THE DEATH OF LENIENCY?
AN ANALYSIS OF THE IMPACT OF BLOCKCHAIN ON THE INDIAN LENIENCY PROGRAM

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Abstract

This Essay analyzes the impact blockchain will likely have on the Indian Leniency Program, and its underlying economic principles. It begins by providing a primer on how leniency programs operate worldwide and the reasons for their success. The economic principles behind the enforcement of leniency programs are enumerated and explained. It then analyzes the provisions of the Indian Leniency Program to determine the problems plaguing it currently and the challenges it may soon face. blockchain is identified as one of these potential challenges facing the program. Consequently, the Essay analyzes the particular characteristics of blockchain that can have an adverse effect on the leniency programs. It further looks at how these characteristics impact the economic principles of leniency programs. In conclusion, it advocates for the Competition Commission of India (CCI) to take a proactive approach in dealing with the challenges that blockchain poses to its leniency program and take the necessary measures to keep itself abreast of the developing best-practices in dealing with similar advanced technologies.

TABLE OF CONTENTS

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I.   INTRODUCTION

One of the most important investigative tools in the arsenal of anti-trust enforcement agencies worldwide, the leniency program, may soon become redundant. International trends indicate that even the most successful leniency programs have started to falter, with the number of leniency applications falling every successive year.[1] The transformative effect of blockchain technology on business relationships and transactions, including cartels, is likely a significant reason for this decline.[2] These trends, bolstered by the increasing use of blockchain, will likely have major repercussions for the Indian Leniency Program.[3] Consequently, this Essay analyzes the likely effects of blockchain on the Indian Leniency Program.

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1.   Org. for Econ. Coop. and Dev. [OECD], *Latin American and Caribbean Competition Forum - Session I: Strengthening Incentives for Leniency Agreements*, at 2, DAF/COMP/LACF(2022)17 (Sept. 14, 2022), https://one.oecd.org/document/DAF/COMP/LACF(2022)17/en/pdf [perma.cc/XK42-N99N].

2.   Michael Ristaniemi & Klaudia Majcher, *Blockchains in Competition Law–Friend or Foe?*, WOLTERS KLUWER: COMPETITION L. BLOG (July 21, 2018), http://competitionlawblog.kluwercompetitionlaw.com/ 2018/07/21/blockchains-competition-law-friend-foe [perma.cc/M56T-VG4A]; *see also infra* Section III.C (analyzing Blockchain as a challenge for implementing leniency programs).

3.   Vishal Rajvansh & Saumya Sinha, *The Interaction Between Blockchain and Competition Law in the Indian Competition Regime*, WOLTERS KLUWER: COMPETITION L. BLOG (May 5, 2021), http://competitionlawblog.kluwercompetitionlaw.com/2021/05/05/the-interaction-between-blockchain-and-competition-law-in-the-indian-competition-regime [perma.cc/GY6X-7PMK].

In Part II, the questions—how leniency programs work and why they have been so successful in the past—are examined. The economic principles underlying leniency programs are identified and analyzed to better understand their operation and success in various jurisdictions. Part III demonstrates how the Indian leniency program operates and seeks to identify potential reasons for its lukewarm success despite its decade-long operation. It juxtaposes the existing problems of the Indian leniency program with international trends that indicate a steep decline in the efficacy of leniency programs due to the advent of blockchain technology.[4]

Part IV of this Essay provides a primer on how blockchain technology works and describes its main characteristics. These characteristics are then analyzed to determine how they may bolster trust among cartel members and complicate the task of law enforcement agencies, greatly diminishing their ability to detect and punish cartelists. This is followed by predicting the likely consequences of such increased trust and the consequent ineffectiveness of enforcement agencies on the economic principles underlying leniency programs in Part V.

The Essay concludes with a prediction that the Indian Leniency Program, as it exists today, will not fare well in facing the challenges presented by the use of blockchain technology. It then calls on the Competition Commission of India (hereinafter, 'CCI') to take proactive measures to ready themselves for dealing with the challenges that blockchain technology presents and making the best use of the opportunities that open up in the way.

II.   WHY LENIENCY?

Developed to curb the rampage of cartels, the Indian Leniency Program under the Competition Act[5] and the Competition Commission of India (Lesser Penalty) Regulations[6] "secures lenient treatment for early confessors and conspirators," who supply "helpful" information to the CCI for proving the guilt of, and consequently penalizing, other cartel members.[7] It is a type of whistle-blower protection program that encourages and incentivizes the various actors connected with anti-competitive activities to come forward and disclose such activities and assist the Commission in exchange for lenient penalties.[8]

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4.   *Id*.

5.   The Competition Act, 2002 (India).

6.   The Competition Commission of India (Lesser Penalty) Regulations, 2009, [hereinafter Lesser Penalty Regulations].

7.   *See generally* CCI, COMPETITION ACT, 2002: LENIENCY PROGRAMME (providing an overview of The Competition Act 2002), http://164.100.58.95/sites/default/files/advocacy_booklet_document/Leniency.pdf [perma.cc/CY2P-5VLN] (last visited Oct. 23, 2022); Simran Kathuria, *Leniency Programme Under Competition Regime in India*, 3 ASIAN L. & PUB. POL'Y REV. 72, 73 (2018) (examining the rationale and procedure of the leniency program).

8.   Kathuria, *supra* note 7, at 73; Cécile Aubert et al., *The Impact of Leniency and Whistle-Blowing Programs on Cartels,* 24 INT'L. J. INDUS. ORG., 1241, 1242 (2006).

Leniency programs have been internationally identified as one of the most effective tools for cartel detection.[9] Due to the difficulty of identifying cartels and proving their underlying agreements, antitrust enforcement agencies often rely upon leniency programs to obtain the internal information required to detect and dismantle such agreements.[10] Theoretical research has highlighted the strong potential of well-designed and well-implemented leniency programs to benefit the market and the consumer.[11] These programs can break the code of silence among cartel members and uncover conspiracies that might otherwise go undetected. Improved collection of intelligence and evidence, increased difficulty of maintaining cartels, and lower costs of adjudication are among the many benefits of such programs.[12] Accordingly, more than 50 countries have operational leniency programs and most of them recognize the programs as the most effective way of cartel enforcement, as per the U.S. Department of Justice.[13]

The underlying idea of leniency programs has been heavily borrowed from certain principles of economics.[14] The following subsections detail how certain economic principles relate to the leniency program to provide a better understanding of how these programs operate and the reasons for their success.

A.   Prisoners' Dilemma

A prisoner's dilemma is when two related parties pursue their own individual interests and act in a manner that provides each of them the maximum mutually exclusive benefit, which is less beneficial than the result the parties would have secured if they had cooperated.[15] In practical scenarios, this dilemma operates as articulated below.

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9.   European Commission Press Release SPEECH/00/295, Mr. Mario Monti Member of the European Commission in Charge of Competition Fighting Cartels Why and How? Why Should We Be Concerned with Cartels and Collusive Beahviour? 3rd Nordic Competition Policy Conference Stockholm, 11–12 September 2000 (Sept 11–12 2000), http://europa.eu/rapid/press-release_SPEECH-00-295_en.htm. [perma.cc/79P3-DURV].

10.   *See generally* MASSIMO MOTTA, COMPETITION POLICY: THEORY AND PRACTICE (1st ed. 2004) (analyzing generally antitrust and competition policy); Sahithya Muralidharan & Chaitanya Deshpande, *Scope for Intersection Between Antitrust Laws and Corporate Governance Principles Vis-à-vis Cartel Deterrence in India*, 9 NAT'L UNIV. JURIDICAL SCIS. L. REV. 93, 103–04 (2016) (examining the intersection between competition law and corporate governance).

11.   GIANCARLO SPAGNOLO, LENIENCY AND WHISTLEBLOWERS IN ANTITRUST, *in* HANDBOOK OF ANTITRUST ECONOMICS 259, 259–260 (Paolo Buccirossi ed., 2008).

12.   *Id*. at 270.

13.   ORG. FOR ECON. COOP. & DEV., FIGHTING HARD CORE CARTELS: HARM, EFFECTIVE SANCTIONS, AND LENIENCY PROGRAMMES 13 (2002), https://www.oecd.org/competition/cartels/1841891.pdf [perma.cc/ZN98-99U2]; SCOTT D. HAMMOND, DEP'T OF JUST., THE EVOLUTION OF CRIMINAL ANTITRUST ENFORCEMENT OVER THE LAST TWO DECADES 2 (Feb. 25, 2010), https://www.justice.gov/atr/file/518241/download [perma.cc/8LC8-9H4U].

14.   Natalia Pavlova & Andrey Shastitko, *Leniency Programs and Socially Beneficial Cooperation: Effects of Type I Errors*, 2 RUSS. J. ECON. 375, 379–80 (2016); *see also* Ulrich Blum et al., *On the Rationale of Leniency Programs: A Game-Theoretical Analysis*, 25 EUR. J. L. & ECON. 209, 216 (2008) (examining leniency regulations through a game-theoretical model).

15.   *See Prisoner's Dilemma*, CORP. FIN. INST., https://corporatefinanceinstitute.com/resources/knowledge/other/prisoners-dilemma [perma.cc/RX7S-HZGS] (Feb 25, 2022) (defining the prisoner's dilemma).

Two individuals are accused of a crime, but the enforcement agency does not have enough evidence to convict either until one of them confesses against the other. The enforcement agency offers both of the accused reduced sentences, or any other incentive, for confessing against the other accused. This leads to a situation where both the accused are tempted to confess against the other in the hope of securing reduced sentencing for themselves (Minimal Sentencing).[16] This situation inevitably leads to both the accused confessing against each other and being convicted (Moderate Sentencing), which is materially worse off than if neither of them had confessed (No Sentencing).[17]

Antitrust enforcement agencies have used this dilemma to develop and implement their leniency programs.[18] To understand the basic application of this dilemma by antitrust enforcement agencies, let us assume that a Cartel XY consists of 2 symmetric members, X and Y. An agency introduces a leniency program to identify and curb such cartels, under which it grants immunity (or reduced penalties) to potential applicants, including X and Y, for reporting collusion.[19] Both X and Y can then choose either to report collusion or not to report collusion.[20] Throughout the process, the enforcement agency keeps the information about the whistle-blower/reporter (say X) confidential to ensure that the other (Y) does not know whether its co-colluder has reported or not.[21]

In this scenario, if neither X nor Y reports collusion, both of them will continue to earn cartel profits provided that the enforcement agency does not identify their collusion on its own.[22] If either member reports, it will be benefitted by gaining immunity from the enforcement agency and earning cartel profits up until the reporting date.[23] As a result, reporting collusion becomes the dominant strategy for both X and Y.[24] Theoretically, this would result in both X and Y reporting the collusion, and greatly facilitating the enforcement agency's job of identifying and curbing cartels.[25]

B.   Carrot and Stick Model

The carrot and stick model is characterized by the use of reward and punishment to induce cooperation.[26] Leniency programs provide both.[27] The overall purpose of effective leniency programs is to create sufficient levels of incentives for members involved in cartels to report collusion and threaten non-

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16. *Id.*

17. *Id*.

18. *See* Ulrich Blum et al., *supra* note 14, at 227 (discussing the prisoner's dilemma's application with leniency programs).

19. *Id*. at 217.

20. *Id*.

21. *See id*. (describing how defection may remain undetected, implying the enforcement agency keeps the information about the whistle-blower confidential).

22. *See id*. at 216 (describing the long-term reward of staying in the cartel and profiting).

23. *Id*. at 220–21.

24. *Id*. at 216.

25. *Id*. at 217.

26. James Andreoni et al., *The Carrot or The Stick: Rewards, Punishments and Cooperation*, 93 AM. ECON. REV. 893, 893 (2003).

27. MOTTA, *supra* note 10, at 9; Pavlova & Shastitko, *supra* note 14, at 390–91.

reporters with heavy sanctions.[28] They do this by ensuring that there is a credible risk of detection of cartels and establishing severe financial and criminal penalties for those who participate in collusive activities.[29] Then, they give reporters substantial incentives in the form of either full or partial immunity from the severe sanctions and penalties.[30]

As has been noted for the U.S. Department of Justice's leniency program, it works in part because the incentives to receive leniency are very high.[31] Robert Connolly notes:

> [a] company and its executives who were engaged in illegal activity get a complete pass from prosecution. There is no requirement that the leniency company disgorge the illegal profits. . . . The leniency company is not put on probation or subject to a compliance monitor. There is no requirement that culpable executives be fired or at least removed from their current position. There is not even a requirement that the leniency company engage in any remedial measures to enhance its compliance program.[32]

C.   Race for Confessions

As noted above, leniency programs use both rewards and punishments to induce cartel members to report collusion.[33] Leniency programs are generally designed to offer the greatest protection or incentives to the first cartel member who reports, and provide diminishing protection or incentives to subsequent reporters.[34] Furthermore, the subsequent reporters also have the onus of adding value to the information that has already been disclosed by the first reporter, without knowing the contents of the first report.[35]

This creates a "race to the authority" among cartel members; a race against each other to report collusion first and secure the greatest protection for themselves.[36] Such a phenomenon creates distrust among cartel members, since none of them know when a member may approach the authority for its own benefit.[37]

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28.   MOTTA, *supra* note 10, at 9; Pavlova & Shastitko, *supra* note 14, at 390–91.

29.   MOTTA, *supra* note 10, at 9; Pavlova & Shastitko, *supra* note 14, at 390–91.

30.   MOTTA, *supra* note 10, at 9; Pavlova & Shastitko, *supra* note 14, at 390–91.

31.   Robert Connolly, *A Carrot and Stick Approach to Leniency and Compliance Programs*, CARTELCAPERS (Feb. 12, 2016), http://cartelcapers.com/blog/carrot-stick-approach-leniency-compliance-programs [perma.cc/JE8T-349P].

32*.   Id.*

33*.   See* Kathuria, *supra* note 7, at 72 (outlining how India's leniency program allows cartelists to dodge significant punishment and increases incentives for lesser penalties).

34.   Kathuria, *supra* note 7, at 72; MOTTA, *supra* note 10, at 9; Pavlova & Shastiko, *supra* note 14, at 383.

35.   Under the Lesser Penalty Regulations, any subsequent leniency application which is not comprehensive enough will have twin negative effects from the applicant's perspective: (a) not getting lesser penalty from the CCI; and (b) since the applicant has made the leniency application, they have admitted that they are involved in a cartel, and hence their scope of defense will be jeopardized.

36.   Eric van Damme & Jun Zhou, *The Dynamics of Leniency Application and Cartel Enforcement Spillovers* 22 (TILEC Discussion Paper No. 2016-006, 2016).

37*.   Id.*

These underlying principles have not only made leniency programs the effective tools that they are today, but they also help identify the shortcomings of a particular leniency program and help to correct them.[38] Accordingly, analyzing the Indian leniency program in light of these principles can help us identify why it has not been as successful as its international counterparts.

III. THE INDIAN LENIENCY PROGRAM AND ITS PREDICAMENTS

A. *How Does the Leniency Program Work in India?*

In India, the CCI can impose a lesser penalty on any member of a cartel if it is satisfied that the member has made a full, true, and vital disclosure in respect of its cartel activities, per Section 46 of the Competition Act read with the Lesser Penalty Regulations.[39] Here, vital disclosure is understood as information or evidence which is sufficient enough to enable the CCI to form a prima facie opinion about the existence of a cartel or establish the contravention of the Competition Act.[40]

Since there is no criminal liability under the Competition Act,[41] the leniency program only extends to the financial liability imposed on cartel members.[42] Accordingly, the CCI can grant a penalty reduction up to 100% to the first leniency applicant, up to 50% to the second applicant, and up to 30% to the third applicant and onwards.[43] As noted earlier, this system incentivizes reporters to file the leniency application with exhaustive information as soon as possible.[44]

As a result, a successful application usually contains details of several members of a particular cartel, the cartel's objective, its modus operandi, a description of the product or service in relation to which it was formed and the geographic coverage of the product and cartel, its duration, any communications and meetings between cartel members, and any other information requested by the CCI.[45] The information contained within the leniency application is kept confidential, both by the CCI and the applicant.[46]

After submitting the leniency application, the applicant must cease its participation in the cartel (unless the CCI instructs otherwise), provide vital disclosure of all cartel-related information, disclose relevant documents,

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38.   Scott D. Hammond, Dir. of Crim. Enf't: Antitrust Div., DEP'T OF JUSTICE, *Cornerstones of an Effective Leniency Program* (Nov. 22, 2004), https://www.justice.gov/atr/speech/cornerstones-effective-leniency-program [perma.cc/D3V2-Z8Q9].

39.   The Competition Act, 2002, § 46 (India).

40.   Lesser Penalty Regulations, *supra* note 6, § 2(1)(h)(i); Kathuria, *supra* note 7, at 76–77.

41.   Aneesh V. Pillai, *The Call for Criminal Sanctions for Enforcement of Competition Law and its Practical Concerns*, 1 COMPETITION L. CIRQUE 26, 28 (2021).

42.   Kathuria, *supra* note 7, at 75.

43.   Lesser Penalty Regulations, *supra* note 6, § 4; *see also supra* Section II.C (examining the "race for confession").

44.   van Damme & Zhou, *supra* note 36, at 2.

45.   CYRIL AMARCHAND MANGALDAS, CARTELS AND THE LENIENCY PROGRAM IN INDIA 10–11 (2021), https://www.cyrilshroff.com/wp-content/uploads/2020/09/Cartels-and-the-Leniency-Program-in-India-Cheat-Sheet.pdf [perma.cc/6XBS-YDX5].

46.   Lesser Penalty Regulations, *supra* note 6, § 6.

information, and evidence, ensure continuous cooperation with the CCI, and not conceal, destroy, remove, or manipulate relevant information.[47] The CCI can impose additional obligations on the applicant depending upon the circumstances.[48]

B.   Why Has the Indian Leniency Program Not Been As Successful As Its Peers?

As indicated by the Indian experience, the mere existence of a leniency program does not necessitate a jurisdiction receiving all the associated benefits, unless the program is meticulously implemented with appropriate guidelines and enforcement powers.[49]

India introduced its Leniency Program in 2009 with the introduction of the Lesser Penalty Regulations.[50] Despite existing for over a decade, the CCI has passed leniency orders in only ten cases.[51] The reasons for such a lukewarm impact are many, including the excessive discretionary powers given to the CCI, the associated uncertainty for the applicant, the absence of a well-defined marker system, and confidentiality concerns.[52] All of these factors together have hampered the CCI's ability to enforce the leniency program efficaciously.[53]

The three prerequisites for an efficient leniency program are a) predictability of procedures, b) protection of identities and data of leniency applicants, and c) high risk of cartel detection and severe sanctions.[54] The Indian leniency program has fallen short in all of these.[55] The following provides a brief account of how the Indian program has fallen short in the aforementioned aspects.

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47.   *Id.* at 2.

48.   *Id.* at 4–5.

49.   *See* Zhijun Chen & Patrick Rey, *On the Design of Leniency Programs*, 56 J. L. & ECON. 917, 917 (2013) (outlining how leniency programs can generate perverse effects and proposing a model to optimize rewards and punishments trade-off).

50.   *See generally* Lesser Penalty Regulations, *supra* note 6 (laying out the leniency program of India).

51.   Karan Chandhiok & Ruchi Khanna, *Taking a Lenient Approach to Leniency*, INDIA BUS. L. J. (Dec. 5, 2019), https://law.asia/taking-a-lenient-approach-to-leniency [perma.cc/957H-B789].

52.   Esha Sharma, *Leniency Regime in India*, LIVE LAW.IN (May 27, 2022, 2:30 AM), https://www.livelaw.in/columns/competition-act-2002-leniency-programme-competition-commission-of-india-lesser-penalty-regulations-cci-200210 [perma.cc/C3RF-QFA3].

53.   *Id.*

54.   *See* Chen & Rey, *supra* note 49, at 918 ("[C]artels may abuse these programs if they are too generous."); Hammond, *supra* note 38 (articulating effective prerequisites for an effective amnesty program as (1) "the threat of severe sanctions for those who lose the race for amnesty," (2) "instilling a genuine fear of detection," and (3) "transparency to the greatest degree possible throughout the enforcement program."); Martha Martinez Licetti, *Combating Cartels in Developing Countries: Implementation Challenges on The Ground*, COM. POL'Y INT'L, Sept. 27, 2013, at 1, 4 ("In practice, if the legal framework allows for criminal sanctions but there is no effective cooperation with public prosecutors, leniency provisions have limited effect.").

55.   Sharma, *supra* note 52 (noting how the Indian leniency program has generally been considered a failure and will not begin to succeed until strict penalties are imposed on violators, which will require the CCI to amend its procedures such that they are more friendly to whistleblowers in terms of protecting confidentiality and ensuring a smooth processing of the potentially relevant information).

1.   (Un)Predictability of Procedures

The CCI has great discretionary powers in the leniency program, which makes the overall program very unpredictable for potential applicants.[56] 'Vital disclosure' is an essential component of securing protection under the program, but the legislation is silent on what constitutes "vital" disclosure.[57] The lack of any proper definition enables the CCI to interpret the term at its discretion.[58] Immunity and lesser penalties can also be withdrawn if CCI finds that the conditions upon which such leniency was granted are not complied with, the applicants had given false evidence, or the disclosure made was not vital.[59] Furthermore, the Indian program lacks a well-defined marker system, which plays a key role in determining the reduction of fine amounts or penalties.[60]

2.   (Lack of) Protection of Identities and Data of Leniency Applicants

The identity of the applicants and the information they provide should be kept highly confidential to protect the interests of the applicants.[61] However, sensitive information related to the applicants has been repeatedly disclosed to the detriment of the applicants,[62] despite the existence of an express regulation designed to ensure the opposite.[63]

3.   (Dearth of) High Risk of Cartel Detection and Severe Sanctions

While the Competition Act provides stringent sanctions for those involved in cartel activities, the leniency program has not been successful in attracting potential applicants.[64] This can be attributed to the lack of any criminal penalties for cartelists, unlike the U.S. and Japan, where severe criminal liability for

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56.   *Id.* ("The reason for this, it could be argued, is the CCI's enormous discretionary powers. The CCI may grant lighter penalties to an applicant who ceases to be a cartel member, according to the Regulations. Applicants must, however, reveal all relevant papers, continue to cooperate, and adhere to any conditions imposed by CCI in exchange for immunity or a reduced penalty. This adds a layer of ambiguity, which deters enterprises involved in cartelization from coming out and providing information.").

57.   Lesser Penalty Regulations, *supra* note 6, § 2(1)(h)(i).

58.   UDAI S MEHTA & SUCHISMITA PATI, CUTS INT'L, DESIGNING EFFECTIVE LENIENCY PROGRAMME FOR INDIA: NEED OF THE HOUR 17 (2016), https://cuts-ccier.org/wp-content/uploads/2019/01/Designing_Effective_Leniency_Programme_for_India-Need_of_the_Hour.pdf [perma.cc/M9YF-Q8XP].

59.   Sharma, *supra* note 52 ("Furthermore, immunity and lighter fines can be revoked under the Indian framework if the CCI determines that the circumstances on which such leniency was granted were not met, the petitioners provided misleading evidence, or the information made was not necessary.").

60.   *Id.* ("One of the reasons for the leniency program's poor performance in India is the lack of a well-defined marker system.").

61.   *Id.* ("The applicant's identity should ideally be kept hidden until anything tangible has been established.").

62.   Arjun Nihal Singh, *The Curious Case Of Leniency Under The Competition Act, 2002 In India*, MONDAQ (June 17, 2019), https://www.mondaq.com/india/cartels-monopolies/816022/the-curious-case-of-leniency-under-the-competition-act-2002-in-india [perma.cc/E6DR-VH96].

63.   Lesser Penalty Regulations, *supra* note 6, § 6.

64.   Angela Dua, *10 Years of the Indian Leniency Programme: Lessons to be Learned from the US and EU Experience*, KSLR COM. & FIN. L. BLOG (June 8, 2020), https://blogs.kcl.ac.uk/kslrcommerciallawblog/2020/06/08/10-years-of-the-indian-leniency-programme-lessons-to-be-learned-from-the-us-and-eu-experience-angela-dua [perma.cc/TLA5-M874].

cartelization encourages cartelists to confess.[65] Additionally, the CCI has not been able to establish a high risk of detection for cartels given the continuous shifts in its economic paradigm.[66]

The leniency program's ability to destabilize existing or terminated cartels depends on its ability to change the net benefit equation for cartels.[67] Cartels founded before the CCI started functioning would have faced altered and higher expected costs due to the introduction of the new regulatory penalties and hence should have been induced toward leniency.[68] However, the fact that cartels (including Electric Power Steering[69] and SBC[70]) continued their operation long after and did not find it appealing to file an LP application illustrates their expectations of a low anticipated penalty that is not a sufficient deterrent.[71] Similarly, the cement cartel[72] continued operating after a jolt by the LP, which proved to be insufficient when compared to their expected future profits.[73] It is highly probable that cartels formed after the CCI's inception

65. *See* Hammond, *supra* note 38 ("The first prerequisite to creating an effective amnesty program is the threat of severe sanctions for those who lose the race for amnesty."); *see also* Hideto Ishida & Atsushi Yamada, *Japan: Cartels*, GLOB. COMPETITION REV. (Apr. 21, 2021), https://globalcompetitionreview.com/review/the-asia-pacific-antitrust-review/2021/article/japan-cartels [perma.cc/3248-XHEZ] (describing Japan's criminal sanctions in certain instances where there are severe competition violations).

66. *Implementation Of Competition Law Face Challenges, Says CCI Chairman Ashok Chawla*, ECON. TIMES, https://economictimes.indiatimes.com/news/economy/policy/implementation-of-competition-law-face-challenges-says-cci-chairman-ashok-chawla/articleshow/36482481.cms [perma.cc/7EK3-FWQM] (June 13, 2014, 1:48 PM).

67. Hammond, *supra* note 38 ("Regardless of whether a cartel is subject to criminal or administrative sanctions, it is axiomatic that cartel activity will not be adequately deterred nor reported if the potential penalties are perceived by firms and their executives as outweighed by the potential rewards.").

68. *Id.* ("We made [the U.S. leniency program] more transparent and increased the opportunities and raised the incentives for companies to report criminal activity and cooperate with the Division. Since then, there has been a nearly twenty-fold increase in the application rate, and it has resulted in the cracking of dozens of large international cartels.").

69. The two Japanese firms, JTEKT Corporation and NSL Ltd, involved in this cartel were already under investigation in 2011 by the Japanese Fair-Trade Commission and penalized for the same on March 29, 2013, for price-fixing in industrial machinery and automotive bearings. JTEKT was an LP applicant in the same. The CCI has also acknowledged this fact in its final order. These firms rigged bids for 'electric power steering' units between 2005 and 2011 through their Indian subsidiaries. NSK was the first LP applicant (followed by JTEKT), based on which the CCI initiated *suo moto* proceedings. In a heavily redacted report, otherwise protected by a 'confidentiality ring,' the first LP application date is not clear. But based on the *prima facie* finding date of the CCI, it could be gauged to be in the second half of 2014, more than a year after the final ruling of the Japanese FTC. Quite clearly, the finding of the Japanese FTC was the driving force for the LP. Ashu Bhargav, *CCI's Horizontal Breakthrough in OEM Market: Leniency Granted to Japanese Companies*, INDIAN REV. OF CORP. & COM. L. (Jan. 28, 2020), https://www.irccl.in/post/cci-s-horizontal-breakthrough-in-oem-market-leniency-granted-to-japanese-companies [perma.cc/JPS5-YJLB].

70. In the case of SBC, a bid-rigging case, the stimuli appear to be an acquisition of one cartel member by another gone afoul, prompting a LA. Similarly, the discovery of the Industrial and Automotive Bearings Cartel (IAB), more than six years after its death (2011), through an LP application in June 2017 by one of the colluding firms, Schaeffler AG, was also most likely prompted by a decision of the latter to rebrand and merge all its sister concerns in India under the brand name of Schaeffler India Ltd., in 2017. Anisha Chand & Swati Bala, *India – Auto-Bearings & CBB: The Peculiar Story Of A Cartel Duo*, CONVENTUS L. (Dec. 10, 2020), https://conventuslaw.com/report/india-auto-bearings-cbb-the-peculiar-story-of-a [perma.cc/Z6ZQ-RDVJ].

71. *See* Hammond, *supra* note 38 (discussing the need for sufficient penalties to create deterrence).

72. Builders Association of India v. Cement Manufacturers Association & Ors., Case No. 29/2010 (CCI, June 20, 2012) (India).

73. Aditya Kalra, *The 'Cartelisation' of the Indian Cement Industry: Antitrust Report*, WIRE (Aug. 5, 2022),   https://thewire.in/business/the-cartelisation-of-the-indian-cement-industry-antitrust-report

weighed the projected cost of being identified and convicted and took necessary procedures to lower that cost.[74] However, in both cases, identification via prima facie case finding by the CCI should have significantly raised the estimated cost and triggered cartel destabilization.[75] Given that just two LP petitions (of twenty-one comparable instances), or less than 10%, have been forced by a prima facie finding, it suggests the probable importance of the 'other' influencing elements discussed in the following sections.[76]

4. Inconsistency in the Application of Mitigating and Aggravating Factors

In the Excel Crop Care case,[77] the Supreme Court of India introduced a two-step process for quantifying penalties—1) determining relevant turnover, and 2) determining the appropriate percentage of the penalty based on aggravating and mitigating factors.[78] Thus, according to the judicial advice, CCI must evaluate all relevant M&A variables since they serve as a suitable surrogate for the harm and losses caused.[79] In general, CCI instructions briefly list several events as mitigating considerations.[80] These include: small tender size; small income from the relevant product; challenging industry circumstances; cooperation by the party; size and significance of the company; informant's conduct; the presence of a competition compliance programme; the enterprise's solvency; and demand-supply situations.[81] Similarly, key aggravating factors examined by CCI include: loss to the public exchequer; impact on public interest; and impact on the end consumer.[82] However, the irregularity with which these parameters are used generates confusion and cannot explain the concerns raised in the preceding section.[83] First, CCI directives do not effectively reason out such elements in general. Second, there are no clear principles or guidelines for employing such factors.[84]

By excluding M&A from most leniency instances, the CCI sends a mixed message: if you succeed, you obtain a waiver but on a harsher penalty basis.[85]

[perma.cc/WKT4-WH2H] (describing how the major cement manufacturers demonstrate evidence of widespread collusion and price-fixing).

74. *Id.* (Noting that exchanged messages between company executives, supply restrictions, and coordinated market behavior all indicate that industry leaders are working together to maintain a cartel).

75. Hammond, *supra* note 38 ("An effective leniency program will lead cartel members to confess their conduct to authorities even before an investigation is opened. In other cases, it will induce organizations already under investigation to abandon the cartel stonewall, race to the government, and provide evidence against the other cartel members.").

76. T.S. Somashekar & Praveen Tripathi, *Cartel Leniency Program in India – Why No Race Here?* 22 (Nat'l L. Sch. of India U., Bengaluru, Working Paper No. 01/2021, 2021).

77. Excel Crop Care Ltd. v. Competition Commission of India, 8 SCC 47 (2017) (India).

78. Somashekar & Tripathi, *supra* note 76, at 34.

79. *Id.*

80. *Id.*

81. *Id.*

82. *Id.*

83. *Id.*

84. *Id.*

85. *Id.* at 34–35.

The effective penalty may not be less than the projected non-leniency penalty, depending on the waiver![86]

5.   *Narrow Scope Due to Terminological Confusion*

The Competition Act differentiates between 'other' horizontal agreements and cartels.[87] Section 3(3) of the Competition Act prohibits agreements at creating cartels, and Section 46 gives the Commission the power to impose a lesser penalty on members of a cartel who make disclosures.[88] Hence, the provisions of Section 46 can only be applied to 'cartels' and not to any other anti-competitive agreement.[89] This poses a risk of the Commission missing out on strategically hidden 'cartels' and bringing them under the ambit of the leniency program.[90] This considerably reduces the ambit and scope of the leniency program.[91] Further, there is an asymmetry between Section 46 and Section 27(b) of the Act which makes it even more complicated.[92]

For example—in Santuka Associates Pvt. Ltd. v. All India Organization of Chemists and Druggists and Ors.,[93] CCI ruled that an association's decision for its member firms should be covered under Section 3(3) of the Act, but it did not label them as a cartel.[94] Directions provided by the All India Organization of Chemist and Druggist Association (AIOCD) were held to be in violation of Section 3(3)(a) and (b) of the Act in the aforementioned case.[95] The AIOCD sought to reduce retail price rivalry by establishing trade margins and limiting medicine supply.[96] CCI held that that AIOCD, "[took decisions] . . . on behalf of the members who are engaged in similar or identical trade of goods and that such practices carried on, or decisions taken by AIOCD as an association of enterprises are covered within the scope of Section 3(3)."[97] Because CCI saw such violations as the result of horizontal agreements rather than cartelization, it chose to penalize only the association, based on its respective preceding three financial years' average turnover (income), effectively ruling out the applicability of the proviso to Section 27(b) and thus Section 46 of the Act.[98]

Further, the CCI has been very inconsistent in its application of Section 3(3) of the Act, as seen in the cases involving FICCI—Multiplex Association of

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86.   *Id*. at 35.

87.   *See* The Competition Act, 2002 §2(b)–(c) (defining "agreements" and "cartels") (India).

88.   *Id*. §§ 3(3), 46.

89.   Somashekar & Tripathi, *supra* note 76, at 13.

90.   *Id*. at 14.

91.   *Id*.

92.   *Id*.

93.   Santuka Associates Pvt. Ltd. v. All India Organization of Chemists and Druggists and Ors., Case No. 20/2011 (CCI, Feb. 19, 2013) (India).

94.   *Id*. at 12.

95.   *Id*. at 27 (AIOCD argues that the violation conclusion "in the absence of an appropriate market definition" is in error).

96.   *Id*. at 68. ("It is evident that AIOCD . . . is able to continuously engage in limiting and controlling the supply . . . insisting upon NOC for . . . fixation of trade margins etc.").

97.   *Id*. at 35.

98.   *Id*. at 15. ("[T]he DG has concluded that the horizontal agreement amongst the members of AIOCD . . . fall within . . . Section 3(3)(a) and 3(3)(b) read with Section 3(1) of the Act.").

India[99] and Indian Sugar Mills Association.[100] Both these cases provide clear illustrations of cartels facilitated by associations and possible agreements between the members themselves, but the CCI treated them as non-cartel infringements of Section 3(3) of the Act while considering penalties.[101]

On the other hand, European Courts have consistently held that the position of a facilitator is comparable to that of an association.[102] In AC Treuhand v. Commission, the ECJ held that a cartel facilitator who had assisted in implementing the cartel would be equally liable.[103] Both of these instances present clear examples of cartels helped by organizations and possible agreements among members, but the CCI considered them as non-cartel Section 3(3) of the Act infringements when assessing fines.[104]

6. *Miscellaneous Factors*

It is critical to recognize that corporations are hesitant to choose leniency due to the associated costs in terms of reputational harm, compensation claims, and the cost of being blacklisted.[105] A company can avoid compensation claims by refusing to choose leniency and continuing to engage in interim bids.[106]

These factors have contributed to the inefficiency of the Indian leniency program and severely affected its ability to prevent anti-competitive practices.[107]

C. *Blockchain as an Emerging Challenge in Implementation of Leniency Programs*

Not only does India have a lot of catching up to do to bring its leniency program up to par with its western counterparts, it also must ready itself for the

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99. FICCI-Multiplex Association of India v. United Producers/Distributors Forum and Ors., Case No. 01/2009 (CCI, May 25, 2011) (India).

100. Indian Sugar Mills Association & Ors. v. Indian Jute Mills Association and Ors., Case No. 38/2011 (CCI, Oct. 31, 2014).

101. *See* FICCI-Multiplex Ass'n of India v. United Producers/Distributors Forum, Case No. 01/2009, (CCI, May 25, 2011) (India); Indian Sugar Mills Association & Ors. v. Indian Jute Mills Ass'n and Ors., Case No. 38/2011, (CCI, Oct. 31, 2014) (India).

102. Joined Cases C-101/07 P and C-110/07 P, Coop de France Betail &Viande and Fédération Nationale des Syndicats d'Exploitants Agricoles (FNSEA) and Others v. Comm'n of Eur. Cmtys., 2008 E.C.R. I-10193; Case T-111/08 MasterCard, Inc. and Others v. Eur. Comm'n, ECLI:EU:T:2012:260, ¶ 243 (May 24, 2012); *see also* C-45/85 Verband der Sachversicherer e.V. v. Comm'n of the Eur. Cmtys., 1987 E.C.R. 405; Johanne S. Bourdages & Marie-Josée Vignola, *Évaluation des Habiletés de Communication Orale chez des Elèves de l'Elémentaire Utilisant* AIM, 65 CAN. MOD. LANGUAGE REV. 731, 743 (2009) (Fr.);

103. C-194/14P AC Treuhand v. Eur. Comm'n, ECLI:EU:C:2015:717, ¶¶ 31–47 (Oct. 22, 2015).

104. *Id.*; Anisha Chand & Alisha Mehra, *Identifying the Bottom Line: What Guides the Imposition of Antitrust Penalties in India?*, COMPETITION POL'Y INT'L (Jan. 3, 2022), https://www.competitionpolicyinternational.com/identifying-the-bottom-line-what-guides-the-imposition-of-antitrust-penalties-in-india [perma.cc/CLY9-W64B].

105. Org. for Econ. Coop. and Dev. [OECD], *Policy Roundtables: Promoting Compliance with Competition Law*, at 11–12, DAF/COMP(2011)20 (2011), https://www.oecd.org/daf/competition/Promotingcompliancewithcompetitionlaw2011.pdf [perma.cc/9EZH-7F57]; Ram Kumar Poornachandran et al., *India: Cartels*, GLOB. COMPETITION REV. (Mar. 25, 2022), https://globalcompetitionreview.com/review/the-asia-pacific-antitrust-review/2022/article/india-cartels [perma.cc/CD9T-DABU].

106. Poornachadran et al., *supra* note 105.

107. *Id.*

forthcoming challenges that may destabilize the underlying principles of leniency programs worldwide.[108]

In Europe, the number of leniency applications was reduced by half between 2014 and 2016.[109] A similar trend has also been observed in the United States.[110] These trends demonstrate that even the most effective leniency programs are facing difficult days, and this situation may only get worse with the application of emerging technologies such as blockchain.[111]

Blockchain is a general-purpose distributed ledger technology that offers trust without the need for a trusted third-party.[112] It does so by providing users with a digital ledger of information that is duplicated and distributed across the entire network of computer systems called nodes.[113] Such duplication and distribution ensure that the ledger is decentralized, without any single point of corruption or failure.[114] This makes the data on blockchain virtually unalterable and error-proof because attempts to tamper with any data on a Blockchain are readily detectable and traceable.[115] These features boost trust, which could be trust in a transaction (that the same amount which left one account as arrived in another, that the sender agreed to it, and that the funds used are unique and were not double-spent); trust that a conditional contract will be automatically executed (without dispute); or trust that a product comes from where a user says it came from.[116]

This trust-building capacity of blockchain can greatly complicate the tasks of antitrust agencies by increasing the trust among cartel members and making information about cartels even harder to access.[117] These factors will likely have great repercussions for leniency programs all over the world and may even make them redundant.[118] The following sections explore how blockchain can be used to disrupt leniency programs and their underlying economic principles, along with its likely effects on the Indian leniency program.[119]

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108.   *Challenges and Co-ordination of Leniency Programmes*, OECD, https://www.oecd.org/competition/challenges-and-coordination-of-leniency-programmes.htm [perma.cc/2SRG-75GA] (last visited Oct. 23, 2022).

109.   Johan Ysewyn & Siobhan Kahmann, *The Decline and Fall of The Leniency Program in Europe*, 1 CONCURRENCES COMPETITION L. REV. 44, 44–45 (2018).

110.   Charles McConnell, *Type A Leniency Applications Down, US DOJ Official Says*, GLOB. COMPETITION REV. (June 15, 2018), https://globalcompetitionreview.com/article/1170614/type-a-leniency-applications-down-us-doj-official-says [perma.cc/GW8B-BUP8].

111.   *See* Thibault Schrepel, *Collusion by Blockchain and Smart Contracts*, 33 HARV. J. L. & TECH. 117, 158–162 (2019) (discussing the impact of blockchain on leniency applications).

112.   Min Xu et al., *A Systematic Review of Blockchain*, FIN. INNOVATION, July 4, 2019, at 1, 1–2.

113.   *Id.*

114.   *Id.*

115.   *Id.*

116.   Chris Pike & Antonio Capobianco, *Antitrust and the Trust Machine*, 5 COMPETITION L. & POL'Y DEBATE 48, 48 (2019).

117.   *Id.*

118.   Schrepel, *supra* note 111, at 158.

119.   *See* discussion *infra*, Parts IV–V.

IV. How Blockchain Aids Collusion

Given its decentralized nature and enhanced data visibility, blockchain can be used as a medium to facilitate collusion.[120] It is feared that a public ledger like blockchain, on which industry data can be published in real-time, will facilitate collusion.[121]

Blockchain can facilitate the information exchange required at the initial stage of forming a cartel, by helping potential cartelists identify the parameters of their collusion and the consequent cartel equilibrium through data exchange.[122] It can also maintain cartel stability by allowing cartels to monitor any possible deviations from the cartel equilibrium reached between the potential cartelists.[123]

Blockchain gives colluding members the ability to track each other's pricing and competitive policies.[124] As will be demonstrated in the following sub-sections, this transforms collusion from a non-cooperative into a cooperative activity, resulting in the creation of a more efficient and secure cartel. Additionally, the technology also makes it difficult for the enforcement agencies to detect such cartels and penalize them.[125]

Several scholars have argued that cartels are inherently unstable, given the high likelihood of an individual party cheating the cartel and deviating from the collusive agreement for its own benefit.[126] For instance, a party tempted to cheat may violate the agreement by undercutting the cartel price and/or selling more than its allotted share.[127] Such acts weigh heavily on the stability of cartels, eventually leading to their demise in most cases.[128]

Cartels have attempted to overcome such instability by building trust among their members[129] or developing mechanisms that detect and penalize deviant members,[130] with little to no success.[131] Today, blockchains can help cartels achieve both these objectives by building trust among cartel members through enhanced visibility of cartel data, and by tracking and penalizing any deviant behavior.[132]

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120. Abderahman Rejeb et al., *Blockchain Technologies in Logistics and Supply Chain Management: A Bibliometric Review*, Logistics, Oct. 7, 2021, at 17–18 [hereinafter *Bibliometric Review*].

121. *Id.*

122. *See id.*; Abderahman Rejeb et al., *How Blockchain Technology Can Benefit Marketing: Six Pending Research Areas*, Frontiers Blockchain, Feb. 19, 2020, at 3.

123. Rejeb et al., *supra* note 122, at 3.

124. *Id.*

125. Shu Yun Lim et al., *Blockchain Technology the Identity Management and Authentication Service Disruptor: A Survey*, 8 Int'l J. Advanced Sci. Eng'g Info. Tech. 1735, 1737 (2018).

126. Christopher R. Leslie, *Cartels, Agency Costs, and Finding Virtue in Faithless Agents*, 49 Wm. & Mary L. Rev., 1621, 1621 (2008); *see also* George J. Stigler, *A Theory of Oligopoly*, 72 J. Pol. Econ. 44, 44 (1964) (explaining that oligopolists want to collude to maximize joint profits).

127. Leslie, *supra* note 126, at 1626–27.

128. *Id.*

129. Christopher R. Leslie, *Trust, Distrust, and Antitrust*, 82 Tex. L. Rev. 515, 528 (2004).

130. Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?*, 44 J. Econ. Literature 43, 86 (2006).

131. *See id.* at 75 (explaining that even cartels that engage in interorganizational practices still fail).

132. Schrepel, *supra* note 111, at 119–120.

Hence, blockchains can transform cartels from inherently unstable to stable arrangements in three main ways.[133] First, blockchains can create a 'visibility effect' among cartel members to boost trust among them.[134] Second, blockchains can create an 'opacity effect' for enforcement agencies by making it very difficult for them to access information about cartels and their activities.[135] Third, blockchain-based smart contracts can help to detect any deviation from the collusion agreement and penalize the deviating party automatically.[136]

A.   Visibility Effect

Thibault Schrepel describes the 'visibility effect' as the information transparency available to the cartels using blockchain.[137] Using blockchain, cartel members can readily monitor the activities of each other in the open market.[138] Real-time record-keeping and tracking of prices, sales, market share, and other such metrics can also be accomplished on a blockchain.[139] Therefore, any deviation is visible to the other cartel members.[140] If there is a spike in one member's sales and profits, all the other cartel members will be able to observe it in real-time with blockchain.[141]

In the example of the XY cartel, both X and Y can track each other's sales, market share, and profits in real time with the use of blockchain.[142] If Y decides to go against the terms of the agreement and tries to increase its market share, such an increase would reflect in its profits.[143] X will know of any such change in real-time and will take the necessary action against Y.[144] Hence, Y will be dissuaded from engaging in any deviant behavior for the fear of penalty or the chance to lose any cartel profits in the future.[145] This visibility effect results from the following characteristics of blockchain.

1.   Decentralization

Blockchain uses Distributed Ledger Technology—a decentralized database without any single administrator or regulator—as its underlying framework.[146] Multiple nodes across the blockchain are responsible for

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133.   *Id.* at 143.
134.   *Id.* at 144.
135.   *Id.* at 149.
136.   *Id.* at 154.
137.   *Id.* at 144.
138.   *Id.*
139.   Rejeb, *supra* note 122, at 2.
140.   *See* Schrepel, *supra* note 111, at 144 (illustrating how using blockchain to inform selling prices makes deviation visible to other members in the same organization).
141.   *See id.* (explaining the recording of price information in a distributed ledger).
142.   *Id.*
143.   *Id.* at 147.
144.   *Id.*
145.   *Id.* at 159.
146.   *See* Andrej Zwitter & Jilles Hazenberg, *Decentralized Network Governance: Blockchain Technology and the Future of Regulation,* FRONTIERS BLOCKCHAIN, Mar. 25, 2020, at 1–2 (explaining that the pressures of globalization forced governance processes to become networked and decentered).

managing it.[147] Such a framework guarantees a secure stream of information for every party on a blockchain network without any single point of failure.[148] For instance, XY cartel is created on a public blockchain, and neither party is singularly responsible for the blockchain's operations or maintenance to the detriment of the other.[149]

2.   *Immutability*

Once information is recorded on blockchain it is virtually irreversible, because it cannot be tampered with or deleted after verification.[150] A block is created when new transactions are executed and it records the consequent new information in the form of a hash value.[151] Further, each block is interconnected with the previous one.[152] Hence, changing the information on one block will alter its hash value which will be different from its previous hash value recorded in the subsequent blocks.[153] Thus, any change in recorded information in one block will require a change of information in all the subsequent blocks,[154] making it nearly impossible to successfully tamper with information that has been recorded given the immense computational work that would be required to succeed in any such endeavor.[155] In cartel XY, if X wishes to tamper with the information, it would have to change information on a majority of the blocks (51%) to successfully alter any information, no matter how insignificant.[156]

Through these characteristics, blockchain fulfils both the requirements to establish visibility among cartel members, i.e., trackability of information and accuracy of information.[157]

B.   *Opacity Effect*

On a blockchain, each node has dual keys: a public key and a private key.[158] Public keys are visible to every node on the blockchain.[159] On the other hand,

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147.   *Id.* at 9.

148.   *See* Marcella Atzori, *Blockchain Technology and Decentralized Governance: Is the State Still Necessary?*, 6 J. GOVERNANCE & REG. 45, 48 (2017) (explaining the efficiency of the public blockchain because it is encryption-secured and offers direct interaction through consensus).

149.   *See id.*

150.   Eugenia Politou et al., *Blockchain Mutability: Challenges and Proposed Solutions*, *in* IEEE TRANSACTIONS ON EMERGING TOPICS COMPUTING, Mar. 2019, at 1 (2020).

151.   *Id.* at 5.

152.   *Id.*

153.   Jinhua Fu et al., *A Study on The Optimization of Blockchain Hashing Algorithm Based on PRCA*, 2020 SEC. & COMMC'N NETWORKS, Sept. 14, 2020, at 1, 1.

154.   Jimi S., *How Does Blockchain Work In 7 Steps – A Clear and Simple Explanation*, MEDIUM: GOOD AUDIENCE (May 6, 2018), https://blog.goodaudience.com/blockchain-for-beginners-what-is-blockchain-519db8c6677a [perma.cc/SBE9-NDDL].

155.   ANDREAS M. ANTONOPOULOS, MASTERING BITCOIN: UNLOCKING DIGITAL CRYPTOCURRENCIES 132–33 (2014).

156.   *Id.* at 215.

157.   *See* Jimi S., *supra* note 154 (explaining the tracking and accuracy capabilities of blockchains).

158.   Mehmet Aydar et al., *Private Key Encryption and Recovery in Blockchain*, DEEPAI (July 9, 2019), https://deepai.org/publication/private-key-encryption-and-recovery-in-blockchain [perma.cc/4LSS-PJAN].

159.   Sheikh Mohammad Idrees et al., *Security Aspects of Blockchain Technology Intended for Industrial Applications*, ELECS. Apr. 16, 2021, at 951, 961 (2021).

private keys are known only to specific parties and are used for authentication and encryption.[160] Hence, only the public key will be visible to parties who are not privy to the collusion.[161]

Despite being visible to every node on the blockchain, a third party will not be able to use the information contained within the key because of a particular feature of Blockchains, i.e., pseudonymity.[162] Being pseudonymous, keys on the blockchain do not carry any identifiers that may establish the "real life" identity of the party.[163] For illustration, X's public key may be B45, and Y's may be Fi76. Since only X and Y will know the code of each other's public key, only X and Y will be able to recognize each other's keys, while any alien entity would not.[164]

Thus, while the transactions may be visible, the real parties making those transactions and the reasons behind them would not be.[165] Consequently, transparency is maintained among the cartel members while ensuring anonymity to any alien entity.[166]

Furthermore, while blockchain can increase the flow of information among colluding parties by manifold, it can also make it very difficult for enforcement agencies to lay their hands on such information.[167] In cases involving private blockchains, there would be no trace of any cartel operations since the existence of the blockchain itself would be concealed, and no unauthorized actors would be able to access it.[168] On the other hand, a public blockchain, which allows for open access to all, may seem beneficial for enforcement agencies at first glance.[169] However, given the pseudonymity effect of blockchain, the agencies would be oblivious to the parties making the transactions and the reasons behind the transactions, making any information they collect redundant.[170] Thus, creating an "opacity effect" for the non-colluders.[171]

The creation of such difficulties incentivizes the continuation of the cartel, because the success of a leniency program is directly proportional to the risk of

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160. Nicolas T. Courtois & Rebekah Mercer, *Stealth Address and Key Management Techniques in Blockchain Systems*, *in* PROCEEDINGS OF THE 3RD INTERNATIONAL CONFERENCE ON INFORMATION SYSTEMS SECURITY AND PRIVACY 559, 559 (2017).

161. *See* Aydar et al., *supra* note 158, at 2 (describing the difference between public and private keys).

162. Mario Oettler, *Anonymity vs Pseudonymity*, BLOCKCHAIN ACAD. MITTWEIDA (Sept. 28, 2021), https://blockchain-academy.hs-mittweida.de/courses/blockchain-introduction-technical-beginner-to-intermediate/lessons/lesson-4-privacy-in-blockchain-2/topic/anonymity-vs-pseudonymity [perma.cc/KP4F-E6XK].

163. *Id.*; ANTONOPOULOS, *supra* note 155, at 61.

164. *See* Oettler, *supra* note 162.

165. *Id.*

166. *Id.*

167. Anna Stylianou, *Cryptocurrencies - The Challenges for Criminals and Investigators*, GLOB. COMPLIANCE INST. (Apr. 4, 2022), https://www.gci-ccm.org/insight/2022/04/cryptocurrencies-challenges-criminals-and-investigators [perma.cc/GMC7-C7ZG].

168. Rui Zhang et al., *Security and Privacy on Blockchain,* ACM COMPUTING SURVS, July 2019, at 51:1, 51:13.

169. *See* Stylianou, *supra* note 167 (describing the difficulty enforcement agencies face when trying to trace blockchain transactions).

170. *Id.*

171. Schrepel, *supra* note 111, at 149.

detection and penalization of the cartel members by agencies.[172] The more probable detection becomes, the riskier it gets for the parties to continue the collusive agreement, making defection increasingly attractive.[173] If this risk of detection by agencies decreases, however, it would make deviation increasingly unattractive.[174]

C.   Detection and Penalization of Deviant Behavior Through Smart Contracts

Cartels are prone to internal cheating by parties seeking short-term profits, which destabilizes the cartel agreement.[175] In the absence of any legally binding contracts, cartel members have to resolve any disputes through an informal mechanism of collective action.[176] Implementing such a mechanism is logistically and practically very difficult.[177] However, with the implementation of smart contracts, the process of detection and penalization of deviant behavior can become automated and unerring.[178]

Smart contracts are self-executing, automatic contracts that are triggered on the completion or occurrence of a predetermined condition provided for in the agreement between parties.[179] Hence, cartel members can enforce their cartel not through law,[180] but through code—by devising a smart contract to enforce the collusive agreement.[181] This smart contract can be coupled with pricing algorithms that are adjusted automatically when the conditions of the smart contract are satisfied.[182]

For instance, XY cartel may enter into a smart contract conditioned to release a guaranteed sum if any party deviates from the cartel determined price.[183] Both parties can keep money in an escrow account, which would automatically dispatch in the form of cryptocurrencies if either of the party deviates from the agreed-upon price.[184] They can further employ a blockchain to share real-time price and output data to ensure the implementation of this smart contract.[185] If Y tries to undercut the cartel-determined market price, it

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172.   JOSEPH E. HARRINGTON, THE THEORY OF COLLUSION AND COMPETITION POLICY 27 (2017).

173.   Stigler, *supra* note 126, at 44.

174.   *Id.*

175.   *Id.*

176.   *See id.* at 45 (noting collusion generally arises from ostensibly independent firms).

177.   *See id.* at 45–48 (discussing methods of collusion and related considerations generally).

178.   *See* Max Raskin, *The Law and Legality of Smart Contracts*, 1 GEO. L. & TECH. REV. 305, 312 (2017) (noting how smart contracts can be used to instantly enforce self-help when a contract term is breached).

179.   *Id.* at 306.

180.   *See id.* at 310 ("A smart contract does not rely on the state for enforcement, but is a way for contracting parties to ensure performance.").

181.   *Id.*

182.   *See, e.g.*, Jae Geun Song et al., *A Smart Contract-Based P2P Energy Trading System with Dynamic Pricing on Ethereum Blockchain*, SENSORS, Mar. 11, 2021, at 4–5 (discussing implementation of algorithmic pricing using smart contracts).

183.   *See* Raskin, *supra* note 178, at 312 (noting how smart contracts can be used to instantly enforce self-help when a contract term is breached).

184.   *Id.* at 313.

185.   *See id.* at 319 (discussing combination of blockchains and smart contracts in transactional context).

would be detected on the blockchain and a penalty would immediately be levied upon Y, transferring money from its account to that of X.[186]

Multiple smart contracts can be integrated into the blockchain,[187] each triggered only when a party violates different aspects of the collusive agreement.[188] This would ensure the automatic execution of the agreement without external intervention.[189]

V. EFFECT OF BLOCKCHAIN ON THE ECONOMIC PRINCIPLES UNDERLYING LENIENCY

As observed before, antitrust agencies have used prisoner's dilemma theories to develop and implement leniency programs.[190] The agencies encourage colluding parties to pursue their individual interests exclusively, instead of pursuing strategies of cooperation with the other colluding parties.[191] To do so, they rely upon the lack of trust among cartel members and seek to exploit it further by offering incentives for non-cooperation.[192] Therefore, the leniency programs are essentially premised upon the lack of trust among colluding parties, and the ensuing non-cooperative prisoner's dilemma.[193]

Blockchain fundamentally alters this dilemma by bolstering trust among the colluding parties.[194] As noted, blockchain offers trust without the need for a trusted third party, and hence, transforms the non-cooperative prisoner's dilemma into a cooperative one.[195] For example, smart contracts can help detect any deviant behavior among the colluding parties and penalize the deviant party instantaneously.[196] Such mechanisms ensure that everyone in the cartel is assured that all other participants are pursuing a cooperative strategy.[197] As a result, cooperation becomes the dominant strategy and no party applies for leniency.[198]

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186. *Id.*

187. *See* Primavera De Filippi et al., *Smart Contracts*, INTERNET POL'Y REV., Apr. 20, 2021, at 4 (discussing how aggregation of smart contracts will enable applications with advanced functionalities).

188. *Id.*

189. Raskin, *supra* note 178, at 319.

190. *See* Blum et al., *supra* note 14, at 220–22 (discussing prisoner's dilemma and how firms behave under leniency programs in the context of the cement case study).

191. *Id.* at 212.

192. *See id.* at 220–22 (noting influence of trust and incentives in firms' decision making). *See generally* Stigler, *supra* note 126 (discussing theory underpinning oligopolic markets).

193. Blum et al., *supra* note 14, at 220–22.

194. *See* De Filippi et al., *supra* note 187, at 2 ("The idea was to eliminate the need for trust amongst the parties, by increasing the confidence that the contract will be performed exactly as designed (typically making breaches prohibitively expensive).").

195. Raskin, *supra* note 178, at 319.

196. *See id.* (stating that the terms of a contract and relevant facts can be programmed into a decentralized blockchain, allowing self-executing smart contracts to function without need for human input).

197. *See id.* (discussing how smart contract-based transactions entail an exceptionally large degree of certainty and thus may have a potentially transformative effect on traditional markets).

198. *Cf.* Blum et al., *supra* note 14, at 220–222 (discussing how lack of trust and stability hinders long-term health of market in the context of the cement case study).

In the illustration of Cartel XY, both X and Y can choose either to report collusion or not to report collusion.[199] If the cartel uses Blockchain technology to conduct its activities, both X and Y will trust each other.[200] As a result, not reporting collusion becomes the dominant strategy for both, and they will continue to earn cartel profits.[201]

Hence, blockchain thwarts the use of prisoner's dilemma by enforcement agencies to identify and curb cartels by literally changing the game.[202] Furthermore, blockchain diminishes the efficacy of the 'carrot and stick' and 'race for confessions' model by making it increasingly difficult for enforcement agencies to detect cartels by themselves.[203] Without a high risk of detection, parties are no longer incentivized to take advantage of the incentives leniency programs offer.[204] Consequently, by reducing the risk of detection, blockchain takes away the 'stick,' i.e., heavy sanctions, from the 'carrot and stick' model, and leaves the 'carrot,' i.e., partial or full immunity, infructuous.[205]

Without an effective 'carrot and stick' model, the 'race for confessions' model also loses its efficacy.[206] The cumulative effect of a diminished threat of detection and increased trust is that the cartel members no longer approach the authority for leniency, let alone race against each other to do so.[207]

Therefore, blockchain severely affects the economic principles underlying leniency programs, and thereby, makes them ineffective.[208]

VI. CONCLUSION AND RECOMMENDATIONS

As noted earlier, leniency cases are declining worldwide and are likely to continue doing so in the foreseeable future.[209] The Indian Leniency program has not been as successful as its counterparts.[210] It now faces the threat of complete redundancy, subject to how swiftly colluding parties identify the benefits of and employ blockchains in cartel building in India.[211]

Despite the complications that blockchain creates for antitrust enforcement agencies, it and other new technologies can also aid enforcement agencies in detecting and deterring anti-competitive activities.[212] For instance, in the course

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199. *See id.* (discussing parties' choice between reporting and not reporting collusion).

200. Raskin, *supra* note 178, at 319.

201. *See* Stigler, *supra* note 126, at 46 (discussing the nature of collusion and cartel agreements).

202. Schrepel, *supra* note 111, at 125 ("[B]lockchain makes it possible to automate transactions between players and to transform certain noncooperative games into cooperative games . . . .").

203. *Id.* at 149 ("[B]lockchain strengthens members' trust in each other because it protects them from detection by antitrust and competition agencies.").

204. *See id.* at 150 (lowering the chance of detection encourages members of a cartel to continue participation).

205. *See* Connolly, *supra* note 31 (describing the "carrot and stick" method of antitrust enforcement).

206. *See* Leslie, *supra* note 129, at 640 (discussing leniency programs creating a "race to confess").

207. *See* Schrepel, *supra* note 111, at 150 ("[L]owering the probability of detection encourages colluders to maintain their participation.").

208. *See id.* at 158 (discussing effects of Blockchain on leniency programs).

209. *E.g.*, Ysewyn & Kahmann, *supra* note 109, at 44 (describing a decline in leniency cases in Europe).

210. Muralidharan & Deshpande, *supra* note 10, at 93–94.

211. *See* Schrepel, *supra* note 111, at 125 (discussing cartel use of Blockchain technology to improve collusion efforts).

212. *Id.* at 144–47 (describing ways Blockchain can be used to prevent anti-competitive activities).

of investigating anti-competitive activities in the market, the information obtained by the enforcement agencies is unverifiable.[213] Blockchains, however, can be used to verify such data, given a blockchain's immutability.[214] If there is some evidence of a cartel between X and Y, the agency can verify such information by accessing transactions on the blockchain.[215] Such independent verification of data would allow securing the best possible evidence, which can greatly aid enforcement agencies in potential litigations.[216]

Similarly, agencies may use smart contracts to ensure adherence by companies to their commitments.[217] Say X commits to not increasing the price of its products in the next two quarters. Smart contracts can help enforcement agencies monitor this and impose restrictions on the future sale of the company if it violates the commitment.[218] Such a mechanism would greatly reduce the costs of monitoring such compliance.[219]

A recent experiment using machine learning has demonstrated that it would be possible to track blockchain and establish patterns of possible collusive behavior among parties by drawing connections between past behaviors of cartel activities, i.e., their pricing actions, market divisions and so forth.[220] Machine learning uses artificial intelligence to predict future outcomes and establish patterns using historical data.[221] By using data on established practices of erstwhile cartels, machine learning can establish new patterns or make predictions that may be tracked on the very same blockchains to help identify cartelization.[222] To achieve this, enforcement agencies, including the CCI, would have to become proactive, rather than reactive in their approach, reengineering the leniency program.[223]

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213. Leslie, *supra* note 129, at 613 ("[I]t is often difficult to trust the numbers submitted by cartel members because the data are often not verifiable.").

214. *E.g.*, Schrepel, *supra* note 111, at 121 ("[B]lockchains are immutable.").

215. Giovanna Massarotto, *Antitrust in the Blockchain Era*, 1 NOTRE DAME J. EMERGING TECH. 252, 268 (2020) ("[E]verything is tracked in the [B]lockchain network making it easy for antitrust enforcers to supervise company's use of data.").

216. *See id.* ("[B]lockchain can be a valuable tool to make the enforcement of antitrust principles in today data [sic] economy effective.").

217. *See* Schrepel, *supra* note 111, at 147 (discussing company use of smart contracts to ensure colluders follow rules, similar principles can be applied by enforcement agencies).

218. *See id.* ("[W]hen companies use smart contracts, rulemaking and rule enforcement are made possible at the same time, which reinforces the trust colluders have in the agreement.").

219. *See, e.g.*, DEPT. OF JUST.: ANTITRUST DIV., EVALUATION OF CORPORATE COMPLIANCE PROGRAMS IN CRIMINAL ANTITRUST INVESTIGATIONS 10 (2019), https://www.justice.gov/atr/page/file/1182001/download [perma.cc/DF56-EDG9] (describing monitoring methods used in U.S. antitrust enforcement).

220. Giovanna Massarotto & Ashwin Ittoo, *Gleaning Insight from Antitrust Cases Using Machine Learning*, 1 STAN. COMPUTATIONAL ANTITRUST 16, 37 (2021).

221. *E.g.*, *id.* at 22 ("[Machine learning] algorithms enable machines to learn how to perform a task . . . through experience. Experience here manifests itself from large volumes of data . . . .").

222. Yugesh Verma, *How Machine Learning Can Be Used with Blockchain Technology?*, ANALYTICS INDIA MAG.: DEVELOPERS CORNER (Oct. 16, 2021), https://analyticsindiamag.com/how-machine-learning-can-be-used-with-blockchain-technology [perma.cc/23RN-K63K] ("Machine learning models can use the data stored in the [B]lockchain network for making the prediction or for the analysis of data purposes.").

223. *E.g.*, Svetlana Avdasheva & Polina Kryuchkova, *The 'Reactive' Model of Antitrust Enforcement: When Private Interests Dictate Enforcement Actions—The Russian Case*, 43 INT'L REV. L. & ECON. 200, 202 (2015) (discussing reactive models of antitrust policy enforcement).

In conclusion, blockchain will have a transformative impact on the principles of antitrust enforcement, much like the Internet at the beginning of the millennium.[224] It is safe to say that the future of the leniency program, especially the Indian version of it, seems bleak.[225] Accordingly, enforcement agencies must adopt new means at a rapid pace if they intend to keep up with these changing times and the challenges that they present, rather than attempting to revive their respective leniency programs.[226]

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224. *E.g.*, Salil Kumar Mehra, *Information in an Antitrust Age*, 2000 U. CHI. LEGAL F. 219, 219 (2000) (describing ways the information age and the Internet change antitrust enforcement).

225. *See* Ysewyn & Kahmann, *supra* note 109, at 44 (discussing a decline in the European antitrust leniency program).

226. *Id.*