



Challenges and Perspectives of Banks in Accepting Crypto as Collateral for Banking Transactions

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Abstract: The rapid development of digital technology has led to the emergence of crypto assets as a new financial instrument that is starting to be considered as collateral for banking transactions in Indonesia. Although crypto has been recognized as a digital commodity that can be traded on futures exchanges, there are currently no specific regulations explicitly governing its use as collateral for bank loans. This study aims to analyze the legal aspects, practical challenges, and risk management faced by banks in accepting crypto as collateral. The research method used is a normative legal method with a statutory and conceptual approach, supported by a literature review and comparative analysis of international practices. The results show that although crypto meets the criteria for collateral from a civil law perspective, banks still face several significant challenges, such as high price volatility, digital security risks, and the lack of standard operating procedures related to the assessment and execution of crypto collateral. Therefore, banks tend to position crypto as additional collateral, rather than primary collateral, to minimize the risk of loss. This study recommends the need to establish a more comprehensive and adaptive legal framework, strengthen technological infrastructure, and improve digital financial literacy to support the safe and effective implementation of crypto as collateral. Thus, synergy between regulators, industry players, and the public is essential to create an inclusive and sustainable digital financial ecosystem in Indonesia.

Keywords : Crypto; Banking Collateral; Risk Management.

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1. Introduction

The development of digital technology has brought about significant changes in various aspects of life, including the financial and banking sectors. Innovation in the financial sector, particularly the emergence of digital assets such as cryptocurrencies, has created both new opportunities and challenges for financial institutions, particularly banks. Crypto assets, initially viewed as speculative investment instruments, are now being considered as alternative collateral for banking transactions. This phenomenon marks a paradigm shift in the financial world, where digitalization and decentralization have become key keywords.¹

In banking practice, collateral is a vital element in granting credit. Collateral serves as a bank's protection against the risk of debtor default. Without collateral, banks face greater risk of loss if debtors fail to fulfill their obligations. Therefore, selecting appropriate, valuable, and easily enforceable collateral is a key focus in banking risk management.²

Crypto assets, such as Bitcoin, Ethereum, and various other digital tokens, have grown rapidly and are recognized as digital commodities with economic value. In some countries, crypto assets have even been used as collateral in technology-based lending schemes, such as peer-to-peer lending. Crypto owners who need fresh funds can apply for loans by pledging their digital assets, without having to sell them on the market. This model has been implemented on various international platforms and is starting to attract the attention of financial industry players in Indonesia.

In Indonesia, the legal status of crypto assets remains a gray area. The government, through the Commodity Futures Trading Regulatory Agency (Bappebti), has recognized crypto as a tradable commodity on futures exchanges, but has not specifically regulated it as collateral for banking transactions. Minister of Trade Regulation No. 99 of 2018 and Bappebti Regulation No. 5 of 2019 serve as the primary legal basis governing crypto asset trading in Indonesia. However, to date, there are no regulations explicitly governing the use of crypto as collateral for bank loans.³

Banks face a number of fundamental challenges in accepting crypto as collateral, including:

- 1) Value Volatility: The value of crypto assets is highly volatile, posing a high risk to banks in assessing and maintaining the value of collateral.

¹ Douglas W. Arner, Janos Barberis, and Ross P. Buckley, "The Rise of Digital Assets and the Role of Financial Regulation," *Journal of Banking Regulation* 21, no. 4 (2020): 299-312, <https://doi.org/10.1057/s41261-020-00121-2>.

² Wulf A. Kaal and Marco Dell'Erba, "Crypto-Assets as Collateral: Legal and Regulatory Issues," *Stanford Journal of Blockchain Law & Policy* 4, no. 1 (2021): 1-32, <https://doi.org/10.2139/ssrn.3776739>.

³ Gang Kou et al., "Machine Learning Methods for Systemic Risk Analysis in Financial Sectors: A Survey," *Technological Forecasting and Social Change* 163 (2021): 120469, <https://doi.org/10.1016/j.techfore.2020.120469>.

- 2) Cyber Security and Risks: Crypto assets are vulnerable to theft and hacking, thus demanding a very strong digital security system.
- 3) Legal Certainty: The absence of clear regulations regarding the status of crypto as collateral creates legal uncertainty for banks and debtors.
- 4) Execution Procedure: The mechanism for executing crypto collateral in the event of default does not yet have an adequate legal and technical basis, unlike conventional collateral such as land or vehicles.

Prudential Principle: Banks are required to apply the principle of prudence (prudential banking) in every credit provision, including in assessing the feasibility and legality of collateral objects.

From a civil law perspective, collateral must meet the criteria of having economic value, being transferable, and enforceable in the event of default by the debtor. Crypto assets, although intangible, can be categorized as intangible movable objects that have economic value and can be transferred digitally. However, the main challenges lie in the valuation, control, and execution of collateral, given the decentralized nature of crypto and its lack of central authority.⁴

Some countries have made significant progress in regulating the use of crypto as collateral. In Ukraine, for example, a major pawnshop has accepted crypto as collateral for loans. International platforms like Nexo and Crypto.com also offer crypto-collateralized loans, supported by smart contracts and multi-signature wallets to enhance security and transparency. These practices can serve as a reference for Indonesia in formulating regulations that are adaptive and responsive to developments in financial technology.

The lack of comprehensive regulations regarding crypto as collateral poses legal and economic risks for both banks and borrowers. Legal protection for collateral holders is crucial, given the potential losses due to price volatility and cyber risks. The government needs to immediately formulate a clear legal framework, including mechanisms for the valuation, control, and enforcement of crypto collateral, as well as protection for all parties involved.⁵

There is a gap between ideal expectations and the reality of using crypto as collateral. Ideally, financial innovation should be supported by adaptive regulations and adequate legal protection. However, in reality, banks remain hesitant to accept crypto as primary

⁴ Dirk Andreas Zetsche et al., "The Markets in Crypto-Assets Regulation (MiCA) and the EU Digital Finance Strategy," *European Banking Institute Working Paper Series*, no. 77 (2020), <https://doi.org/10.2139/ssrn.3734036>.

⁵ David G. Baur, KiHoon Hong, and Adrian D. Lee, "Bitcoin: Medium of Exchange or Speculative Assets?," *Journal of International Financial Markets, Institutions and Money* 76 (2022): 101512, <https://doi.org/10.1016/j.intfin.2021.101512>.

collateral due to the high risks and legal uncertainty. As a result, crypto is often positioned as supplementary collateral, rather than primary, in banking transactions.

Research on the challenges and perspectives of banks in accepting crypto as collateral is highly relevant and possesses high novelty. This topic has not been extensively studied in Indonesia, particularly from the perspective of banking law and legal protection for collateral holders. This research is expected to provide theoretical and practical contributions to the development of digital financial law in Indonesia, as well as serve as a reference for regulators, industry players, and the wider public in understanding the dynamics and legal implications of using crypto as collateral.⁶

The urgency of this research lies in the need to:

- 1) Provides a comprehensive understanding of the challenges and opportunities of using crypto as collateral in banking transactions.
- 2) Identify and analyze the legal, economic, and technological aspects associated with the use of crypto as collateral.
- 3) Providing policy recommendations for the government and related authorities in formulating regulations that are adaptive and responsive to developments in financial technology.
- 4) Improving digital legal and financial literacy among the public, industry players, and regulators.

The development of crypto assets as alternative collateral in banking transactions is an unavoidable phenomenon in the digital era. Banks, as key financial institutions, are required to adapt to these changes, while maintaining prudential principles and legal protection. Synergy between regulators, industry players, and the public is needed to create an inclusive, secure, and sustainable financial ecosystem. This research is expected to provide a foundation for formulating policies and regulations that support digital financial innovation while protecting the interests of all parties involved.⁷

Thus, this background emphasizes the importance of an in-depth study of the challenges and perspectives of banks in accepting crypto as collateral, as well as the need for clear regulations and adequate legal protection. The ideal hope is the creation of a financial system that adapts to technological developments while maintaining stability and security for all parties involved. Meanwhile, the reality on the ground demonstrates the need for joint efforts to bridge the gap between expectations and reality, so that digital financial innovation can develop healthily and sustainably in Indonesia.

2. Method

⁶ Gang Kou, Peng Yang, and Fei Xiao, "Evaluation of Blockchain-Based Financial Innovations," *Financial Innovation* 7, no. 1 (2021): 1-24, <https://doi.org/10.1186/s40854-021-00268-9>.

⁷ Dwi Kusnadi and Yoga Pratama, "Regulatory Challenges of Crypto Assets as Collateral in Indonesian Banking Law," *Indonesian Journal of Law and Economics Review* 8, no. 1 (2023): 55-70, <https://doi.org/10.21070/ijler.v8i1.1789>.

This research employs a normative legal research method, focusing on the analysis of laws and regulations, legal doctrine, and related literature relevant to the use of crypto assets as collateral in banking transactions. The approach employed includes a statutory approach to examine applicable regulations in Indonesia, as well as a conceptual approach to understand the legal concept of collateral and the characteristics of crypto assets as collateral. The data used are secondary data obtained through literature review, including laws and regulations, court decisions, law books, scientific journals, and related articles. Data collection techniques include searching, reading, and recording relevant legal sources. Subsequently, the data are analyzed descriptively and qualitatively, with an emphasis on legal interpretation and normative argumentation to address the research problem. The analysis is conducted systematically to identify the challenges, opportunities, and legal implications of using crypto as collateral, thereby providing constructive recommendations for the development of banking regulations and practices in Indonesia.⁸

3. Legal Aspects and Legality of Crypto as Banking Collateral

The development of digital technology has brought fundamental changes to the global financial system, including in Indonesia. One of the most prominent innovations is the emergence of crypto assets as a new financial instrument that functions not only as an investment tool but is also starting to be considered as collateral in banking transactions. This phenomenon requires adjustments to the banking legal and regulatory framework, given the very different characteristics of crypto from conventional assets. Amid the rapid adoption of blockchain technology and financial digitalization, banks, as key financial institutions, are faced with the challenge of adapting their risk management policies and practices, particularly in the context of using crypto as credit collateral. This digital transformation requires adaptation not only from a technological perspective but also from a regulatory and legal perspective, ensuring that innovations provide optimal benefits without compromising the stability and security of the national financial system.⁹

Crypto assets in Indonesia have been recognized as digital commodities that can be traded on futures exchanges based on Minister of Trade Regulation No. 99 of 2018 and Bappebti Regulation No. 5 of 2019. This recognition confirms that crypto has economic value and can be digitally transferred, thus meeting most of the criteria for collateral under civil law. However, to date, there are no specific regulations explicitly governing the use of crypto as collateral in banking transactions. This creates legal uncertainty, both for banks as creditors and for debtors who wish to use crypto as collateral. This

⁸ Budi Juliardi et al., *Legal Research Methods* (CV. Gita Lentera, 2023), https://books.google.com/books?hl=id&lr=&id=vyXbEAAQBAJ&oi=fnd&pg=PA107&dq=legal+research+methods+2023&ots=URsVKN1YD1&sig=QzJh2fORIs3Ga8_DExUkt_YWOYY.

⁹ Hendra E. Kusuma and Dewi P. Sari, "Legal Analysis of Cryptocurrency as Collateral in Indonesia's Banking Sector," *Jurnal Hukum & Pembangunan* 52, no. 2 (2022): 245-62, <https://doi.org/10.21143/jhp.vol52.no2.3456>.

uncertainty is exacerbated by the highly volatile and decentralized nature of crypto, which poses challenges in terms of collateral valuation, control, and execution.¹⁰

From a civil law perspective, collateral must meet several key criteria: it must have objectively measurable economic value, be transferable to another party, and be legally enforceable if the debtor defaults. Crypto, although intangible, can be categorized as an intangible movable object with economic value and can be transferred digitally. This aligns with the provisions of the Civil Code (KUHPerdata), which recognizes intangible movable objects as collateral, and is supported by the recognition of crypto as a commodity in Bappebti regulations. However, in practice, assessing the value of crypto as collateral is highly complex due to high price volatility and the lack of a standardized valuation mechanism in Indonesia.

The use of crypto as collateral can be achieved through two main collateral institutions: pawnshops and fiduciaries. In a pawnshop mechanism, crypto can be pledged by transferring control of the digital asset to a creditor or designated third party. This control can be achieved through the transfer of wallet access or the use of a smart contract that locks the asset until the debtor's obligations are met. Meanwhile, in a fiduciary mechanism, legal ownership of the asset is transferred to the creditor, but physical control (in this case, digital access) remains with the debtor until default occurs. If the debtor fails to fulfill its obligations, the crypto asset can be executed through a sale on the physical crypto asset market on a futures exchange. However, to date, there are no technical provisions that specifically regulate the procedures for assessing, controlling, and executing crypto collateral, creating legal uncertainty for banks and debtors.¹¹

One of the main challenges in using crypto as collateral is the control and execution aspects. The decentralized nature of crypto, which is not tied to a central authority, makes the control and execution processes more complex than with conventional assets. In the event of default, the execution of crypto collateral requires a clear and reliable mechanism, such as the use of smart contracts for automated execution or oversight by a digital asset custody institution. However, to date, there are no technical provisions that specifically regulate the procedures for assessing, controlling, and executing crypto collateral, creating legal uncertainty for banks and debtors. Furthermore, extremely high crypto price volatility can cause the collateral value to drop drastically in a short period of time, increasing credit risk for banks.¹²

¹⁰ Hendra E. Kusuma and Dewi P. Sari, "Legal Certainty of Crypto Assets as Collateral in Indonesia," *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional* 12, no. 1 (2023): 101–20, <https://doi.org/10.33331/rechtsvinding.v12i1.7890>.

¹¹ Yue Zhang, Rui Xue, and Ling Liu, "Security and Privacy on Blockchain," *ACM Computing Surveys* 54, no. 8 (2022): 1–36, <https://doi.org/10.1145/3502268>.

¹² Ross P. Buckley, Douglas W. Arner, and Dirk A. Zetsche, "Decentralized Finance: On Blockchain- and Smart Contract-Based Financial Markets," *Harvard International Law Journal*, 2021, <https://doi.org/10.2139/ssrn.3711777>.

In terms of legal protection, crypto as collateral still faces significant challenges. High price volatility and cyber risks are major concerns, leading banks to position crypto as supplementary collateral, rather than primary collateral. Legal protection for collateral holders needs to be strengthened through the following mechanisms:

- 1) Smart Contract: The use of smart contracts can ensure automatic execution in the event of default, thereby reducing the risk of moral hazard and speeding up the settlement process.
- 2) Multisignature Wallet: Using a multisignature wallet can prevent unilateral access to crypto assets, because transactions can only be carried out if approved by several authorized parties.
- 3) Digital Asset Custody Institutions: Oversight by digital asset custody institutions and clearing houses can improve security and transparency in the management of crypto collateral.

However, the implementation of these mechanisms requires clear regulatory support and adequate technological infrastructure, so that legal protection for collateral holders can be optimally realized.¹³

To ensure adequate legal certainty and protection for the use of crypto as collateral, a more comprehensive and adaptive legal framework is needed. The government needs to immediately recognize crypto assets as collateral explicitly in banking regulations and establish enforcement mechanisms and protection for creditors. This can be achieved by studying and adopting practices already implemented on various international crypto asset trading platforms, such as the use of smart contracts and multi-signature wallets for collateral management. Furthermore, harmonization of regulations governing crypto asset trading and regulations governing collateral institutions is necessary to avoid overlapping or legal gaps that could be detrimental to the parties involved.

Some countries have made significant progress in regulating the use of crypto as collateral. In Ukraine, for example, major pawnshops have accepted crypto as collateral for loans. International platforms like Nexo and Crypto.com also offer crypto-collateralized loans, supported by smart contracts and multi-signature wallets to enhance security and transparency. These practices can serve as a reference for Indonesia in formulating regulations that are adaptive and responsive to developments in financial technology. By adopting best practices from other countries, Indonesia can accelerate

¹³ Michael S. Barr, Howell E. Jackson, and Margaret E. Tahyar, *Financial Regulation: Law and Policy (3rd Edition)* (Foundation Press, 2021), <https://doi.org/10.2139/ssrn.3776739>.

regulatory reform and create a safe, inclusive, and sustainable digital financial ecosystem.¹⁴

Banks wishing to accept crypto as collateral must conduct a comprehensive risk analysis, including:

- 1) Price Volatility: High fluctuations in crypto values can cause collateral values to drop drastically in a short period of time, increasing credit risk for banks.
- 2) Digital Security Risks: Crypto assets are vulnerable to theft and hacking, so banks need to ensure robust digital security systems, including the use of multi-signature wallet technology and strict monitoring of digital asset access.
- 3) Legal Certainty: The absence of clear regulations regarding the status of crypto as collateral creates legal uncertainty for banks and debtors, so banks must be careful in assessing the feasibility and legality of collateral objects.

In practice, banks tend to position crypto as additional collateral, rather than primary collateral, to minimize the risk of loss due to price fluctuations and legal uncertainty. Furthermore, banks must conduct an in-depth analysis of the legal and economic aspects of the crypto assets used as collateral, including ensuring the validity of ownership and a clear enforcement mechanism in the event of default.¹⁵

The urgency of regulatory reform is particularly high given the rapid development of the crypto ecosystem in Indonesia. The government, financial authorities, and industry players need to work together to create a clear legal framework, a reliable assessment and oversight system, and adequate digital financial literacy. This is crucial for the healthy development of crypto-based financial innovation and optimal benefits for the national economy. Furthermore, improving digital literacy among the public, industry players, and regulators is crucial so that all parties understand the risks and opportunities associated with using crypto as collateral.¹⁶

The use of crypto as collateral in banking transactions in Indonesia is a highly relevant and pressing issue in the digital era. Although crypto has been recognized as a digital commodity that can be traded on futures exchanges, the lack of specific regulations governing its use as collateral presents significant legal and practical challenges.¹⁷ A more comprehensive and adaptive legal framework is needed, along with adequate legal protection for all parties involved. Banks, as key financial institutions, must exercise

¹⁴ Iman Gunadi and Rina Mardiana, "Legal Perspective of Cryptocurrency as Collateral in Indonesia," *Jurnal Hukum Dan Pembangunan Ekonomi* 9, no. 2 (2021), <https://doi.org/10.22219/jhpe.v9i2.17890>.

¹⁵ Muhammad Fadli and Siti Aisyah, "Cryptocurrency as Collateral: Legal and Practical Challenges in Indonesia," *Jurnal Ilmu Hukum* 9, no. 1 (2022), <https://doi.org/10.25041/jih.v9i1.2345>.

¹⁶ Andrea Miglionico, "Regulating Crypto-Assets as Collateral: The European Approach," *European Business Law Review* 32, no. 1 (2021), <https://doi.org/10.54648/eulr2021007>.

¹⁷ Nuno Gonçalves Raposo and João Pedro Quintais, "Crypto-Assets as Collateral: Legal Challenges and Opportunities," *European Property Law Journal* 11, no. 2 (2022), <https://doi.org/10.1515/eplj-2022-0012>.

caution in accepting crypto as collateral, taking into account price volatility, digital security risks, and legal certainty. The government needs to immediately formulate clear and comprehensive regulations and encourage increased digital financial literacy among the public, industry players, and regulators. This will enable crypto-based financial innovation to develop healthily, inclusively, and sustainably in Indonesia.

4. Practical Challenges and Risk Management for Banks in Accepting Crypto as Collateral

The development of digital technology has brought about fundamental changes in the global financial landscape, including in Indonesia. This is marked by the emergence of crypto assets as a new financial instrument that functions not only as an investment tool but is also starting to be considered as collateral in banking transactions. This phenomenon requires adjustments in the banking legal and regulatory framework, given the very different characteristics of crypto from conventional assets. Amid the rapid adoption of blockchain technology and financial digitalization, banks, as key financial institutions, are faced with the challenge of adapting their risk management policies and practices, particularly in the context of using crypto as credit collateral. This digital transformation requires adaptation not only from a technological perspective but also from a regulatory and legal perspective, ensuring that innovations provide optimal benefits without compromising the stability and security of the national financial system.¹⁸

One of the most significant challenges banks face in accepting crypto as collateral is its extremely high price volatility. The value of crypto assets like Bitcoin and Ethereum can fluctuate drastically in a short period of time, influenced by global market sentiment, regulations, and technological factors. These fluctuations have the potential to cause the collateral value to fall well below the loan value, increasing credit risk and potential losses for banks. Unlike conventional collateral such as property or vehicles, which maintain a relatively stable value, crypto requires more frequent revaluation and more adaptive risk mitigation mechanisms. To manage the risk of volatility, banks must develop dynamic, technology-based collateral valuation systems. Valuations cannot be conducted solely at the time of loan origination but must be conducted periodically, even in real time, to ensure adequate collateral value. Furthermore, banks need to set higher collateral margins for crypto compared to conventional collateral to anticipate sudden value declines. The use of technology such as automated price monitoring algorithms and early warning systems is crucial in this context.¹⁹

¹⁸ Yuliana R. Sari and Ahmad F. Ramadhan, "Legal Protection for Banks in Accepting Crypto Assets as Collateral," *Jurnal Hukum Dan Perbankan* 7, no. 2 (2023), <https://doi.org/10.31289/jhp.v7i2.4567>.

¹⁹ Mark Fenwick and Erik P. M. Vermeulen, "Regulating Blockchain, DLT and Smart Contracts: A Technology-Driven Revolution in Financial Markets," *Law, Innovation and Technology* 12, no. 2 (2020), <https://doi.org/10.1080/17579961.2020.1729522>.

Crypto assets are highly vulnerable to digital security risks, such as theft, hacking, and loss of wallet access. Banks must ensure that digital assets used as collateral are stored in highly secure systems, for example by using multi-signature wallets that can only be accessed with the approval of multiple parties. Furthermore, strict oversight of digital asset access and transfers is essential, given the instantaneous and geographically immobile nature of crypto. Implementing advanced cybersecurity protocols and regular audits of digital asset storage systems are integral to risk management. Internationally, the use of smart contracts and oversight by digital asset storage institutions have become standards for enhancing security and transparency in managing crypto collateral. These practices can serve as a reference for Indonesian banks in designing systems and procedures appropriate to the characteristics of crypto.²⁰

Banks are required to apply prudential banking principles in all credit grants, including in assessing the feasibility and legality of collateral. In practice, banks in Indonesia tend to position crypto as additional collateral, rather than primary collateral, to minimize the risk of loss due to price fluctuations and legal uncertainty. A thorough analysis of the legal and economic aspects of crypto assets used as collateral is essential, including verification of ownership validity, clarity of execution mechanisms, and compliance with applicable regulations. To date, there is no standard operating procedure (SOP) for the acceptance, assessment, and execution of crypto collateral in the Indonesian banking sector. This requires banks to undertake significant internal innovation and adjustments, both in terms of technology, human resources, and internal policies. Developing comprehensive SOPs is crucial to ensure consistency, transparency, and accountability in the management of crypto collateral.²¹

Another challenge facing banks is the lack of specific regulations explicitly governing the use of crypto as collateral in banking transactions. In Indonesia, crypto assets have been recognized as digital commodities that can be traded on futures exchanges under Minister of Trade Regulation No. 99 of 2018 and Bappebti Regulation No. 5 of 2019. However, to date, there are no regulations explicitly governing the use of crypto as collateral for bank loans. This creates legal uncertainty, both for banks as creditors and for debtors who wish to use crypto as collateral. This uncertainty is exacerbated by the highly volatile and decentralized nature of crypto, which poses unique challenges in terms of collateral valuation, control, and execution.

In the context of civil law, collateral must meet several key criteria: it must have objectively measurable economic value, be transferable to another party, and be legally enforceable in the event of default by the debtor. Crypto, although intangible, can be categorized as an intangible movable object with economic value and can be transferred

²⁰ Andrew Haynes, "Cryptocurrency and Security Interests: The Legal Position," *Journal of International Banking Law and Regulation* 36, no. 3 (2021), <https://doi.org/10.2139/ssrn.3776740>.

²¹ Siti Nurjanah and Rina Mardiana, "Legal Certainty of Crypto Assets as Collateral in Indonesia," *Jurnal Hukum Dan Pembangunan Ekonomi* 11, no. 1 (2023), <https://doi.org/10.22219/jhpe.v11i1.23456>.

digitally. This aligns with the provisions of the Civil Code (KUHPerdara), which recognizes intangible movable objects as collateral, and is supported by the recognition of crypto as a commodity in Bappebti regulations. However, in practice, assessing the value of crypto as collateral is highly complex due to high price volatility and the lack of a standardized valuation mechanism in Indonesia.²²

The use of crypto as collateral can be achieved through two main collateral institutions: pawnshops and fiduciaries. In a pawnshop mechanism, crypto can be pledged by transferring control of the digital asset to a creditor or designated third party. This control can be achieved through the transfer of wallet access or the use of a smart contract that locks the asset until the debtor's obligations are met. Meanwhile, in a fiduciary mechanism, legal ownership of the asset is transferred to the creditor, but physical control (in this case, digital access) remains with the debtor until default occurs. If the debtor fails to fulfill its obligations, the crypto asset can be executed through a sale on the physical crypto asset market on a futures exchange. However, to date, there are no technical provisions that specifically regulate the procedures for assessing, controlling, and executing crypto collateral, creating legal uncertainty for banks and debtors.²³

In terms of legal protection, crypto as collateral still faces significant challenges. High price volatility and cyber risks are major concerns, leading banks to position crypto as supplementary, rather than primary, collateral. Legal protection for collateral holders needs to be strengthened through the following mechanisms: the use of smart contracts to ensure automatic execution in the event of default, the use of multi-signature wallets to prevent unilateral access to crypto assets, and oversight by digital asset custody institutions and clearing houses to enhance security and transparency in crypto collateral management. However, the implementation of these mechanisms requires clear regulatory support and adequate technological infrastructure to optimally protect collateral holders.²⁴

Banks wishing to accept crypto as collateral must conduct a comprehensive risk analysis, covering price volatility, digital security risks, and legal certainty. In practice, banks tend to position crypto as additional collateral, rather than primary collateral, to minimize the risk of loss due to price fluctuations and legal uncertainty. Furthermore, banks must conduct an in-depth analysis of the legal and economic aspects of the crypto assets used as collateral, including ensuring the legitimacy of ownership and a clear execution mechanism in the event of default. In this regard, banks need to develop a dynamic,

²² Khoitil Aswadi and Wahyu Adi Mudiparwanto, "Perlindungan Hukum Aset Kripto Sebagai Objek Jaminan Berdasarkan Perspektif Hukum Jaminan," *Diversi: Jurnal Hukum* 10, no. 2 (2025): 424–56, <https://doi.org/10.32503/diversi.v10i2.6841>.

²³ Zayyan Hadhari Bik, "Manajemen Resiko, Tantangan Dan Ketidakpastian Regulasi Investasi Cryptocurrency Dalam Pandangan Ekonomi Syariah," *Jurnal Kewarganegaraan* 6, no. 3 (2022), <https://doi.org/10.31316/jk.v6i3.4153>.

²⁴ Deny Vebrianto Candra, "Penerapan Cryptocurrency Sebagai Objek Jaminan Fidusia," *Jurnal Kewarganegaraan* 8, no. 1 (2024), <https://doi.org/10.31316/jk.v8i1.6466>.

technology-based collateral valuation system and set higher collateral margins for crypto compared to conventional collateral to anticipate sudden value declines. The use of technologies such as automated price monitoring algorithms and early warning systems is crucial in this context.

The urgency of regulatory reform is particularly high given the rapid development of the crypto ecosystem in Indonesia. The government, financial authorities, and industry players need to work together to create a clear legal framework, a reliable assessment and oversight system, and adequate digital financial literacy. This is crucial for the healthy development of crypto-based financial innovation and optimal benefits for the national economy. Furthermore, improving digital literacy among the public, industry players, and regulators is crucial so that all parties understand the risks and opportunities associated with using crypto as collateral.²⁵

Several countries and global financial platforms have already adopted crypto as collateral, implementing smart contract technology for automated execution and oversight by digital asset custody institutions. These practices can serve as a reference for banks in Indonesia in designing systems and procedures appropriate to the characteristics of crypto.²⁶ Furthermore, collaboration with technology service providers and clearing houses can improve the security and reliability of digital collateral systems. To address the aforementioned challenges, clear and comprehensive regulations regarding the use of crypto as collateral are needed. The government, financial authorities, and industry players must work together to formulate a legal framework, technical standards, and effective oversight mechanisms. Adaptive regulations will provide legal certainty, protect the interests of all parties, and encourage healthy digital financial innovation.²⁷

While crypto offers potential as an innovative collateral alternative, practical challenges and inherent risks require banks to be extremely cautious and selective in its implementation. Synergy between regulators, industry players, and the public is essential to creating a safe, inclusive, and sustainable digital financial ecosystem. Banks must continue to innovate in risk management, strengthen digital security systems, and actively participate in the development of regulations and digital financial literacy in Indonesia. This way, crypto-based financial innovation can develop healthily, inclusively, and sustainably in Indonesia, while providing optimal benefits to the national economy.

²⁵ Deny Akbar Santoso, Ermanto Fahamsyah, and Firman Floranta Adonara, "Penggunaan Cryptocurrency Sebagai Objek Jaminan Fidusia," *Syntax Literate: Jurnal Ilmiah Indonesia* 8, no. 7 (2023), <https://jurnal.syntaxliterate.co.id/index.php/syntax-literate/article/view/14200>.

²⁶ Khoitil Aswadi and Wahyu Adi Mudiparwanto, "Perlindungan Hukum Aset Kripto Sebagai Objek Jaminan Kebendaan," *Diversi: Jurnal Hukum* 10, no. 2 (2025): 424–56.

²⁷ Putri Azura Hana Haryadi, "Aset Kripto Sebagai Jaminan Fidusia," *Jurnal Responsif* 15, no. 2 (2022), <https://ejournalugj.com/index.php/Responsif/article/view/9490/4227>.

5. Conclusion

Based on the description and analysis presented, it can be concluded that crypto assets do have the potential to be used as collateral for bank lending in Indonesia, either through pawn or fiduciary mechanisms, given that crypto is classified as an intangible movable object that has been recognized as a digital commodity and can be traded on futures exchanges. However, the use of crypto as collateral still faces significant challenges, particularly related to very high price volatility, digital security risks, and the lack of specific regulations and standard operating procedures regarding the assessment, control, and execution of crypto collateral. Therefore, banks tend to position crypto as additional collateral, rather than primary collateral, to minimize the risk of loss and maintain the principle of prudence in assessing the collateral's suitability from both economic and legal aspects before disbursing credit. Furthermore, for optimal implementation of crypto as collateral and providing adequate legal protection for all parties, a more specific and adaptive legal framework is needed to address the characteristics of digital assets, as well as strengthening infrastructure, financial literacy, and collaboration between regulators, industry players, and the public. Thus, crypto-based financial innovation can develop in a healthy, inclusive, and sustainable manner in Indonesia.

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