items purchased in-game or through the SCM (Valve Corporation, 2018a). As Valve states, this change was made in an effort to combat fraud and scams that

occur using trade bots. Valve justified the seven-day restriction by asserting that in trades conducted between actual players, a given item does not move more than once a week (Valve Corporation, 2018a). Though not overtly stated, the rationales behind the trade restrictions are to curtail the movement of skins to the gambling sites and third-party marketplaces where players can sell their skins for real-world currency.

In the current era of video game development and monetization, some companies have distributed their games for free, opting to instead monetize through microtransactions. The base cost of CS:GO is \$15 USD, with quarterly sales that list the game for up to fifty percent off. In December of 2018, Valve introduced a new game mode and removed the up-front cost, making nearly all aspects of the game free to play (Steam Support, 2018). Valve still charged players \$15 USD for “Prime Status”, which allows players to separately play with games with others that have Prime Status. Prime Status acts as a deterrent for cheaters, as players either need to spend money or an extremely long time playing the game to unlock it. Though Prime Status is useful in avoiding hackers and unsavoury teammates in competitive gameplay, players were able to earn Prime Status through gameplay. It stands to reason that the elimination of a paywall was due, in part, because the developers believed they could make more money on the game through microtransactions than they otherwise would have with the paywall.

Valve, in another effort to combat existing fraud networks, announced that moving forward keys purchased in-game can no longer leave the purchasing account; pre-existing CS:GO keys are still eligible to be traded or sold on the SCM (Valve Software, 2019). Valve states that fraud networks bought CS:GO keys to launder or liquidate their illicit gains, to the point where most of the keys on the SCM were believed to have come from fraudulent sources. An unintended consequence of this announcement was the disturbance of activity within the skin trading market. As posted on a well-known skin trading subreddit, 'GlobalOffensiveTrade', a guide pinned to the top of the site by user “uh_bang” briefly

describes the new common currency (uh_bang, 2019). The new trading currency for CS:GO skins are items from DoTA 2 called 'arcanas' and 'hooks', two extremely common and liquid types of items available for purchase directly from Valve, just like CS:GO keys prior to this update.

OPskins

Founded in 2015, OPSkins was a Montreal-based online marketplace which once served as the most prominent facilitator of both the purchase and sale of skins. The steps a user would take to process a transaction on this marketplace were: a user that looking to sell their skin would log onto the website using the Steam API; that user then chooses the skin they want to sell from their Steam inventory through the website and choose a price to list the item at; the user would receive a trade request from an OPSkins bot for the chosen skin; once that trade has completed, the skin would appear on the marketplace; an interested party could then purchase the item with either their balance gained from other skin sales, or money directly loaded onto the website; the seller receives the money, less a brokerage fee, and can retrieve the money through PayPal.

Many trading platforms and users were inconvenienced with Valve's decision in March of 2018 to introduce a seven-day trade restriction on items received in trade. This decision prompted the founders of OPSkins to pivot from the standard marketplace model and incorporate the blockchain and cryptocurrencies as a method of circumventing the week-long trade restriction on CS:GO items (OPskins, 2018a). This led to the creation of the Worldwide Asset eXchange (WAX) cryptocurrency, which would be used to facilitate skin trades on the OPSkins marketplace. The release of OPSkins' WAX ExpressTrade on June 6th was not kindly received by Valve, as the release of this feature sought to undermine the authority Valve had on its intellectual property. Two days later, on June 8th, Valve publicly released an announcement on their website stating that OPSkins had to cease all use of Valve intellectual property by June 21st, and that all of OPSkins trade bots would be disabled by that date (Valve Corporation, 2018). That same day, OPSkins released an official statement urging their current users to withdraw their items from the platform, though they did ensure that any current cash balance they have on the website would be protected and available to withdraw (OPskins, 2018b). On June 14th, OPSkins disabled

skin deposits onto their platform in advance of the looming decommissioning of their trade bots (OPSkins, 2018c).

A Reddit user by the name of 'W1Z0' used an API and located most of the trade accounts previously owned by OPSkins. The user found 2,884 bots associated with OPSkins, with a total inventory value of nearly two-million dollars USD (W1Z0, 2018). With the removal of OPSkins as a convenient third-party skin marketplace other websites such as CS.money and Bitskins appeared, filling the market void OPSkins left behind.

Games of Chance

Skin gambling websites offer some of the same games of chance that are often available at a brick-and-mortar casino. Some websites also offer the ability to wager on sporting events, though for the most part sites that still take deposits with skins are focused on offering casino-style games and online slots. Some commonly offered games on these sites are as followed: roulette, crash, blackjack, minesweeper, tibian die, jackpot, Russian roulette, fast jackpot, baccarat (Refer to Table 2 for a complete description of the games offered on the site CSGOatse.com).

Chris Grove, a gambling industry analyst, states that skin gambling accounts for the vast majority of the total amount gambled in esports (Grove, 2016b). The skin gambling market can be collated into five types of games: sportsbooks, jackpot, roulette, coin flip, and 'other' games such as blackjack, raffles, rock-paper-scissors, and mystery boxes. Of the projected \$7.4 billion dollar skin gambling market, Grove estimates that roughly 45% is represented in sportsbooks; 26% in jackpot-style games; 14% in roulette; 6% in coin-flips, and 10% in all other games (Grove, 2016b).

Skin gambling websites often incentivize gambling on their platforms by offering a reduction in commission on wins, in exchange for including the website name in the player's Steam username. This type of advertisement is the digital version of advertisements appearing on the uniforms of televised players and athletes. Steam usernames are often carried across games on the Steam platform, so the username change acts as a cross-gaming advertisement. Once the player has finished their gaming session, the player can keep their account balance as is on the site to return to at a later date, or they can withdraw the balance and have CS:GO skins equivalent to the cashed-out value returned to the same Steam account used to make the deposit.

Sports book pari-mutuel system

Used primarily in gambling events such as horse racing, the pari-mutuel system is an old bet wager system that collects and dispenses placed wagers. This system operates by having the bet-maker collect all wagers placed on an event prior to its start. Once the event is complete, the total wagered amount is pooled and distributed equally among the winners proportionate to their wagers, less a percentage fee that the bet-maker takes for facilitating the wagers (Liebman, 2016). Instead of calculating the likelihood of an event and assigning a payout based on underlying data and statistical analysis, some online sportsbooks, such as 'csgofast' and 'Rivalry', still utilize the pari-mutuel payout structure (CSGOFAST, 2019; Rivalry, 2019). The pari-mutuel system does well in capturing the general consensus on how gamblers perceive a certain match or wager and the likely outcome. In other words, the pari-mutuel system reflects the average bettor's confidence in the match's outcomes.

CS:GO Lounge

The arrival of loot boxes in CS:GO created a new virtual market economy and an unregulated space perfectly designed for gambling, a space the founders of CS:GO Lounge sought to occupy. In an article published in Bloomberg Business, Kamali Melbourne and Matthew Campbell (2015) highlight the two worlds that exist in esports gambling – regulated gambling through bookmakers like William Hill and unregulated gambling through websites like CSGOLounge.

Researching the domain name's history using a service called 'Domain Tools', it was revealed that an individual purchased and registered the domain of 'csgolounge.com' the day Valve released loot boxes and skins into CS:GO (DomainTools, 2019). Prior to Valve's cease-and-desist letter, CSGO Lounge was widely regarded as one of the largest and most popular online pari-mutuel sportsbooks. CSGO Lounge utilized trade bots and the Steam API to accept users skins and allow them to use those same skins to bet on professional CS:GO matches.

To place a bet, a user would log onto the site and find professional and semi-professional Counter-Strike matches on the right-hand side of the website (Figure 7). They would click on the particular match they were interested in betting on and be taken to the match's unique page. This page would list the contents of the user's Steam inventory and allow the user to choose up to four skins they wanted to wager on a match. Then, a CSGO Lounge bot would initiate a trade with the user over Steam, displaying a verification code on both the website and the trade window to verify that the requested trade was initiated by a verified CS:GO Lounge bot (Figure 8). Once a wager was confirmed, the user was not able to cancel the wager and return the skins; however, up until the final minutes before the beginning of a match, the user was able to switch the team they placed a bet on (Figure 9). If a user won a bet the received and wagered items would appear in an online inventory on CS:GO Lounge, able to be either cashed out or re-wagered (Figure 10). Users could place a new bet either with the items in their

online inventory or by using items in their Steam inventory; wagers with items already on the platform did not require a new trade to be initiated. If items were not currently being used in an active bet, the user could request a withdrawal of the skins from the platform back into their Steam inventory (Figure 11). In the same fashion as a deposit onto the platform, a CS:GO Lounge bot would initiate a one-sided trade to return items to the user's Steam Account. From there, the user would be able to equip the skins for in-game use, trade them to other users, or sell the skins on the SCM for Steam Wallet funds.

Real Money Esportsbooks

Some operators have taken a regulated approach to betting on the outcomes of esports games. Three sites (Betway, GG.bet, and loot.bet) cater to this market, all with slightly different offerings for those interested in gambling on their specific site. Each site offers their own in-house odds on the outcomes of professional CS:GO matches. In addition to betting on CS:GO matches, GG.bet offers bets on traditional sports, slots, and other games of chance such as coin flipping. Betway caters to wagers on politics, horse racing, and a large number of sports, including uncommon ones such as Badminton, Handball, and Table Tennis. Loot.bet supports betting on the most popular competitive esports, including CS:GO, and has a weekly contest where the most successful bettors over the course of a week win cash or physical prizes such as an iPhone. As Melbourne & Campbell (2015) highlight, established bookmakers like William Hill have also taken on wagers

“Rigged” Games of Chance and Undisclosed Partnerships

On June 4th, 2016 it was revealed that two prominent YouTube personalities in the gaming space, Trevor “TmarTn” Martin and Tom “Syndicate” Cassell, owned a large skin gambling website CSGOLotto.com (Florida Division of Corporations, 2015; Martin, 2016). This was problematic for a number of reasons. First, they were recording and publishing videos of their engagement in games of chance on the website and did not disclose their ownership or affiliation in any video posted to YouTube, a violation of Federal Trade Commission’s Endorsement Guidelines (Walton, 2016; Federal Trade Commission, 2016). The content was uploaded to YouTube without age restrictions on viewership, meaning anyone could access and view the videos. These videos showed the creators winning large sums of money on skin gambling websites, making the profits seem effortless. The reach that these content creators had cannot be understated – at the time this information was revealed, Martin and Cassell had roughly 3.2 million and 460,000 subscribers respectively (Social Blade, 2016a; Social Blade,

2016b). The day after Martin and Cassell were outed as owners of the site they gambled on, Cassell published a video admitting to fixing outcomes on another skin betting website, Steamlooto (Prescott, 2016). This behaviour can lead to additional unethical behaviour, as we will encounter in the following sections.

O'CSGO Diamonds' was a site that allowed users to deposit CS:GO skins onto their site and gamble on the outcome of a randomly generated number. Players were able to convert their skins to the on-site gambling currency, 'Diamonds', by trading their items to a bot owned by the site as a means to 'deposit' credits onto the site. On this site, one diamond was roughly equivalent to \$1 value in skins (Green, 2018a). From there players were able to use this on-site currency to gamble on the outcome of a random number generator. How the game worked on this site was: every round of betting was roughly fifteen seconds long, where at the conclusion of a round a number is generated between zero and 99.99. Users bet on if the number will be under 47.50, over 52.49, between 47.50 and 52.49, or under 1. Users were able place multiple bets in the different categories – they are not restricted to just betting on one category (Figure 12).

Many of these types of websites partnered with Twitch streamers in order to increase recognition and visitation on their websites. On June 12th, 2016 one of CSGO Diamonds' sponsored streamers, Mohamad "m0E" Assad, threatened to publically release information that he claimed would be detrimental to the company if the site did not allow him to withdraw roughly \$26,000 USD of Diamonds off the platform (Green, 2018b). It is important to note that Assad had a large audience base and brought a lot of traffic to the site and was the largest sponsored streamer of the site with over 500,000 followers on the Twitch streaming platform. Assad's reach over the CS:GO community at the time cannot be understated; it was reported that CSGO Diamonds' sponsorship deal was for ten percent of the site's monthly profits in exchange for roughly 120 hours of streamed gameplay on their website per

month (Green, 2018b). Assad sought to use the compromising screenshots as leverage to renegotiate his sponsorship agreement and to allow him to cash out some Diamonds on his account, as he was failing to achieve the monthly number of hours streamed in his original deal. The site did not comply with Assad's request and on the following day CSGODiamonds pre-emptively admitted in a TwitLonger post that they supplied Assad with advanced knowledge of the outcomes of virtual dice rolls to ensure the player would have their desired results (TwitLonger, 2016). This is another example of how tradeable skins have altered the online space and created enclaves for unregulated gambling.

The unethical behaviour did not stop there as it was revealed on July 16th, 2016 that James "Phantoml0rd" Varga, a popular Twitch streamer, was the owner of CSGOShuffle – a skin gambling website he used almost exclusively to stream gambling content from. In a YouTube, Richard Lewis releases Skype screenshots he obtained from a third party which details his extremely probable ownership of CSGOShuffle (Lewis, 2016a). Included in these screenshots, which Lewis displays to viewers in multiple published videos, is evidence of Varga using site-owned skins to fund wagers on his own website, and multiple instances of Varga asking for information from the site coder to help influence whether or not he should place a wager (Lewis, 2016a; Lewis, 2016b).

These findings highlight the continued skulduggery in esports. Valve attempted to distance themselves from this behaviour, with Valve Executive Erik Johnson clarifying that they do not have business relationships with these gambling sites and have never received revenue from them (Johnson, 2016). This post served as a warning to skin gambling sites, as Johnson's post clarified to readers that use of the Steam API to run a gambling business is prohibited by the API and user agreements. Twitch, the largest online streaming platform, was also cognisant of the fact that accounts displaying CS:GO gambling content were continuously occupying top spots in their CS:GO category. To curtail this Twitch forbade streamers from showing CS:GO gambling content; this announcement was made the day after

Johnson's statement (Nordmark, 2016). Shortly after the announcement, Twitch banned Varga from their platform, stating that it was due to a violation of the Twitch terms of service (Klepek, 2016).

Coincidentally, this is the same day Valve released their cease-and-desist letter to twenty-three skin gambling websites, which asked the named websites to cease operation, or Valve would take further action against the named websites.

In relation to deterrence, the presence of organisations such as gambling websites and streamer partnerships raise questions about deterring individual versus institutional behaviours.

Match-Fixing

In addition to online gambling, skins have played a role in match fixing within Counter-Strike at the highest level of competitive play. As Steele and Opie (2018) note, match-fixing lacks an international definition which is problematic for internationally-played sports. The authors posit that match-fixing is defined as the pre-determination of a winner or a specific behaviour within a sporting competition. Integrity within sport only exists when transgressions on the ethical fabric of that very sport are wholly avoided. If a team or player decides to deliberately underperform in a match, it eclipses the virtue of sportsmanship (Irwin & Naweed, 2018). That is to say, sports build credibility and legitimacy by avoiding cases that scrutinize the validity of sporting outcomes. Where facilities exist for spectators to wager on outcomes or propositions adjacent to a sporting event, cases of match-fixing may appear. The root motivations behind match-fixing are multi-factorial, though the primary incentive is often financially motivated (Carpenter, 2012; Steele & Opie, 2018).

McNamee (2013) notes that the increasing amount of proposition bets – wagers that are placed on events that happen during a match – may lead to a heightened possibility for corruption. ‘Spot-fixing’, as it is known, refers to the purposeful completion of proposition bets which are otherwise niche outcomes (Steele & Opie, 2018). For example, players involved in a ‘spot-fix’ could try to manipulate the timing of scoring, or which player scores the first point.

Fixing a match is premeditated and requires multiple parties to successfully execute. Steele and Opie (2018) state there are three roles various individuals fill in a match-fix: the fixers; the intermediaries; and financiers. Fixers are those directly engaged with fixing the match, such as players or officials. Intermediaries act as the middle-person – arranging for different parties to collude on the fixed match, placing the wagers, delivering instructions, and directing payments. As part of a match-fix

operation, financiers stake the capital being wagered. People in these roles, according to Steele & Opie, comprise the foundation for a fixed match to take place.

Manipulating outcomes within sporting events is a phenomenon that continually occurs. Often unbeknownst to the casual spectator when one retroactively analyzes the history of a sport, match-fixing has occurred in virtually every sport – examples of sports where match fixing has occurred include Japanese sumo wrestling, basketball, baseball, and cricket (Boeri & Severgnini, 2013). Raul Caruso affirms this belief, citing historical examples of match-fixing in soccer. Caruso (2009) contends that in European soccer leagues with relegation, some teams will tacitly collude with others so as to try and keep the worst-performing team within the league. This type of collusion is difficult to spot, but as some scholars (Caruso, 2009; Steele & Opie, 2018) assert, only slight underperformance is necessary to fix a match at the highest levels of competition.

Relative to traditional sports, esports have much less oversight in how they operate at a competitive level. Unlike traditional sports, which have oversight bodies and relevant laws that govern in-sport behaviour, esports often do not have powerful agencies or bodies that specifically govern and reprimand unethical and unwanted behaviours. To this end, a risk assessment of threats to the integrity of esports was conducted by the Esports Integrity Coalition (ESIC) and published in February 2016. The ESIC identified eight threatening behaviours which were dichotomized into two categories: Cheating to Win and Cheating to Lose (Smith, 2016). Behaviours that were categorized under Cheating to Win were: Software cheats and hacks; Online attacks; Doping, and; Disabling/abusing opponents. Actions categorized under Cheating to Lose were: Match-Fixing; Technicians and Officials Corruptions; Spot-Fixing, and; Tournament “structural” manipulation. The ESIC analyzed these behaviours using a threat assessment methodology (Smith, 2016). This methodology assigned a score between one and five to each practice based on two factors: the likelihood of a particular behaviour occurring; and, the severity

of the impact on esports, its reputation, and the commerciality. The threat assessment score is the product of the likelihood of something occurring and its impact – higher numbers indicate greater risk levels (refer to Table 3).

The South Korean government established the Korea e-Sports Association (KeSPA) in 2000 to formally recognize esports as a vocation and to codify what behaviours were legally acceptable and unacceptable within this emergent space. As Ozkurt (2019) outlines, KeSPA distributes pro-gaming licenses according to each professionally-recognized video game. These are necessary for a South Korean player to compete in organized esports play. KeSPA has also established minimum salaries for professional players – the only country to date that has recognized and offered esports players protections to this extent (Ozkurt, 2019).

The extrinsic motivations for players to match-fix in esports are especially strong. Unlike traditional sport, the infrastructure surrounding player development in esports often does not exist or is woefully inadequate. As described by Brock (2017), many young players are drawn to professional video game playing because of the wealth, fame, and success found at the highest levels of play. Aspiring professional esports players are often forced to train with meager remuneration. The low average earnings potential, short career lifespan, and low probability of an individual player becoming a top-level professional provides additional incentives for semi-professional esports competitors to be coerced into fixing matches (Brock, 2017; Irwin & Naweed, 2018).

Other Examples of Match-Fixing in CS:GO

Valve's heavy-handed response to the iBUYPOWER match-fixing scandal sought to deter future professional and semi-professional teams from intentionally throwing a match. Though Valve hoped

that this extremely punitive punishment would dispel future teams from engaging in match-fixing behaviours, the advent of cash-based esports betting and increasing coverage of small tournaments on esports betting sites has created additional opportunities for outside individuals to influence competitive matches. Allegations of match-fixing in semi-professional CS:GO re-surfaced when Richard Lewis (2017) released detailed encounter with an alleged match-fixer associated with a betting ring. The matter was brought to Lewis' attention when he received a screenshot of a conversation between the owner of a small CS:GO organization and the match-fixer. In speaking privately with the match-fixer, the individual claims that four specific matches were thrown, with evidence to support that this individual had placed large bets in favour of the outcome using the betting site Nordic Bet. Upon learning this information, Nordic Bet stated they would launch an investigation into the matter, though there has been no update on the findings as of yet.

Legal and judicial ramifications from match-fixing in esports have been generally unheard of, with the exception of the Starcraft 2 match-fixing stings in South Korea. Moving forward, this may change as Joe O'Brien (2019) reported that in August of 2019 Australian police executed a string of warrants culminating in the arrest of six individuals ranging from the ages of nineteen to twenty-two following an investigation into at least five fixed matches. According to the Victorian Police press release, the accused individuals were interviewed in relation to "engaging in conduct that corrupts or would corrupt a betting outcome of event or event contingency, or use of corrupt conduct information for betting purposes" (Victoria Police, 2019). In Australia, this offense carries a maximum penalty of ten years imprisonment. This information was first presented to Australian law enforcement by a betting agency, demonstrating that some actors within the esports space have the sense to self-regulate.

Other Esport Examples

Unscrupulous and unethical behaviours like match fixing can appear when an industry has the capabilities and market desire to dispense and process wagers on professional play. The generally unregulated nature of esports means it is prone to questionable behaviour, exemplified by some particularly insidious incidents.

A report from the South Korean Changwon Regional Prosecution Service was released in October of 2015 stating that twelve individuals were implicated in a match-fixing ring within the competitive StarCraft 2 scene. At the time this report was released, nine of the twelve individuals were arrested and indicted, with two others having been indicted but not arrested, and one other identified individual still at large (Waxangel, 2015). Another match-fixing sting occurred in April of 2016 which identified eleven individuals involved and resulted in eight individuals arrested, two of which were highly-regarded professional StarCraft 2 players (Waxangel, 2016).

Match-fixing has occurred in the competitive scene of League of Legends as well. A member of LGD Gaming reported suspicious behaviour from other LGD employees to the League of Legends Union Discipline Management Team, and both an internal and external investigation was conducted. Sanctions are based on the League of Legends Esports Global Penalty Index, a codified list of punishable offenses that govern conduct over professional and semi-professional League of Legends play. The index lists and describes a number of behaviours the developers deemed unfit for competitive play' the minimum, maximum, and typical suspension amounts for each listed offense, and; a posted statute of limitations for each offense (Riot Games, 2019).

On June 18th, 2019 official sanctions were levied on five players and staff of LGD Gaming for their involvement in match-fixing (Chen, 2019). Four individuals were reprimanded by the League of

Legends Union Discipline Management team. Two players, Xiang Renjie and Fu Dingyuan, received an eighteen month and ten month ban respectively. The coach, Tang Sheng, also received a ten month ban, and LGD Gaming League of Legends team manager Song Ziyang received a lifetime ban. In addition to the aforementioned individuals, the stage host for LGD Gaming's home venue was found to have involvement in the match-fixing. The contracts for all five employees were subsequently terminated following the conclusion of the investigation.

Stakeholders and Regulatory Roles

Since the goal of this inquiry is to frame the phenomenon of gaming related gambling and associated behaviours through the lens of deterrence theory, it is important to consider various stakeholders who may serve as agents of social control/deterrence as well as others (including gamers themselves) whose behaviours may be impacted by these effort or lack thereof. The following section outlines the role some of these stakeholder bodies have played in reacting to or attempting to regulate undesirable behaviours in the gaming ecosystem, with attention paid to particular instances and reactions around gambling, item-trading, and match-fixing.

Plenary power

Within the realm of online video game distribution, there are few platforms that rival the size and market power that Steam, and their parent company Valve, has over the PC games space. According to Jonathan Bolding, after discounting additional pieces of downloadable content and software, Steam has over 30,000 games available for purchase in their games catalogue (Bolding, 2019). Valve, with their extensive and well-known repository of video games, have an enormous amount of power over game developers that want to list their game for sale on the Steam platform. The ability to host a major Valve-sponsored tournament is regarded as an honour within the industry, but it also allows Valve to exert power over the professional CS:GO scene. An example of this can be found in Valve's blanket ban of the iBUYPOWER team (Valve Corporation, 2016a). Tournaments not sponsored by Valve could allow banned players to participate, but this would conflict with the underlying goal of being chosen to host the next major CS:GO tournament.

In consultation with professional CS:GO players, the Electronic Sports League (ESL) lifted the indefinite bans placed on the ex-iBUYPOWER players, though it was made clear that the bans would still

be upheld if ESL were to host Valve-sponsored events (Mira, 2017). This means that the previously-banned players would be able to take part in any non-valve ESL-specific leagues and tournaments.

DreamHack, aligning their rules with the recommendations set forth by the Esports Integrity Committee (ESIC), announced that they would also unban the iBUYPOWER players and allow the affected players to participate in their leagues and tournaments (DreamHack, 2017). This change demonstrates a shift in how tournament operators and the public viewed the punitive sanctions levied on the former iBUYPOWER roster.

Cease & Desist from Valve

In 2016 Valve sent a cease-and-desist letter (Figure 13) to twenty-three popular skins betting sites, which caused the majority of these sites to either close down or heavily modify their operations in the skin gambling business. Valve assert that the owners of the listed sites were using Steam services for commercial use, violating the Steam Subscriber Agreement which licenses the Steam service for personal, non-commercial use. Owners of these sites were not notified in advance of this cease and desist letter and had ten days to cease what Valve determined was ‘commercial use’ of their accounts – effectively giving the named sites ten days to cease operating.

With a power vacuum having appeared shortly after Valve took measurable actions against the named skin gambling sites, other smaller sites emerged and annexed the now-open market segments. This author attempted to visit the sites named in Valve’s cease and desist letter and found that some of the sites are still online, though a fewer number of those sites were still functional. Of the twenty-three sites outlined in the cease and desist, eight presently remain accessible with four sites still containing the option to deposit virtual skins in exchange for betting tokens on the platform. The active websites are: csgo500.com, csgoatse.com, csgofast.com, and csgocrash.com. It should be noted that the website link for ‘csgocrash.com’ immediately directs to ‘csgofast123.com’, the same platform as ‘csgofast.com’. Additionally “societylogin.com” still exists though it redirects to stake.com, a real-money gambling platform.

As demonstrated in the previous sections of this work, the existence and prevalence of loot boxes in modern video games is problematic for the contemporary video game player. The capitalistic nature of game developers and publishers, some of the largest ones being publicly on a stock exchange, can often be at odds with public good at large. The fiduciary care that these companies have to their investors and shareholders mean that their decision-making process behind profit-maximization may

not recognize, or in more malicious cases completely ignore, the potential for consumer harm.

Consequently, government entities and organizations must often step in to protect the consumer and fill in the information gap. What follows is an expansion on what the major European and North American game rating agencies have done with respect to skins gambling.

Ratings Boards & Integrity Commissions

One set of stakeholders with a specific interest in assessing suitability of game content based on potential player age are rating boards. The most recognizable of these, the Entertainment Software Rating Board (ESRB) is a third-party entity that rates and suggests how appropriate video games are for the North American consumer based on what kind of content is contained in a particular game, and its online interactive elements. There are six categories for how age-appropriate the ESRB deems a video game: Everyone, Everyone 10+, Teen, Mature 17+, Adults Only 18+, and Rating Pending (Entertainment Software Rating Board, 2019). Every category, with the exception of Rating Pending which is seen while a game is in the early stages of marketing and advertisement, denotes a suggested minimum age for the player of a particular video game (See Table 4 for a detailed description of the age categories).

The ESRB posts a list of the different types of content they screen for, some examples of which include: Blood and Gore, Drug Reference, Strong Language, Strong Sexual Content, and Violence (Entertainment Software Rating Board, 2019). Another contributing factor to a games' final rating is what they refer to as 'Interactive Elements', which are the online features of a product such as: the ability to complete in-game purchases with real world currency, and unfiltered interaction with other players through a games' communication networks.

According to Jason Schreier, journalist for the gaming news outlet Kotaku, the ESRB does not consider loot boxes gambling. They do not consider this gambling because a player opening a loot crate is always guaranteed to receive in-game content, even if it is something that the player does not particularly want (Schreier, 2017). This is not to say that the ESRB gives no consideration to gambling content in video games; on the ESRB website there is a ratings guide that lists the common themes and content found within video games where gambling is addressed. Within this list there contains two headings which directly address gambling: 'real gambling' and 'simulated gambling'. The ESRB define

‘real gambling’ as being able to bet or wager real cash or currency, whereas ‘simulated gambling’ is the ability to gamble without betting or wagering real cash or currency (Entertainment Software Rating Board, 2019).

A search for Counter-Strike: Global Offensive’s rating on the ESRB website returns that the game received a ‘Mature 17+’ rating from the ESRB because the game contained blood and intense violence. Though the rating system has content descriptors for simulated and real gambling, the ESRB does not apply these labels to Counter Strike: Global Offensive.

Similar in function to the ESRB, the Pan European Game Information (PEGI) organization assesses the suitability of video games for different age audiences. The organization was founded in 2003 with the goal of aggregating individual rating systems within European and Balkan countries. Akin to the ESRB, the PEGI utilizes content descriptors to assess subject matter within a video game and apply a recommendation on a suitable age range for the video game’s audience. The PEGI utilizes five age labels to categorize video games: PEGI 3, PEGI 7, PEGI 12, PEGI 16, and PEGI 18. These labels identify what age demographic a game is recommended for (see Table 5 for a full description of the PEGI age labels). For instance, the PEGI state that games with the PEGI 7 label are suitable for players aged seven and up, as there may be content with scenes or sounds that can possibly frighten younger children – content such as implied or non-realistic violence (PEGI, 2019)

With respect to the loot box mechanic, PEGI defers the responsibility to law makers, stating that it is not up to PEGI to decide whether something is considered gambling or not. According to PEGI’s Operations Director Dirk Bosmans, it is the responsibility of a national gambling commission and lawmakers to define what constitutes gambling (Palumbo, 2017). Bosmans notes that if a gambling commission were to state that loot crates are a form of gambling, PEGI’s criteria would change as well. Indeed, the PEGI, like its North American counterpart, has a content descriptor for gambling. The PEGI

contends that a game obtains this descriptor by containing elements that encourage or teach gambling behaviours – particularly those games of chance that are found in a casino (PEGI, 2019).

The PEGI does acknowledge that in the current video game landscape consumers are often encouraged to spend extra money on a game through in-game purchases. A survey conducted by the market research firm Ipsos revealed that two in five parents of children that play video games indicated that their child spends money in-game (PEGI, 2018). This facilitated the creation of a new content descriptor for physical releases of video games labelled ‘in-game purchases’ (PEGI, 2018). The application of this content label will help inform the buyer of the existence of optional in-game purchases to decide whether or not the parent will need to monitor account activity and spending.

A query on how many games contained the ‘in-game purchase’ descriptor, ‘gambling’ label, and a combination of the two was conducted using PEGI’s advanced search function located on the home page of the website. There were over 31,000 game titles catalogued in PEGI’s information repository, though it is important to note that some games available on multiple platforms will appear as duplicates or triplicates, based on the number of systems the game is available on. Sorting for the aforementioned descriptors and a combination of the two revealed that there are 370 games with the gambling descriptor, 165 that had the in-game purchase label, and eleven that held both descriptors.

Consequently, a specific search for the game Counter Strike: Global Offensive on PEGI’s website indicates that the game received an 18+ label for the frequent moderate violence. The game does not contain a gambling or in-game purchase descriptor, which suggests that the PEGI does not formally recognize that there are elements of chance or gambling that appear within the game.

As a functioning and standardized recreation, professionalized video gaming is still in its infancy relative to its traditional sport counterparts such as the NBA, MLB, and NHL. One barrier that prevents

esports from ascending to the level of legitimacy that traditional professional sports currently occupy is demonstrated in the myopic viewpoint displayed by some players, event organizers, and leagues. For instance, in 2015 a member of the Cloud9 CS:GO team admitted in an interview that he and his teammates had used the performance-enhancing substance Adderall during CS:GO matches at a major tournament earlier in the year (Lewis, 2015b). Additionally, over the lifecycle of esports there have been multiple reports of companies either not paying players and broadcast crew, or paying them with significant delay (Lewis, 2019; Myers, 2017).

The esports industry does not have an official governing body or multiple organizations providing oversight to the profession – they do not have a Commissioner’s Office or Player’s Union like the MLB does, nor do they have independent bodies such as the United States Anti-Doping Agency (USADA) conducting randomized testing on athletes as they do in the Ultimate Fighting Championship (UFC).

Actors in the esports space have attempted to create mechanisms of accountability. One form of which can be found in the Esports Integrity Commission (ESIC). It is a not-for-profit oversight body which is supported by various event organisers, some of which include companies such as ESL and Dreamhack, government bodies like the UK Gambling Commission and Malta Gaming Authority, and betting operators like Rivalry and Betway. Headed by Ian Smith, the ESIC functions as a small watchdog and oversight organization – they have a portal on their website dedicated for anonymous submissions of ethical breaches in esports. They also offer information and investigative services to partnered stakeholders and betting operators.

At the 2018 Gaming Regulators European Forum, sixteen gambling regulators signed a declaration, identifying concerns with respect to skin betting, loot boxes, social casino gaming, and gambling-themed content contained within video games available to children (UK Gambling Commission, 2018a). This declaration highlights a growing collective concern over the available content

within some modern video games and third-party websites that facilitate gambling. Many of the signatories of this declaration were representatives of notable European countries such as the UK, Isle of Man, Norway, The Netherlands, Malta, France, and Spain; the US State of Washington also participated in this forum and signed onto the declaration. Though the Malta Gaming Authority has stated that operators within the esports community were able to display self-regulation, the same cannot be said for video game publishers.

Governmental responses

In the wake of loot box popularization, unauthorized third-party gambling websites, and match-fixing scandals breeding from the lack of oversight within the esports space, different governmental bodies have responded to and recognized the problem to varying degrees. What follows is a detailed foray into the differing levels of acknowledgement and response from countries that have publicly addressed the issue.

Netherlands

The Netherlands Gaming Authority (NGA) launched an investigation into the loot boxes of ten different games and released a research report on April 10th, 2018 that outlined their findings. Unlike other countries, the Netherlands declined to name which ten games were analyzed for this report, though they included a description of the playing environment and the PEGI rating of the studied game. In this report, the NGA states that loot boxes contravene Dutch law if the in-game goods from loot-boxes are transferable; if they are not transferable they do not break Dutch law (Netherlands Gaming Authority, 2018). In the determination of the NGA, in-game items possess a market value as soon as they are transferable since a transaction, such as a sale, can be made with these in-game items (Netherlands Gaming Authority, 2018). Four of the ten anonymous loot boxes included in the report were deemed to contravene Dutch law and though they were not directly named, Yin-Poole reports that a Dutch broadcaster specifically named FIFA 18, Dota 2, PlayerUnknown's Battlegrounds, and Rocket League as the video games which breach the Dutch Betting and Gaming Act (Yin-Poole, 2018a).

On April 19th, 2018 the NGA published a press release which summarized the report's findings. Included in this summary was a warning for publishers to modify their games before mid-June, with the

implied threat that they would begin to face disciplinary action after this date, including criminal prosecution (Netherlands Gambling Authority, 2018). This warning was heeded by one major publisher, as Valve released a statement on June 19th to its Dutch players that, effective immediately, trading and SCM transfers for both CS:GO and DOTA 2 items were disabled until an alternate solution can be negotiated between Valve and the NGA (Yin-Poole, 2018b). On July 11th, Valve released an update to CS:GO, stating that Steam trading and the SCM were re-enabled for Belgian and Dutch Steam accounts but players from this region would no longer be able to open loot boxes (Valve Corporation, 2018c).

Belgium

In November of 2017, the Belgian Gaming Commission (BGC) launched an investigation into loot boxes to determine whether or not they constitute gambling (Chalk, 2017). The Commission released this research report in April of 2018, examining the loot boxes in four popular video game titles – Overwatch, Star Wars Battlefront II, FIFA18, and CS:GO. The BGC asserts that when real-world money is used to purchase a loot box or an intermediary item to acquire or open the loot box, this constitutes as a wager under the Belgian Gaming and Betting Act (Belgian Gaming Commission, 2018).

In the case of CS:GO loot boxes can be earned through gameplay or purchased on the Steam Market for an average of four US cents. The loot crate then requires a key to unlock, which can be purchased from the developer for \$2.50 US – this means the wager is equal to the summation of the cost of both the loot box and the cost of a key. The BGC notes that because skins have different rarities and drop rates, this necessarily imparts a level of exclusivity and thus some monetary value (Belgian Gaming Commission, 2018). In addition, these virtual skins can be re-sold on either the Steam Market or on third-party websites for real-world currency. This allows the player to tangibly determine if they have won or lost, depending on benchmarked value of the received item.

With the aforementioned factors considered by the Belgian Gaming Authority, they have determined that the loot boxes in CS:GO constitute a game of chance under Belgian law, as the four constitutive elements of gambling – game, wager, chance, outcome – are present (Belgian Gaming Commission, 2018). The report recommends criminal prosecution of publishers and developers that continue to operate these games of chance. As noted above, on July 11th, 2018 Valve responded to the BGC declaration by removing players' ability to open loot boxes (Valve Corporation, 2018c).

Isle of Man

The Isle of Man has been a hotspot for gambling and online gaming firms since 2001 when they introduced legislation to provide a space for companies to legally incorporate and operate from (Isle of Man, 2019). Large online gaming sites, such as PokerStars, have been granted an operating license from the Isle of Man in what can be considered the infancy of the online-gambling era – for instance, PokerStars was granted their operating license in 2005 (PokerStars, 2019).

Leading the legitimization of online gaming and gambling from a regulatory perspective, the Isle of Man's Gaming Supervision Commission (GSC) expanded the existing regulations surrounding online gaming and gambling. These changes formally recognized convertible and non-convertible virtual currencies. According to the GSC, convertible virtual currencies include crypto-currencies, such as Bitcoin and Litecoin, which can be bought and sold for fiat currency on exchanges (ICLG, 2019). Non-convertible virtual currencies are defined as virtual goods such as digital "skins" for avatars and weapons in video games, as well as other digital objects that have functions in video games, in addition to in-game currencies that can be used to buy such objects (Isle of Man Gambling Supervision Commission, 2017). This change in legislation has transformed the landscape, as it breathes legitimacy to the underground scene of skin wagering. The legislation also opens the opportunity for other jurisdictions to

recognize and legalize this market which would provide protection for players and deter youth gambling.

The Isle of Man GSC's decision to support gambling forays with virtual currencies and skins betting reflect the evolving gambling landscape and the desire to be a first-mover in this generally unregulated online space. Gambling is a more contentious issue in the United States than it is in Europe, where the Isle of Man GSC has established a legal area of incorporation for virtual currencies betting. The United Kingdom has also generally recognized skins gambling as an activity that occurs, though it is outside the purview of the current guidelines.

Malta

Malta is another destination where gaming operators have sought as a home country based on their overt position as business and gaming-forward country. Comparable to the Isle of Man and their gaming authority, the Malta Gaming Authority (MGA) has been seen as a quick mover when it comes to designing and implementing gaming and gambling regulations. One example of this is how quickly Malta began to monetize skill-based gaming. In 2015, the Malta Gaming Authority proposed that a new arm of licensing was needed for games that are primarily skill-based, although these games still contain considerable elements of chance (Wood, 2017).

The MGA also released a position paper in December of 2015 regarding their stance on Digital Games of Skill with Prize. In this position paper, section 3.2(f) states that esports should be recognized under the law, though no licensing requirement should exist since other countries do not currently impose licensing requirements and such an area is still governed by general legislation (Malta Gaming Authority, 2015). The position paper also acknowledges that operators of esports display great levels of

self-regulation – that is, activities deemed morally reprehensible have been publicly exposed and reported by individuals or actors with close relationships to the offenders.

They also list what they consider to be the archetypes of esports and whether or not they require licensing. They note that Role-Playing Games (RPGs), Multiplayer Online Battle Arenas (MOBAs), and Massively Multiplayer Online Role-Playing Games (MMORPGs) are influenced by random number generation, but the intricacies within the game - namely, the mechanics, strategies, knowledge, equipment and skill - all have a considerable effect on the outcome and effectively render the element of chance negligible (Malta Gaming Authority, 2015). Collectible card games are also considered, with Hearthstone as the demonstrated example. In Hearthstone, players construct thirty-card decks from the hundreds of different cards available on the platform that have monsters, characters, spells, or utility items and use those to compete against other players. Elements of chance come into play because at the beginning of every player's turn, they draw a card. Though drawing the right card at the correct time is itself lucky, over the course of a large number of matches, series, and tournaments, the chance factor is significantly reduced in determining the winner of a match.

Having released their position paper in 2015, the MGA formally reiterated its position on August of 2016 and publicly committed to creating and introducing regulations for this emergent space (Malta Gaming Authority, 2016). Consequently, January 2017 saw the implementation of regulations and licensing on 'Digital Games of Skill', specifically, Daily Fantasy Sports (DFS) games, recognizing that the activity was predominantly skill-based (Malta Gaming Authority, 2017). The first license issued by the MGA was to the online DFS site DraftKings, where they subsequently expanded into Germany (Gouker, 2017).

Australia

Concerns surrounding loot boxes have caught the attention of Australian politicians and lawmakers, as academics and other organizations have begun to come forward, voicing their sense of disquietude over the mechanic. One concerned Australian citizen contacted the Victorian Gambling Authority (VGA) and received a response from Jarrod Wolfe, a Strategic Analyst in the Compliance Division at the VGA, which stated that the loot box mechanic qualifies as gambling by definition in the Victorian Legislation (Stevenson, 2017). Wolfe notes that legislative powers at the State and Federal level are not currently equipped to handle the issue. This has also resulted in two Senate committee hearings – one conducted in Melbourne, and one in Canberra – as part of a preliminary inquiry that sought to examine the extent to which loot boxes constitute a form of gambling, and; the adequacy of current consumer protections and regulatory frameworks for in-game microtransactions (Environment and Communications References Committee, 2018a; Environment and Communications References Committee, 2018b). At the first hearing in Melbourne, the Committee took evidence from thirteen individuals in an attempt to paint a complete picture of the issue at hand, and how multiple stakeholders view the problem. This culminated in a report published in November of 2018 which recommended that the Australian Government undertake a comprehensive review of loot boxes in video games; to search for gaps in regulatory and consumer protection frameworks that might currently exist; and, to make Australia’s approach to loot boxes consistent with its international counterparts (Environment and Communications References Committee, 2018b).

Levying judicial judgement against major video game publishers is not a novel phenomenon within the Australian judiciary. The Australian Competition and Consumer Commission filed a lawsuit against Valve in 2014, alleging that they had violated Australian Consumer law. In 2016, the Federal Court ruled that Australian Consumer Law applied to the US-based Valve and found that certain terms

and conditions, consumer guarantees, and refund policies were false or misleading in the Steam Subscriber Agreement (Australian Competition & Consumer Commission, 2017). This resulted in the Australian Full Court levying a three-million-dollar penalty against the company. A Valve-led appeal of this ruling and its penalty was dismissed in 2017. Compliance will come quickly if lawmakers reform the treatment of loot boxes, as evidenced by Valve's quick action to temporarily halt item trading in the Netherlands.

USA

The history of gambling in the United States has historically been tumultuous. Sports leagues have been hesitant to endorse gambling, especially given the history behind betting scandals such as the Black Sox scandal in professional baseball and the 2007 betting scandal in professional basketball (Chicago Historical Society, 2014; Schwarz & Rashbaum, 2007). This stance has softened over time, as evidenced by National Basketball Association (NBA) commissioner Adam Silver's op-ed calling for the legalization and regulation of the sports betting industry (Silver, 2014). Silver opined that wagers on sports were already taking place, and it would be in the best interests of multiple parties to bring this subterranean economy into the public sphere.

The exact amount illegally wagered per year on sports betting is debated. In his piece, Silver estimated that the amount illegally wagered on sports each year was roughly four-hundred billion dollars; Jordan Weissman (2014) investigated Silver's claim and found sources that purport that the estimated total annual amount wagered on sports betting ranged from a low of fifty billion to the four-hundred billion figure that Silver cites (Silver, 2014; Weissmann, 2014).

The Professional and Amateur Sports Protection Act of 1992 (PASPA) was a law that sought to define the legality of sports betting in America, outlawing sports wagering in all states except Oregon, Delaware, Montana, and Nevada (Professional and Amateur Sports Protection Act, 1992). In 2018, the US Supreme Court ruled that PASPA was unconstitutional, opening the doors to legalized sports betting (US Supreme Court, 2018). Of importance is the fact that the US Supreme Court voided the entirety of PASPA, and not just certain sections of the legislation. When possible, as Sheryl Ring notes, the Court attempts to retain the acceptable portion of the law by splitting and discarding the unconstitutional portions (Ring, 2018a). The nullification of PASPA has potentially created a new revenue stream for all parties involved with sports betting. Shortly after PASPA's removal, Ring (2018b) reports that MGM Resorts International entered a partnership with Major League Baseball (MLB), receiving official access to their statistical data and use of the league logos and marks. In an effort to mitigate potential front-running of betting sites with non-public information, and to allow for business and data partners to adjust ahead of the public, MLB announced that teams must send their starting player lineups to league officials at minimum fifteen minutes before they are publicly announced (Raftery, 2019).

The topic of loot boxes has been covered by American media outlets and addressed by lawmakers around the country. In 2016, the Washington State Gambling Commission sent a letter to Valve's co-founder, Gabe Newell, asking him to stop the facilitation of gambling activities through the Steam platform (Washington State Gambling Commission, 2016a). One week later, they investigated Valve and determined skins gambling is illegal and unregulated, ordering Valve to stop skins gambling (Washington State Gambling Commission, 2016b; Wolf, 2016). Hawaii State representative Chris Lee stated his intent to introduce legislation that would ban the sale of games with the loot box mechanic in Hawaii (Hussain, 2017; Lumb, 2018). Senator Josh Hawley also stated that he would introduce federal legislation that would prohibit the inclusion of loot boxes and other microtransactions in video games (Romm & Timberg, 2019). Joined by Senators Ed Markey and Richard Blumenthal, the bill, officially titled the

“Protecting Children from Abusive Games Act”, would prohibit the sale of loot boxes to minors and the inclusion of pay-to-win mechanics in games sold to minors (Kelly, 2019).

The Federal Trade Commission (FTC) has also acknowledged the loot box problem and FTC Chairman Joseph Simons said he would launch a probe to investigate the issue (Fung, 2018). Part of this probe resulted in the creation of a public workshop on August 7th, 2019 that invited industry leaders and experts onto multiple panels in front of members of the FTC to discuss and assess the loot box landscape (Federal Trade Commission, 2019).

Lawsuits have been filed against Valve vis-à-vis their involvement in skin betting. In 2016, a class action lawsuit was filed against Valve over the illicit gambling occurring in CS:GO, though a judge dismissed the case later that year (McLeod et al. v. Valve Corporation et al., 2016). In 2019, a Native American nation that operates a casino in Washington state filed a lawsuit against Valve, alleging that they have profited from the illegal online gambling for years and have taken minimal actions to curtail its continued existence (Levy, 2019; Quinault v. Valve, 2019). The lawsuit launched by the Quinault Nation is still ongoing as of January 2020.

United Kingdom

The United Kingdom Gambling Commission and their responses to loot boxes have been some of the most public comments to date as the issue has been discussed at UK parliamentary hearings. In the UK, citizens are able to create online petitions to ask the government to take action on public issues. The process to create an online petition is fairly simple: a UK citizen or resident creates an online petition and gets five people to support it; the government will filter the petition for spam and publish it. The Petitions Committee reviews all published petitions and have the authority to escalate an issue to

Parliament or the government. When a petition reaches ten thousand signatures, the government is forced to respond to a petition, and at one hundred thousand signatures the petition's topic will be considered for a parliamentary debate (UK Government and Parliament, 2019).

On October 4th, 2017 a petition was created asking lawmakers to recognize virtual items, loot boxes, their mechanics, and to expand the current definition of gambling to include this new gambling modality (UK Government and Parliament, 2018). This petition received nearly 17,000 signatures and prompted a response from the Department for Digital, Culture, Media, and Sport (DCMS) which stated that they are aware of the existence of loot boxes and point a position paper they released in March of 2017 detailing their particular stance on the matter.

Following this petition, a number of British Members of Parliament (MPs) have submitted written questions about loot boxes to the Department for DCMS. Utilizing the UK Parliament's online search function for indexed written questions and answers, a search for the term "loot" was conducted, filtering for responses only from the Department for DCMS. The date of the search parameters were restricted spanned the beginning of 2014, ending in December 2019. Using this method, twenty-two related questions and answers relating to loot boxes were found.

The very first written question about loot boxes was submitted on October 6th 2017 by Daniel Zeichner. He directed a question to Tracey Crouch who was, at the time, the Parliamentary Under-Secretary for Digital, Culture, Media and Sport, on the topic of loot boxes. In this question, MP Zeichner asks: "To ask, what steps [the Secretary of State for Digital, Culture, Media and Sport] plans to take to help protect vulnerable adults and children from illegal gambling, in-game gambling and loot boxes within computer games" (UK Parliament, 2017). The response from the Department of Digital, Culture, Media and Sport pointed to their position paper and reiterated their stance on the matter which is: "Where items obtained in a computer game can be traded or exchanged outside the game platform they

acquire a monetary value, and where facilities for gambling with such items are offered to consumers located in Britain a Gambling Commission licence is required. If no licence is held, the Commission uses a wide range of regulatory powers to take action" (UK Parliament, 2017).

Further questions on the topic of loot boxes were addressed similarly to the first question – acknowledging the existence of the behaviour and pointing to multiple reports to suggest that the incumbent UK Government is considering the different recommendations. The UK government's initial foray into loot boxes began in August of 2016 with the release of a discussion paper produced by the UK Gambling Commission (UK Gambling Commission, 2016). The discussion paper was then developed into a position paper, released in March 2017 outlining their current position on the matter of loot boxes and virtual currencies. Expressed in their position paper, the UK Government acknowledges the loot box mechanic and how closely it emulates that of a slot machine (UK Gambling Commission, 2017). They articulate that if there a readily accessible opportunity to exchange in-game items received from loot boxes for money or monetary instruments exists it is likely to be considered a licensable gambling activity (UK Gambling Commission, 2016). That is to say, if in-game items are transferable outside of the game platform, they have monetary value (UK Parliament, 2017; UK Gambling Commission, 2016; 2017).

By this logic, items obtained from games on the Steam gaming platform are housed in an account's inventory and stay on the platform and therefore do not have monetary value. Though the Steam platform has their own marketplace where users can buy and sell items, it does not offer any way to transfer the funds from this sale into real-world currency – the money stays on the platform in the user's "Steam Wallet" and users are able to buy games or other items on the platform with the money in this wallet. Facilities for gambling refer to third-party websites that offer different games of chance. These websites take deposits through a trade with a shell account on the Steam platform, an account created with the sole intention of housing the items as collateral for the deposit on the website. Once

the trade is completed, a user is allocated play units onto the third-party website – often, one unit represents either one US dollar or one US cent.

Published in November of 2018, the UK Government commissioned a research study on youth gambling participation of children between the ages of 11 and 16. This annual report found that at the time the survey was administered fourteen percent of youth had participated in gambling in the past week – the second lowest point on record, with 2011 being the high mark with twenty-three percent of surveyed youth stating that they had participated in gambling activities within the past week (UK Gambling Commission, 2018). With respect to loot boxes, this study found that of the 2,865 youth sampled, thirty-one percent of respondents self-reported having paid or used in-game items to open a loot box; three percent of respondents admitted to having bet with in-game items (UK Gambling Commission, 2018).

These findings culminated in an elaborate report on immersive and addictive technologies that the DMCS submitted to the House of Commons on September 12th, 2019. This report highlights the effect social media and emergent technologies have had on modern society, with the section dedicated to ‘financial harms of immersive technologies’ expanding on gambling-adjacent behaviours such as loot boxes and skin betting. The committee’s recommendation on loot boxes was: loot boxes that contain the element of chance should not be allowed in games sold to children, and that they should be excluded in the absence of research to prove that no harm to children is present with their inclusion (UK Digital, Culture, Media and Sport Committee, 2019) The committee also recommends that the PEGI should apply the existing ‘gambling’ content label, and the corresponding age limits, to video game titles that contain loot boxes that can be purchased with real-world currency and do not display their contents prior to purchase (UK Digital, Culture, Media and Sport Committee, 2019). Consequently, the committee insisted that companies should be doing more to curtail the transfer of in-game items for

real world money and its use in unlicensed gambling. The committee considers loot boxes that can be purchased with real-world currency and do not reveal the contents in advance to be games of chance played for money's worth – something that this committee argues should be recognized under the Gambling Act (UK Digital, Culture, Media and Sport Committee, 2019).

China

In December of 2016, China's Ministry of Culture released a new set of rules and regulations related to online games available for play within the country. This new rule set included a regulation which requires developers of video games with the loot box mechanic to disclose the odds of players receiving items (Gartenberg, 2017). It is important to note that laws in China require their online ecosystem to be closed, which prompted Valve to partner with Chinese games publisher Perfect World Co. to launch Steam China – a platform region-locked to China (Chalk, 2018). Journalist Richard Scott-Jones disseminated a translation of Perfect World's release of the CS:GO loot box odds, a release that outlined the likelihood of a player receiving an item from each of the five 'tiers' (Scott-Jones, 2017). The likelihood that a player will receive an item from the 'red' tier is 0.64%, and an item from the 'yellow' tier is a lowly 0.26% (see Table 6 for a list of loot box probabilities). It must be noted that multiple items are present within any given tier – that is to say, the odds of opening a specific item from a loot box is further reduced by a factor corresponding to the number of items within a specific reward tier. One other resource of note released by Perfect World is a real-time scrolling list of in-game items received by Chinese CS:GO players (Perfect World, 2017). The introduction of this website seems to coincide with China's attempt at higher levels of transparency within the video game space.

Canada

Though there have not been any federal laws addressing the existence of loot boxes, attention to them has been raised by entities within Canada. The Gambling Research Exchange Ontario (GREO) was a government-funded project by the Ontario government to study, collect, and disseminate gambling-related data and information backed by the academic literature. In the third edition of a piece sponsored by the GREO entitled “Conceptual Framework of Harmful Gambling: An International Collaboration”, the authors note that video games have recently become more conversant with gambling, though at the time of the work’s publication the authors state that there was not currently any data to detail which age demographics engage with loot boxes (Abbott, et al., 2018). Additionally, Travis Sztainery published a brief that describes loot boxes as a “gacha” – the purchase of a lottery-draw where the player has a chance to win virtual items with differing levels of rarity (Sztainert, 2018; Koeder & Tanaka, 2017). Though the Ontario government eliminated funding to this organization in 2019 (Jeffords, 2019), the GREO partnered with the UK Gambling Commission in its three-year National Strategy to Reduce Gambling Harms (Gambling Research Exchange Ontario, 2019).

Discussion

This section will serve as a space where I will discuss the findings presented in the previous section and expand on what this means for the online gaming landscape moving forward.

Video game monetization has evolved over the years with many publishers attempting to diversify the revenue stream from solely being composed of retail sales. At the Social Gaming Summit in 2008, David Perry, an Irish game developer, discussed a number of monetization models of games. After the Summit, he created a blog post about his categorization of monetization that exists in the video game world, which can be broken down into six major models: retail, digital distribution, subscription, microtransaction, player trading, and advertising (Liew & Perry, 2008). A short categorization of six major models of video game monetization with added examples follows.

The retail model specifically refers to brick-and-mortar stores that sell video games. A recognizable example of a retail store in the United States for games is GameStop, which has a Canadian subsidiary called EB Games. The digital distribution model refers to third-party platforms, such as Steam, that distributes games to players. A widely-known example of subscription-based revenue models is the monthly subscription to World of Warcraft, where players purchase the base game and expansion on the game in addition to paying a monthly subscription fee to access the online content.

Microtransactions as a model of monetization focus on the use of extra purchases in a game to enhance the player's experience; they are not directly necessary to progress through the game.

Microtransactions can be broken down into two subsections – paid downloadable content and loot boxes. Paid downloadable content extends the original gameplay experience by providing an expansion or other extra content on top of the base game for the player, a prominent example of which can be found within the Call of Duty video game franchise. Loot boxes generally contain cosmetic items which are used to enhance the player's aesthetic look; though, as previously noted, there have been examples

of games that have implemented loot boxes that contain items that confer a gameplay advantage. Blizzard-Activision's *Overwatch* utilizes cosmetic upgrades found in loot crates, with no discernable advantage conferred to players that own these superficial skins. Player trading refers to an online marketplace where in-game content can be bought and sold between players for real-world currency, with the platform collecting a fee per transaction. A well-known contemporary example of this is the SCM on the Steam platform, where items – including *Counter-Strike* skins – can be bought and sold. Finally, there exists advertising as a method of monetization. Often found in free-to-play and mobile games, users may either have ads on the screen as they progress through the game, or they may be compelled to watch an advertisement at set intervals during gameplay (Liew & Perry, 2008).

The aforementioned models of monetization were popular among video game publishers and developers as a means of generating revenue on their creative endeavours. With controversy surrounding loot boxes continuing to grow, some developers opted to shift their secondary revenue stream to a new model – the Premium Progression Pass.

Progression Passes

This system began in 2013 through Valve's annual Compendium progression pass – an optional, purchasable item for the game *Defensive of the Ancients 2* (DotA 2) that contained fixed rewards unlocked through gameplay (Liquipedia, 2019). The digital content within these passes is transparent which allows the player to know exactly what they can unlock and how long it will take to unlock the cosmetic items. The progression pass can be purchased for a flat fee, though for DotA 2 Valve gives players the option to purchase upgraded battle passes and levels to progress and unlock more rewards.

Unlike other games that use the progression pass, 25% of the money generated from Compendium progression pass sales are gathered and included in the prize pool for the largest annual

tournament in DotA 2, 'The International'. Since its introduction, the total prize pool for this tournament has increased every year; The International's prize pool broke twenty million US dollars in 2016, and in 2019 the final amount was in excess of thirty-four million dollars (Bailey, 2019).

Publishers that are looking for a new stream of revenue – one devoid of the controversies that surround the mechanics of loot boxes – can effectively utilize the progression pass concept. The total amount Valve has collected from sales of progression passes can be calculated we work backwards from Valve's statement of reallocating 25% of total generated money to the prize pool. Valve provides \$1.6 million US dollars as the base of a prize pool every year. Subtracting \$1.6 million from the total prize pool and multiplying the remainder by four, since Valve states they reallocate 25% of the money, we find that the total amount raised by the 2019 progression pass in DotA 2 is roughly \$130.9 million dollars (Figure 14).

Other publishers have begun to move away from the loot box mechanic to other systems of monetization. At the 2018 Electronic Entertainment Expo trade show, colloquially known as E3, the game developers behind PlayerUnknown's Battlegrounds (PUBG) and Rocket League announced that they are introducing the premium progression pass system, referred to in this case as Battle Passes, to their respective games (Grubb, 2018b). Players seem to have responded positively to the transparency of progression passes, which is reflective of the revenues these games had in 2018. Fortnite generated roughly \$296 million dollars in April 2018 when Epic Games, the developers of Fortnite, released a new Battle Pass (Statt, 2018). This is more than twice the amount Fortnite made in February of that same year, where the game bought in \$126 million dollars (SuperData Research, 2018). Both Fortnite and PUBG had enormous revenues in 2018 – Fortnite had the largest annual digital revenue for a single game in 2018 with roughly \$2.4 billion dollars in 2018, while the Xbox, PlayStation, and PC versions of PUBG eclipsed over a billion dollars of revenue itself (Handrahan, 2019; SuperData Research, 2019).

For some games the introduction of premium progression passes as an alternate source of revenue has generally been effective. This has varied based on the game – for instance, Apex Legends was released in February 2019 and reported to have earned roughly \$92 million during the month of its release; just two months later, research firm SuperData stated that Apex Legends generated only \$24 million dollars of revenue for the month (SuperData, 2019a; SuperData, 2019b). These revenue figures speak to the nature of progression passes when compared to loot boxes; progression passes are one-time payments for known rewards, while the rewards from loot boxes are varied and inconsistently dispensed over a small sample of case openings. With the increasing scrutiny the loot box mechanic has faced, publishers and developers may look to pivot to this newer system of monetization; one that is congruent with public expectation.

Direct Storefronts

Some games have added a storefront section with offerings that can be bought with real-world money or in-game currency. One example of this can be found in Rocket League. Released in 2015, Rocket League is an extremely popular online game described as high-octane soccer with played with remote-controlled cars. In 2016, the developers released loot crates into the game, unlockable with a key purchased using real-world currency (Watson, 2018). In 2019, the developers announced that they were discontinuing the loot box model of monetization in favour of a storefront that allows skins and cosmetic modifications to be directly purchased (Psyonix, 2019). Overwatch is another game where players can directly purchase cosmetic items with in-game credits. These credits can be obtained by opening loot boxes; loot boxes can be obtained through gameplay or purchased with real-world money (Blizzard Entertainment, 2016). With gambling commissions from multiple countries directing their attention to loot boxes, developers have turned to the direct storefront as one way to continuously extract value from their games.

Esports Revenue and Skins Betting

Relative to other industries, esports is in its infancy though there is massive potential for this market to grow considerably. Twitch, the largest video-game-streaming site, was acquired by Amazon in 2014 for \$970 million US dollars (Kim, 2014). According to the market research firm Newzoo, 2019 was the first year where revenues of the global esports market eclipsed the \$1 billion US dollar mark (Pannekeet, 2019). This emergent industry has the potential to exponentially grow based on its viewership alone – the total esports audience in 2019 was 454 million individuals and is projected to reach 645 million by 2022 (Pannekeet, 2019). With this large amount of viewership, future growth can come from a variety of sources such as merchandising sales and advertising fees.

Another revenue stream that would propel the growth of esports comes from gambling. The annual economic value of the illicit gambling has been estimated to be worth close to 500 billion US dollars (Singh, 2013). In a market research report published in 2015, Chris Grove and Adam Krejcik estimated that there were 590,000 paid activities for real-money fantasy esports betting, 1.72 million wagers conducted for esportsbooks, and roughly 3.2 million players gambling through informal markets (Grove & Krejcik, 2015). Their base projections called for the esports betting market to rapidly expand by 2020, estimating that 19.4 million bettors would wager \$23.5 billion dollars on esports, generating \$1.8 billion dollars in revenues for market operators (Grove & Krejcik, 2015). The bull case projected the market to have 32.5 million participants wagering a total of \$42.9 billion dollars, producing revenues of \$3.3 billion dollars. In a white paper, Grove (2016a) estimated that the total handle of skin gambling would dwarf cash gambling; he approximately projected that \$7.4 billion dollars of skins would be wagered in 2016 compared to \$550 million of cash.

It is important to note that these lofty projections were released prior to Valve sending cease-and-desist letters to skin gambling operators. Valve's crackdown decimated the market and necessitated

a revision of Grove's projections. Grove's (2016b) new 2020 projection saw the base total handle change from \$23.5 billion dollars to \$670 million dollars; the bull projections were subsequently revised from a \$42.9 billion handle to a mere \$969 million.

The intersection of technology and business provides individuals the capacity to incorporate and register companies overseas in countries that have business-friendly regulations (e.g. the Isle of Man and Malta), thus giving these companies the ability to skirt local regulations. Greater levels of regulation at the national level may not be enough if business owners have the wherewithal to host their business overseas. A potential solution to this problem could be found through the utilization of international enforcement agencies such as INTERPOL. As Abbott and Sheehan (2013) note, the Federation Internationale De Football Association (FIFA) partnered with INTERPOL to implement educational programs to combat match-fixing in soccer. Akin to esports most professionals, both players and officials, involved with soccer at the lower levels do not make a lot of money, making them easy targets and providing them with grand incentives to partake in match-fixing (Abbott & Sheehan, 2013).

Another step towards combating loot boxes and illicit skin wagering could be through the recognition of professional esports players as athletes. Some academics (Hemphill, 2005; Jonasson & Thiborg, 2010; Jenny, Manning, Keiper, & Olrich, 2017; Llorens, 2017) contend that the constituent elements of what constitute traditional sports can be found in esports. Governments could recognize the status of esports athletes as equal to traditional athletes, thus legitimizing the practice and naturally giving esports more mainstream coverage. An example of a government legitimizing esports can be found in Germany, where they have officially introduced the first dedicated esports visa (Ashton, 2019). This could potentially illuminate any scandalous behaviour and provide implicit pressure onto video game developers to shore up any unethical and troublesome behaviour found within the sport.

Finally, developers like Valve have a role to play in the rise of this underground behaviour. This may require Valve to continuously take an active stance on the matter, as they have previously done. One way this could be done is for Valve to monitor and shut down applications that use the steam API to facilitate the transfer of skins. The items gambling websites receive as collateral stay on the platform, generally on multiple accounts that are used solely as storage. As seen with OPSkins, Valve could identify the skin storage accounts linked to gambling websites and freeze them, effectively shutting down the operation. It remains to be seen what further actions Valve choose to take – though it remains clear that future legitimacy within this space requires some amount of buy-in from Valve.

The findings presented in this study are certainly relevant to the field of criminology for a number of reasons. First, the introduction of transferrable cosmetic items had the unintended consequence of being stores of value which created a subterranean economy. Loot box keys, as Valve themselves have claimed, have been a cash-out method for international fraud rings (Valve Software, 2019). One can surmise how problematic it can become if your platform provides cybercriminals an additional avenue to launder stolen assets for ‘clean’ money.

Second, these findings illuminate the skewed incentives structure in the esports realm. As Stalans and Donner (2018) assert, individuals from a variety of cultural, socio-economic, and intellectual backgrounds participate in cybercrime for a number of different reasons. It is clear that some actors in the esports space do not have a moral quandary engaging in unscrupulous activity. For some, tradeable cosmetic items represent a novel store of value used to engage in wagers, on games of chance, or the target of fraud. For others, skins were merely an item that enhanced the visual appeal of their character.

The intent of Valve’s punishment against the individuals involved in the iBUYPOWER scandal was punitive and served as an attempt to deter others from future match-fixing. From a deterrence theory standpoint, Valve’s actions served as a relatively ineffective deterrent to future instances of

match-fixing because it focused on severity (lifetime bans to a precedent example) and because of this, lacked support from other stakeholders in the CS:GO ecosystem (e.g., players and teams). This incident was the first recorded instance of match-fixing within professional play in CS:GO. The leisurely pace at which sanctions were levied, especially considering that at the time iBUYPOWER was considered the best North American CS:GO team, may have given prospective match-fixers the impression that it would be easy to conceal match-fixes at lower levels of competitive play. Lewis noted that the gameplay and demeanour of the iBUYPOWER players during the fixed match was undoubtedly peculiar (Lewis, 2015a). For prospective match-fixers, this scandal highlighted the need to be more discreet with influencing game outcomes; it would be less suspicious if the end result was close, rather than an obvious trouncing. The indefinite ban was regarded as an unnecessarily harsh punishment, underscored by the fact that even Lewis (2015c), in a separate piece, publicly opposed the uncertain terms of the penalty.

Deterrence theory can be conceptualized in relation to individual actors and their "rational choices" around deviant and criminal behavior. This framework is certainly applicable in the current inquiry, but as the analysis illustrates, institutional actors (e.g., game studios, esports bodies, gambling website companies) also make decisions related to regulatory structures and their sanctioning policies. Value can be found from applying the lens of deterrence theory as a framework to the issue of loot boxes. As we have unearthed throughout this work, there were no regulating frameworks or oversight bodies recognizing actions within this liminal space. Valve's informal judgements against match fixers and skin gambling websites connote a form of punitive deterrence displayed to the video game world. The continued existence of skin gambling after Valve's responses indicate that the involvement of gaming regulators may be necessary to provide a stronger form of deterrence against some actors than currently exist in most countries. As loot boxes are readily available to youth, and skin gambling websites a few clicks away from the loot boxes, gaming regulators may be required to step in to prevent youth from accessing these websites and to mitigate overall gambling-related risks linked to loot boxes.

This thesis provides value for future applications of deterrence theory in that it situates the theory on a spectrum of individual to institutional.

Limitations

The present study's chronological case analysis of CS:GO's transferrable cosmetic items is not without its limitations, and they will be discussed here. First, the current study follows the trajectory of virtual skins in CS:GO from its release in 2013, highlighting key events and major changes surrounding the game's loot boxes and skins. Many modern video games utilize the loot box concept in one form or another, but this study only focuses on match-fixing and unregulated gambling using CS:GO skins as a casino-chip proxy – whether this behaviour of wagers extends past the realm of CS:GO is outside the purview of this work.

Claims regarding the cause-and-effect relationship between virtual skins, match-fixing, and gambling were avoided. In other words, the findings from this study retrospectively chart a particularly tumultuous and problematic set of behaviours that have grown from the presence of transferrable cosmetic items. This study sought to elucidate the past and present landscape of loot boxes and skins in CS:GO. Admittedly, there is much to unravel within this space – more can be examined with respect to loot boxes and skins than can be contained within the confines of this particular study. This work offers a starting point on how regulatory bodies can conceptualize skins and loot boxes, and what they could be used for.

Another limitation of the current inquiry is that it frames the studied phenomena through the lens of deterrence theory, and while this rational choice perspectives are useful in understanding certain behaviours (on and offline), an integrated theoretical approach including perspectives such as control and (sub)cultural theories would provide opportunities to consider intersections between individual decision making and broader social, economic and cultural forces. This thesis attempted to examine the observed behaviours primarily through a criminology-focused lens; an interdisciplinary lens may enrich this thesis' point-of-view (e.g, game studies, communications, etc.)

Implications for Future Study

This current study set out to map the loot box and skin gambling landscape in CS:GO, providing nuanced insights into particular behaviours and controversies within this realm. The problems surrounding CS:GO skins and loot boxes exist, in part, because there is no clear international stance on the matter. Individual government entities have deemed that the loot box mechanic is problematic (UK Gambling Commission, 2017; Washington State Gambling Commission, 2016; Environment and Communications References Committee, 2018) or that it even contravenes local gambling regulations (Belgian Gaming Commission, 2018; Netherlands Gambling Authority, 2018). Though individual governments have begun to enact legislation that force Valve to make loot boxes more transparent – in France users can scan a case to reveal its contents (Bennett, 2019); the percent chance of receiving items from loot boxes were revealed in China (Scott-Jones, 2017) – the developers have not generally modified the mechanic without pressure from these regulatory bodies.

It is clear that this novel area of research would benefit from additional academic scrutiny. A path forward can only begin with collective buy-in from stakeholders at all levels. Monitoring the developments within this space would be a worthwhile endeavour; it would be of interest to analyze the impact of various government and corporate interventions on loot boxes and skin gambling in CS:GO. Future academic work may also choose to analyze or document the behaviours, transactions, and gambling that occur with other transferrable video game items like those found in DoTA 2 and FIFA Ultimate Team.

Another future perspective to consider is that of corporate social responsibility within the space. Corporations have long-considered their fiduciary duty to shareholders as its foremost concern; however, there has been an industry shift towards considering the downstream effects decisions have on the end user. This approach would provide a needed critical orientation when considering legally

grey behaviours and their impact on players as well as player related ecosystems (such as esports) but also how efforts to deter certain behaviours could have complex and even unintended consequences on some players and player organisations.

An additional area for future study is the cryptocurrency space vis-à-vis non-fungible tokens (NFTs). With the appearance of NFTs in popular culture, there could be a link drawn between NFTs and tradeable skins, as both are able to be transferred between individuals and a price can be established between both.

One final area for future study could be within the gaming space itself. With respect to CS:GO, a follow-up examination could be undertaken to see if any additional barriers are imposed onto the game – either self-imposed by Valve, or driven externally by other countries and their respective gambling commissions' rulings. A further examination into other existing games could be embarked upon as well, focusing on updates to games and tracking if developers of existing games include tradeable items in a future update. As well, a prospective eye could be directed to new video game releases, as developers may look to include loot boxes within their game's monetization system either by choosing to create and embed a trading system within their own game, or publishing their game through Steam and utilizing the existing SCM infrastructure.

List of Figures & Tables

Figures

Figure 1. A screenshot of the contents in the 'Prisma Case' in Counter-Strike: Global Offensive. Item rarity is denoted by colour; items with the left-justified blue border are the most common offerings; the rarest items are red and golden-bordered. The price to purchase a virtual key which would unlock this loot box is \$3.59 CAD (\$2.50 USD).

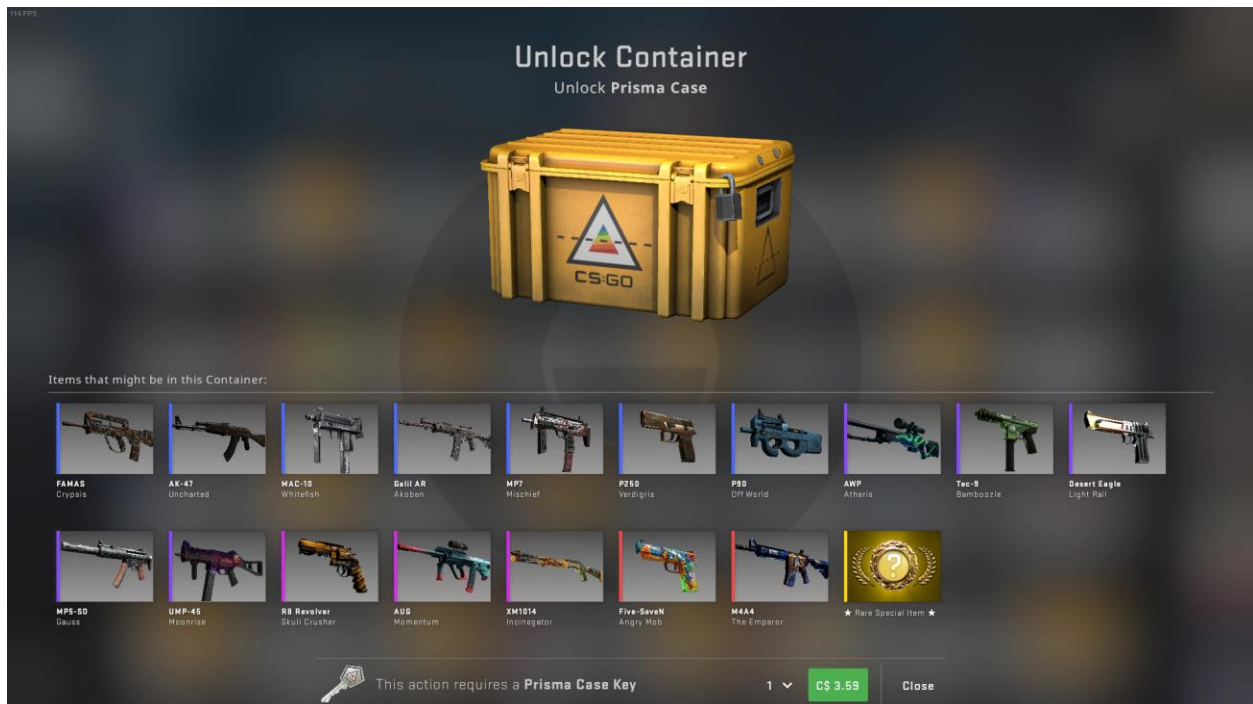


Figure 2. Three still images from a case unboxing in the game Overwatch. From left to right: The case starting to open; the items shooting out from the case like animated fireworks; the received items (Note: In this specific case opening the user unboxed a 'legendary' skin which explains the extra visual effects compared to the other items in the case)

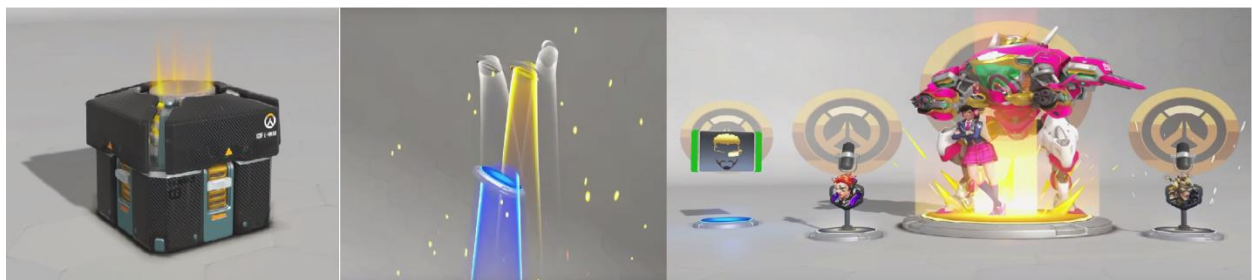











Figure 3. A screenshot of the Steam Community Market's front page. Users are able to filter items from specific games in the outlined box; the arrow marks the search browser for a specific item.

Popular Items		Newly Listed	Recently Sold
NAME	QUANTITY	PRICE	
 Prisma 2 Case Counter-Strike: Global Offensive	2,906	Starting at: CDN\$ 6.03	
 Shattered Web Case Counter-Strike: Global Offensive	90,310	Starting at: CDN\$ 1.55	
 Mann Co. Supply Crate Key Team Fortress 2	11,408	Starting at: CDN\$ 3.04	
 Operation Breakout Weapon Case Counter-Strike: Global Offensive	135,757	Starting at: CDN\$ 0.71	
 Sticker Gold Web (Foil) Counter-Strike: Global Offensive	3,609	Starting at: CDN\$ 7.62	
 Glove Case Counter-Strike: Global Offensive	186,162	Starting at: CDN\$ 0.23	
 Spectrum Case Counter-Strike: Global Offensive	347,237	Starting at: CDN\$ 0.12	











[Read about security requirements](#) for using the Community Market.

Search for Items 

Search

Show advanced options... 

Browse by Game

-  Counter-Strike: Global Offensive
-  Dota 2
-  Golf With Your Friends
-  Killing Floor 2
-  PAYDAY 2
-  PLAYERUNKNOWN'S BATTLEG...
-  Steam
-  Subnautica
-  Team Fortress 2
-  Z1 Battle Royale


[Show more](#) 

Figure 4. This is a screenshot of the Prisma 2 Case listing page, a loot box released in Counter-Strike: Global Offensive in April 2020. In the red box, a user can see the highest bid prices and lowest ask prices for this particular item. Outlined in a green box is a continuously-updated public ledger of actions for the given item.

This item is a commodity, where all the individual items are effectively identical. Individual listings aren't accessible; you can instead issue orders to buy at a specific price, with the cheapest listing getting automatically matched to the highest buy order.

After purchase, this item:

- will not be tradable for one week
- can immediately be re-sold on the Steam Community Market

2855 for sale starting at **CDN\$ 6.11**

Buy...

Price	Quantity
CDN\$ 6.11	1
CDN\$ 6.15	5
CDN\$ 6.16	19
CDN\$ 6.17	10
CDN\$ 6.18	20
CDN\$ 6.21 or more	2800

525398 requests to buy at **CDN\$ 6.07** or lower

Sell...

Price	Quantity
CDN\$ 6.07	5
CDN\$ 6.01	1
CDN\$ 5.84	9
CDN\$ 5.82	45
CDN\$ 5.79	167
CDN\$ 5.77 or less	525171

Recent activity




-  Malko sam nagal ! cancelled their listing for CDN\$ 6.18
-  ツ C4uga ツ™ listed this item for sale for CDN\$ 5.29
-  Karachovsk listed this item for sale for CDN\$ 6.07

Figure 5. Pictured are two graphs found on the item page for the Prisma 2 Case in Counter-Strike: Global Offensive. The top graph is a trend line of the median sale prices for this item over a given time period. Here, the user is able to view the historical price of an item over a week, a month, or its lifetime. The bottom graph is a representation of the cumulative number of buy (blue) and sell (green) orders for the item at a certain price point.

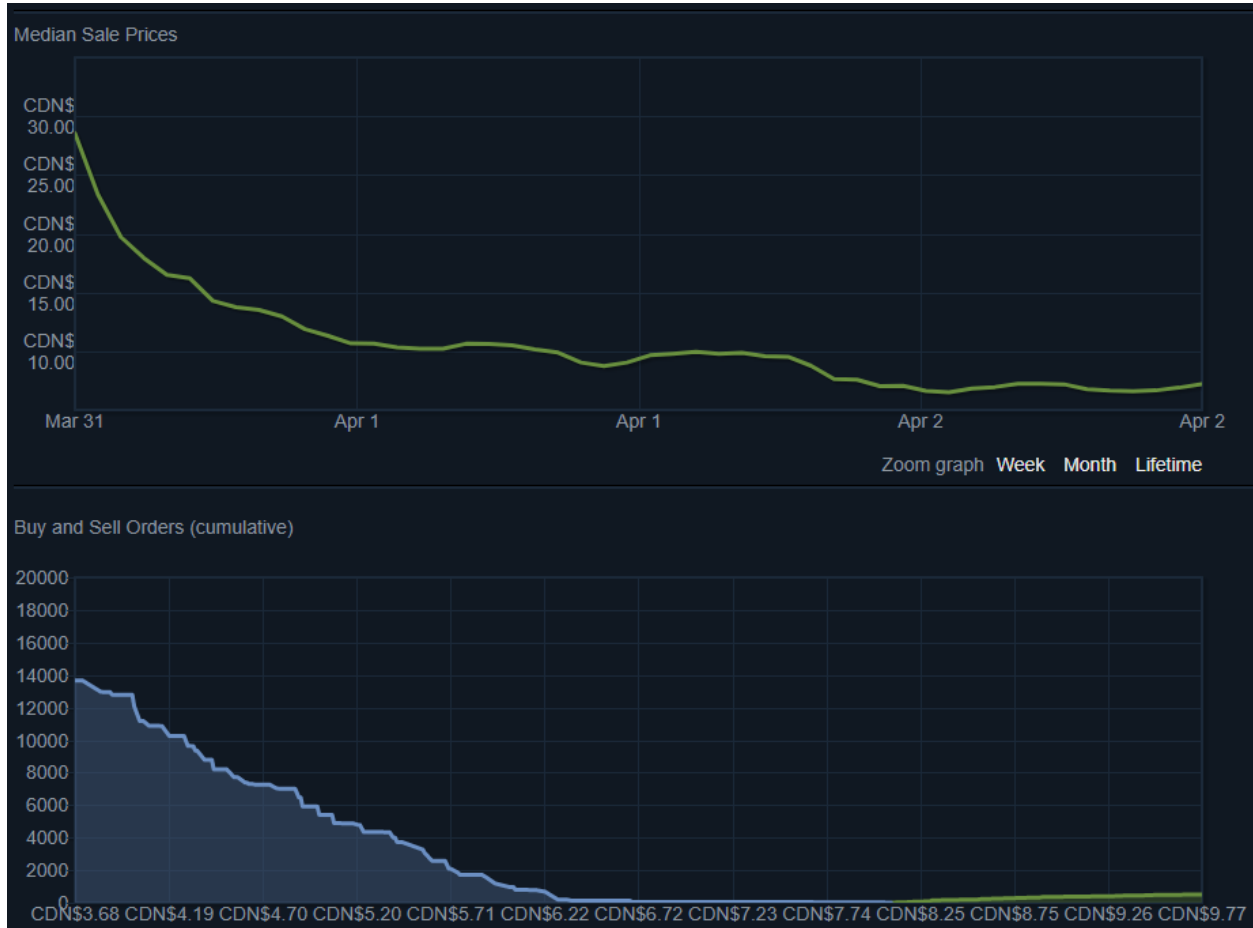


Figure 6. A screenshot of the case opening screen in Counter-Strike: Global Offensive by the YouTube channel WatchGamesTV (bottom left) [https://youtu.be/ DZyIOEK-7I?t=168](https://youtu.be/DZyIOEK-7I?t=168)

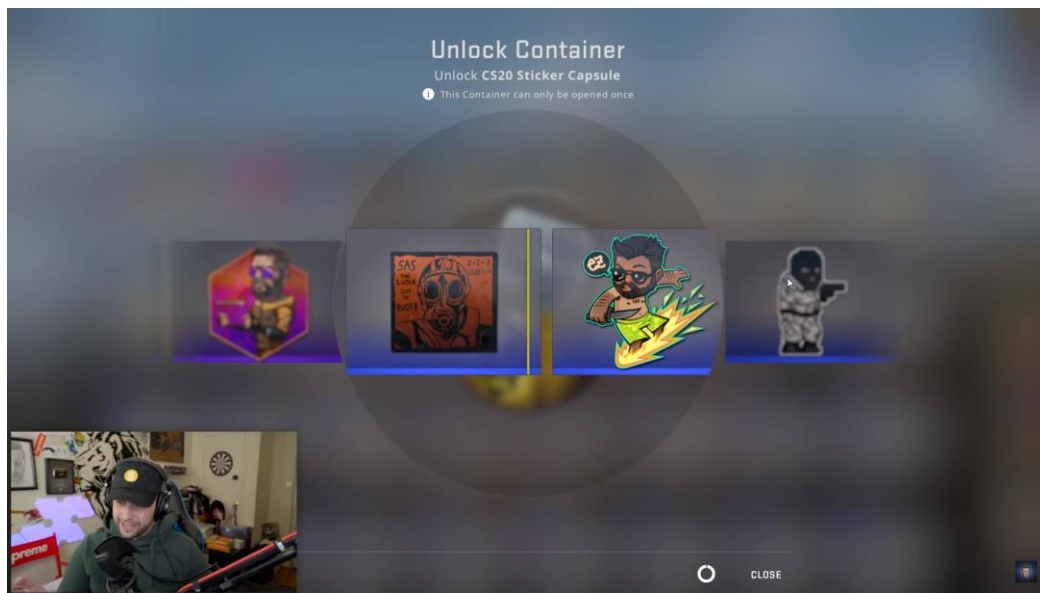


Figure 7. A screenshot from August 20th, 2015 of four matches a user could bet on during the ESL One Cologne 2015 group stage. These games were best-of-ones following the Swiss-system tournament bracket.

The screenshot displays four match cards from the ESL One Cologne 2015 group stage. Each card includes the match time, time zone, format, team names, logos, and betting odds. The ESL logo is present on the right side of each card.

Match Time	Time Zone	Format	Team 1	Team 2	Betting Odds
+ 8 hours from now	05:45 EDT	Best of 1	Kinguin 88%	Imm 12%	ESL
+ 9 hours from now	07:15 EDT	Best of 1	Cloud9 78%	TBDb = Kinguin/Immunity winner	22%
+ 11 hours from now	08:40 EDT	Best of 1	CLG 73%	eB 27%	ESL
+ 12 hours from now	10:05 EDT	Best of 1	NaVi 89%	TBDb = CLG/eBettle winner	11%

Figure 8. An example of the Steam Trade with a CSGO Lounge bot. In this example, the Steam User has requested to withdraw skins off the platform, which is why there are items being received but none being sent by the Steam User. In the bottom left corner is the 'protection code' – this code also appears on the website as a sanity check for the user to know that they are completing a trade with the correct bot.

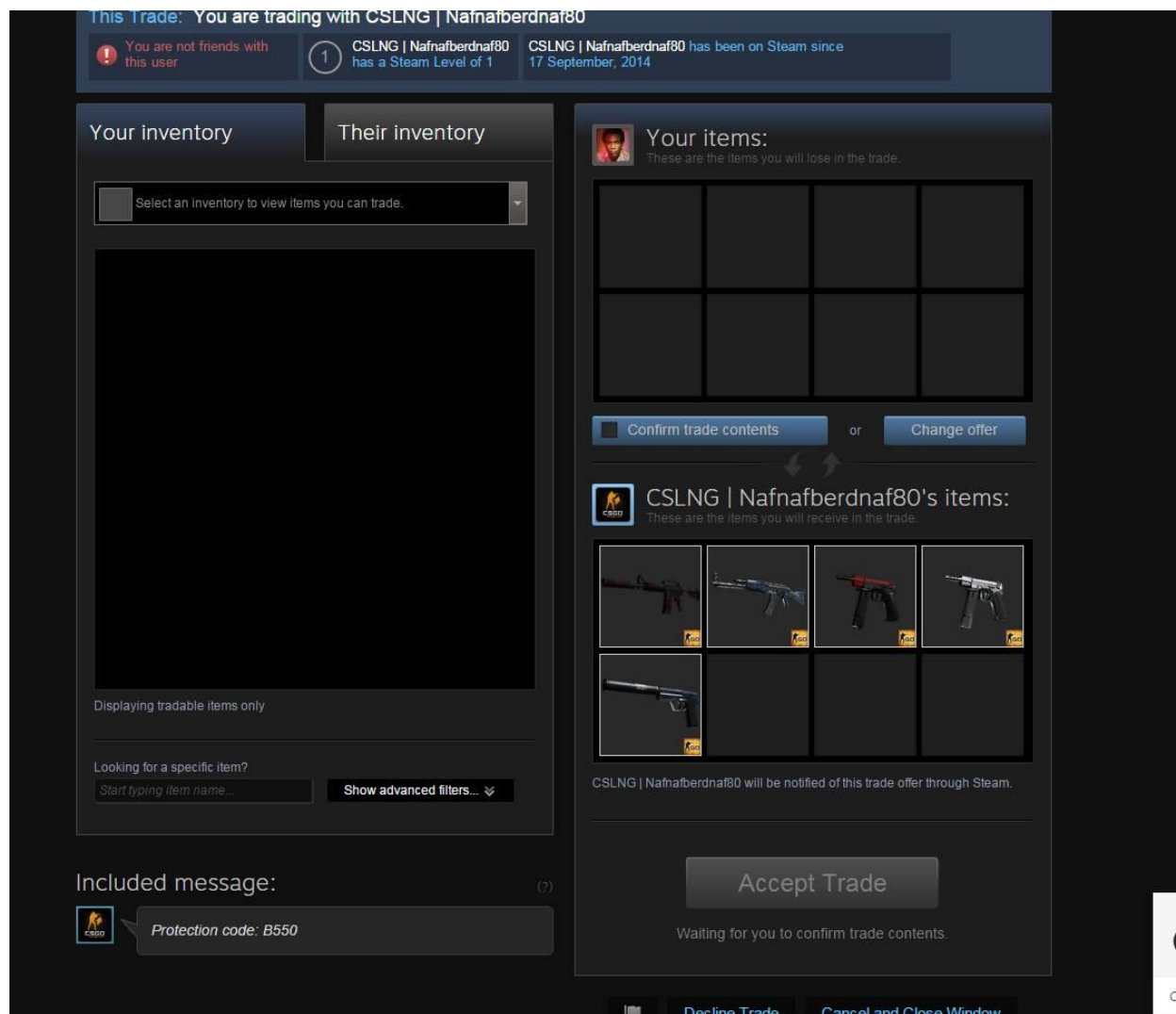


Figure 9. A screenshot of this author's \$5.96 wager in 2015 on Team Liquid to beat CLG in a Counter-Strike match. If the match were to have commenced at that moment, the wager would have received \$7.97 in skins on a win, though the nature of pari-mutuel betting meant that the odds shifted based on how much money was wagered on each side.

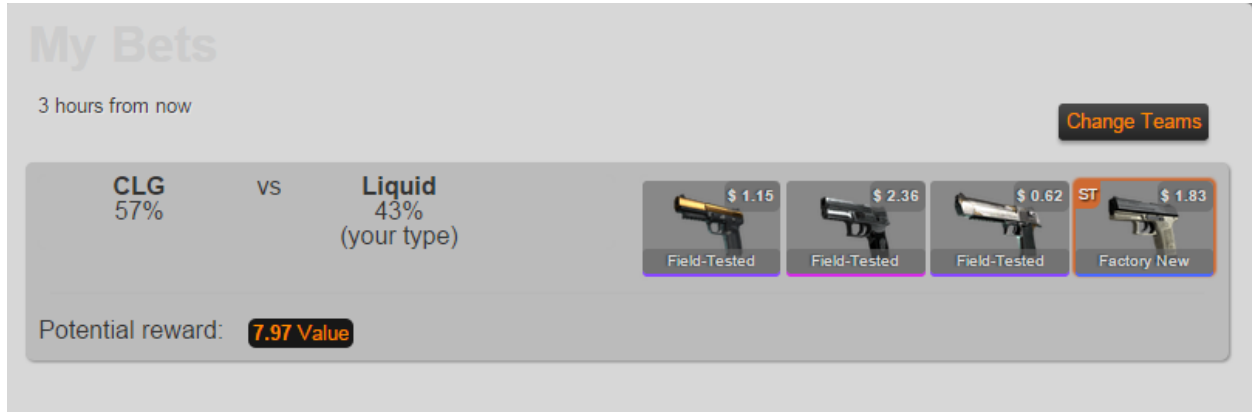


Figure 10. A picture of this author's CSGO Lounge account in 2015 with wagered skins in his online inventory. The price in the top right-hand corner of every item was their approximate value on the Steam market in US Dollars which was updated daily.

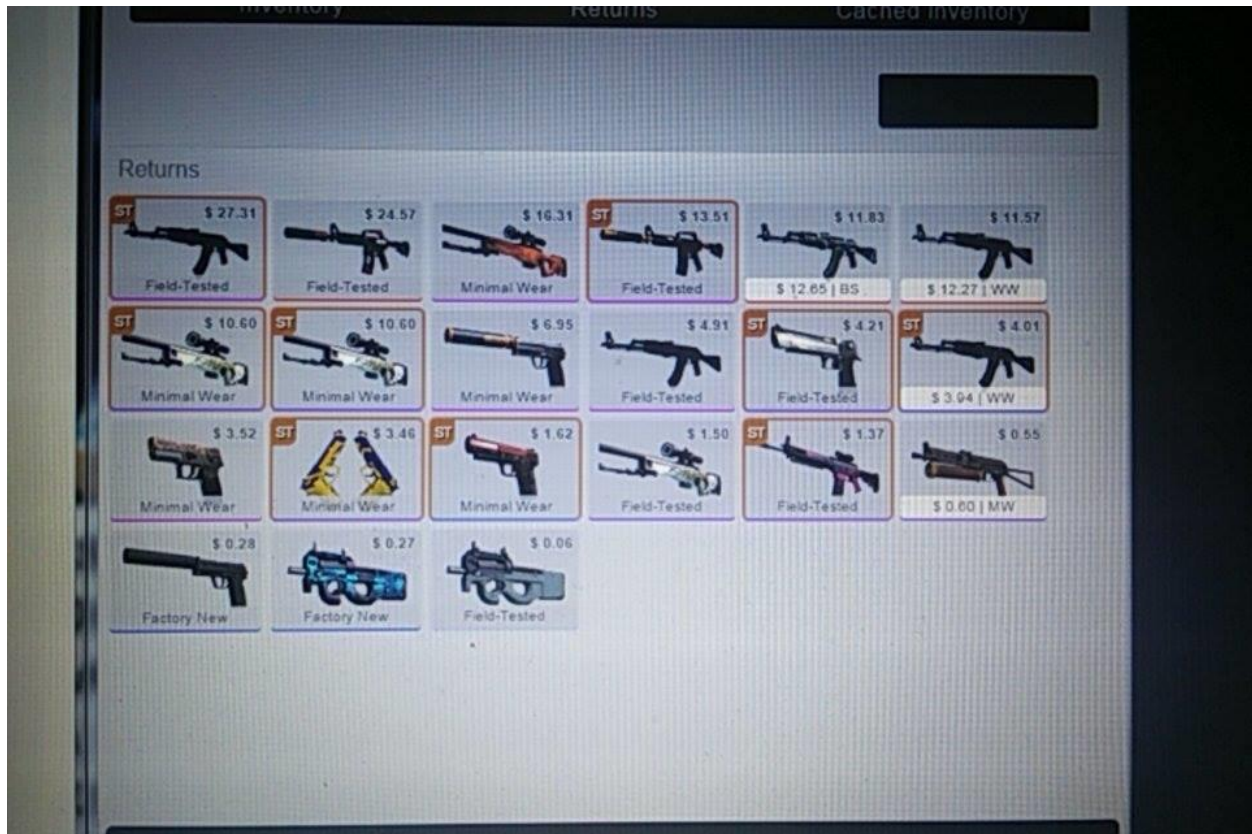


Figure 11. A picture of this author withdrawing the rest of his skins off the CSGO lounge platform.

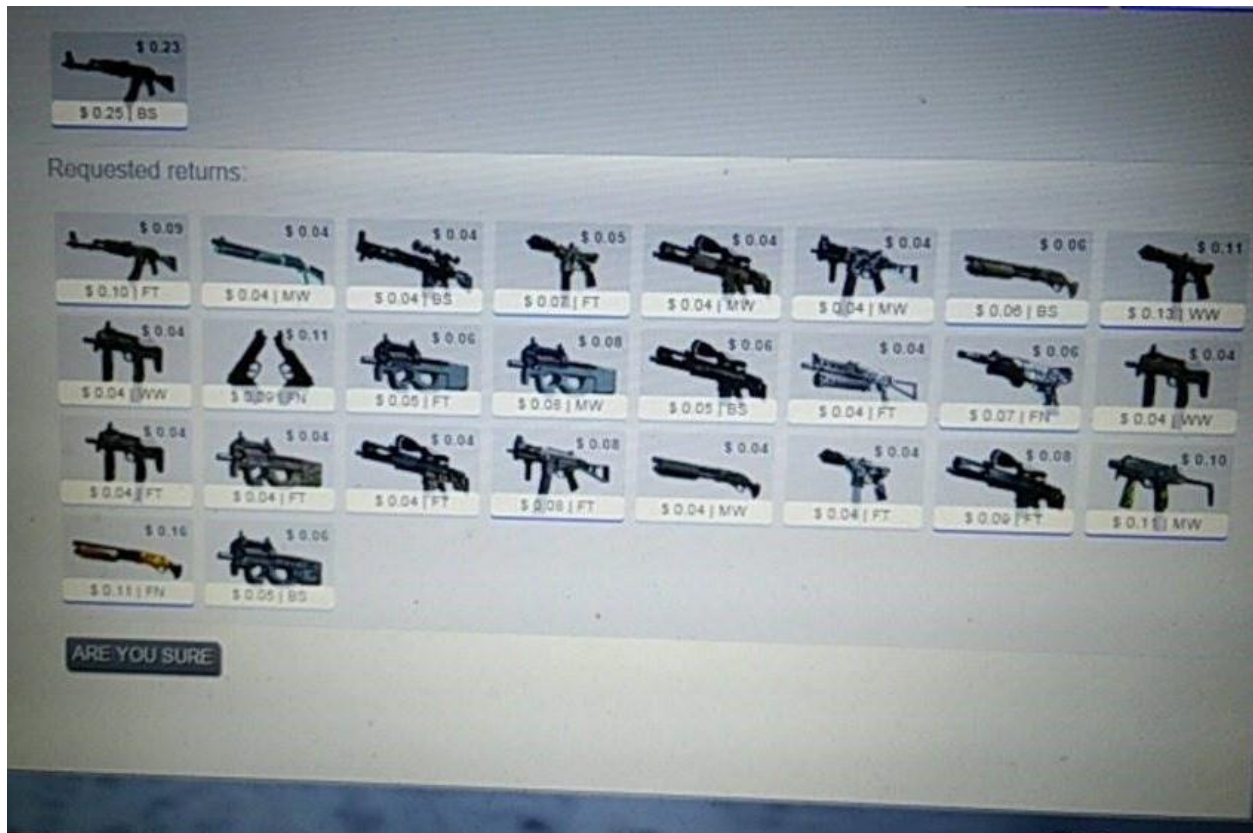


Figure 12. A screen capture of the now-defunct CS:GO Diamonds site. Users were able to wager on the outcome of the random number generator.

The screenshot displays a dark-themed interface for a random number generator. At the top, it indicates "Next roll in 19s" with a diamond icon. The main display shows four vertical columns of numbers: 9, 2, 8, and 8. Below this, the "BET AMOUNT" is set to 0.00, with buttons for +10, +100, +1000, X2, 1/2, MAX, and CLEAR. Four betting categories are listed: UNDER 47.50 (Win 2x), OVER 52.49 (Win 2x), 47.50 - 52.49 (Win 19x), and UNDER 01.00 (Win 95x). A "Previous Rolls" list on the right shows a sequence of numbers: 92.88, 97.75, 00.94, 91.95, 51.94, 66.40, 79.73, 20.95, 87.15, and 75.79. At the bottom, a table summarizes the betting data for each category.

Bets for 2x	UNDER 47.50	Bets for 2x	OVER 52.49	Bets for 19x	47.50 - 52.49	Bets for 95x	UNDER 01.00
Total bet	142.34	Total bet	9.33	Total bet	6.80	Total bet	1.12
My bet	0.00	My bet	0.00	My bet	0.00	My bet	0.00

Figure 13. A copy of the cease and desist letter, with the names of the twenty-three websites the legal action is directed at.



Valve Corporation

valvesoftware.com

10900 NE 4th Street, Suite 500
Bellevue, WA 98004

vox 425.889.9642
fax 425.827.4843

Dear Sirs:

Re: Violations of Steam Subscriber Agreement

We are aware that you are operating one of the gambling sites listed below. You are using Steam accounts to conduct this business. Your use of Steam is subject to the terms of the Steam Subscriber Agreement ("SSA"). http://store.steampowered.com/subscriber_agreement/. Under the SSA Steam and Steam services are licensed for personal, non-commercial use only. Your commercial use of Steam accounts is unlicensed and in violation of the SSA. You should immediately cease and desist further use of your Steam accounts for any commercial purpose. If you fail to do this within ten (10) days Valve will pursue all available remedies including without limitation terminating your accounts.

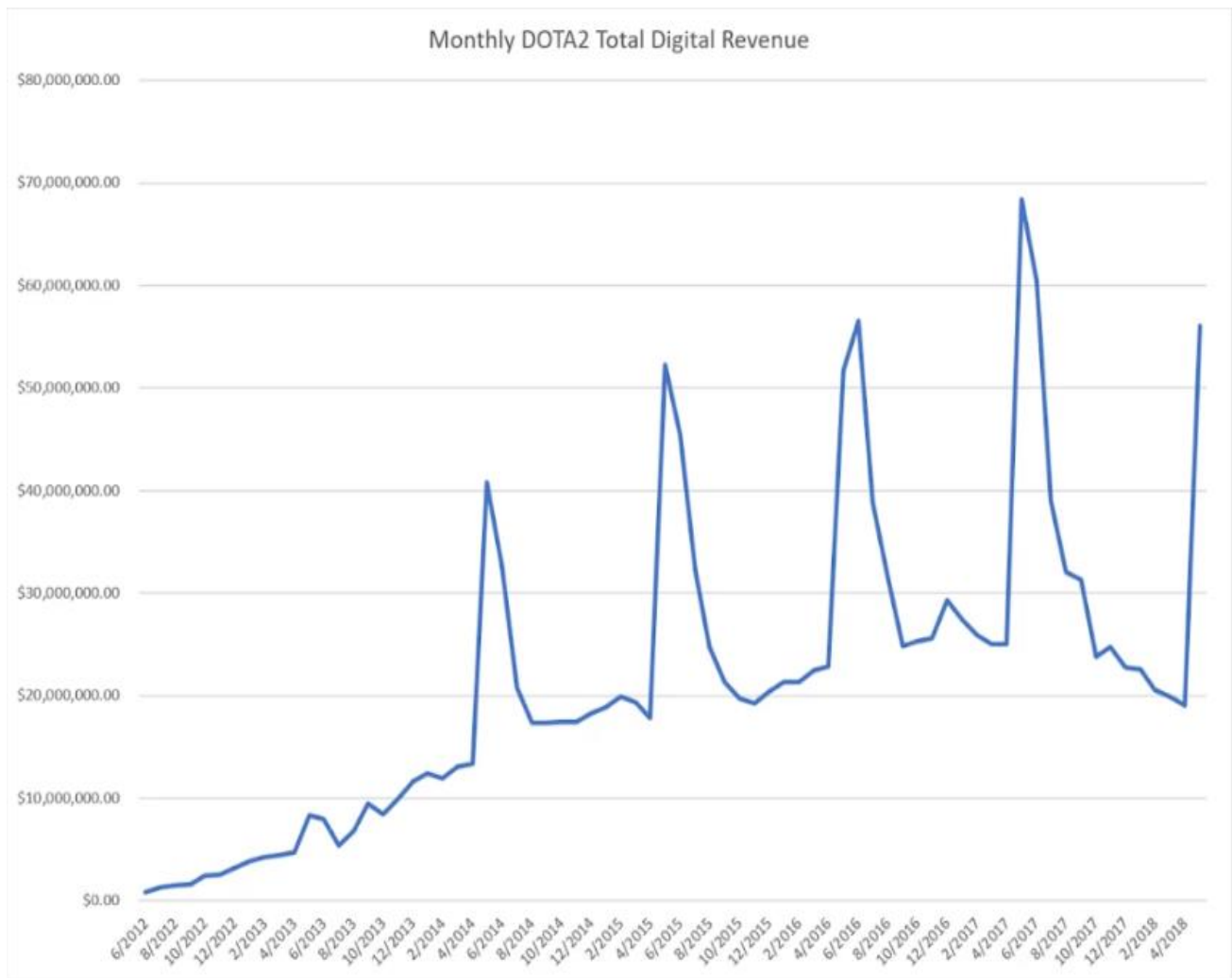
Karl Quackenbush

General Counsel, Valve Corp.

csgolounge.com
csgostrong.com
csgodouble.com
csgo500.com
csgocosmos.com
csgocasino.net
csgo2x.com
csgohouse.com
csgoatse.com
csgodiamonds.com
societylogin.com
dota2lounge.com
csgocrash.com
csgolotto.com

csgobig.com
csgofast.com
csgosweep.com
csgomassive.com
csgobattle.com
skins2.com
csgopot.com
csgowild.com
bets.gg

Figure 14. A screen capture of monthly DOTA 2 revenues, where the spikes in monthly revenues denote when the premium progression passes were active. The X axis represents the progression in time noted in months, while the Y axis represents monthly revenues at ten million dollar (USD) intervals.



Tables

Table 1: Examples of Loot Boxes from Different Games

Title of Game	How the Loot Box Operates
Overwatch	Players receive a crate they can open that contains cosmetic upgrades for their characters. Four cosmetic items are contained in each loot box with four tiers of rarity and associated colours: Common (white), Rare (blue), Epic (purple), and Legendary (gold). Duplicates are transformed into in-game currency, which can be used to purchase additional cosmetics directly.
Middle-Earth: Shadow of War	Players can purchase War Chests for real-world currency and can open them for items that help a player's progression throughout the game. This practice was discontinued in 2018.
Forza Motorsport 7	Prize crates can only be earned through gameplay and contained in them are cosmetic items or boosts that help the player only in the single-player campaign. This feature was removed from the game in 2018 (Welsh, 2018).
FIFA 19	FIFA 19: Packs containing digital trading cards of famous soccer players can be purchased using FIFA Ultimate Team (FUT) coins, an earned in-game currency, or FIFA Points which can be purchased through a trusted retailer such as Nintendo, PlayStation, Xbox, or Origin (EA's proprietary game distribution software). Packages of FIFA points can be purchased for as low as \$1.49 for 100 points, or up to 12000 points for \$129.99. Players are able to buy and sell players for FUT Coins on the FUT 'Transfer Market', though the developer urges against purchasing third-party coins stating that it is against the Terms of Service (Electronic Arts, 2019).
Mass Effect	Mass Effect: Players can purchase packs that contain new mods, weapons, and equipment for the multiplayer mode with credits earned through gameplay or through purchased MS/BioWare points (Mass Effect Wiki, 2019). Every real-world dollar spent is redeemable for 80 MS/BioWare points.
Star Wars: Battlefront II	Initially, this game contained purchasable loot boxes which contained items that strengthened a player's character in the game. Prior to the official launch of the game, players were able to purchase 'Crystals' which were exclusively used to open loot

	<p>crates. However, prior to the game's official launch, EA disabled all microtransactions in an attempt to rework their loot crate system (Gabrielson, 2017). In March of 2018, EA re-released the loot box concept as a daily log-in bonus, featuring purely cosmetic items (Grubb, 2018).</p>
Fortnite	<p>'Llama Boxes', Fortnite's version of loot boxes, are available for purchase using earned in-game currency or the player can purchase the in-game currency with real-world money. January 2019 saw the transformation of Fortnite's loot crate mechanic, where players are now able to see the contents of the crate without having to purchase it (Good, 2019). If the player does not want the items in the crate, they can wait until the contents of the daily store refreshes.</p>
Rocket League	<p>Released in 2015, Rocket League incorporated loot boxes as a cosmetic option to the game on September 8th, 2016 with Patch v1.22 (Watson, 2018). These crates were obtained through gameplay and unlocked with keys purchased with real-world currency. At the end of 2019, loot boxes were discontinued and replaced with a 'blueprint', allowing for players to see the exact item crafted (Connors, 2019). Keys were transformed into credits, but the mechanic is functionally similar to loot boxes, sans the loot crate randomness.</p>

Table 2: A list and description of each game of chance offered on CSGOatse.com

Game of Chance	Description
Roulette	Users can bet on the outcome of a single-zero roulette spin, where the values range from zero (green) to fourteen with 1-7 as red, and 8-14 as black. Wagers can be placed on a colour or zero as the outcome
Crash	Simulating a stock-market curve, users can wager an amount and guess on how high the multiplier will advance until the multiplier 'crashes', ending the game. The user wins if the ending multiplier is larger than their predicted multiplier. The payout is a function of the amount wagered multiplied by their predicted multiplier. (ex. A bet of 1,000 coins with a winning predicted multiplier of 2.00x results in a total profit of 2,000 coins - the 1,000 principle and an additional 1,000 coins for the winning multiplier prediction)
Blackjack	Similar to the game offered at land-casinos, the game deals two cards to the player and dealer. The player may either "hit" or "stand" to get as close to 21 as possible without going over.
Minesweeper	Using a five-by-five grid, the player can select how many bombs they want to have hidden on the board before beginning the wager. This game mode can have one, three, five, or twenty-four bombs hidden within twenty five squares. In order to receive a winning wager, the user must reveal seven squares with one bomb, five squares with three bombs, three squares with five bombs, or one square with twenty-four bombs.
Tibian Dice	A six-sided die is rolled and players can bet on the outcome of the roll from one through six, or if the number will be between one and three or four through six.
Jackpot	Users compile their wagers over a short time period (anywhere between fifteen seconds and sixty seconds) and add them into group pot. The chance of winning is a function of how much the user wagers relative to the total amount within the pool.
Russian Roulette	A variant of the coin-flip, users wager an equal amount against each other in a virtual game of 'Russian Roulette', where the winner collects the total purse after the house commission is removed.

Table 3: ESIC’s Risk Analysis of Possible Threats to Esports

Cheating to Win	Cheating to Lose
<p>Software Cheats and Hacks: “Traditional” cheating in esports accomplished by utilizing software “cheats” or hacking that either assists the cheater or hampers the opponent.</p> <p>Likelihood: 5 Impact: 5 Threat Assessment: 25</p>	<p>Match-Fixing: Deliberately losing a game or match to directly or indirectly profit from the outcome.</p> <p>Likelihood: 5 Impact: 3.5 Threat Assessment: 17.5</p>
<p>Online Attacks: An online attack directed at an opponent’s internet connection with the intention of slowing down or completely disabling the opponent’s internet connection.</p> <p>Likelihood: 5 Impact: 4 Threat Assessment: 20</p>	<p>Technicians and Officials Corruption: Betting fraud that is committed with the help of favourable one-sided rulings by officials, biased seeding/groupings, admins granting one team access to in-game information they should not have.</p> <p>Likelihood: 3 Impact: 4 Threat Assessment: 12</p>
<p>Doping: Using drugs/substances without a therapeutic or medical exemption in order to gain an advantage over other non-using players.</p> <p>Likelihood: 3.25 Impact: 3.75 Threat Assessment: 12</p>	<p>Spot-Fixing: Deliberately underperforming or manipulating a particular part/passage in the interests of betting fraud, profiting either directly or indirectly.</p> <p>Likelihood: 4 Impact: 2.5 Threat Assessment: 10</p> <p>Example: Two players in the Mountain Dew League (MDL), ESEA’s highest level of competition, were found to have relatives placing bets on their own matches, either for the players themselves or using information gleaned from the players. The investigation conducted by ESEA did not conclusively suggest that the other members of their team were aware this was occurring. As a result, the two offending players were levied a year-long ban by the league, and their team was removed from the MDL (ESEA, 2018b)</p>
<p>Disabling/Abusing Opponents: Physically disabling an opponent before or during a match, including assaulting the opponent or doping them without consent.</p> <p>Likelihood: 2</p>	<p>Tournament “Structural” Manipulation: Purposefully underperforming to take advantage of a tournament or league structure that would match a team against weaker opponents in subsequent rounds. It is not usually associated with betting, but rather a desire to progress</p>

<p>Impact: 2.5 Threat Assessment: 5</p>	<p>further in a tournament or competition.</p> <p>Likelihood: 3 Impact: 2 Threat Assessment: 6</p> <p>Example: In a playoff tournament for promotion into the ESEA league's highest circuit of competition, the MDL, team FakeOut Nation deliberately lost a match against Bravado Gaming to gain a favourable path to the finals of the playoffs (ESEA, 2018a). As a result of this behaviour, the players on the offending team were banned for the subsequent season.</p>
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(Smith, 2016)

Table 4: ESRB's Ratings Categories

Rating Category	Description
Everyone	Content is generally suitable for all ages. Games with this rating may contain minimal cartoon, fantasy, or mild violence and/or use of mild language.
Everyone 10+	Content is generally suitable for those aged 10 and up. Games with this rating may contain cartoon, fantasy, or mild violence. There may be mild language and/or minimally suggestive themes.
Teen 13+	Games with this category label are suitable for those aged 13 and up. There may be violence, suggestive themes, crude humour, minimal depictions of blood, simulated gambling and/or infrequent use of strong language.
Mature 17+	Content found in this category is suitable for those aged 17 and up. Games here may contain intense violence, sexual content, strong language, blood, and gore.
Adults Only 18+	Content found in these games is suitable only for adults; those aged 18 or older. These games may contain prolonged scenes of intense violence, graphic sexual content, and/or gambling with real currency.
Rating Pending	Games with this label have not received a final ESRB rating. This rating category only appears on advertising, marketing, or promotional materials that are expected to carry an ESRB rating. This will be replaced by a game's rating once assigned.

(Entertainment Software Rating Board, 2019)

Table 5: PEGI's Age Labels

Age Label	Description
PEGI 3	The content of these games should be suitable for all ages, with no content that is likely to frighten young children. Mild violence in a comical sense or childlike setting is acceptable. No profanity should be heard.
PEGI 7	These games may contain content that can frighten young children. Mild forms of violence (implied/non-realistic) violence are acceptable for a PEGI 7 rating.
PEGI 12	Video games that show violence of slightly more graphic nature towards fantasy characters or non-realistic violence to human characters can be found in this age category. Mild sexual innuendo and profanity is acceptable, and depictions of gambling can be present.
PEGI 16	Games with depictions of violence or sexual activity that resemble real life are found with this rating. Profane language, use of alcohol, tobacco, or illegal drugs can be present in games at this level.
PEGI 18	Games with this rating have depictions of gross violence, apparently motiveless killing, or violence towards defenseless characters. Glamorization of illegal drug use and sexual activity fall into this age category.

(PEGI, 2019)

Table 6: Perfect World's Loot Box Odds in CS:GO

Item Tier	Chance of Receiving an Item in This Tier (%)
Dark Blue; Rare	79.92%
Purple	15.98%
Pink	3.2%
Red	0.64%
Gold	0.26%

(Scott-Jones, 2017)

Note: There is a 10% chance of receiving the Stat-Trak variant of a weapon skin – a Stat-Trak skin contains a module that keeps a running tally of kills on a weapon

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