Opening the compliance and enforcement loot box: A retrospective on some practice and policy impacts achieved through academic research

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A B S T R A C T

Loot boxes are gambling-like products in video games that can be purchased with real-world money to obtain random rewards. Regulations have been imposed in some jurisdictions to attempt to address potential harms. Two recent policy studies assessed companies' compliance (but more often, non-compliance) with those regulations. The first study found that a supposed 'ban' on loot boxes in Belgium was not enforced so the product remained widely accessible. A preprint reporting this was widely publicised by the media. This enhanced awareness led to companies newly complying with the law and helped policymakers to view the practicality of banning loot boxes with more due scepticism. Researchers should consider actively sharing non-peer-reviewed preprint results to protect consumers more promptly. The second study found that, contrary to regulations, many games with loot boxes were not labelled. Subsequent engagement with the media and the industry self-regulators caused remedial actions to be taken: unlabelled games have since been correctly labelled, and non-compliant companies have been punished with (albeit insignificant) fines. The societal impacts of loot box policy studies demonstrate the importance of actively communicating research results to the public through media engagement and challenging companies and regulators when they are not complying with or enforcing regulations.

1. Social impact

Loot boxes are mechanics inside video games that players can engage with to obtain random rewards. Loot boxes that require purchase with real-world money, or 'paid loot boxes,' have been the subject of significant public controversy and regulatory scrutiny due to their structural and psychological similarities to traditional gambling [1,2] and the well-replicated link between loot box purchasing and problem gambling [3–5]. Hereinafter, 'loot boxes' refers to only paid loot boxes, unless otherwise specified, and the term is inclusive of all in-game purchases with randomised elements however aesthetically portrayed [6], including social casino games [7,8(p. 22),cf 9]. Many countries are considering regulating loot boxes [10,11]. A wide range of regulatory options are available from a public health perspective [12], and a number of legal and industry self-regulatory measures have already been adopted [13,14].

One important issue is whether these imposed measures have been adequately complied with by companies against whom they apply. Compliance is one crucial aspect of effectiveness; the other being whether the measure is effective at influencing the underlying behaviour it is intended to target or, i.e., whether it has efficacy. If a measure is not well-complied with (for example, if only half of all companies are actually implementing it), then even if the measure possesses practical efficacy when applied, it cannot be said to be an effective policy. Indeed, previous research has argued that existing loot box-related industry self-regulation, such as providing a label disclosing loot box presence on the packaging, fails to assist consumers even when properly implemented [15(p. 660),16,17]. However, examining the implementation of, and compliance with, potentially practically unhelpful measures remains a valuable exercise because the insights derived from such research would assist in ensuring future measures that do actually have efficacy will be well-complied with once they are eventually invented and adopted: for

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example, through building better platform-wide infrastructure and monitoring regimes to enhance compliance.

This article summarises the impacts on corporate practice and regulatory enforcement that two loot box policy studies have made after their results were published. Specific regulatory rules that have already been imposed were identified, and content analysis was conducted on video games and related marketing materials to check whether those rules have been complied with. Notably, fully according with open science principles, both studies were conducted in the registered report format, which meant that the research motivation and methodology were peer reviewed prior to data collection [18]. All underlying data, comments from reviewers, and responses to those comments and various revisions made to the manuscripts are publicly available for scrutiny.

2. Methodology

2.1. Belgian 'ban' on loot boxes

In the first study [19], I examined whether companies have complied with the 'ban' on loot boxes imposed by the Belgian gambling regulator in 2018 [20]. Even though all loot boxes were deemed to be illegal gambling in an official report that was widely publicised by the media and known to the player community [e.g., 21,22], I found that 82 of the 100 highest-grossing iPhone games were still generating revenue using in-game purchases with randomised elements in mid-2022. Policymakers in other countries, such as the Netherlands, have suggested that their country should emulate the Belgian regulatory position [23]. However, my study revealed that adopting such a restrictive position might not be practically enforceable against the millions of video games presently available and may lead to unintended negative consequences, such as giving parents a false sense of security.

2.2. Industry self-regulatory loot box warning label

In the second study [8], I assessed (i) whether the North American (ESRB; Entertainment Software Rating Board) and European (PEGI; Pan-European Game Information) video game age rating organisations accurately labelled games as containing loot boxes and (ii) whether popular games containing loot boxes listed on the Google Play Store were accurately labelled. The industry self-regulatory measure of attaching the warning label of 'In-Game Purchases (Includes Random Items)' to games containing loot boxes was introduced in 2020 [6,24]. The ESRB and PEGI independently conduct content moderation and decide whether a game should be labelled. By comparing their rating decisions against each other, I found that both have made rating mistakes (that they have since admitted to) by failing to label certain games with loot boxes as containing them. Separately, I also examined whether popular games on the Android platform containing loot boxes have been accurately labelled on the Google Play Store: 71 of 100 games failed to be attached with the warning. As part of the research process, after the initial results were found independently, I contacted the age rating organisations to seek their responses and remedial actions.

3. Results and implications

3.1. Belgian 'ban' on loot boxes

The results from the preprint of my first study was reported on by the leading video game industry media, GamesIndustry.biz, without any prompting from me because at the time I was hesitant to actively promote non-peer-reviewed, preprint results [25]. More than 50 media venues around the globe then reported on the findings in over 16 languages [e.g., 26,27]. This included work by the Belgian journalist, Timon Ramboer, who obtained an official response from the Minister of Justice admitting to the current unsatisfactory state-of-affairs [28]. The arguably viral media reporting allowed for the results to be publicised to a wide audience of players, industry stakeholders, and policymakers.

This appears to have led to companies deciding to change their corporate behaviour and comply with the law by changing the availability of loot boxes and video games in Belgium during the month after the initial media reporting of the research results. For example, *Roblox* (Roblox Corporation, 2006) is one of the most popular games played by young people today. The company claimed in 2020 that '*over half* of US kids and teens under the age of 16 play the game' (emphasis original) [29]. However, loot boxes are sold in exchange for real-world money to children in many parts of *Roblox* [8]. There was reportedly 'a Roblox-led program to comply with laws in […] Belgium' which led to content being removed from the Belgian version of the game [30]. Some of that content was later amended after their removal to allow for a compliant version that no longer contained illegal loot boxes to be re-released [31]. Another company 'indefinitely turned off in-app purchases in Belgium' for *Empires & Puzzles* (Small Giant Games, 2017) to ensure compliance [32]. Interestingly, when the Belgian 'ban' was initially announced in 2018, some companies quickly took compliance action back then [e.g., 33–35]. This suggests that my Belgian study, or rather the media reporting thereof, was likely responsible for causing the changes in corporate compliance behaviour in 2022, some four years too late. This also reveals that the Belgian gambling regulator might have achieved better enforcement had it more actively and widely promoted its regulatory position. For example, it might have been practicable to contact the companies behind the 500 highest-grossing games and demand compliance. Actively monitoring and enforcing the law against those games would likely have captured and prevented the vast majority of loot box spending given how video game spending is highly concentrated in the most popular games [36]. This could have been a more effective policy.

Besides impacts on commercial practice, policymakers in other countries have also taken note of the ineffectiveness of the Belgian approach as implemented and the relevant shortcomings. For example, the UK Government stated in the House of Lords that it is monitoring the 'research' in Belgium and will not blindly copy that approach without considering its practical application and effectiveness (or lack thereof) [37]. Australian policymakers similarly took this into account when recommending law reform [38(pp. 144–145, paras. 6.76–6.77)].

It is impossible to know whether the same policy and practice impacts could have been achieved without widespread media reporting of the academic results. I doubt it, which is why I encourage active engagement with journalists to allow academic knowledge to be popularised. A second issue worth considering is whether preprint results (as compared to peer-reviewed results) should be publicised. The Belgian paper was published after relatively rapid peer review in January 2023, about six months after the preprint was initially posted. Had the preprint not been posted or had the preprint results not been reported on, and assuming that the peer-reviewed publication would have received the same media treatment that the preprint in fact did, then the changes in corporate compliance behaviour would have been delayed by more than six months (this period would have been longer had the peer review process been more protracted). Consumers would have been exposed to more potential harms during that period. Similarly, the UK Government would not have had access to the results when debating the issue in Parliament in October 2022, and policymaking would have been less evidence-informed. Research in other domains has identified how preprint results do not usually change significantly following peer review [39]. The preprint results might also be reported on by journalists without any active prompting (as occurred with the Belgian paper). Active promotion of the preprint results would allow the authors to better control the narrative and provide a point of contact for journalists to resolve any misinterpretation. I decided after this experience that, henceforth, where appropriate, preprint results clearly stating that they are preliminary and subject to change following peer review should be sent to trusted journalists to allow for rapid popular dissemination.

3.2. Industry self-regulatory loot box warning label

Accordingly, following the publication of a preprint of my second study, I actively approached journalists to inform them of the results. This allowed both industry stakeholders [40] and players [41] to be promptly informed of the results and to provide comments which were incorporated into the eventual peer-reviewed publication. It cannot be known whether the age rating organisations would have communicated with me had the media not helped to publicly put them on notice. In any event, the organisations engaged with me to discuss the results. The email exchanges have been placed into the public domain [42,43]. Both organisations admitted to making mistakes, but also disputed whether they were at fault in certain cases. A number of games that have not been labelled were since corrected and duly labelled. However, notably, tens of thousands of other games with loot boxes likely remain unlabelled.

Four months following the study, PEGI has also since publicly announced that it took enforcement action by fining two companies €5000 each for failing to disclose loot box presence when applying for age ratings, which caused their respective game to not have been duly labelled [44]. This failure on the part of the companies constituted a 'serious' breach of the PEGI Code of Conduct and would have attracted a fine between €5000 to €20,000 for a first breach [45]. PEGI decided to impose the lowest possible fine within that range. Notably, *Diablo Immortal* (Blizzard Entertainment & NetEase, 2022), one of the two games fined, reportedly made over US$525 million (or about €480 million) in the year since its original release without having the required label attached [46]. Thusly, the €5000 fine represents a mere 0.001% of the revenue generated. Such an insignificant fine is unlikely to act as an effective deterrence against future non-compliance. (For context, the monetisation strategy of using loot boxes in *Diablo Immortal* was highly controversial and heavily criticised by the player community and media as 'predatory' around the game's release [47,48]. Indeed, there were widely circulated media reports of how the game would not release in Belgium in order to comply with loot box regulation prior its release elsewhere [49,50]. Therefore, PEGI should have known, even before my study results were published, that the game contained loot boxes but did not disclose that fact and taken enforcement actions more promptly without the need for external intervention.) The PEGI Code of Conduct should be updated to allow it to impose higher fines, including GDPR (General Data Protection Regulation)-type, percentage-based fines on global turnover, so that larger companies can be properly deterred. A recent resolution of the European Parliament recognised that PEGI is the trusted source for age rating information in Europe and is required by law in some countries now and proposed to consider enshrining it under EU law [51](para. 41). Companies would still participate in the PEGI system even if the potential fine is significantly higher and would in any case be forced to do so if a revised version of PEGI is adopted as EU law.

Interestingly, *Diablo Immortal* is a game that failed to disclose loot box presence to both PEGI and the ESRB, which is why it was labelled by neither. This actually was one of the disclosed limitations of the original study, as such games could not be identified using the adopted methodology. Other games like this may exist. When asked, the ESRB stated that it does not publicly discuss enforcement. It is therefore unknown whether the ESRB took enforcement actions. Not making this information public means that the deterrence effects of any enforcement actions that were taken (if any) have been significantly reduced.

Video game industry media (in over 60 venues and over 12 languages) has reported on the enforcement actions taken by PEGI, including highlighting how small the fines were [52,53]. This may lead to further public debate on the inefficacy of industry self-regulation and the need for stricter and more accountable regulation of loot boxes.

3.3. Use of preprints during policy consultations

These two studies' peer review and publication process, and that of at least one other academic study on loot boxes by other authors [54],

also coincided with the Australian House of Representatives Standing Committee on Social Policy and Legal Affairs' 'Inquiry into online gambling and its impacts on those experiencing gambling harm,' which considered imposing stricter regulations on loot boxes [38]. Whether reliance should be placed on preprints during policy consultations is worth further consideration. Some reflections stemming from the Australian experience are shared.

Firstly, preprint results that directly speak to a specific issue that the policymakers are considering should be duly presented to them, so as not to deprive decision-makers of relevant information. The Terms of Reference for the Inquiry specifically asked for comments on whether the legal definition of 'gambling' should be broadened in Australia to encapsulate loot boxes [38](p. xvii), so that the national loot box regulatory position would effectively emulate that of Belgium. It would be disingenuous for any stakeholder, with knowledge, to not discuss the results of my first study showing that such an approach is unlikely to be practicable. A submission to the Inquiry by another academic team referred to my Belgian study to make the point, but it correctly clearly signified that the paper was a preprint [55](p. 7). Indeed, the submission by the main video game industry trade body also referred to my study because it happened to support industry interests [56](p. 11), although it failed to highlight the then preprint nature of the results. (I also referred to my study in my own submission, although the study has already been peer-reviewed and was forthcoming in a journal by that point [57](pp. 2–6)).

Secondly, preprint results should rightfully be referred to in response to contrary arguments. Industry stakeholders have suggested in their submission to the Inquiry that the industry self-regulatory loot box warning label allegedly 'clearly signals upfront to the consumer prior to purchase that a game contains for-purchase loot boxes' [56](p. 13). However, my second study clearly indicated that this was not the case as many games with loot boxes were not even implementing the measure. I therefore believed it was appropriate to refer to preprint results (as they then were and highlighted as such) in my first supplementary submission to the Inquiry to provide balance and prevent decision-makers from being misled by bare industry assertions that were not backed-up by *any* evidence (as compared to my assertions expressed through the preprint, which were at least backed-up with *some* evidence, e.g., the publicly available data that I have shared and may be independently analysed by any interested party) [58](pp. 1–3). This reveals how industry assertions, which are often bare (in the sense that they have not been evidenced in any way) or may potentially be based on industry-funded reports that are published on a discretionary basis, are not held to the same standards as peer-reviewed academic research but may nonetheless be relied upon by policymakers. Therefore, it is justifiable, and indeed incumbent on relevant researchers and stakeholders, to present all contrary evidence to ensure a balanced debate.

As it later transpired, all relevant preprint research referred to in the submissions were peer-reviewed and published by the time that the Inquiry report expressing the policymakers' opinions was itself published. There were no major changes to the research results, and the assertions based on the preprints all held through peer review. The industry is justified to point out to decision-makers that a certain academic study has not yet been peer-reviewed and caution against over-reliance on it, as the industry did in a previous 2018 Australian Senate inquiry concerning loot boxes [59](pp. 43–44, paras. 3.55–3.57), even though that study did eventually pass through peer review without major amendments to its findings [3]. Similarly, any stakeholder is justified to highlight that industry assertions may be biased and caution decision-makers against over-reliance on them. Indeed, the industry has demonstrated that it is perfectly happy to ask policymakers to rely on a preprint that support its commercial interests (and failed to provide a similar caution about over-reliance) [56](p. 11).

To conclude, if the only evidence that exists that policymakers would need is in preprint form, then it should be referred to, so as to not hide what little information there is. Further, if the preprint results are

contrary to assertions made by another stakeholder using evidence that is less robust than what an academic preprint presents (or were even made without *any* evidence), then researchers should rightfully bring the preprint results to the attention of policymakers to provide balance and prevent them from being misled. In either case and regardless of who is presenting preprint results, policymakers should be prominently informed that the preprint results have not yet been peer-reviewed and are subject to change and be warned against over-reliance.

Positionality statement

In terms of the author's personal engagement with loot boxes, he plays video games containing loot boxes, but he has never purchased any loot boxes with real-world money.

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Declaration of Competing Interest

L.Y.X. was employed by LiveMe, then a subsidiary of Cheetah Mobile (NYSE:CMCM), as an in-house counsel intern from July to August 2019 in Beijing, People's Republic of China. L.Y.X. was not involved with the monetisation of video games by Cheetah Mobile or its subsidiaries. L.Y. X. undertook a brief period of voluntary work experience at Wiggin LLP (Solicitors Regulation Authority (SRA) number: 420659) in London, England in August 2022. L.Y.X. has contributed and continues to contribute to research projects that were enabled by data access provided by the video game industry, specifically Unity Technologies (NYSE:U) (October 2022 – Present). A full gifts and hospitality register-equivalent for L.Y.X. is available via: https://sites.google.com/view/leon-xiao/about/gifts-and-hospitality-register. The up-to-date version of L.Y.X.'s conflict-of-interest statement is available via: https://sites.google.com/view/leon-xiao/about/conflict-of-interest.

Acknowledgments

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