

**SAMEER MANDHAN**

**CONFRONTING THE DEFI REVOLUTION: A  
COMPARATIVE ANALYSIS OF THE  
APPLICATION OF NEW ZEALAND'S PERSONAL  
PROPERTY SECURITIES ACT 1999 TO  
CRYPTOASSETS**

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**Abstract**

*The financial sector is being upended. The major disruptor is decentralised finance (DeFi), which eliminates the need for centralised intermediaries by empowering individuals with peer-to-peer digital exchanges. DeFi has experienced rapid growth over the past few years and its proliferation is likely to continue. DeFi, which uses emerging blockchain technology, is underpinned by cryptoassets such as bitcoin, ether, and Non-Fungible Tokens (NFTs). As DeFi offerings have become increasingly sophisticated, important legal issues have arisen. One such issue is whether the law is appropriately positioned to recognise and give effect to cryptoasset-collateralised lending arrangements. Presently, legal uncertainty poses a substantial risk to market participants, who are for the most part transacting blindly. This paper, therefore, addresses the applicability and comparative suitability of New Zealand's Personal Property Securities Act 1999 (the PPSA) to cryptoasset collateral arrangements. It argues, using the recent Singaporean case of *Chefpierre* as a test case, that the PPSA is generally preferable — as regards upholding DeFi parties' intentions by providing due legal recognition to their arrangements — to the English (and thus Singaporean) approach to secured credit law. Although determining that the PPSA is better positioned than English law to respond to novel cryptoasset collateral arrangements, the author illustrates how the challenges posed by cryptoassets still necessitate a degree of legislative change — in particular, to the PPSA's perfection requirements and priority rules. Consequently, the author undertakes a thorough review of potential routes to legislative change, including a comparative analysis of legal principles and developments in the United Kingdom and the United States of America. The author subsequently recommends that a number of bespoke rules and concepts designed to respond to cryptoassets be introduced into the PPSA, concluding that such reform is a crucial step in New Zealand's journey to confront the DeFi revolution.*

**Word length**

*The text of this paper (excluding abstract, table of contents, footnotes, appendices and bibliography) comprises approximately 8118 words.*

***Keywords***

*“Cryptoassets”, “Security (Interest)”, “Personal Property Securities Act 1999”, “Collateral”, “Decentralised Finance (DeFi)”.*

## *I Introduction*

The world is experiencing a financial revolution.<sup>1</sup> The major disruptor is decentralised finance (DeFi), which uses emerging distributed ledger technology (DLT) — such as blockchain<sup>2</sup> — to eliminate the need for centralised<sup>3</sup> financial institutions and thus trust<sup>4</sup> and reliance in such entities. DeFi challenges the traditional intermediated financial system by “empowering individuals with peer-to-peer digital exchanges”,<sup>5</sup> offering greater accessibility, efficiency, and investment opportunities.<sup>6</sup> Anyone with an internet connection can buy, sell, lend and borrow using software that records and validates transactions in databases which are distributed across the entire network of participants.<sup>7</sup> DeFi has experienced substantial growth over the past few years and, with rapidly increasing adoption by institutional investors, links “with traditional financial institutions are growing.”<sup>8</sup> Its proliferation may also accelerate the ongoing trend toward the “cryptoization” of the global economy.<sup>9</sup>

At the forefront of the DeFi revolution are cryptoassets. The Bank for International Settlements defines cryptoassets as “private digital assets<sup>10</sup> that depend primarily on cryptography and distributed ledger or similar technology.”<sup>11</sup> Familiar cryptoassets include cryptocurrencies such as bitcoin and ether, as well as Non-Fungible Tokens (NFTs). The

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<sup>1</sup> CNBC International “What is DeFi, and could it upend finance as we know it?” (5 September 2022) <[www.youtube.com](http://www.youtube.com)>.

<sup>2</sup> Ethereum.org “Decentralised finance (DeFi)” (8 September 2023) <<https://ethereum.org>>.

<sup>3</sup> Ethereum.org, above n 2.

<sup>4</sup> Mike Bechtel “In us we trust: Decentralized architectures and ecosystems” (6 December 2022) Deloitte Insights <[www2.deloitte.com](http://www2.deloitte.com)>.

<sup>5</sup> Rakesh Sharma “What Is Decentralised Finance and How Does It Work?” (21 September 2022) Investopedia <[www.investopedia.com](http://www.investopedia.com)>.

<sup>6</sup> Ethereum.org, above n 2.

<sup>7</sup> Kaihua Qin, Liyi Zhou, Yaroslav Afonin, Ludovico Lazzaretti, Arthur Gervais “CeFi vs. DeFi - Comparing Centralized to Decentralized Finance” (16 June 2021) arXiv <[arxiv.org](http://arxiv.org)>.

<sup>8</sup> International Monetary Fund, Monetary and Capital Markets Department “The Rapid Growth of Fintech” *Global Financial Stability Report* (International Monetary Fund, April 2022) at 66.

<sup>9</sup> At 66.

<sup>10</sup> Digital assets are, in turn, defined as “a digital representation in value which can be used for payment or investment purposes or to access a good or service.” See Basel Committee on Banking Supervision, below n 11, at 32.

<sup>11</sup> Basel Committee on Banking Supervision “Prudential treatment of cryptoasset exposures” (Bank for International Settlements, December 2022) at 32.

size of the global cryptocurrency market has grown and fluctuated dramatically, peaking at approximately USD 3 trillion in November 2021, before crashing to and plateauing at around USD 1 trillion since mid-2022.<sup>12</sup> But despite the notable scams, frauds,<sup>13</sup> and crises, and notwithstanding the valid criticism that global uptake of cryptoassets is merely an economic bubble buttressed by speculative investing, cryptoassets are likely here to stay.<sup>14</sup>

As DeFi offerings have become increasingly sophisticated, important legal issues have arisen. One such issue is whether the law is appropriately positioned to recognise and give effect to lending arrangements where cryptoassets are used as collateral. Presently, legal uncertainty poses a substantial risk to market participants, who are for the most part transacting blindly. This risk is exacerbated by two aspects of DeFi. First, DeFi arrangements tend to be highly leveraged, with some platforms allowing traders up to 125 times leverage on some assets.<sup>15</sup> Second, DeFi generally operates under a narrow banking model,<sup>16</sup> with most lending platforms requiring overcollateralisation<sup>17</sup> to mitigate the risk created by price volatility.<sup>18</sup> This is accomplished by setting discount factors<sup>19</sup> for different types of cryptoassets.<sup>20</sup> Therefore, to fund their highly risky trading, participants will borrow cryptoassets and, in return, post a significantly greater value of cryptoassets as collateral. In a market where leverage and collateral are so important, it is crucial that parties have certainty as to the legal nature and enforceability of their arrangements.

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<sup>12</sup> CoinGecko “Global Cryptocurrency Market Cap Charts” (11 September 2023) <[www.coingecko.com](http://www.coingecko.com)>.

<sup>13</sup> Perhaps the most notorious of these was the collapse of FTX in November 2022. See for example Natalie Sherman and Joe Tidy “Crypto giant FTX collapses into bankruptcy” (11 November 2022) BBC <[www.bbc.com](http://www.bbc.com)>.

<sup>14</sup> Campbell Pentney, Zac Kedgley-Foot and Sebastien Aymeric “The Big Picture: Blockchain and Cryptocurrency” (December 2022) Bell Gully <[www.bellgully.com](http://www.bellgully.com)>.

<sup>15</sup> International Monetary Fund, Monetary and Capital Markets Department “The Crypto Ecosystem and Financial Stability Challenges” *Global Financial Stability Report* (International Monetary Fund, October 2021) at 45.

<sup>16</sup> Igor Makarov and Antoinette Schoar “Cryptocurrencies and Decentralised Finance (DeFi)” (BIS Working Papers, No 1061, December 2022) at 3.

<sup>17</sup> Overcollateralisation is the posting of collateral which has a value in excess of the loan amount.

<sup>18</sup> International Monetary Fund, above n 8, at 66.

<sup>19</sup> For example, if the discount factor for a particular cryptoasset is 0.4, borrowers can borrow up to 40% of the value of the collateral (in the form of that cryptoasset) posted.

<sup>20</sup> International Monetary Fund, above n 8, at 75.

In light of the significant global consideration and implementation of law reform in this area, the author explores and analyses how New Zealand’s Personal Property Securities Act 1999 (the PPSA) might apply to DeFi cryptoasset-collateralised lending arrangements, using *Janesh s/o Rajkumar v Unknown Person (“CHEFPIERRE”)* [2022] SGHC 264 (“*Chefpierre*”) as a test case.

The author concludes that, as regards upholding DeFi parties’ intentions by providing due legal recognition to their arrangements, the PPSA is generally preferable to the English (and thus Singaporean) approach to granting and enforcing security. But despite the PPSA being better positioned than English law to accommodate novel cryptoasset collateral arrangements, the challenges posed by cryptoassets still necessitate a degree of legislative reform. The author, therefore, recommends the implementation into the PPSA of two bespoke rules: (i) a new method for the perfection of security interests in cryptoassets and (ii) the granting of super-priority to secured parties who perfect their security interests in cryptoassets by that method.

## *II Cryptoassets as Property*

### *A Personal Property at Common Law*

When parties enter into a secured lending transaction, they want to be certain that the law will give effect to the rights and obligations they intend to create in relation to the purported collateral. For transactions involving cryptoasset collateral to achieve appropriate legal recognition and certainty in New Zealand, they must fall under the scope of the PPSA. This will only be the case if cryptoassets constitute personal property.

Under the PPSA, “personal property” includes “chattel paper, documents of title, goods, intangibles, investment securities, money, and negotiable instruments”.<sup>21</sup> This definition does not identify any essential characteristics of personal property nor illuminate when a

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<sup>21</sup> Section 16.

thing is capable of being personal property.<sup>22</sup> Instead, a thing is first deemed to be personal property at common law and then, for the purposes of the Act, categorised within one of the seven enumerated components of personal property. Therefore, one must turn to the common law to determine whether cryptoassets constitute personal property.

The common law recognises only two categories of personal property: *choses* in possession and *choses* in action.<sup>23</sup> The former category refers to moveable, “tangible things of which physical possession can be taken and rights in relation to which can be asserted by use and enjoyment”.<sup>24</sup> The latter refers to intangible things which have no independent form and exist only insofar as they are recognised by the legal system;<sup>25</sup> rights in such things can only be obtained or enforced by legal action, and not by taking physical possession.<sup>26</sup>

Notwithstanding that rights to cryptoassets can be asserted by use and enjoyment — a person who has knowledge of or access to the relevant private key<sup>27</sup> can spend, transfer, or otherwise use a cryptoasset<sup>28</sup> — they are simply strings of data and thus intangible things that are incapable of being possessed.<sup>29</sup> Cryptoassets are not *choses* in possession.<sup>30</sup>

A quintessential *chose* in action is a bank deposit.<sup>31</sup> Since deposited money is the bank’s and not the customer’s, there is nothing in the bank’s hands which belongs to the customer that the latter can enforce their rights in by taking physical possession.<sup>32</sup> Consequently, a bank deposit is simply a legal claim by the customer (the creditor) against the bank (the

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<sup>22</sup> Linda Widdup *Personal Property Securities Act: Concepts in Practice* (4th ed, LexisNexis, Wellington, 2016) at 75.

<sup>23</sup> *Colonial Bank v Whinney* [1885] 30 Ch D 261 per Fry LJ.

<sup>24</sup> Matteo Solinas “Pushing the Boundaries: A Tentative Taxonomy of Money in New Zealand Private Law” (2021) 52 VUWLR 607 at 617.

<sup>25</sup> Law Commission *Digital Assets: Final report* (Law Com No 412, June 2023) at [3.19].

<sup>26</sup> Solinas, above n 24, at 617.

<sup>27</sup> A private key is an alphanumeric code used in cryptography, similar to a password. Private keys are used to authorise transactions and prove ownership of the relevant cryptoassets. Only those with knowledge of the relevant private key can access the corresponding funds/cryptoassets.

<sup>28</sup> Satoshi Nakamoto “Bitcoin: A Peer-to-Peer Electronic Cash System” (Bitcoin, Whitepaper, 2008) at 1.

<sup>29</sup> Solinas, above n 24, at 617.

<sup>30</sup> At 617.

<sup>31</sup> *Foley v Hill* (1848) 2 HLC 28.

<sup>32</sup> *Foley v Hill*, above n 31.



debtor) for the amount held (the debt).<sup>33</sup> But the “chain of digitised information” that comprises a cryptoasset “is not a legal claim for the payment of money”.<sup>34</sup> Although a participant can view their total cryptocurrency balance by using wallet software, giving the impression that it is similar to a bank account/deposit, at no point in the protocol is a central intermediary involved who records participants’ accounts and validates transfers.<sup>35</sup> Consequently, it is impossible “to identify a person against whom action could be taken to vindicate those proprietary rights. In short, there is no one to take on the role of a debtor” within the network.<sup>36</sup> Thus, cryptoassets “cannot be conceived of as rights or claims in themselves”,<sup>37</sup> they are instead “things to which rights can relate.”<sup>38</sup> Furthermore, unlike the creditor’s right to be repaid by the bank, cryptoassets exist independently of the legal system and “can be used and enjoyed independently of whether any rights or claims in relation to them are enforceable by action.”<sup>39</sup> Cryptoassets — whilst intangible things — are not, in the orthodox, narrow sense, *choses* in action.<sup>40</sup>

Cryptoassets exhibit elements of each but do not fit neatly into either category.<sup>41</sup> Therefore, it is difficult to reconcile their legal nature with the common law’s *chose* in action/*chose* in possession dichotomy. That notwithstanding, the view that cryptoassets are personal property is the consensus amongst legal commentators<sup>42</sup> and one which was endorsed in New Zealand by the High Court in *Ruscoe v Cryptopia Ltd (in liq)*.<sup>43</sup> In *Cryptopia*, the Court did not treat the common law’s categories of personal property as the starting point.<sup>44</sup> Instead, its approach was to first determine if a thing is property; from there, since all personal property necessarily must be either a *chose* in action or a *chose* in possession, that thing is exclusively categorised within the binary.<sup>45</sup> In this way the two recognised

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<sup>33</sup> *Foley v Hill*, above n 31.

<sup>34</sup> Solinas, above n 24, at 617.

<sup>35</sup> Solinas, above n 24, at 617.

<sup>36</sup> At 617.

<sup>37</sup> Law Commission, above n 25, at [3.32].

<sup>38</sup> At [3.52].

<sup>39</sup> At [4.26].

<sup>40</sup> Solinas, above n 24, at 617.

<sup>41</sup> At 616.

<sup>42</sup> At 619.

<sup>43</sup> *Ruscoe v Cryptopia Ltd (in liq)* [2020] NZHC 728.

<sup>44</sup> At [123].

<sup>45</sup> At [124].

categories of personal property were not intended to force a “narrow view of what can be classified as property but rather [to] simply [...] push all examples of property into one of two categories.”<sup>46</sup> To determine whether cryptocurrencies were capable of being property, Glendall J applied<sup>47</sup> Lord Wilberforce’s oft-cited statement of the characteristics of property in *National Provincial Bank v Ainsworth*.<sup>48</sup> His Honour held that cryptocurrencies satisfy the *Ainsworth* criteria in that they are definable, identifiable by third parties, capable in their nature of assumption by third parties, and have some degree of permanence and stability.<sup>49</sup> Having established that cryptocurrencies are property, to accord with the dictum that all personal property must be of one of two kinds, his Honour determined that “the most that could be said is that cryptocurrencies might have to be classified as choses in action”<sup>50</sup> given that they are incapable of being possessed.

This approach, which has been independently recognised and approved in Singapore<sup>51</sup> and England<sup>52</sup>, provides for *choses* in action to be treated as a wide, residual category of things that “captures any object of personal property rights that is not a [*chose*] in possession.”<sup>53</sup> As such, a broader and more flexible conceptualisation of personal property is possible at common law, one which captures cryptoassets.<sup>54</sup>

However, relying on a broader, residual category of *choses* in action to recognise cryptoassets as property is not a universally accepted proposition. The Law Commission of England and Wales recommends an alternative approach: that the law unequivocally recognise that a thing will not be deprived of legal status as personal property merely because it is neither a *chose* in possession nor a (true) *chose* in action.<sup>55</sup> This is accomplished by the creation of a new, third category of personal property.<sup>56</sup> “Third

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<sup>46</sup> At [124].

<sup>47</sup> At [102].

<sup>48</sup> *National Provincial Bank v Ainsworth* [1965] 1 AC 65.

<sup>49</sup> *Cryptopia*, above n 43, at [116].

<sup>50</sup> At [124].

<sup>51</sup> See *B2C2 Ltd v Quoine Pte Ltd* [2019] 4 SLR 17.

<sup>52</sup> See *AA v Persons Unknown* [2019] EWHC 3556 (Comm).

<sup>53</sup> Law Commission, above n 25, at [2.49].

<sup>54</sup> Solinas, above n 24, at 617.

<sup>55</sup> Law Commission, above n 25, at [3.68].

<sup>56</sup> At [3.65].

category things”<sup>57</sup> will explicitly include cryptoassets.<sup>58</sup> The thrust and merits of this approach are not within the scope of this paper.

### *B Categorisation under the PPSA*

Regardless of which approach is preferred, cryptoassets clearly are personal property and thus can be subject to the PPSA when purportedly used as collateral. A further consideration is exactly how the PPSA would apply. As noted above, the Act’s definition of “personal property” is more akin to a description, simply identifying seven categories of collateral which are “defined so that every conceivable type of personal property falls within only one of the categories.”<sup>59</sup> Although the PPSA generally applies uniformly to all personal property, certain provisions only apply, or apply differently, depending on the category of collateral into which the personal property in question falls. Of the prescribed categories, only two — intangibles and money — are potentially applicable to cryptoassets. Notably, these are mutually exclusive categories: if a cryptoasset constitutes “money”, it cannot also be an “intangible”.<sup>60</sup>

“Intangible” refers to “personal property other than chattel paper, a document of title, goods, an investment security, money, or a negotiable instrument”.<sup>61</sup> It is a residual category, meaning that a thing which is personal property, but which does not fall within any of the six other prescribed categories, is an “intangible” for the purposes of the Act.<sup>62</sup> Although this seems rather inclusive, “the other categories are intended to be defined so precisely that only intangible personal property will fall within the intangible category.”<sup>63</sup> All cryptoassets will constitute “intangibles”. The only exception is if certain cryptoassets, specifically cryptocurrencies such as Bitcoin, are instead deemed “money”. “Money” means “currency authorised as a medium of exchange by the law of New Zealand or of any

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<sup>57</sup> As they are termed by the Law Commission of England and Wales. See [2.46].

<sup>58</sup> At [3.68].

<sup>59</sup> Widdup, above n 22, at 81.

<sup>60</sup> Personal Property Securities Act 1999, s 16.

<sup>61</sup> Personal Property Securities Act 1999, s 16.

<sup>62</sup> Widdup, above n 22, at 81.

<sup>63</sup> Widdup, above n 22, at 81.

other country”.<sup>64</sup> Until recently, there was no question as to whether cryptocurrencies constituted money under the PPSA or equivalent overseas legislation. But that is no longer the case: the government of El Salvador authorised Bitcoin as legal tender and thus as a medium of exchange in 2021.<sup>65</sup> On a plain reading it follows that at least Bitcoin is caught by the statutory definition of money<sup>66</sup> and is therefore expressly excluded from constituting an intangible.<sup>67</sup> However, such a reading, absent further statutory interpretation, is incomplete. Under the PPSA, “money” is restricted to tangible, physical legal tender, i.e., notes and coins.<sup>68</sup> This is supported by the fact that other things which could reasonably be considered money in the colloquial sense are instead captured by different categories of collateral. For instance, bank deposits, which are private money and a medium of exchange, are instead captured by a distinct defined term, “account receivable”, a subcategory of “intangible”.<sup>69</sup> Likewise, cheques fall under the definition of “negotiable instrument”, a distinct category of collateral.<sup>70</sup> The definition of “cash proceeds” also distinguishes “money” from “deposit accounts”, “cheques” and “drafts”.<sup>71</sup> Furthermore, the definition of “intangible” expressly excludes “money”, suggesting that “money” is intended to capture only physical/tangible things.<sup>72</sup> Therefore, Bitcoin and other cryptocurrencies will not be categorised as “money”.

It follows that cryptoassets will be subject to the PPSA’s intangible-specific rules in addition to its general provisions. The author recommends that cryptoassets are explicitly included as a defined term in the PPSA — like “account receivable” — so that they are identified as a specific subcategory of the residual “intangible” category of personal property. This would allow for the drafting of rules which apply specifically to cryptoassets

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<sup>64</sup> Personal Property Securities Act 1999, s 16.

<sup>65</sup> Oscar Lopez and Ephrat Livni “In Global First, El Salvador Adopts Bitcoin as Currency” (7 October 2021) The New York Times <[www.nytimes.com](http://www.nytimes.com)>.

<sup>66</sup> Setting aside whether Bitcoin has been adopted truly and in practice as a medium of exchange in El Salvador, regardless of it being so authorised.

<sup>67</sup> Sam Babe, Tamie Dolny and Angela Oh “Virtual Collateral 101: How to Take and Enforce Security Over Cryptocurrencies, Crypto-Assets and Central Bank Digital Currencies” (19 April 2023) Aird Berliss <[www.airdberliss.com](http://www.airdberliss.com)>.

<sup>68</sup> Widdup, above n 22, at 216.

<sup>69</sup> Section 16.

<sup>70</sup> Section 16.

<sup>71</sup> Section 16.

<sup>72</sup> Section 16.

on account of their unique nature, thereby providing for cryptoassets to be treated differently, where necessary, from (other) intangibles.

### *III Chefpierre*

The recent Singaporean case of *Chefpierre* concerned a borrower who would regularly enter into lending arrangements on NFTfi, a peer-to-peer NFT-collateralised cryptocurrency lending platform.<sup>73</sup>

NFTfi lending arrangements are facilitated by smart contracts.<sup>74</sup> NFTfi’s user interface allows parties to negotiate key terms: the quantum, interest rate and duration.<sup>75</sup> If they indicate their mutual agreement on the platform, two transactions are automatically executed.<sup>76</sup> First, the NFT offered as collateral is immobilised and kept in escrow, though without a third party (like NFTfi) acting as custodian or escrow agent.<sup>77</sup> Instead, the NFT is transferred to NFTfi’s “escrow smart contract” — an “automated quasi-escrow agent”.<sup>78</sup> The “de facto owner of the NFT during the duration of the loan is the smart contract. No one (also not the NFTfi team) can access the NFT during that time.”<sup>79</sup> Second, the lender’s funds are transferred into the borrower’s account. The NFT can only be withdrawn upon full repayment of the loan, at which point it is automatically transferred back to the borrower.<sup>80</sup> The smart contract provides the lender with a unilateral “foreclosure” option, exercisable only in the event of default.<sup>81</sup> Upon default, the loan can no longer be repaid, even if the lender has not yet foreclosed.<sup>82</sup> If the lender forecloses, they become the sole

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<sup>73</sup> NFTfi has reportedly facilitated more than 50,000 loans with an aggregate loan volume of approximately USD 480 million. See NFTfi, below n 74.

<sup>74</sup> NFTfi “How NFT lending works” (11 September 2023) <<https://nftfi.com>>. See Part VIII (Appendix) below for the definition of “smart contract”.

<sup>75</sup> Timothy Chan and Kelvin F. K. Low “DeFi Common Sense: Crypto-backed Lending in *Janesh s/o Rajkumar v Unknown Person (‘CHEFPIERRE’)*” (2023) 86(5) MLR 1278 at 1280.

<sup>76</sup> NFTfi, above n 74.

<sup>77</sup> NFTfi “Terms & Conditions” (11 September 2023) <<https://nftfi.com>>.

<sup>78</sup> Chan and Low, above n 75, at 1281.

<sup>79</sup> NFTfi, above n 74.

<sup>80</sup> NFTfi, above n 74.

<sup>81</sup> NFTfi, above n 74.

<sup>82</sup> NFTfi, above n 74.

owner of that NFT<sup>83</sup> and waive their claim for the outstanding amount.<sup>84</sup> These, per NFTfi's Terms & Conditions, are "predefined rules which apply to every loan".<sup>85</sup>

On 19 March 2022, the borrower entered into a loan agreement with a user whom he knew only by the pseudonym "chefpierre.eth" ("Chefpierre") for 150,000 DAI (equivalent at the time to USD 150,000).<sup>86</sup> The borrower offered a particularly rare and valuable NFT as collateral.<sup>87</sup> Because the NFT was immensely precious to him,<sup>88</sup> his loan agreement with Chefpierre contained a number of additional terms which attempted to vary or otherwise set aside the standard terms on which NFTfi invites parties to contract.<sup>89</sup> For instance, at no point was the lender to utilise the foreclosure option within the smart contract without first granting the borrower reasonable opportunities to make full repayment of the loan.<sup>90</sup> And notwithstanding the existence of the option:<sup>91</sup>

at no point would the lender obtain ownership, nor any right to sell or dispose of the Bored Ape NFT. The lender could only, at best, hold on to the Bored Ape NFT, pending repayment of the loan.

The borrower was unable to repay the loan by the due date.<sup>92</sup> After negotiations for an extension of time failed, Chefpierre exercised the "foreclosure" option, transferring the NFT from NFTfi's escrow smart contract into his cryptocurrency wallet.<sup>93</sup>

Notwithstanding that the decentralised nature of blockchain posed difficulties vis-à-vis establishing jurisdiction, Lee Siu Kin J held that there must be a court which had

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<sup>83</sup> NFTfi, above n 74.

<sup>84</sup> Chan and Low, above n 75, at 1280.

<sup>85</sup> NFTfi, above n 77.

<sup>86</sup> Janesh s/o Rajkumar v Unknown Person ("CHEFPIERRE") [2022] SGHC 264 at [17].

<sup>87</sup> At [10].

<sup>88</sup> At [11].

<sup>89</sup> At [11].

<sup>90</sup> At [11].

<sup>91</sup> At [11].

<sup>92</sup> At [20].

<sup>93</sup> At [21].

jurisdiction and could serve as an appropriate forum to hear the dispute.<sup>94</sup> Since the claimant was located in Singapore and carried on his business there, that court was the Singapore court.<sup>95</sup>

The High Court of Singapore then affirmed that a court can grant an injunction against a person unknown so long as that person is sufficiently described.<sup>96</sup> The description of the defendant as (i) the “user behind the account ‘chefpierre.eth’ on Twitter and Discord as of the date of filing of this Application”<sup>97</sup> and (ii) the “person to whom the Bored Ape NFT had been transferred to”<sup>98</sup> was sufficiently certain to identify both those who were included (by it) and those who were not.<sup>99</sup> Thus, the pseudonymous nature of the transaction did not preclude the claimant from seeking relief.<sup>100</sup> Additionally, it was held to be acceptable, given practical limitations, for the claimant to serve court papers on Chefpierre through online chat platforms and the messaging function of the latter’s cryptocurrency wallet.<sup>101</sup>

Because Lee Seiu Kin J dealt with an interlocutory, *ex parte* application for a proprietary injunction, *Chefpierre* does not offer a meaningful discussion of the potential personal property security issues given rise to. Hence, these issues will be discussed first in relation to English law (which is aligned fully with the Singaporean approach). Subsequently, the author will explore how the PPSA would likely apply had the facts arisen in New Zealand.

#### *IV The English Approach*

The English approach to secured credit law can be described as formalistic because it recognises and differentiates between four types of security interests in personal property,

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<sup>94</sup> At [30].

<sup>95</sup> At [30].

<sup>96</sup> At [41].

<sup>97</sup> At [40].

<sup>98</sup> At [40].

<sup>99</sup> At [41].

<sup>100</sup> At [42].

<sup>101</sup> At [91].

the applicability of which depends on the nature of the property in question.<sup>102</sup> Security interests are either possessory — (contractual) liens and pledges — or nonpossessory — (equitable) charges and mortgages. Possessory security interests are applicable only to tangible property; nonpossessory security interests can be created in both tangible and intangible property.<sup>103</sup> Even setting aside the additional terms bargained for *Chefpierre* — which only add to the uncertainty — the arrangement illustrates the difficulties of unequivocally ascertaining and characterising the secured party’s interest under English law.<sup>104</sup> Plainly, the lender’s interest in the collateral cannot be a pledge or a lien because the borrower cannot deliver physical possession of the intangible NFT to the lender.<sup>105</sup> Whilst non-possessory security interests can be theoretically granted in cryptoassets, characterising the lender’s interest in the NFT as either a mortgage or a charge is implausible.<sup>106</sup>

Although the arrangement contained a right of “foreclosure” on the lender’s part and a coded right of redemption on the borrower’s part — features consistent with a mortgage — it is unlikely that the arrangement created a mortgage.<sup>107</sup> A legal mortgage over personal property requires title in the collateral to be transferred to the mortgagee at inception (on the condition that it will be re-transferred on the discharge of the secured obligations).<sup>108</sup> This is inconsistent with standard NFTfi loan agreements, under which legal ownership of an NFT is only transferred upon exercise of the foreclosure option in the event of a debtor’s default.<sup>109</sup> Further:<sup>110</sup>

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<sup>102</sup> Roy Goode and Louise Gullifer (ed) *Goode on Legal Problems of Credit and Security* (5th ed, Sweet & Maxwell, United Kingdom, 2013) at 5.

<sup>103</sup> At 6.

<sup>104</sup> Chan and Low, above n 75, at 1289.

<sup>105</sup> Goode and Gullifer, above n 102, at 6.

<sup>106</sup> Chan and Low, above n 75, at 1290.

<sup>107</sup> At 1289.

<sup>108</sup> Thomson Reuters “Glossary: Mortgage” (11 September 2023)

<<https://uk.practicallaw.thomsonreuters.com>>.

<sup>109</sup> NFTfi, above n 74.

<sup>110</sup> Chan and Low, above n 75, at 1289.



insofar as the code purports to grant the lender the option of foreclosing as a self-help remedy, this is fundamentally incompatible with the principle that foreclosure must always be an act of the court.

That being said, the smart contract's "foreclosure" option appears to be consistent with the legal power to foreclose vested in a mortgagee, since its exercise extinguishes the borrower's proprietary interest in the NFT and imposes no obligation on the lender to account to the borrower for any surplus value.<sup>111</sup>

The lender's interest is unlikely to constitute a charge because foreclosure is unavailable to chargees.<sup>112</sup> Furthermore, the existence of a charge is inconsistent with the notion that the lender, upon foreclosure, becomes owner of the NFT. A charge only allows the chargee, upon default, to have the collateral and its proceeds of sale appropriated to the discharge of the debt in question;<sup>113</sup> it does not vest in the chargee the right to own or possess the collateral.<sup>114</sup> But when a lender enforces their rights via the "foreclosure" option, they are not obligated to sell the NFT and instead can retain it as their property. In any case, the fact that enforcing a charge necessarily involves selling the collateral<sup>115</sup> raises practical difficulties in a market where price volatility and uncertain liquidity "may render the sale of collateral difficult or ineffective as a mechanism for realising its full market value."<sup>116</sup> Therefore, even if it can be validly granted/created, a charge is not particularly suitable in relation to cryptoassets.

The limitations of the English (Singaporean) model are readily apparent: whilst participants of NFTfi and similar platforms clearly intend to create legal rights and obligations commensurate with security being taken in the cryptoassets offered as collateral, it is

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<sup>111</sup> At 1289.

<sup>112</sup> At 1290.

<sup>113</sup> Goode and Gullifer, above n 102, at 37.

<sup>114</sup> Thomson Reuters "Glossary: Charge" (11 September 2023)

<<https://uk.practicallaw.thomsonreuters.com>>.

<sup>115</sup> Law Commission *Digital Assets: Consultation paper* (Law Com No 256, July 2022) at [18.22].

<sup>116</sup> At [18.14].

unclear what security interest is created.<sup>117</sup> In particular, the requirements pertaining to the creation of nonpossessory security interests and the rules governing their enforcement are granular and formalistic — perhaps to the extent that such security interests are either inapplicable because of how cryptoasset collateral arrangements are commonly structured, or practically unsuitable because of the novel qualities of cryptoassets and the cryptoasset market.

A more suitable approach is one sufficiently broad and flexible to circumvent the challenges created by legal granularity and formalism. The author posits that the PPSA — if amended to integrate bespoke principles which can address the idiosyncratic features of cryptoassets — would provide a superior framework.

## *V The PPSA*

The structural and functional basis of the PPSA is founded on Canadian legislation, which is itself modelled on Article 9 of the American Uniform Commercial Code.<sup>118</sup> The PPSA was birthed from calls for reform in the late 20<sup>th</sup> century, with the most important initiatives coming from the New Zealand Law Commission in 1988 and 1989.<sup>119</sup> New Zealand's secured credit law at the time, which shared many similarities with present-day English law, was considered to be in an unsatisfactory state, being overly complex, incongruent and inaccessible.<sup>120</sup> In response, the PPSA offered a substance-over-form approach which sought to ensure that the law applied consistently to all transactions that were functionally equivalent and essentially served the same purpose.<sup>121</sup>

### *A Creation*

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<sup>117</sup> Chan and Low, above n 75, at 1289.

<sup>118</sup> Richard North "The New Zealand Personal Property Securities Act: growing pains" (2005) 11 *CantaLR* 123.

<sup>119</sup> Anthony Duggan and Michael Gedye "Personal Property Security Law Reform in Australia and New Zealand: The Impetus for Change" (2009) 27 *Penn St. L. Rev.* 655 at 659.

<sup>120</sup> Widdup, above n 22, at 1.

<sup>121</sup> At 1.

Unlike English law, the PPSA does not recognize nor provide for different security interests;<sup>122</sup> its statutory “security interest” is a broad, catchall concept which can be granted in all personal property, including intangibles.<sup>123</sup> A security interest is created without regard to the form of the transaction<sup>124</sup> which creates or provides for the interest and the identity of the person who has title to the collateral.<sup>125</sup>

Subject to the limited exceptions in s 23, an interest constitutes a “security interest” under the PPSA if:

- (i) it falls within the general definition of “security interest” under s 17(1)(a) as an “interest in personal property created or provided for by a transaction that in substance secures payment or performance of an obligation”; or
- (ii) it is a deemed security interest — an interest identified in s 17(1)(b) — even if it doesn’t fall within the above definition.

An interest in cryptoasset collateral will not be a deemed security interest; if a security interest in cryptoassets exists, it will be by virtue of s 17(1)(a).

In *Chefpierre*, the lender’s interest in the NFT was created by a transaction that in substance secured payment by the borrower of the loan amount. But it will only be a security interest for the purposes of s 17(1)(a) if “it reveals that the debtor encumbered the property by granting real rights in it to the creditor.”<sup>126</sup> To ascertain whether the parties intended to create “real” rights in the borrower’s asset(s) in favour of the lender, the court will look to the language they used when creating their contractual relationship.<sup>127</sup>

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<sup>122</sup> At 5. However, there are some exceptions to this general rule. The PPSA applies to the various security interests that can be created at common law, e.g., charges, mortgages, and pledges, all of which are treated as statutory security interests. See s 17(3). The PPSA also recognises common law liens (to a limited degree) and s 93 provides that a common law lien has priority over a statutory security interest in certain circumstances.

<sup>123</sup> At 6.

<sup>124</sup> Personal Property Securities Act, s 17(1)(a)(i).

<sup>125</sup> Personal Property Securities Act, s 17(1)(a)(ii).

<sup>126</sup> Widdup, above n 22, at 20.

<sup>127</sup> At 20.

Whilst the arrangement certainly encumbered the borrower's rights in the NFT by restricting his ability to deal with, i.e., control, it as if he were absolute owner, it is unclear whether any "real" rights in the NFT were intended to be granted to Chefpierre. Notwithstanding that after foreclosure the NFT would be stored in Chefpierre's cryptocurrency wallet, the additional terms provide that the only right in the NFT he gained — even after default — was merely the right to hold it for an indeterminate period until full repayment of the loan was effected. This suggests that Chefpierre could not look to the NFT to satisfy the borrower's obligation. In that case, he is unlikely to have gained proprietary rights in the collateral and characterising Chefpierre's interest as a PPSA security interest is an uncertain proposition. However, the additional terms directly contradict the standard, predefined terms on which NFTfi invites parties to contract. It is unclear whether the additional terms are effective, that is if they successfully vary or invalidate the rights and obligations in relation to the collateral contemplated by boilerplate NFTfi lending arrangements.

Setting aside then the additional terms, what rights are granted to the lender? Plainly, the borrower encumbered the collateral by granting the lender the right to take control of, i.e., transfer to his cryptocurrency wallet, the NFT in the event of default. At this point, the lender gained "real", proprietary rights in the collateral and was entitled to look to it to satisfy the borrower's obligation — he could sell or keep it as he pleased. But there is an important caveat: a PPSA security interest is a mere encumbrance on the property and does not transfer any ownership interest to the secured party.<sup>128</sup> So, does the notion of the lender acquiring ownership of the NFT upon foreclosure<sup>129</sup> invalidate the existence of a security interest? The author suggests not. NFTfi lending arrangements do not transfer an ownership "interest" in the NFT to the lender for the period of the loan; they instead provide for ownership of the NFT to be transferred to the lender following default, at which point the loan period has expired. In other words, "foreclosure" is simply how a lender enforces their security interest in an NFT. Its effect, therefore, is better understood as the result of a security interest being enforced. And the transfer of ownership of collateral from a

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<sup>128</sup> At 7.

<sup>129</sup> As per NFTfi's standard, "predefined" terms.

borrower to a secured party is a result consistent with the valid enforcement of a PPSA security interest.

Therefore, notwithstanding whether the particular transaction in *Chefpierre* creates a security interest, there are no difficulties in categorising a lender's interest which is created by a standard NFTfi transaction as falling within s 17(1)(a) and so constituting a statutory "security interest".

The lender in a boilerplate NFTfi arrangement can be more confident that the arrangement gives rise to a PPSA security interest in their favour than whether it creates a valid mortgage or charge under English law. Indeed, all cryptoasset-collateralised lending arrangements, regardless of their form, are likely caught under s 17(1)(a) and thus subject to the PPSA. The PPSA's comparative lack of granularity and formalism means it is better suited than English law to recognise security interests in cryptoassets and consequently give legal effect to the rights and obligations DeFi parties intend to create.

### *B Enforcement*

In contrast to English law, where the manner of enforcement available to secured parties depends on the (type of) security interest created,<sup>130</sup> enforcing a PPSA security interest is comparatively more straightforward.

Secured parties must comply with Part 9 of the PPSA except to the extent that the enforcement provisions have been contracted out of by the parties under s 107.<sup>131</sup> Once a debtor has defaulted a secured party generally has the option of either selling the collateral or retaining it. If there are multiple secured parties any one of them, no matter its priority, can seize and sell the collateral.<sup>132</sup> If a secured party opts to sell the seized collateral, it must provide notice to the debtor and any higher-priority secured parties.<sup>133</sup> A court may

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<sup>130</sup> Refer to the earlier discussion about the enforcement of charges under English law.

<sup>131</sup> Widdup, above n 22, at 463.

<sup>132</sup> Personal Property Securities Act, s 109.

<sup>133</sup> Personal Property Securities Act, s 114(1).

make an order directing the manner in which any notice is to be given or dispensing with the giving of the notice.<sup>134</sup> New Zealand courts — like the High Court of Singapore in *Chefpierre* — may consider notice by way of digital messaging platforms to be satisfactory given the pseudonymous nature of cryptoasset transactions. The sale extinguishes all security interests in the collateral.<sup>135</sup> The sale amount goes to the secured parties in order of priority up to the amount they are owed. Any surplus amount goes to the debtor.<sup>136</sup> An alternative to selling the collateral is to retain it.<sup>137</sup> Retention transfers ownership of the collateral to the secured party and all security interests in it are extinguished.<sup>138</sup> However, this option is only available to the party with the highest-ranking security interest and in the absence of objection by another secured party.<sup>139</sup>

In *Chefpierre*, the lender was the only secured party and, by default, the highest-priority secured party. Therefore, how he enforced his security interest — whether by selling or retaining the NFT — would be at his discretion. For instance, if he was unlikely to realise the full market value of the NFT at the time of default, he could opt to retain/hold it in wait for more favourable conditions. For reasons already discussed, such flexibility is practically advantageous as regards cryptoassets. But supposing there was another secured party who had a higher-ranking security interest in the collateral, *Chefpierre* would be unable to retain the NFT. This outcome undermines the practical benefits of enforcement under the PPSA. However, implementation of the law reform recommended by the author<sup>140</sup> would result in secured parties in *Chefpierre*'s position always having — assuming all perfection requirements are satisfied — the highest-ranking security interest in the cryptoasset collateral and thus the option to retain it upon default.

### *C Attachment*

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<sup>134</sup> Personal Property Securities Act, s 186.

<sup>135</sup> Personal Property Securities Act, s 115.

<sup>136</sup> Personal Property Securities Act, ss 116A and 117.

<sup>137</sup> Personal Property Securities Act, s 120.

<sup>138</sup> Personal Property Securities Act, s 123.

<sup>139</sup> Personal Property Securities Act, ss 120, 121 and 122.

<sup>140</sup> The author's recommendations as to law reform are discussed in Part VI (Law Reform).

For a security interest to become effective and legally enforceable, it must attach to the collateral.<sup>141</sup> Attachment is also a prerequisite for the perfection of a security interest.<sup>142</sup> The following analysis assumes that *Chefpierre*'s interest in the NFT constitutes a PPSA security interest.

The PPSA provides for two levels of attachment.<sup>143</sup> With respect to enforcing a security interest against a party to the security agreement (such as the borrower/debtor), there are two requirements for valid attachment: value is given by the secured party and the debtor has rights in the collateral.<sup>144</sup> With respect to enforcing a security interest against a third party, such as a competing secured creditor, for valid attachment the two aforementioned requirements, as well as the requirements specified in s 36, must be satisfied.<sup>145</sup> Since *Chefpierre*'s security interest would be enforced against only the borrower, only the two threshold requirements are applicable. Both are satisfied: *Chefpierre* gave value for the collateral in the form of the cryptocurrency lent to the borrower, and the borrower, who owned the NFT, had rights in the collateral. *Chefpierre*'s security interest attached to the NFT.

Although there were no competing secured creditors, it is worthwhile determining whether s 36 is complied with. Section 36 is satisfied either if the collateral is in the possession of the secured party or if a security agreement containing an adequate description of the collateral is signed by or otherwise assented to by the debtor.<sup>146</sup> Because one cannot "possess" intangible cryptoassets the section cannot be satisfied by the former method.<sup>147</sup> In any case, s 36 is more usually satisfied by means of a security agreement.<sup>148</sup> In *Chefpierre*, the loan agreement assented to by the debtor described the collateral as a particular Bored Ape Yacht Club NFT with the ID #2162.<sup>149</sup> Since each NFT ID is unique

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<sup>141</sup> Widdup, above n 22, at 115.

<sup>142</sup> Personal Property Securities Act, s 41(1)(a).

<sup>143</sup> Section 40.

<sup>144</sup> Section 40(1).

<sup>145</sup> Section 40(1).

<sup>146</sup> Section 36.

<sup>147</sup> This is subject to s 18 of the PPSA, which provides for an extended definition of "possession" in certain cases, including in relation to intangible investment securities. Section 18 is discussed below in Part D.

<sup>148</sup> Widdup, above n 22, at 126.

<sup>149</sup> *Chefpierre*, above n 86, at [2].

to a specific non-fungible token,<sup>150</sup> this description allows the NFT used as collateral to be identified and is thus an “adequate description”.<sup>151</sup> Section 36 is satisfied.

#### *D Perfection*

Perfection refers to steps required by statute to give publicity<sup>152</sup> to security interests and thus minimise the risk of:<sup>153</sup>

third-party transacting decisions and claims being undermined by an ‘invisibility of security interests’, and of the value realisable by third parties being compromised by the existence of undisclosed priority security interests.

A common statutory formality requirement to achieve perfection is registration. A PPSA security interest is perfected when a financing statement in relation to that collateral is registered on the Personal Properties Securities Register,<sup>154</sup> a publicly available online database.<sup>155</sup>

In relation to cryptoasset collateral, perfection by registration creates difficulties. First, registration imposes an additional cost and administrative burden<sup>156</sup> on parties. This runs counter to the intention behind and appeal of DeFi arrangements, which are designed to be more expedient and accessible than the traditional financial system.<sup>157</sup> Another core tenet of DeFi is that it purports to be “trustless”.<sup>158</sup> Of course, that is not entirely true — participants must still trust the protocol and each other — but, in principle, it means that participants are able to transact only on the faith of the immutable blockchain. This is

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<sup>150</sup> Jolene Creighton “NFTs Explained: A Must-Read Guide to Everything Non-Fungible” (12 January 2023) nft now < <https://nftnow.com>>.

<sup>151</sup> Personal Property Securities Act, s 36(1)(b)(i).

<sup>152</sup> Louise Gullifer “What should we do about financial collateral?” (2012) 65 Current Legal Problems 377 at 386.

<sup>153</sup> Law Commission, above n 115, at [18.99].

<sup>154</sup> Personal Property Securities Act, s 41(1)(b)(i).

<sup>155</sup> Personal Property Securities Register “What is the PPSR?” (11 September 2023) <<https://ppsr.companiesoffice.govt.nz>>.

<sup>156</sup> Law Commission, above n 25, at [8.49].

<sup>157</sup> Ethereum.org, above n 2.

<sup>158</sup> Mike Bechtel, above n 4.



difficult to reconcile with requiring participants to register, check and otherwise rely on an external register maintained by a third party who exists offchain.<sup>159</sup> Moreover, relying on an external register to determine priority and thus the available method(s) of enforceability, as well the order of distribution in the case of a sale, will lead to slower enforcement of security interests.<sup>160</sup> This is disadvantageous in the context of cryptoasset markets, where, for reasons already discussed, time is often of the essence when a debtor has defaulted. Additionally, since the built-in pseudonymity is one of the attractions of cryptoassets, maintaining it is generally considerably important to DeFi participants.<sup>161</sup> But registration requires public disclosure of parties' personal information; for example, to register a financing statement on the PPSR where the debtor is an individual, the secured party must provide the debtor's name, date of birth and address.<sup>162</sup> Requiring the secured party to have knowledge of the debtor's personal information is also difficult to square with the widespread preference for pseudonymity<sup>163</sup> of DeFi participants.

Second, DeFi arrangements are intrinsically global and decentralised – on which jurisdiction's register must financing statements be registered? The likely answer is the jurisdiction in which the collateral is situated, which in the case of cryptoassets — seeing as they are intangibles and have no physical location — refers to the jurisdiction where the debtor is located.<sup>164</sup> But because of the pseudonymous nature of DeFi arrangements it is practically impossible for system participants to ascertain where a person is situated and thus the jurisdiction in which a possible security interest in the relevant cryptoassets has been registered. Although these challenges can be circumvented by creating a borderless cryptoasset-specific register, there is no centralised entity within a permissionless<sup>165</sup> blockchain upon whom the obligation of maintaining a register could be imposed.

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<sup>159</sup> “Offchain” means external to the distributed ledger/blockchain system in which the cryptoasset exists. See Law Commission, above n 25, at xii.

<sup>160</sup> Law Commission, above n 25, at [8.49].

<sup>161</sup> Cryptopedia Staff “Anonymity vs. Pseudonymity In Crypto” (18 May 2021) Cryptopedia <[www.gemini.com](http://www.gemini.com)>.

<sup>162</sup> Personal Property Securities Act, s 142(1).

<sup>163</sup> Kelvin F. K. Low and Ernie G. S. Teo “Bitcoins and other cryptocurrencies as property?” (2017) 9 *Law, Innovation and Technology* 235 at 238.

<sup>164</sup> Personal Property Securities Act, s 30(a).

<sup>165</sup> Permissionless blockchains are open for anyone to join and use and typically have the potential to be highly transparent and decentralised. This is to be contrasted with permissioned blockchains, which require

Under the PPSA, a third party who acquires property that is subject to a registered security interest and then suffers loss because of the enforcement of the security interest, cannot claim as a defence — subject to limited exceptions<sup>166</sup> — that it lacked actual knowledge of the security interest.<sup>167</sup> This model is effective when it is clear what the relevant register is, since searching that register is an imperative element of due diligence. However, when the relevant register could be any one of the many global personal property registers, it is commercially unacceptable to, in effect, require persons to investigate each. Therefore, in the context of cryptoassets, registration fails to offer sufficient protection to third parties.<sup>168</sup>

It follows that, in respect of cryptoasset-collateralised lending arrangements, for statutory perfection requirements to achieve their intended aim, they must offer a method other than registration.

The PPSA also provides that a secured party can perfect its security interest by taking possession of the collateral.<sup>169</sup> Although this method of perfection is *prima facie* inapplicable to intangibles, the PPSA allows for a broader meaning of possession in certain cases — including in relation to intangible investment securities.<sup>170</sup> Section 18 extends the definition of “possession” beyond its ordinary meaning of physical possession of a tangible thing. Consequently, the section expands the scope of how perfection by taking “possession” can be achieved.<sup>171</sup>

## *VI Law Reform*

### *A Perfection by Control*

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invitations to join and use and within which power is typically controlled by a central entity or small group of validators chosen by the owner of the blockchain.

<sup>166</sup> That is, for the most part the PPSA’s priority rules operate regardless of a person’s knowledge.

<sup>167</sup> Widdup, above n 22, at 161.

<sup>168</sup> Law Commission, above n 25, at [8.30].

<sup>169</sup> Section 41(1)(b)(ii).

<sup>170</sup> Section 18.

<sup>171</sup> Widdup, above n 22, at 138.

As regards law reform, there are broadly two options. Section 18 can be amended to allow “possession” of cryptoassets to be taken where certain requirements are satisfied, for example, if they are in a person’s control. This would enable perfection by possession to apply to cryptoassets and so introduce a different means (albeit one that is functionally and statutorily equivalent to taking “possession”) by which to perfect security interests in cryptoassets. However, such an approach is unnecessarily complex and risks making the legislation unclear and inaccessible. Alternatively, a new third method of perfection, circumscribed to apply only to cryptoassets (as a defined term and subset of intangibles), can be introduced into the PPSA. The author recommends this approach because it is more conducive to drafting coherent, understandable rules and principles regarding cryptoassets.

Perfection by control is a viable alternative because it is the intangible analogue to perfection by taking possession of a tangible thing.<sup>172</sup> Further, control is an appropriate way to give publicity to security interests in cryptoassets because the presence or absence of control is a defining, observable feature of collateral arrangements.<sup>173</sup> If a cryptoasset is controlled by a party other than its apparent owner, this sends a clear, sufficiently public signal to likely third parties (i.e., other participants in the system) as to the possible existence of a security interest in the cryptoasset.<sup>174</sup> Additionally, unlike registration, control-based perfection neither relies on external intermediaries nor imposes an administrative burden and additional costs upon participants. However, difficulties arise because “control” can be conceptualised in various ways, and it is unclear what would, and should, constitute “control” for the purposes of perfecting a security interest in cryptoassets.<sup>175</sup>

### *1 The FCARs*

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<sup>172</sup> Xavier Focroulle Ménard, Andrew James Lom and Rachael Browndorf “Bringing the UCC into the digital age: Review of the 2022 UCC amendments and controllable electronic records” (1 November 2022) Norton Rose Fulbright <[www.nortonrosefulbright.com](http://www.nortonrosefulbright.com)>.

<sup>173</sup> Ménard, Lom and Browndorf, above n 172.

<sup>174</sup> Law Commission, above n 25, at [8.116].

<sup>175</sup> At [8.93].

Under the United Kingdom’s Financial Collateral Arrangements (No 2) Regulations 2003 (the FCARs), perfection is achieved by the secured party taking “possession or control” of the financial collateral.<sup>176</sup> “Possession” for the purposes of the FCARs is different to the common law concept of possession in that it is a “composite factual and legal construct”.<sup>177</sup> “Control” similarly comprises a legal element.<sup>178</sup> This legal component is at the crux of determining whether financial collateral is in a person’s “control”.<sup>179</sup>

Although what is meant by “control” under the FCARs is not entirely settled, it likely refers to legal negative control<sup>180</sup> (the legally enforceable right to prevent the taking or disposing of the collateral) possibly in combination with some form of factual<sup>181</sup> control.<sup>182</sup> There is considerable uncertainty as to whether this conceptualisation can be satisfactorily applied to the various, complex control configurations present in cryptoasset collateral arrangements.<sup>183</sup> For instance, in many arrangements — including that in *Chefpierre* — for the duration of the loan the cryptoasset will not be practically controllable by either the borrower or the lender, instead being subject solely to the operation of a “deterministic holding arrangement”, such as an escrow smart contract.<sup>184</sup> Whilst *Chefpierre* had legal positive control (the legally enforceable right to take the NFT in the event of the debtor’s default), it is uncertain, in view of both NFTfi’s standard terms and the additional terms, if he had legal negative control. Moreover, *Chefpierre* only gained factual control following default upon exercising the foreclosure option. For the duration of the loan, the NFT was practically controlled by the escrow smart contract.<sup>185</sup> Indeed, the only point at which lenders in these “deterministic” escrow arrangements have practical control is after the expiry of the loan period, and the gaining of such control is conditional upon a repayment

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<sup>176</sup> Regulation 3(1).

<sup>177</sup> Law Commission, above n 25, at [8.94].

<sup>178</sup> At [8.97].

<sup>179</sup> At [8.94].

<sup>180</sup> At [8.93].

<sup>181</sup> Factual control is the practical ability to exercise positive and/or negative control. See [8.93].

<sup>182</sup> At [8.94].

<sup>183</sup> At [8.97].

<sup>184</sup> At [8.96].

<sup>185</sup> This is because the holding arrangement is deterministic. Since the underlying escrow smart contract is coded to automatically execute a given set of instructions upon fulfilment of predetermined conditions, neither the lender nor the borrower has the practical power to effect outcomes other than those that are programmed to occur.

default. It also cannot be argued, since NFTfi itself was not a custodian, that another person or entity had practical control of the NFT on the lender's behalf.<sup>186</sup>

Therefore, the FCARs' concept of "control" is unlikely to be an adequate, appropriate basis on which to build a perfection rule for cryptoassets.<sup>187</sup>

## 2 *The UCC*

A distinct conceptualisation of control is provided by the recently proposed amendments to the American Uniform Commercial Code (the UCC).<sup>188</sup>

The 2022 amendments<sup>189</sup> introduce a new article — Article 12 — which recognises a new class of assets called controllable electronic records (CERs). A CER is a "record stored in an electronic medium that can be subjected to control."<sup>190</sup> This definition is intended to capture, *inter alia*, all cryptoassets generally.<sup>191</sup> The amendments also modify the existing Article 9 to clarify the perfection and priority of security interests in CERs.<sup>192</sup> The amended Article 9 provides that security interests in CERs can be perfected by control.<sup>193</sup> A person has "control" if they have:<sup>194</sup>

- (i) The power to "avail [themselves] of substantially all the benefit from the [CER]";<sup>195</sup>
- (ii) The exclusive power to "prevent others from availing themselves of substantially all the benefit from the [CER]";<sup>196</sup> and

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<sup>186</sup> NFTfi, above n 74.

<sup>187</sup> Law Commission, above n 25, at [8.97].

<sup>188</sup> Uniform Law Commission and the American Law Institute *Uniform Commercial Code Amendments (2022)* (Uniform Law Commission, 1 June 2023).

<sup>189</sup> The amendments, adopted by the Uniform Law Commission in July 2022 as a model law, must be enacted by each individual state to be effective in such state.

<sup>190</sup> UCC, § 12-102(1).

<sup>191</sup> Ménard, Lom and Browndorf, above n 172.

<sup>192</sup> Ménard, Lom and Browndorf, above n 172.

<sup>193</sup> UCC, § 9-314.

<sup>194</sup> Fulfilment of conditions (i) and (ii) below creates a rebuttable presumption of control absent evidence of the contrary. See UCC, § 12-105(d).

<sup>195</sup> UCC, § 12-105.

<sup>196</sup> UCC, § 12-105.

- (iii) The exclusive power to “transfer control of the [CER] to another person or cause another person to obtain control of another [CER] as a result of the transfer”.<sup>197</sup>

Additionally, a person must be able and willing to readily identify themselves to third parties as the person having these powers.<sup>198</sup> Identification can be made other than by name, such as by account number or cryptographic key.<sup>199</sup>

The Article 12 concept of “control” is best understood as “the functional analogue of possession of tangible personal property”.<sup>200</sup> The common law concept of possession is a factual matter.<sup>201</sup> It follows that, unlike the FCARs, the UCC defines “control” solely by reference to factual, not legal, control. Even so, as discussed above, requiring secured parties to have practical control of the cryptoasset collateral creates difficulties in practice. However, in contrast to the FCARs, “control” under Article 12 is a bespoke concept applicable only to CERs.<sup>202</sup> As such, the requirements of “control” are, by design, flexible enough to accommodate the control configurations utilised in most cryptoasset collateral arrangements. For instance, the exclusivity requirement (and thus “control”) will be satisfied even where the aforementioned powers are shared among multiple people.<sup>203</sup> A person can also obtain an exclusive power (and thus “control” of the collateral) through another person.<sup>204</sup> These principles permit a secured party to take control of a CER held with a third-party custodian.<sup>205</sup> Most crucially, UCC § 12-105(b)(1) directly contemplates collateral arrangements involving smart contracts, and permits control to be taken by a secured party where:

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<sup>197</sup> UCC, § 12-105.

<sup>198</sup> UCC, § 12-105(a)(2).

<sup>199</sup> UCC, § 12-105(a)(2).

<sup>200</sup> Uniform Law Commission and the American Law Institute, above n 188, at 230.

<sup>201</sup> Law Commission, above n 25, at [5.8].

<sup>202</sup> UCC, § 12-105.

<sup>203</sup> UCC, § 12-105(b)(2).

<sup>204</sup> UCC, § 12-105(e).

<sup>205</sup> Ryan Laity and Donald G. Bird “UCC Article 12 - A sensible framework for secured transactions involving cryptocurrencies or other digital assets” (15 December 2022) BLG <[www.blg.com](http://www.blg.com)>.

a system in which the electronic record is recorded [...] has a protocol programmed to cause a change, including a transfer or loss of control or a modification of benefits afforded by the electronic record.

Conceptually, a lender can take “control” of cryptoasset collateral despite it being subject to the practical control of a “deterministic holding arrangement”,<sup>206</sup> such as an escrow smart contract.<sup>207</sup> It follows that, under the Article 12 model, Chefpierre could have perfected his security interest in the borrower’s NFT by taking “control” of the NFT when it was transferred into NFTfi’s escrow smart contract.

### *B Perfection by Provision*

Another alternative, a method of perfection based on “provision”, is proposed by the Financial Law Committee of the City of London Law Society (the CLLS-FLC).<sup>208</sup> The proposal aims to address extensive criticism of the “uncertainties, practical challenges and limitations arising from the interpretation of the current “possession or control” test under the FCARs.”<sup>209</sup> The notion of “provision”, which refers to the collateral having been “provided to”<sup>210</sup> the collateral taker, stems from the perfection requirement under the European Union’s Financial Collateral Directive<sup>211</sup> (which Directive was generally implemented into United Kingdom law by the FCARs).<sup>212</sup> It is a broader, more flexible concept of which factual control is only a constituent element;<sup>213</sup> for example, rights of withdrawal or substitution in favour of the borrower do not compromise the satisfactory provision of the collateral to the lender, notwithstanding any impact these rights may have on the lender’s “control” over the collateral.<sup>214</sup>

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<sup>206</sup> Law Commission, above n 25, at [8.96].

<sup>207</sup> Laity and Bird, above n 205.

<sup>208</sup> Financial Law Committee of the City of London Law Society “Financial Collateral: A Proposal For its ‘Provision’” (4 November 2022) at [8].

<sup>209</sup> Law Commission, above n 25, at [8.124].

<sup>210</sup> At [8.134].

<sup>211</sup> European Union Financial Collateral Directive 2002/47/EC, art 2(2).

<sup>212</sup> Financial Law Committee of the City of London Law Society, above n 208, at [6].

<sup>213</sup> Law Commission, above n 25, at [8.116].

<sup>214</sup> At [8.118].

The CLLS-FLC’s proposal is framed by reference only to financial collateral and the FCARs.<sup>215</sup> As such, it does not deal with the specific issues posed by cryptoassets and cryptoasset collateral arrangements.<sup>216</sup> Nevertheless, “provision” is a utile concept because it is sufficiently flexible to respond to a “diverse range of collateral holding arrangements and management techniques” for cryptoassets.<sup>217</sup> Whilst the starting point and overall framing of the method of perfection would be shared with the approach under the Directive,<sup>218</sup> its substantive content — including the meaning and parameters of the constituent concept of control — would be bespoke and formulated specifically to accommodate cryptoasset collateral.<sup>219</sup>

The author expresses no opinion as to whether a “provision”-based or a “control”-based method of perfection is most suitable. Evidently, reform to the PPSA is necessary, but the choice of which framework to use is one best made through a more exhaustive multidisciplinary process combining technological and legal experts.

### *C Priority*

Under the PPSA’s general priority rules,<sup>220</sup> which apply to security interests in intangibles, it is possible for a party outside of an NFTfi-esque lending arrangement to have a higher-ranking security interest than a lender who has perfected<sup>221</sup> their security interest in a cryptoasset by taking “control” of or having been “provided” it. But the notion that any party other than the lender in such arrangements would have priority to the cryptoasset collateral is contrary to the reasonable commercial expectations of both the lender and DeFi market participants at large.<sup>222</sup>

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<sup>215</sup> At [8.140].

<sup>216</sup> At [8.125].

<sup>217</sup> At [8.134].

<sup>218</sup> At [8.121].

<sup>219</sup> At [8.121].

<sup>220</sup> Section 66.

<sup>221</sup> Assuming a new means of perfection is implemented.

<sup>222</sup> Joseph Cioffi, Adam Levy and Christine DeVito “Perfecting digital assets: There's no control without power” (20 May 2023) Reuters <[www.reuters.com](http://www.reuters.com)>.



To illustrate the difficulties caused by the PPSA's current priority rules, consider the following hypothetical. Suppose a bank has a registered security interest in person A's present and after-acquired property. Person A later enters into an NFTfi lending arrangement with person B and offers an NFT as collateral. B then perfects his security interest in the NFT by taking "control"<sup>223</sup> of it. Under the s 66 rules, the bank's prior-perfected security interest, which encompasses the NFT, has priority over B's security interest in the NFT. But since the registration of security interests is not a feature of cryptoasset-collateralised lending arrangements that is necessarily observable by system participants, registration fails to sufficiently publicise and indicate to likely third parties the possible existence of security interests in the cryptoasset in question. Therefore, not only is it extremely unlikely that B had actual notice of the bank's security interest at the time he agreed to take the NFT as collateral, but more crucially, it would be practically impossible for B to become aware of the bank's security interest and so look to protect his commercial interests. B's decision to lend to A and his interest in the NFT both being undermined by a largely "invisible"<sup>224</sup> security interest is an unfair outcome and one that undermines B's legitimate expectation that he can look to the NFT in the event of A's default.<sup>225</sup> Such an outcome would also seriously inhibit the granting of security interests and thus impede the flow of credit in DeFi markets.<sup>226</sup> Therefore, law reform is necessary for both principled and practical reasons.

Since it is a defining, observable feature of collateral arrangements, a more suitable priority regime would look to utilise "control" (or "provision") as a means to perfect a first-rank security interest in cryptoassets. Such is the approach adopted by the 2022 amendments to the UCC. Per Article 12, whilst security interests in a CER can still be perfected by registration,<sup>227</sup> security interests in a CER perfected by control will have priority.<sup>228</sup> In other words, a security interest in cryptoassets perfected by control will

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<sup>223</sup> As defined in Article 12 of the UCC.

<sup>224</sup> Law Commission, above n 115, at [18.99].

<sup>225</sup> Notwithstanding that A's use of the NFT as collateral in his agreement with B would (likely) constitute a breach of his security agreement with the bank. But of course, the bank can look to protect its commercial interests by taking "control" of the NFT and thus receiving super-priority.

<sup>226</sup> Law Commission, above n 25, at [8.30].

<sup>227</sup> UCC, § 9-312.

<sup>228</sup> UCC, § 9-326A.

receive super-priority over other security interests in the same cryptoassets perfected only by registration.<sup>229</sup> In the above hypothetical, the lender's security interest in the NFT would take priority over the bank's security interest, notwithstanding that the latter was perfected earlier.

Perfection by registration remains a useful option in many circumstances and should be retained as a means to perfect security interests in cryptoassets. The author further recommends that, regardless of which of the proposed perfection methods is adopted in New Zealand, perfection of security interests in cryptoassets by that method should grant super-priority to secured parties. Such reform would not be inconsistent with the PPSA's overarching approach to priority since the Act already recognises several exceptions to its general priority regime: purchase money security interests sit outside of the s 66 rules<sup>230</sup> and the priority of security interests in accessions<sup>231</sup> and commingled goods<sup>232</sup> are governed by different, specialised rules.

## *VII Conclusion*

In view of the proliferation of decentralised finance, this paper addresses the applicability and comparative suitability of the PPSA to cryptoasset-collateralised lending arrangements.

Part II dealt with questions of legal taxonomy, concluding that cryptoassets constitute personal property and thus can be subject to the PPSA. Part III outlined *Chefpierre* and the nature of NFTfi lending arrangements more broadly. In Part IV, the author appraised the English (Singaporean) approach to personal property security, propounding that its granularity and formalism render it inadequate in respect of creating and enforcing security interests in cryptoassets.

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<sup>229</sup> Laity and Bird, above n 205.

<sup>230</sup> Sections 73 - 77.

<sup>231</sup> Sections 78 - 81.

<sup>232</sup> Sections 82 - 86.

In Part V, the author used *Chefpierre* as a test case for the application of the PPSA, canvassing several of the Act's core provisions, including those concerning the creation, attachment, perfection, and enforcement of security interests. The author posited that the PPSA is generally preferable to English law, being better positioned to uphold DeFi parties' intentions by providing due legal recognition to their arrangements. The author subsequently illustrated how the challenges posed by cryptoassets nevertheless necessitate a degree of legislative reform — noting, in particular, that existing methods of perfection and rules as to priority are unsuitable. In Part VI, the author recommended the introduction into the PPSA of bespoke rules and concepts designed to respond to cryptoassets and explored potential avenues for how such reform could be implemented.

In conclusion, the PPSA is reasonably well-placed to accommodate novel cryptoasset collateral arrangements. However, for New Zealand to unequivocally confront the DeFi revolution, it must look to learn from and integrate elements of legal developments overseas.

## *VIII Appendix*

### *A Glossary*

#### **Bitcoin:**<sup>233</sup>

Bitcoin is the archetypal example of a public, permissionless crypto-token system and is a communications channel which creates a system for electronic transactions. The system allows individuals to communicate with one another without the need for a centralised intermediary to authenticate the integrity of any communication or message.

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<sup>233</sup> Law Commission, above n 25, at vii.

**Blockchain:**<sup>234</sup>

A method of recording data in a structured way. Data (which might be recorded on a distributed ledger or structured record) is usually grouped into timestamped “blocks” which are mathematically linked or “chained” to the preceding block, back to the original or “genesis” block.

**Decentralised finance (DeFi):**<sup>235</sup>

A general term for automated and/or deterministic and decentralised and/or disintermediated applications providing financial services on a (generally decentralised and often blockchain-based) settlement layer, including payments, lending, trading, investments, insurance and asset management.

**Distributed ledger:**<sup>236</sup>

A digital store of information or data. A distributed ledger is shared (that is, distributed) among a network of computers (known as nodes) and may be available to other participants. Participants approve and eventually synchronise additions to the ledger through an agreed consensus mechanism.

**Distributed ledger technology (DLT):**<sup>237</sup>

Technology systems that enable the operation and use of a distributed ledger.

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<sup>234</sup> At vii.

<sup>235</sup> At ix.

<sup>236</sup> At x.

<sup>237</sup> At x.

**Non-Fungible Token (NFT):**<sup>238</sup>

A cryptoasset which confers digital ownership rights of a unique asset (e.g., a piece of digital art), using a technology such as DLT to support the recording or storage of data.

**Smart contract:**<sup>239</sup>

Computer code that, upon the occurrence of a specified condition or conditions, is capable of running automatically or deterministically according to pre-specified functions.

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<sup>238</sup> HM Treasury Future financial services regulatory regime for cryptoassets: Consultation and call for evidence (February 2023) at 16.

<sup>239</sup> Law Commission, above n 25, at xiv.

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