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INTRODUCTION

The use of cryptoassets as an investment asset to generate passive income has become steadily more popular since the implementation of smart contracts on blockchains. Many of these ways of generating returns on cryptoassets are an integral part of Decentralized Finance (DeFi) applications. But there are also risks involved, in particular the bankruptcy of the custodian or other intermediary that holds the asset for the customer. The winding up or liquidation of a crypto business carries the great danger that crypto savers are left with cents on the dollar. If cryptoassets are truly valuable, one might think about going to court. But what are the rights the former cryptoasset holder has in the event of its investment intermediary's insolvency? This is the question this article seeks to address. We examine not only staking and delegating, but also similar transactions such as yield farming, liquidity mining, and crypto lending to find out the particular rights of the customer in an insolvency of her intermediary. Because the crypto-economy is global, we also analyze the applicable law to these transactions.

I. THE PREMISE, THE PROBLEMS, AND THE STRUCTURE OF THIS PAPER

A. The Premise

Cryptos are not capital assets and do not earn interest – or so one thought. Although highly unlikely that 'Satoshi Nakamoto' ever contemplated the use of Bitcoin as a traditional investment asset, the practice has steadily been increasing in popularity. A wide range of terms are floated about, but the basic underlying idea is the same: you give up at least partial control over your cryptoassets[1] in favor of some other party who uses it in

 We thank Dirk Zetzsche, University of Luxembourg, for his valuable comment.

1. In the following, the term cryptoasset shall be used as a reference for any type of financial value transferred by means of a blockchain. The concept of cryptoasset generally purports to refer to a wide array of diverse coins or tokens that very often blur the distinctions between traditional

the crypto market to generate profits, of which you receive a share. In common crypto parlance, you "stake" your cryptoassets to the other party's particular investment strategy, and you receive an "annual percentage yield." Such returns sometimes reach hundreds or thousands of percentage points and can, accordingly, be very attractive.[2]

But equally high are the risks involved. Some are inherent in the blockchain protocol itself, which are often known as "on-chain" risks. These include, for example, losses caused by flaws in the underlying code. Other risks arise from malicious behavior on the part of the developers or other crypto users, which are also known as "off-chain" risks.[3] Of these, "rug pulls" are perhaps the most harmful: such pure scams that siphon off crypto-funds from unwary investors lured by promises of highly attractive returns and undermine trust in the crypto economy and the blockchain technology itself.

However, no risk lurks with such omnipresence as that classic risk against which no commercial enterprise can ever wholly rest assured (and which a great deal of commercial law is concerned to allocate *ante ex*): counterparty insolvency. With significant macroeconomic headwinds and the capital markets cooling down, key participants within the crypto space are increasingly faced with a strain on their business liquidity.[4] Whilst such market players claim that all crypto-holdings are safe, their clients and account holders feel rather differently and withdraw their assets as confidence in the crypto-market continues to plummet. This only worsens the situation for crypto businesses already struggling to

financial assets' classes. It is however worth keeping in mind that, while the broader concept of cryptoasset is used in this paper, it is coins (e.g. Bitcoin or Ether) and stablecoins (e.g. U.S.-Dollar Coin (U.S.DC)) that are mostly used today for generating returns via staking, yield farming, or liquidity mining.

2. Most crypto trading platforms offer rather moderate interest rates. *Compare* BINANCE EARN, BINANCE, www.binance.com/en/earn (last visited July 10, 2023), COINBASE EARN, COINBASE, www.coinbase.com/earn (last visited July 10, 2023); STAKE WITH KRAKEN, KRAKEN, www.kraken.com/features/staking-coins (last visited July 10, 2023), *and* BITPANDA STAKING, BITPANDA, www.bitpanda.com/de/staking (last visited July 10, 2023*), with* YIELD FARMING, COINMARKETCAP, https://coinmarketcap.com/de/yield-farming/ (last visited July 10, 2023) (The annual percentage yield of BCH-BNB of is approximately 1065871%).

3. *See* Raphael Auer et al., *The Technology of Decentralized Finance (DeFi)* 3 (BIS Working Paper No. 1066, 2023), https://www.studocu.com/pe/document/universidad-de-lima/economia/cl1-d-auer-et-al-the-technology-of-descentralized-finance-de-fi/55660328 (mentioning that the "rise of DeFi has been accompanied by many incidents with an accumulated total loss exceeding 3 billion USD"); *see also* Liyi Zhou et al., *SoK: Decentralized Finance (DeFi) Attacks*, 1 (Cryptology ePrint Archive, Paper No. 2022/1773, 2022), https://epri nt.iacr.org/2022/1773.

4. Financial Security Board, *Regulation, Supervision and Oversight of Crypto-Asset Activities and Markets*, at 5 (Oct. 11, 2022); *see* BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, FEDERAL RESERVE, FINANCIAL STABILITY REPORT 45-46 (2022); Auer, *supra* note 3, at 2-3.

maintain their viability. Hence many crypto intermediaries have already been declared insolvent,[5] with market trends indicating that others are likely to follow.[6]

In this paper, we do not concern ourselves with the controversial questions as to the legal nature of the cryptoassets themselves; i.e., we do not seek to answer how a Bitcoin or an Ether is best analyzed as a matter of private law. Rather, we are concerned with the legal question of whether a "staker" (as our crypto investor will henceforth be called, reflecting its colloquial rather than technical use) can be said to have transferred property or encumbered their property rights in cryptoassets in favor of other parties, such as the staking intermediary or the network. In this, we proceed on the premise that all holders of cryptoassets enjoy proprietary rights (rights *in rem* that are valid in relation to third parties, i.e. *erga omnes*) in respect of their crypto holdings, which may not be true in all jurisdictions.[7] Rather than dwelling on the latter countries, we focus on

5. The year 2022 was filled with the crash, insolvency, and bankruptcy of many crypto ecosystems, brokers, companies, and exchanges. *See* Joshua Oliver et al., *Luna Crash Sends a Chill Through Decentralized Finance Market*, FINANCIAL TIMES (June 6, 2022), https://www.ft.com/content/c10bc6f7-abbe-45dc-9367-042186c3336f (explaining Terra Network crashed at the start of 2022); Serena Ng et al., *Crypto Hedge Fund Three Arrows Ordered by Court to Liquidate*, WALL ST. J. (June 29, 2022), www.wsj.com/articles/crypto-fund-three-arrows-ordered-to-liquidate-by-court-11656506404 (explaining crypto hedge fund Three Arrows Capital was ordered to liquidate in June 2022); *Voyager Digital Commences Financial Restructuring Process to Maximize Value for All Stakeholders*, PRNEWSWIRE (Jul. 6, 2022),

www.prnewswire.com/news-releases/voyager-digital-commences-financial-restructuring-process-to-maximize-value-for-all-stakeholders-301581177.html (explaining crypto broker Voyager Digital filed for bankruptcy); *Important Client Update,* BLOCKFI, https://blockfi.com/November28-ClientUpdate (last visited July 10, 2023) (showing crypto lending platform BlockFi went bankrupt in November 2022); *Celsius Network Initiates Financial Restructuring to Stabilize Business and Maximize Value for All Stakeholders,* BUSINESS WIRE, (Jul. 6, 2022), www.businesswire.com/news/home/20220713005911/en/Celsius-Network-Initiates-Financial-Restructuring-to-Stabilize-Business-and-Maximize-Value-for-All-Stakeholders (last visited July 10, 2023) (explaining Celsius filed for bankruptcy in July 2022); Paulina Okunyté, *Crypto Exhchange Nuri Files for Insolvency in Germany, Celsius Bankruptcy to Blame*, DAILY COIN, (Aug. 10, 2022), https://dailycoin.com/crypto-exchange-nuri-files-for-insolvency-in-germany-celsius-bankruptcy-to-blame/(highlighting German crypto exchange Nuri's insolvency); MacKenzie Sigalos, *Sam Bankman-Fried steps down as FTX CEO as his crypto exchange files for bankruptcy,* CNBC (Nov. 11, 2022), https://www.cnbc.com/2022/11/11/sam-bankman-frieds-cryptocurrency-exchange-ftx-files-for-bankruptcy.html (describing the bankruptcy of crypto-exchange FTX).

6. *Today's Cryptocurrency Prices by Market Cap*, COINMARKETCAP, https://coinmarketcap.com (last visited July 10, 2023) (describing the fall of crypto-asset market capitalization by more than 2/3 from September 2021 to December 2022).

7. For instance, under German law, proprietary rights to intangible cryptoassets such as Bitcoin are not recognized unless they are created under the Act on Electronic Securities. *See* BÜRGERLICHES GESETZBUCH [BGB] [Civil Code] § 90 (Ger.).

the question of whether and to what extent these rights, where they exist, are transferred or encumbered when the holder commits their assets to one of the practices that we examine. We do so through the lens of insolvency proceedings.

B. The Problems

This paper's main focus is to examine the legal position a staker might have on the insolvency of their staking intermediary. Are they entitled to make a direct claim of ownership to their staked assets—notwithstanding that they have conceded partial, or even full control over it in favor of the intermediary—such that they are removed from the intermediary's insolvent estate altogether? If not, are they to be treated as a secured creditor, or at least even a preferential creditor? Or will they simply have no other choice but to join the queue with the intermediary's other unsecured creditors for a *pari passu* share in whatever assets are left? Answering this seemingly simple question is no easy task, for three main reasons.

First, the rights a staker has against its intermediary's insolvency turn on the legal basis of the transfer of control. For what purpose or reason did the staker concede control over his cryptoassets in favor of the intermediary in the first place, such that they are considered as "belonging" to the intermediary and thus part of its insolvency estate? This requires an examination of staking practices as a matter of fact to ascertain the basis upon which the staker agreed to cede control over his cryptoassets. A cursory view of the "staking" market reveals a wide range of diverse practices, and it would be erroneous to think that they would be treated alike as a matter of law simply because they have the same economic objective to generate passive returns on a cryptoasset holding. To the contrary, differences in practices give rise to vast differences in the set of facts that courts will deem as material, and from which legal inferences and findings will be drawn when determining the rights of the staker in the intermediary's insolvency.

It is further not helpful that the promoters of staking schemes do not generally take legal advice before devising and advertising their investment strategies. Some adhere to the "Code is Law"[8] philosophy and consider that any problems arising from staking will be solved via the blockchain itself. Others, whilst recognizing that their operations might be

8. PRIMAVERA DE FILIPPI AND AARON WRIGHT, BLOCKCHAIN AND THE LAW 193-94 (2018) (stating explicitly that Code is Law does not mean that software and legislation are equivalent; rather, this pithy formulation is meant to indicate that code, much like the other forces, regulates behavior.); *see also* LAWRENCE LESSING, CODE: AND OTHER LAWS OF THE CYBERSPACE: VOLUME 2, 324 (2006) ("Code is not law, any more than the design of an airplane is law.").

subject to legal processes, bandy about terms such as "property," "trust," and "ownership"[9] without any consideration of what these mean or require in law. As every dispute lawyer will know, what the parties thought they were doing or intended to do, as evidenced by their written agreements and their conduct, and what they actually did in law, are often two very different things. Nevertheless, what the parties thought they were doing or intended to do remains the general starting point. The simple transfer of some asset from A to B is merely a naked fact: it tells nothing about the basis of the transfer itself; which is, in turn, indicative of the rights of the parties in respect of the object once transferred.

For example, when A agrees to "sell" her Bitcoin to B, this generally means that A is not only agreeing to transfer control or possession of the Bitcoin to B, but is also agreeing to transfer her property right in the Bitcoin too, for a price. The result of a successful sale is, therefore, that A no longer has any rights to or in the Bitcoin, which are now owned by B outright (assuming, as we do, that the relevant property law recognizes Bitcoin as being the object of property rights). Instead, A has a personal claim against B for the price; and if B is insolvent before it is paid, A has no other choice but to line up as an unsecured creditor in B's insolvency. By contrast, if A wishes to "deposit" her Bitcoin with B under a regular deposit, this means that A is agreeing to transfer control over the Bitcoin to B for some period of time but not her right of "ownership." A only gives up the immediate right of control and fully expects this to be restored to her at the end of the term. If B fails to do so, A may assert her right of 'ownership' in the Bitcoin against B to compel its return, as well as potentially against any third parties, such as C, to whom B might have transferred the Bitcoin. In addition, A will also likely have a personal action against B for breach of the deposit agreement. Again, if B is insolvent, the personal action may well prove worthless; but, significantly, A's property claim will largely be effective against B's insolvency estate should the Bitcoin have fallen therein.

It is, therefore, not simply enough that the staker has conceded control over his assets to the intermediary, it is also important to examine the

9. Gilead Cooper, *Virtual Property as Trust Assets and Feature Investments,* 36 BUTTERWORTH'S J. OF INT'L BANKING AND FIN. LAW, 751–52 (2021); Helmut Stix, *Ownership and Purchase Intention of Cryptoassets – Survey Results,* 29-31 (Oesterreichische Nationalbank, Working Paper No. 226, 2019), www.ecb.europa.eu/pub/conferences/shared/pdf/20191126_payments_conference/academic_paper_stix.pdf; ZeMing M. Gao, *Digital Assets are Subject to Property Law,* COINGEEK (Aug. 8, 2022), https://coingeek.com/digital-assets-are-subject-to-property-laws/; Joseph Raczynski, *Non-fungible Tokens: Asset Ownership via Blockchain Rockets into Legal,* THOMPSON REUTERS (Mar. 22, 2021), www.thomsonreuters.com/en-us/posts/legal/non-fungible-tokens-legal/; LAW COMMISSION, *Digital Assets: Final Report*, 412 LAW COM, vii- xvii (UK).

basis for the transfer. The basis for these transfers is usually grounded in the law of contract, with the precise purpose of the asset transfer, and the parties' rights following the transfer clearly set out in writing. Where the contract is unclear, courts will consider a vast range of factors under the rules of contractual construction,[10] such as the parties' expectations, conduct, and pre-contractual negotiations, to determine their intentions.

Contract law accords primacy to parties' intentions under the principle of freedom of contract; however, this is not necessarily conclusive of what the parties achieved in law. A contract may be held void or unenforceable for failure to comply with any legal formalities, but the matter is rendered even more complex in circumstances where a contract's subject matter relates to proprietary rights. These "holy grail" of rights on any insolvency are of prime relevance in the staking context, but remain a mandatory form of private law that places a significant limitation on the role of the parties' agreement. If, for example, the relevant property law provisions hold that any asset delivery must create a perfected security interest by public registration pursuant to an agreement, this is not a requirement from which the parties can simply derogate by common intention and agreement. Failure to comply will result in the invalidity of the security interest and its ineffectiveness in insolvency. Thus, what the parties achieved in law by the staker giving up control over his cryptoassets in favor of the intermediary for 'staking purposes' depends, in the first instance, on both the purpose and nature of the transaction underpinning the concession of control; and secondly, on any relevant provisions of property law. Only when these are identified and applied to the facts will the parties' rights become clear.

Second, the outcomes of subjecting the relevant facts to the relevant legal provisions are complicated because property and contract laws differ across legal systems around the world. As a result, it may well be the case that the same set of facts leads to different conclusions as to the parties' respective rights, depending on which law is held to be the applicable law to their relationship and transaction. As a very simple example, the property requirement outlined above that an agreement to create a security interest, or any delivery of an asset pursuant to such agreement, must be perfected by using public registration may be the rule under the property

10. LAWRENCE COLLINS & JONATHAN HARRIS, DICEY, MORRIS & COLLINS ON THE CONFLICT OF LAWS, para. 32-143 (Sweet & Maxwell U.K. 15th ed. 2012) (1896); OLE LANDO, INTERNATIONAL ENCYCLOPEDIA OF COMPARATIVE LAW (Kurt Lipstein ed., Mohr, Tubingen, Vol. 3, 1976). Also explicitly stated in the conflict-of-laws provisions, *see e.g.* Art 12(1)(a) Regulation (EU) 593/2008, of the European Parliament and of the Council of June 17, 2008 on the Law Applicable to Contractual Obligations (Rome I), 2008 O.J. (L 177).

law of jurisdiction A. However, the property law of jurisdiction B might require only an enforceable agreement plus delivery for the security interest to be validly constituted. Suppose, then, that a staking agreement purports to grant the staker a security interest in the intermediary's pool of staked assets, and obliges the intermediary to register the security "in accordance with any applicable law" upon delivery by the staker of his assets to the intermediary to be added to the pool. However, upon such delivery by the staker, and in breach of their agreement, the intermediary fails to take any steps to register the security interest.

Accordingly, the question of whether the security interest was validly constituted in favor of the staker depends on whether the property law of A or B (or some other jurisdiction) applies. In the same vein, if the terms of the agreement itself were uncertain as to the parties' mutual rights and obligations, the contract law of jurisdiction C might permit recourse to pre-contractual negotiations to ascertain what the parties had intended; whereas such recourse to earlier drafts of the agreement might be prohibited under the contract law of jurisdiction D. Finally, even in simple transfers of property rights under a bilateral agreement becomes difficult in the present context of insolvency, as questions of *when* property rights pass under a valid agreement to transfer and the effect where a purported differ from jurisdiction to jurisdiction. Thus, in both property and contract matters, identifying the applicable law is paramount to identifying in the final instance what the staker and intermediary achieved in law.

Third, identifying the applicable law in a bankruptcy case is a complicated exercise. It is a well-established rule of private international law that a bankruptcy court will generally apply the *lex fori*, i.e., its own domestic law, which is often known in the bankruptcy context as the *lex concursus*.[11] This principle is of paramount importance as it allows for the centralization of the enforcement of all claims against the debtor—e.g., the insolvent staking intermediary—in a single tribunal. It is also a well-established rule that the *lex fori* applies to the characterization of any issue in dispute for the purpose of the conflict of laws. In our example of a failure to register a security interest, is the real issue between the parties a matter of breach of contract (and if so, what kind of contract), or one of the property rights *in rem*? Courts in different jurisdictions will come to different conclusions on this issue, and in our case, characterization will be determined by the bankruptcy court in accordance with its own domestic rules.

11. ANTONIO LEANDRO, INSOLVENCY, APPLICABLE LAW, *in* ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW 931-32 (Jürgen Basedow et al. eds., 2017).

However, once the bankruptcy court has concluded on this initial characterization, it does not necessarily mean it will apply its domestic law when trying the issue to resolve the rights of the parties; the choice-of-law rules of the bankruptcy court may well point to another law as governing the particular issue in dispute. In terms of our agreement to create a security interest above, if the bankruptcy court has identified the issue as one of a right *in rem*, it will apply its own conflict-of-laws rules for property matters to identify whether it is Property Law A or Property Law B, or some other law to determine whether registration was required (Law A) or a valid agreement and delivery were enough (Law B) to create the security interest that will render the staker's position in the intermediary's insolvency far more advantageous than if it only had personal rights for breach of the security agreement. These applicable laws may well be different from those of the bankruptcy court: thus, the importance of the *lex fori concursus* in insolvency matters does not mean that a bankruptcy court will never apply a foreign law.

The exact outcomes of this process of identifying the applicable law is further complicated by the diversity of conflict-of-laws rules around the world. For example, the conflict rules of State X might state that, in the absence of choice between the parties, contractual matters are governed by the law having the closest connection with the contract, whereas the conflict rules of State Y state that, in the absence of a choice, contractual matters are governed by the law of the place where the contract was concluded. Although there is a degree of harmonization within the EU, the general rule remains that each jurisdiction around the world has its own conflict-of-laws rules. Even within a single political nation-state such as the UK or the US, each legal jurisdiction within these states follows its own domestic approach to the conflict of laws.[12] Accordingly, the question of the law applicable to our staker's rights will depend, to a large extent, on where our staking intermediary's insolvency is opened and administered, as bankruptcy courts will always, and without exception, follow the conflict-of-laws rules of the forum. Complicating these issues further is that, in the context of proprietary rights *in rem*, the nature and basis of any transfer of an asset remains only the first step of the analysis. If the purpose is to pass property rights, the actions taken by the parties will be assessed according to the relevant jurisdiction's property law.

12. For an overview, *see* PETER HAY ET AL., CONFLICT OF LAWS (2018); John F. Coyle, et al., *Choice of Law in the American Courts in 2021: Thirty-fifth Annual Survey*, THE AM. J. OF COMPAR. LAW 318, 319-363 (Jan. 22, 2022).

C. The Structure of this Paper

In accordance with this overview of the legal problems, to answer the seemingly simple question of a staker's rights on its intermediary's insolvency, Section B starts with a review of the various crypto investment strategies currently seen in the market. Section C will then examine the potential legal analysis to arrive at possibilities for characterizing the underlying transaction. Next, Section D, explores the absence of any firm legal guidance at present on characterization, and outlines how our conclusions can be used as a tentative basis for determining the applicable law, at least in the abstract. Finally, Section E is where we draw some broader conclusions.

II. EMPIRICAL DISTINCTIONS

The ways in which cryptoassets may be used as an investment asset is limited only by the creativity and ingenuity of those decentralized financiers at the forefront of the cryptoasset and Decentralized Finance (DeFi)[13] spheres. Although there is no consistent use of terms, distinguishing between the various practices as a matter of empirical substance is crucial, as this ultimately feeds into the set of facts a court will be asked to consider and from which legal conclusions will be drawn. In this respect, there is a considerable difference between, for example, an outright transfer of the staked asset from the staker to intermediary to be applied to the intermediary's investment strategy, and the exercise by the intermediary of certain rights associated with the staked asset without any transfer of the asset itself. Accordingly, this section sets out some of the various practices seen in the crypto investment context.

A. Staking

Staking in a precise technical sense refers to a process peculiar to "proof of stake" consensus mechanisms.[14] Blockchain networks function on the

13. Decentralized Finance (DeFi) can be defined as follows: DeFi is a competitive, contestable, composable and non-custodial financial ecosystem build on technology that does not require a central organization to operate and that has no safety net. *See* Auer, *supra* note 3, at 3.

14. These are increasingly being adopted by blockchain networks to replace the energy-intensive 'proof of work' mechanism. *See e.g.* THE MERGE, ETHREUM, https://ethereum.org/en/upgrades/merge/ (last visited July 10, 2023) (discussing the efforts to replace the proof-of-work mechanism of the Ethereum network by a proof-of-stake consensus mechanism, which led on Sept. 15, 2022 to what became known as The Merge). On the debate about the sustainability of the proof-of-work mechanism, *see also* Felix Irresberger et al., *The Public Blockchain Ecosystem: An Empirical Analysis*, N.Y.U. STERN SCH. OF BUS., 1, 4-5 (Apr. 18, 2021). On different consensus protocols,

basis of consensus[15] and such consensus is achieved by one participant in the network—the so-called "validator" or "validating node" —collating proposed transfers broadcast to the network into a proposed new block, then propagating that block for acceptance by the other participants, or nodes, as the next block to be added to the chain. In most networks, any node can act as a validator, but as this process is open to abuse by malicious nodes, any validating node seeking to propagate a new block on the blockchain is required to 'prove' its trustworthiness. In the original "proof of work" consensus mechanism, proving trustworthiness is done by solving a mathematical puzzle.[16] By contrast, in the newer proof of stake mechanism, the validating node must both (1) prove it holds a stake in the network (i.e., a quantity of the blockchain's native cryptoassets);[17] and (2) be willing to forfeit that stake in the event that it has been deemed by the other nodes as fraudulent or as having otherwise acted in bad faith[18] in a process referred to as "slashing."[19]

see Auer, *supra* note 3, at 8. Shijie Zhang & Jong-Hyouk Lee, *Analysis of the Main Consensus Protocols of Blockchain,* 6 ICT EXPRESS 93, 93-97 (2020).

15. A very good introduction to blockchain technology is found in ARVIND NARAYANAN ET AL., BITCOIN AND CRYPTOCURRENCY TECHNOLOGIES. A COMPREHENSIVE INTRODUCTION (Princeton University Press, 2016). *See also* ANDREAS ANTONOPOULOS, MASTERING BITCOIN: UNLOCKING DIGITAL CRYPTOCURRENCIES (O'Reilly Media, Jan. 13, 2015); AARON WRIGHT & PRIMAVERA DE FILIPPI, DECENTRALIZED BLOCKCHAIN TECHNOLOGY AND THE RISE OF LEX CRYPTOGRAPHIA (2017); IRIS H-Y CHIU, REGULATING THE CRYPTO ECONOMY: BUS. TRANSFORMATIONS AND FINANCILISATION 1–44 (2021); CAROL GOFORTH, REGULATION OF CRYPTOTRANSACTION 1–10 (2020); COLLEEN BAKER & KEVIN WERBACH IN, FINTECH LAW AND REGUL. 148-164 (Jelena Madir ed., 2021).

16. *See* ARVIND NARAYANAN ET AL., BITCOIN AND CRYPTOCURRENCY TECHNOLOGIES. A COMPREHENSIVE INTRODUCTION 131–164 (2016); *see also* DANIEL STABILE, ET AL. DIGITAL ASSETS AND BLOCKCHAIN TECHNOLOGY 20–22 (2020); Auer, *supra* note 3, at 8.

17. STABILE, *supra* note 16, at 22.

18. *See infra* Section C.1.

19. Such slashing takes place, for example, with Polkadot, Tezos, and Ethereum. *See, e.g.,* POLKADOT SLASHING, POLKADOT, https://wiki.polkadot.network/docs/learn-staking#slashing (last visited July 10, 2023); EVERSTAKE, *How Does Slashing Work in Tezos and Why is it Important to Delegate Only to Reliable Bakers Like Everstake,* MEDIUM, https://medium.com/everstake/how-does-slashing-work-in-tezos-and-why-is-it-important-to-delegate-only-to-reliable-bakers-like-a6c931e93c56 (last visited July 10, 2023); *Understanding Eth2 Slashing and Preventative Measures,* BLOXSTAKING, https://www.bloxstaking.com/blog/ethereum-2-0/understanding-eth2-slashing-preventative-measures/(last visited July 10, 2023). In contrast, Avalanche and Cardano refuse to reward the staker in such cases and the cryptoassets themselves are not withdrawn. *See* AVALANCHE, https://www.avax.network/validators (last visited July 10, 2023); *see also Why Cardano Does Not Need Slashing*, CARDANIANS, https://cardanians.io/en/why-cardano-does-not-need-slashing-152 (last visited July 10, 2023). Solana also provides a similar mechanism in principle, but it has not yet been activated. *See* SOLANA, SLASHING RULES https://docs.solana.com/de/proposals/slashing (last visited July 10, 2023). On the general functioning of slashing, *see* Giulia

Cryptoassets thus offered up as proof of a validating node's stake in the next block are known as "staked," and the risk of losing staked assets through the sanction of slashing works to deter any validating node from impairing the smooth functioning of a blockchain network. Backed by a slashing mechanism, staking thus ensures the integrity of any new block added to the blockchain. For its validation efforts, the validating node earns rewards in the form of the transaction fees paid by users of the network and/or cryptoassets newly created with each propagated block. Nodes, therefore, compete for their proposed blocks to be accepted onto the blockchain. The exact selection process varies across proof-of-stake algorithms. However, two models of staking are worth distinguishing: direct staking and staking by delegation.

1. Direct Staking

A node can directly stake cryptoassets it holds to the network by participating in the proof of stake consensus mechanism. In this case, it is the node itself that suffers the loss if its stake is slashed due to fraudulent transactions or inactivity.

2. Staking via an Intermediary ("Delegation")

Staking can also be done via an intermediary. In practice, this is the most common form of staking.[20] Many crypto intermediaries—notably crypto exchanges—offer staking services to their account holders. They can do so by either acting as a validator or by mediating the staking of the cryptoassets to a third party (the intermediary) who will act as a validator.[21] There are important commercial incentives for doing the latter: broadly speaking, the greater the quantity of cryptoasset a validating node can stake, the more returns it can generate from the validation process.

Fanti, et al., *Economics of Proof-of-Stake Payment Systems* 21 (M.I.T. Sloan Working Paper No. 5845-19, 2021).

20. Currently, the following platforms offer staking by delegation: Coinbase, Binance, Kraken, Bitpanda. *Coinbase User Agreement*, COINBASE, 6 (2023), www.coinbase.com/legal/user_agreement/ireland_germany; *Binance Terms of Use*, BINANCE (2023), www.binance.com/en/terms; *Terms of Service*, Annex C-D, KRAKEN, (2023), www.kraken.com/legal; *Allgemeine Gesch. . .ftsbedingungen [General Terms and Conditions*
Bitpanda GmbH & BAM], BITPANDA, Annex IIA, IIB, (2023), www.bitpanda.com/de/legal/bitpanda-general-terms-conditions.

21. *Coinbase User Agreement*, COINBASE (2023), www.coinbase.com/legal/user_agreement/ireland_germany (explaining digital assets can be staked in a third party proof of stake network via staking services provided by Coinbase or an affiliate or a third party); *Terms of Service*, Annex B, KRAKEN (2023), www.kraken.com/legal ("Payward Trading may perform any or all of the PSA Services directly or through one or more service provider(s).").

Hence, it makes sense to collect cryptoassets from those willing to stake, use them in the validation process and share the rewards with those that have contributed to the staking of the intermediary.

Staking via an intermediary is often called "delegation," even though the terminology varies. Two types must be distinguished. In the first, cryptoassets are contributed to the pool of assets staked by the validator itself or by a third party acting as the validating node. In the second type of delegation, cryptoassets are not transferred themselves, but rather, a "right" to propagate the next block is transferred. This method of staking via delegation is associated with particular types of blockchain networks,[22] where each unit of the blockchain's native cryptoasset inherently carries such right. The right to propagate the next block is allocated at random but many holders of the native cryptocurrency are uninterested in exercising the right. It therefore "delegates" this right to a node able and wishing to exercise it, usually in return for a fee. Crucially, only the "protocol right to propagate the next block" associated with the cryptoasset is delegated, not the asset itself.

B. Yield Farming

The term "yield farming" is associated with DeFi; in particular, with decentralized crypto exchanges (DEXs). DEXs are algorithms through which cryptoassets can directly be exchanged without the intervention of any intermediary.[23] Although the term is used in various ways, in practice, yield farming is, for the purposes of this paper, used to denote the process whereby the DEX incentivizes its users to stabilize the value of certain cryptoassets—usually the DEX's own native token/cryptocurrency—by refraining from trading in those assets.

This commercial objective of reducing the volatility of the relevant cryptoasset is affected by the user committing assets of that type to a smart contract, with returns paid by the DEX in exchange. Assets committed in yield farming operations are held passively in the smart contract and are not traded on the exchange or used for any other purpose.

22. L.M. Goodman, TEZOS – A SELF-AMENDING CRYPTO-LEDGER WHITE PAPER 10-14 (Sept. 2, 2014), https://tezos.com/position-paper.pdf; Amy Held, *Baking, Staking, Tezos and Trusts: Crypto Sale and Repurchase Transactions Analysed by the High Court*, 37.2 BUTTERWORTH'S J. OF INT'L BANKING AND FIN. LAW 96 (2022); Seyed Mojtaba Hosseini Bamakan, et. al., *A Survey of Blockchain Consensus Algorithms Performance Evaluation Criteria* 154 SCIENCE DIRECT 1, 4-5 (2020); Nicola Dimitri, *Liquid Proof-of-Stake in Tezos: An Economic Analysis,* 13 INFO. 556, 557 (2022).

23. Auer, *supra* note 3, at 18-20.

The user is given a receipt to acknowledge the deposit, usually in token form, and is usually permitted to withdraw the cryptoassets at will.[24]

C. Liquidity Mining

Liquidity mining also involves a DEX, but differs in that a cryptoasset holder will provide a pair of cryptoassets to a DEX, and will receive in return cryptoassets issued by the DEX as "interest."

To understand the process of liquidity mining, it is important to understand a little more about how DEXs operate. In general, trading of cryptoassets on a DEX takes place via Automated Market Makers ("AMM"), which are smart contracts that provide much-needed liquidity to the market.[25] In order to fulfill their task, AMM themselves need liquidity in the form of cryptoassets. This is necessary for the DEX to function continuously and smoothly, which is particularly important for the trading of digital assets with a low trading volume. On a DEX, the liquidity will be provided by a so-called Liquidity Provider ("LP"), i.e., a holder of cryptoassets, by putting them into a so-called Liquidity Pool. Technically, this will be implemented by the LP exchanging a pair of—at least two—cryptoassets against an LP token. As a rule, the possible pairs are predefined and presuppose a certain ratio between the cryptoassets provided. The LP token is not a mere receipt of a deposit but represents the share of the liquidity pool that the contributed cryptoassets make up.[26] The process of liquidity mining is, thus, quite similar to yield farming. However, it is distinct from yield farming operations in several key ways.

First, the commercial objective of the offeror of such a transaction differs. Whereas yield farming aims at reducing the circulation of certain cryptoassets, liquidity mining serves to provide additional liquidity for certain types of assets. Unlike deposits of cryptoassets provided in yield

24. *See e.g., Syrup Pool FAQ and Troubleshooting*, PANCAKESWAP (last visited July 10, 2023) https://docs.pancakeswap.finance/products/syrup-pool/syrup-pool-guide/syrup-pool-faq; *Yield Farming*, SUSHISWAP (last visited Jan. 23, 2023), https://docs.sushi.com/docs/Products/Concepts/Yield%20Farming; *Yield Farming*, TRADER JOE (last visited Jan. 23, 2023), https://support.traderjoexyz.com/en/articles/6708479-yield-farming; *Staking Your CRV,* CURVE FINANCE (last visited July 10, 2023) https://resources.curve.fi/crv-token/staking-your-crv.

25. *See* Alfred Lehar & Christine A. Parlour, *Decentralized Exchange: The Uniswap Automated Market Maker*, J. FIN. (forthcoming); Lindsay X. Lin, *Deconstructing Decentralized Exchanges*, 2.1 STAN. J. BLOCKCHAIN L. AND POL'Y 58, 74 (2019); Auer, *supra* note 3, at 11-13.

26. Auer, *supra* note 3, at 10 (quoting "ETH/USDC LP is an example of an equity token, representing claims on shares of underlying assets, in this specific case being a claim on the amount of ETH and USDC deposited as liquidity provision (LP) in the Uniswap DEX."). *See* UNISWAP, https://uniswap.org/blog/uniswap-v3 (last visited July 10, 2023) (highlighting the V3 version of the Uniswap DEX implemented an NFT representing fractional ownership of the protocol liquidity.).

farming operations, contributions in liquidity mining do not remain passive but are actively used in the market by the DEX. The DEX uses the liquidity so that market participants can exchange the respective cryptoassets in the liquidity pool against each other. The exact combinations of cryptoassets to be contributed are usually predefined by the DEX, but there generally are no caps on the number of cryptoassets a DEX will accept into a Liquidity Pool.

Second, Liquidity Providers may "cash out" their share of the Liquidity Pool for the contributed cryptoassets at any time by redeeming the LP Token. There is, however, no guarantee that the Liquidity Provider will receive the same amount of each cryptoasset as they had originally contributed; it all depends on the composition of the Liquidity Pool at the time of redemption. For this reason, and because of the fluctuating value of cryptoassets, LPs endure the risk of impermanent loss (or "divergence loss," as it is sometimes called), which occurs when one provides liquidity to a pool that contains more than one asset and then the market price of at least one of the assets in the pool changes.[27] An impermanent loss thus derives from the fact that the returned assets upon redemption might be of a lesser total value than if they had simply been held onto and not used for liquidity mining.

D. Crypto Lending

Crypto lending enables users to lend and borrow cryptoassets for a fee or interest. These transactions can be offered by centralized[28] or decentralized[29] platforms, or by other operators. Under such a lending model, the holder transfers cryptoassets to another address for the payment of remuneration. The recipient can then freely deal with those cryptoassets until it receives a withdrawal order from the address depositing the cryptoassets. This withdrawal order can often be placed at any time. Higher

27. Doncho Karaivanov, *Impermanent Loss Explained With Examples & Math*, THE CHAIN BULLETIN, https://chainbulletin.com/impermanent-loss-explained-with-examples-math/ (May 3, 2021).

28. For example, see Simple Earn, BINANCE, www.binance.com/en/savings#lendinl-demandDeposits (last visited July 10, 2023); BITFINEX, www.bitfinex.com/lending-products-start/ (last visited July 10, 2023); BLOCKFI, www.blockfi.com (last visited July 10, 2023); CIRCLE, www.circle.com/en/products/yield (last visited July 10, 2023); CRYPTO, https://crypto.com/eea/earn (last visited July 10, 2023); GEMINI, www.gemini.com/earn (last visited July 10, 2023).

29. For example, see AAVA, https://aave.com (last visited July 10, 2023); COMPOUND, https://compound.finance (last visited July 10, 2023); MAKERDAO, https://makerdao.com/en/ (last visited July 10, 2023). *See* Auer, *supra* note 3, at 13-15; Daniel Perez et al., *Liquidations: Defi on a Knife-Edge*, in INT'L CONF. ON FIN. CRYPTOGRAPHY AND DATA SECURITY 457–476 (2021).

interest rates may, however, be achieved if cryptoassets are invested for a fixed period of time.

Decentralized platforms offer lending transactions via lending pools.[30] Cryptoassets are contributed to a pool to be lent onwards to third parties against collateral and interests. This is realized through a smart contract, by which a cryptoasset is transferred to a DeFi platform in exchange for a corresponding cryptoasset issued by the platform.[31] Each borrowed cryptoasset thus matches its token counterpart of the DeFi platform. The token issued by the DeFi platform can—possibly after a certain period of time—be redeemed for the cryptoasset originally provided, with an additional remuneration. This makes crypto lending look very similar to liquidity mining. The difference, however, is that in crypto lending, assets are not provided in pre-defined pairs. Also, the lent assets can be used for a wider range of purposes.

E. Summary

As has been demonstrated by this brief survey, whilst staking is generally used in a flexible way by market participants, the use of cryptoassets to generate passive income encompasses a wide range of practices. For reasons that will become apparent, we consider that it is imperative to distinguish between various staking models when trying to ascertain the staker's rights upon its intermediary's insolvency.

III. LEGAL CHARACTERIZATION

As noted in Section A-2, characterization is a matter undertaken by the forum as a preliminary step in determining the law applicable to any issue in dispute before it. In the case of the rights of a staker in the event of its intermediary's insolvency, the most pressing issue in dispute will usually be whether the staker has a vested proprietary interest, acquired before the insolvency proceedings were opened, in an asset that has come

30. Auer, *supra* note 3, at 13-15 (highlighting that an "essential difference to loans issued by traditional financial institutions is that interest rates are set automatically."). *See* Jiahua Xu & Nikhil Vadgama, *From Banks to DeFi: The Evolution of the Lending Market*, Univ. Coll. London Centre for Blockchain Technologies 1, 53-66 (Dec. 20, 2022).

31. One example is the platform Compound issuing their cToken against the deposit of an eligible cryptoassets. *See* ROBERT LESHNER & GEOFFREY HAYES, *COMPOUND: THE MONEY MARKET PROTOCOL* 3-4 (2019), https://compound.finance/documents/Compound.Whitepaper.pdf; *see also* AAVE, PROTOCOL WHITEPAPER 8–16 (2020), https://github.com/aave/aave-protocol/blob/master/docs/Aave_Protocol_Whitepaper_v1_0.pdf (Aave issuing aToken).

to fall within the insolvent estate, or whether his rights are merely personal.

Though bankruptcy proceedings are generally governed by the law of the bankruptcy court (the *lex fori concursus*), there are two key areas in which the bankruptcy court will apply another law, using its own conflict of law rules. First, proprietary issues will generally be determined by the general rule, consistent across all systems of private international law, that such matters are governed by the law of the place where the asset is located (the *lex rei sitae*). Second, when determining the legal basis upon which the staker conceded control over the asset in favor of the intermediary (which is why the asset now, prima facie, has fallen into the intermediary's insolvency estate), the bankruptcy court will apply the proper law of that agreement to ascertain the validity of the agreement and the consequences that follow.[32] Given that various legal bases for transfer give rise to different governing laws, we consider now some of the ways in which the practices in Section B could be characterized as a matter of law and the legal consequences that follow.

Before doing so, we must draw attention to several points as to our methodology. We rely to a considerable extent on the written representations of the staking intermediary (i.e., the way in which the staking operation has been described or marketed to potential stakers); and, where available, any written staking agreement pursuant to which the staker conceded control over the relevant assets. We are mindful that these are neither conclusive as to what the parties achieved in law, nor are they necessarily an accurate reflection of what technically happens at the protocol level. Nevertheless, such representations and agreements between the parties hold legal significance as giving some indication of what the parties had intended to do. As such, they will likely be considered by the courts. To account for as many legal systems as possible, we do not commit ourselves to a single characterization or to the private law techniques of a single jurisdiction, given that the blockchain is a global mechanism for the storage and transfer of value, which is not governed by the law of one state alone, but by a plurality of laws. Whilst a multi-jurisdictional characterization raises obvious challenges, to the extent possible, we try to adopt a broad perspective by referring to "transnational" principles of private law; whether by reference to international conventions, or to common foundations in, for example, Roman law or the common law. Finally, we emphasize that we are concerned with private law, not regulatory law. Nevertheless, given that there are significant overlaps, especially between staking operations and regulatory definitions of certain investment

32. *See infra* Section D.

practices, we briefly address the reasons why we do not discuss two matters that, *prima facie*, might be thought to be directly relevant to our objectives in characterizing staking, loosely defined as the use of cryptoassets as a capital asset for investment purposes.

First, we are aware that some regulatory authorities, most notably the Securities and Exchange Commission ("SEC") in the United States ("U.S."), have characterized staking transactions as "investment contracts" and hence as "securities," submitting those who offer them to the registration requirements of the Securities Act 1933.[33] Useful as such definitions are, these are exclusively valid in the realm of supervision and regulation; they do not determine the rights and obligations between private individuals, such as crypto holders and crypto exchanges, and do not apply in litigation between them. They also do not deprive our analysis of its sense as they are still challenged in court. Should the SEC's position prevail in these litigations, staking services could still be offered by those intermediaries who register with the authority. Furthermore, many, if not most, countries of the world do not share the SEC's view that staking is a "security."

Second, given the common commercial objective between traditional investment practices and staking, it may seem apt in many cases to characterize a pool of cryptoassets applied towards a particular investment strategy as a fund of some sort (e.g., a mutual fund, alternative investment fund, or collective investment scheme). The problem, however, remains that these are regulatory classifications that define the *substance* of a particular investment practice. Such practices, however, are carried out via a wide range of legal constructs that give rise to different private law consequences.

For example, in the U.S. alone "mutual funds" are regulated by federal law in the Investment Company Act of 1940,[34] which focuses on the regulation and supervision of the fund but is a misnomer insofar as it says very little, if anything, as to the private rights of the investors in an "investment company."[35] Rather, these private rights are generally governed by the laws of the federal states, where a basic distinction can be made

33. *See e.g.*, Complaint at 89, SEC v. Coinbase, Inc., 23 Civ. 4738 (S.D.N.Y. filed June 6, 2023) (No. 1:23-cv-04738); Complaint, SEC v. Binance Holdings Ltd., No. 1:23-cv-01599 (D.D.C. filed June 5, 2023); Complaint, SEC v. Payward Ventures Inc., No. 23-cv-588 (N.D. Cal. filed Feb. 9, 2023).

34. 15 U.S.C. §§ 80a-1 to 80a-64.

35. Charles E. Jr. Rounds & Andreas Dehio, Comment, *Publicly-Traded Open End Mutual Funds in Common Law and Civil Law Jurisdictions: A Comparison of Legal Structures*, 3 N.Y.U. J.L. & BUS. 473, 478 (2006) (calling the terminology of the Investment Company Act of 1940 "unfortunate").

between the trust[36] and corporate models[37] commonly used to structure the practice of investment via a mutual fund. In turn, these two models give rise to different rights between the fund manager and the investor.[38] In Europe, the private law rights that arise from investment in investment funds are even more complex. European Union ("EU") legislation contains two texts, the Undertakings for Collective Investment in Transferable Securities Directive[39] and the Alternative Investment Fund Managers Directive,[40] but, again, these are regulatory definitions that say nothing as to how such investment funds are structured as a matter of private law. Various models can be identified under the private law of the constituent (and former) Member States, which may range between trust-like regimes comparable to those seen in the U.S., corporate models, models based on partnerships, and co-proprietary models.

As such, regulatory definitions are generally not helpful in the present context as they encompass a wide range of private law structures. As we are only concerned with the private law rights that arise from these private law structures, we do not address regulatory regimes separately, but discuss them under the relevant private law categories.

A. Secured Transaction

When looking at staking (in the technological sense) from a legal perspective, the notion of "secured transactions" comes to mind.[41] To create a security interest, the owner of an asset, the "security provider," usually gives up possession or control over the asset.[42] The security right is

36. In this model, managers have certain fiduciary duties towards investors, who enjoy certain rights in the assets of the fund. *See id.* at 478-83.

37. *Id* at 478-83. A model involves a corporation run by directors that has title to the assets. The investors, in turn, are the shareholders of the corporation. Despite the separate corporate personality, the directors have trustee-like duties that run directly to the investors.

38. *Id*. at 478–79. It has, nevertheless, been argued that both models essentially reflect a trusts relationship, such that they even the corporate models are "trusts in disguise".

39. Directive 2009/65/EC of the European Parliament and of the Council of 13 July 2009 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), 2009 O.J. (L 302).

40. Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2003/41/EC and 2009/65/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010 (AIFMD), 2011 O.J. (L 174).

41. *See generally* U.C.C. § 9 (AM. L. INST. 2010); U.N. Commis on Int'l Trade Law, *Model Law on Secured Transactions*, U.N. Doc. E.17.V.1 (2019).

42. U.C.C. § 9-203(b) (AM. L. INST. 2010); STEVEN L. HARRIS & CHARLES W. MOONEY, SECURITY INTERESTS IN PERSONAL PROPERTY 91 (5th ed. 2011) (mentioning three conditions UCC 9-203(b) sets forth to enforceability, and thus attachment: First, value must be given; second, the debtor must have rights in the collateral, and this the debtor must agree that a security interest will

"perfected" when the other party, termed the "secured party," obtains possession over the asset or when a financing statement is filed.[43] The security interest or collateral right is a limited property right, protecting the security taker in case the security provider fails to perform his obligations, e.g. repaying a loan. The security right allows the security taker to obtain control over the asset if he does not yet have it (i.e., in case a financing statement has been filed). He may then sell the asset and apply the net proceeds of the sale to the secured obligation.[44]

Ignoring for one moment the differences between tangible and intangible assets, the simple form of staking bears some striking resemblances with a secured transaction: typically, the asset will be locked during the time it is staked, meaning that the staker is prevented from exercising control over them.[45] During the whole process, the asset can be accessed only by the staker; the providers of staking services are at pains to underline that the staker retains ownership despite the staking.[46] Finally, if the staker or the validator has violated the rules of the network, e.g. by engaging in malicious validation or by refusing to validate, the assets may be "slashed," which essentially means that they will be transferred to the network.

attach and either the collateral must be in the secured party's possession or control or the debtor must have signed a security agreement); *see* Auer, *supra* note 3, at 4. ("Customers that interact with such platforms […] give up custody of their assets").

43. U.C.C. § 9-201 (AM. L. INST. 2010); HARRIS & MOONEY, *supra* note 42, at 92–93 (calling UCC 9-201 a "baseline rule", which is generally understood to mean that an attached security interest will be senior to conflicting claims unless the UCC provides otherwise).

44. HARRIS & MOONEY, *supra* note 42, at 617 ("Taking possession of collateral following a debtor's default only begins the process of enforcing a security interest in collateral. A secured party in possession of tangible collateral following a default typically wishes to sell the collateral and then to apply the net proceeds of the sale to the secured obligation.").

45. *See, e.g.*, *Coinbase User Agreement App. 4, Sec. 3, Subsec. 1.4*, COINBASE, https://www.coinbase.com/legal/user_agreement/united_states (last updated Nov. 8, 2023) ("Some Digital Asset networks require that a certain amount of staked assets be locked (restricted from sale or transfer) for a certain period of time while staking."). Another example is from an older August 30, 2022, version of the Coinbase User Agreement that stated, "If you choose to stake your ETH, your ETH will be pledged for staking and will become locked on the Ethereum protocol until Phase 1.5 of the Ethereum network upgrade is completed." *Coinbase User Agreement Sec. 3, Subsec. 1.5*, COINBASE, https://www.coinbase.com/legal/user_agreement/united_states (last visited August 30, 2020).

46. *See Terms of Service Annex C, Sec.1.2*, KRAKEN, https://www.kraken.com/legal (last updated June 19, 2023) ("You retain ownership of the Supported Tokens and such Supported Tokens shall remain property of you when staked under the terms of this Addendum."); *Id*. at *App. 4, Sec.* 3(1.1) ("This instruction to stake your digital assets does not affect the ownership of your digital assets in any way."); *General Terms and Conditions Bitpanda GmbH & BAM Sec. 7.2*, BITPANDA, https://www.bitpanda.com/en/legal/bitpanda-general-terms-conditions (last updated Aug. 23, 2023) ("Bitpanda clients are the beneficial owners of Stakes Assets at all times, . . .").

All of these points make staking seem similar to a secured transaction. A further indication supporting this characterization is the use of the word "pledge" by some staking agreements;[47] a pledge is a typical secured transaction. There can hardly be a stronger indication of the parties' intentions than the use of this word, which is understandable even to laymen.

Yet, there are also some glaring differences between staking and classic secured transactions. First, the staker can usually "unstake" the assets at any time and thereby immediately terminate the staking agreement; in this case, the assets will be returned to her subject to the non-occurrence of a slashing event.[48] Second, the security interest does not secure the repayment of a loan, but rather the proper performance of the validation functions on the network; in other words, the assets will be taken away as a punishment for not behaving properly on the network rather than for not fulfilling a monetary obligation. It does not serve to mitigate credit risk but gives incentives for "good" behavior.[49]

One may reasonably debate whether these two particularities exclude characterizing staking as a secured transaction. The first point, it is suggested, does not necessarily justify such an exclusion, as a security provider and security taker are free to determine the length of their agreement and can also include a right to terminate it at any time. The second particularity is perhaps not as great if one considers that collateral also incentivizes "good" behavior in the sense of a loan. Still, it must be admitted that there is no underlying obligation to repay a loan and the associated credit risk mitigation. However, it is not completely excluded that a secured transaction may serve to enforce some other obligation; just think of a bail cost that is deposited with a court or the police or security as collateral to incentivize future involvement in the judicial process. In these cases, the asset may be lost if some other event than the non-

47. *See Coinbase User Agreement 1.7(d)*, COINBASE, https://www.coinbase.com/legal/user_agreement/united_states (last updated Aug. 24, 2023) ("Staked ETH and associated rewards that have been wrapped as cbETH are held by Coinbase on behalf of holders of cbETH, and ownership of these assets shall not transfer to Coinbase.").

48. *See General Terms and Conditions Bitpanda GmbH & BAM Annex II A, Sec. 1, Subsec. 2.7*, BITPANDA, https://www.bitpanda.com/en/legal/bitpanda-general-terms-conditions (last updated Aug. 23, 2023) ("The Flexible Staked Asset can be unstaked at any time with immediate effect at the sole discretion of the Bitpanda Client (no lock-up). In this case the Bitpanda Client receives his Flexible Staked Assets, subject to the non-realization of the Slashing Risk outlined in point 7, back in their Wallet and all Rewards accrued on such Flexble Staked Assets until the relevant Final Offer Click Unstaking.").

49. *See* James Burnie et al., *What's at Stake? The Legal Treatment of Staking*, 37.9 BUTTERWORTH'S J. OF INT'L BANKING AND FIN. LAW 596 (2022).

repayment of the loan occurs. Still, one may speak of a "secured transaction," at least in a loose sense of the word.

Other types of transactions that are common in the field of generating revenue from cryptoassets do not bear this similarity to secured transactions. While the token holder also relinquishes possession or control over the asset in the case of yield farming, liquidity mining, and crypto lending, these cases lack a legal obligation to be collateralized. We therefore consider it highly unlikely that these transaction types will be considered to fall into the category of secured transactions.

The effect of characterizing an operation as a "secured transaction" depends on the type of the secured transaction. In the case of a "pledge" or "lien," the operation would not touch upon the initial distribution of ownership. There would merely be the creation of a new right *in rem*. The insolvency risks of the person providing the security right would thus be limited. If, on the other hand, the secured transaction results in an "outright transfer" then the collateral provider would bear the full risk of insolvency of the collateral taker. Which of these two types of characterizations will be retained in a particular case is not entirely sure and will depend on the applicable terms and conditions. Yet, our informed belief is that without any contrary indications, it is more likely that a court will lean in favor of a more restricted transfer (i.e., the creation of a pledge or lien). That is because this category strikes an appropriate balance between the interests of the staker and those of his counterparty: the staker does not lose his rights completely, while the counterparty gets as many rights as it needs for its particular purpose, i.e., slashing.

secured transaction	staking	yield farming	liquidity mining	crypto lending
purpose = protection of security taker	✓	✗	✗	✗
creation of a right *in rem*	-	✗	✗	✗
security provider gives up control	✓	✓	✓	✓
linked to performance of an obligation	✓	✗	✗	✗

Table 1: secured transaction

B. Deposit

The deposit has its origins in the Roman concept of *depositum,* which survives in both modern common law and civil law jurisdictions alike and has a particular influence on the law of banking. This characterization seems particularly important for our analysis, given e.g., the comparisons that have been drawn between crypto lending to DEXs with depositing money with a bank.[50] To test the validity of this characterization, it is necessary to distinguish between two types of deposits.

The first type of deposit—called in Latin *depositum regulare*—serves the commercial objective of safekeeping the assets in the interests of the depositor. A typical example is a deposit box stored in the vault of a bank, of which the depositor has exclusive use for depositing his assets. Under this model, the assets deposited remain in the vault and are recovered *in specie* upon withdrawal by the depositor. Throughout the term of the deposit, the depositor does not lose his right of ownership in the assets deposited.

However, commercial banking has long discarded this model of deposit; and has adopted, instead, what is known in many civilian jurisdictions as *depositum irregulare*.[51] This follows the model of fractional reserve banking, under which a bank uses the assets of the depositors for its own commercial purposes, e.g., to provide credit to third parties on terms that generate profits (i.e., interest), and only keeps a fraction of the assets to pay out depositors that ask for withdrawals in the short term. In this model, the custodian acquires ownership of the asset held in custody and has all the rights of the owner to dispose of the fungible assets held in custody; his obligation to the depositor is simply to return goods of the same quantity and quality.[52] This model was described by Lord Cottenham in *Foley v. Hill:*

50. *See* Andrew R. Sorkin et al., *The New "Shadow" Banks*, N.Y. TIMES: DEALBOOK NEWSLETTER (Sept. 8, 2021), www.nytimes.com/2021/09/08/business/dealbook/crypto-bitcoin-regulation.html.

51. BÜRGERLICHES GESETZBUCH [BGB] [CIVIL CODE], § 700, https://www.gesetze-im-internet.de/englisch_bgb/englisch_bgb.html (Ger.); OBLIGATIONENRECHT [OR] [CODE OF OBLIGATIONS] Mar. 30, 1911, SR 220, RS 220, art. 481 (Switz.); CODICE CIVILE [C. C.] [CIVIL CODE] art. 1782 (It.); CIVILKODEKSS [C.C] [CIVIL CODE] art. 1992 (Lat.); CODE CIVIL [C. CIV.] [CIVIL CODE] art. 1932 (Fr.); *see also* Cour de cassation [Cass.] [supreme court for judicial matters] 1e civ., Nov. 29, 1983, Bull. civ. I, No. 280 (Fr.); Cour de cassation [Cass.] [supreme court for judicial matters] com., July 9, 1979, Bull. civ. IV, No. 230 (Fr.).

52. Timo Fest, MÜNCHENER KOMMENTAR ZUM HGB [MUNICH COMMENTARY ON THE HGB, VOL. 6] Einlagengesch. . .ft para 193–94 (Carsten Herresthal ed., 4th ed. 2019); Martin Henssler, MÜNCHENER KOMMENTAR ZUM BGB [MUNICH COMMENTARY ON THE BGB, VOL. 6] § 700 BGB para 3 (Martin Henssler ed., 9th ed. 2023).

> *The money paid into the banker's, is money known by the principal to be placed there for the purpose of being under the control of the banker; it is then the banker's money; he is known to deal with it as his own; he makes what profit he can, which profit he retains to himself […]*[53]

Characterization as an irregular deposit may seem appropriate for some of the operations analyzed and can be applied where the following two conditions are met: first, the depositor can recall the assets at any time; and second, the custodian need not return the same assets he received. This is the case, in particular, for yield farming and liquidity mining, but also for crypto lending. It is therefore possible that a court may consider any of these three operations as an irregular deposit.

However, such characterization would not correspond to the commercial purpose of the operations and the intentions of the parties that underpin them. Typically, the underlying cryptoassets are held by a custodian. Since they are already in custody, there is no reason for an additional deposit with the same or another intermediary. Instead, the commercial reasoning behind the operations described is to obtain profits, and this is not only on the side of the recipient of the asset, but also on the part of the transferor. However, it is not inconceivable that for certain actors the purpose of safekeeping is of overriding importance. In this case, a characterization as a deposit may be apposite.While the answer to whether a platform is taking deposits ultimately depends on the parties' intentions and on how the services offered are structured, the risk analysis remains the same as in the case of crypto lending: the initial holder of the cryptoasset bears the counterparty risk, i.e., the risk that the other party to the contract does not perform (see above section C-2). It is therefore not significant for the distribution of insolvency risks whether one characterizes crypto lending as a loan or as an irregular deposit.

53. Foley v. Hill [1848] 9 Eng. Rep. 1002 (HL) (appeal taken from Eng.); *see also* PETER ELLINGER ET AL., MODERN BANKING LAW 93–94 (3d ed. 2002); Joachimson v. Swiss Bank Corp. [1921] 3 KB 110; Busher v. Fulton, 191 N.E. 752 (Ohio 1934).

irregular deposit	staking	yield farming	liquidity mining	crypto lending
purpose = safekeeping and restitution	✗	✗	✗	✗
return goods of the same quantity and quality	✓	✓	✓	✓
transfer of ownership	-	-	-	-
possibility to recall assets at any time	-	✓	✓	✓

Table 2: irregular deposit

C. Loan

The legal concept of a loan is, perhaps, particularly apt for crypto lending. Broadly defined, a loan is a transaction whereby one party—the lender—makes funds available to another party—the borrower—against an obligation to repay the nominal amount, with or without interest. Crypto lending seems consonant with this definition because it implies the full title transfer of the relevant assets to another party with an obligation to return goods of the same quality and quantity plus remuneration. At least at first blush, lending cryptoassets to a DEX may therefore be legally characterized as a loan. Loans in law, however, require that several other criteria be met, and whilst each jurisdiction differs, some broad principles are common to all.[54]

The first criterion is that the economic purpose of a loan agreement must be to provide capital to the borrower. The debtor is permitted to use the capital for a certain period of time, e.g., to make investments or grant loans itself. There must not be any restrictions on how the cryptoassets are used by the platform. From the lender's perspective, this means he must renounce the right to claim back the exact same assets *in specie*; he

54. Matthias Lehmann, INSOLVENCY, APPLICABLE LAW ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW 215–219 (Jürgen Basedow et al. eds., 2017).

must, therefore, be willing to give up his title to the assets against the promise to receive goods of the same quantity and quality.

The second condition is that the borrower must be obliged to repay the funds. This is generally the case. Crypto lending services provide for the reimbursement of the deployed funds, generally including interest.[55] This is not surprising—after all, hardly anyone is willing to donate their assets. Typically, the parties to crypto lending stipulate that the repayment is made upon the lender's request at any time. Traditionally, loan repayments are, however, only accelerated under specific and limited conditions. Of course, the determination of the due date is generally in the hands of the parties, and loan agreements come in different kinds; bullet loans, for instance, are loans in which the principal is repaid in full at the end of the loan term, but here again, repayment is made by the borrower and not upon simple and unconditioned recall by the lender. This notwithstanding, the qualification of a loan seems a good fit for crypto lending schemes.

While the characterization as a loan is particularly apt for crypto lending, other transactions are less likely to fall into this category. Whereas in staking, yield farming, or liquidity mining the initial token holder may also result in an outright transfer of funds, their economic purpose is not to provide capital to the borrower. Staking serves to secure a position of a network. Yield farming aims at reducing the amount of tokens in circulation. Liquidity mining is perhaps closest to a loan, yet the liquidity miner receives as counter-performance an interest in the LP, which is unusual for a lender. We therefore consider it rather unlikely that any of these other three operations will be qualified as a loan in any jurisdiction.

The key point of the characterization as a loan is its repercussion on the distribution of risks, especially insolvency risks. Like a loan of fiat currencies or other movable assets, the loan entails the transfer of cryptoassets from the lender to the borrower. The initial token holder is losing any right she had in the asset and will have only a claim—i.e., an obligation—against the borrower. In the insolvency of the borrower, the initial token holder will therefore rank as unsecured and may then be left only with a part (quota) of the amount he or she has lent or suffer a complete loss. This shows the importance of distinguishing crypto lending from staking.

55. *See e.g. Blockchain.com User Agreement Sec. 5.1*, BLOCKCHAIN.COM, https://exchange.blockchain.com/lega/terms (last updated Sept. 7, 2023).

Staking Your Crypto: What are the Stakes?

loan	staking	yield farming	liquidity mining	crypto lending
purpose = provide credit	✗	✗	✗	✓
obligation to repay a nominal amount	✓	✓	✓	✓
transfer of ownership	-	-	-	-
fixed maturity	✗	✗	✗	✓

Table 3: loan

D. Partnership

Partnerships exist in many jurisdictions. They come in very different shapes and forms, but generally, are characterized by two or more persons carrying out a business for profit.[56] As such, they are popular vehicles for the conduct of fund business. It is, however, important to note at the outset that the term partnership is used to denote a wide variety of vehicles that differ considerably in private law terms. Broadly, two separate distinctions need be drawn between: (1) partnerships that are unregistered and in which partners are jointly and severally liable for all obligations of the partnership and each of the other partners; and (2) partnerships that are registered, take the form of a separate legal entity and in which partners may limit their liability.

English law provides a good example of what we will refer to as "general partnerships." Notwithstanding the use of the term "firm" in some contexts to refer to the partnership as a quasi-separate entity,[57]

56. *See e.g.* Partnership Act 1890, 63 Vict. c. 39, § 1 (UK); UNIF. P'SHIP ACT (UNIF. L. COMM'N 2013) (demonstrating that in the United States, partnership legislation belongs to the states' sphere of competence but is harmonized via the Uniform Law Commission (ULC)).

57. The term is used, for example, where a partnership is a party in civil litigation. *See O'Neil v. Philips* [1999] UKHL 24, [1999] 1 WLR 1092 (appeal taken from Eng).

traditional partnerships under English law[58] are constructed entirely as a matter of contract between the partners, who conduct business in their individual names both as principal for himself, and as an agent of all other partners. As such, the key private law consequences that follow are that each partner is jointly and severally liable for all debts and other obligations of all other partners; and own partnership assets in common with each other. Comparable unregistered vehicles also exist under a variety of names in civil law jurisdictions.[59] As a result of these onerous duties placed on partners in an unregistered partnership, a modified form of partnership, known as the "limited partnership," was introduced in England, under which certain classes of partners, the "limited partner," undertakes only to contribute capital or property to the firm, and is not liable for the debts or obligations of the firm beyond the amount contributed.[60] It is, however, critical to note that all limited partnerships in England operate only in private law to modify the obligations between partners *inter se*—between or among themselves. As a matter of form, although there is a duty to register a limited partnership, limited partnerships remain construed in private law entirely as a matter of contract, where prime importance is placed on the written partnership agreement.

Civilian jurisdictions often also recognize two forms of partnership, one consisting merely of a nexus of contracts, with unlimited liability of the partners, and another that is registered and in which the liability of the partners is typically limited.[61] Although these partnerships fall short of having separate legal personalities, the legal provisions for incorporated bodies often are applied by analogy. Partnerships lend themselves particularly well as a characterization of the relationship between stakers, as

58. The 1890 Partnership Act placed traditional partnerships on statutory footing after long development at common law. *See generally*, Partnership Act 1890, 63 Vict. c. 39, § 1 (UK).

59. *See e.g.* CODE CIVIL [C. CIV.] [CIVIL CODE] art. 1871-1873 (Fr.) (setting out the legal regime of the unregistered "société en participation" that applies also to *de facto* partnerships ("sociétés créées de fait")); ALLGEMEINES BÜRGERLICHES GESETZBUCH [ABGB] [CIVIL CODE] § 1175, https://www.ris.bka.gv.at/eli/jgs/1811/946/P1175/NOR40165222 (Austria); BÜRGERLICHES GESETZBUCH [BGB] [CIVIL CODE], § 705, https://www.gesetze-im-internet.de/englisch_bgb/ (Ger.) (stating that if two or more persons pursue a joint (business) activity they form a civil-law partnership unless choosing another legal personality; the Austrian civil-law partnership, however, has no legal capacity and therefore cannot be a subject of its own rights and obligations).

60. *See generally* Limited Partnerships Act 1907, 9 Edw. 7 c. 24 (Eng.).

61. *See e.g.* ALLGEMEINES BÜRGERLICHES GESETZBUCH [ABGB] [CIVIL CODE] § 1175, https://www.ris.bka.gv.at/eli/jgs/1811/946/P1175/NOR40165222 (Austria); UNTERNEHMENSGESETZBUCH [UGB] [CORP. CODE] §§ 105, 161, https://www.corporate-governance.at/code/ (Austria); BÜRGERLICHES GESETZBUCH [BGB] [CIVIL CODE], § 705, https://www.gesetze-im-internet.de/englisch_bgb/englisch_bgb.html (Ger.); CODE DE COMMERCE [C. COM] [COMMERCIAL CODE] art. L221-1–L222-1 (Fr.).

this involves a common pooling of assets. Absent any registration or incorporation, crypto holders staking their cryptoassets may at first sight qualify as partners of a general partnership, where all other crypto holders contributing assets are partners. As described in the empirical section,[62] all stakers indeed undertake to add and validate new blocks of a blockchain with the common goal of processing and timestamping transactions or supporting validators by contributing assets to the validation process in exchange for rewards. The prospect of profit may be seen as consonant with the broad definition of partnership. Stakers also submit and agree upon the proof of stake mechanism being a kind of randomized scheme of distribution of profits.[63] The characterization as a general partnership is particularly relevant when stakers pool together their cryptoassets for the purpose of staking, as they clearly partner up (albeit not knowing each other personally) to profit from the addition of a new block. However, in some staking agreements, the allocation of profits is randomized and upon the intermediary's discretion, which does not square well with the traditional concept of general partnerships.[64] In this case, stakers also jointly bear the risks of, *inter alia*, slashing.

The partnership characterization also seems to stand independently of whether stakers act directly or indirectly via an agent, i.e., a validating node that will act on their behalf. In that sense, delegation is very much akin to a principal-agent relationship, irrespective of whether it entails an outright transfer of cryptoassets or a mere transfer of "staking rights."[65] In such use case scenarios, stakers (as principals) remain the partners. This characterization seemingly also fits rather well liquidity mining and certain types of crypto lending, namely those operating with pools of cryptoassets. Both types of DeFi applications generally rely on at least two people collectively committing their cryptoassets to a common pool. In the case of liquidity mining, token holders provide liquidity to the market by transferring their cryptoassets to a common pool often in exchange for a token representing their share in the pool. In doing so, they pursue the common aim of generating returns. The same line of argumentation can be extended to yield farming. Similar concepts may also be

62. *See supra* Section B.

63. *See, e.g.*, *Terms and Conditions, 5.2: Staking Services*, BLOCKCHAIN, https://exchange.blockchain.com/legal/terms (last updated July 1, 2023).

64. *See*, *e.g.*, *Coinbase User Agreement*, supra note 21; *Terms of Service, C: On-Chain Staking Services, D.3: Rewards*, KRAKEN, www.kraken.com/legal (last updated June 19, 2023); *Allgemeine Gesch. . .ftsbedingungen* [*General Terms and Conditions*], *II A.3: Rewards, Commission, and Payout Interval*, BITPANDA, www.bitpanda.com/de/legal/bitpanda-general-terms-conditions (last updated Aug. 23, 2023).

65. See *supra* Section B.1.b for further details on the different delegation models.

found in the case of crypto lending. Token holders provide capital to a third party (a DEX or another operator) to generate returns. Such a third party may be a smart contract pool offered by a DEX. In this case, one might assume a partnership between all cryptoassets holders contributing to such a lending pool. The holders of the cryptoassets also bear a certain risk, namely that the borrower may not be able to repay the borrowed cryptoassets. There are, however, also a number of counterarguments against the partnership characterization. First, it seems generally inapposite for mere bilateral relationships in which a crypto holder transfers outright its cryptoassets to another operator, without of common will to partner up with the recipient for profit. This point is likely to speak against the partnership characterization of most crypto lending operations. Second, and even more importantly, the parties to the operations analyzed here will generally not be ready to assume the liability of the partners for all debts and obligations of the venture. Typically, cryptoholders that partner up in a pool generally do not intend to assume any risk of liability beyond the loss of the asset(s) they committed and transferred.

A possible exception would be a case where pooled cryptoassets are used as collateral in leverage transactions for which liabilities might exceed the total asset value of the pool, but this scenario is very rare. In general, no staker, yield farmer, liquidity provider or crypto lender wants to incur any liability for the other persons contributing to the pool or for the pool itself. Such commercial considerations, however, may be addressed by reference to the possibility of limiting liability. Given that formal registration is virtually non-existent for the operations analyzed here, characterizations based on the limited liability of partners seems unplausible for most cases. Accordingly, it does not seem plausible to characterize any of the staking operations considered above as carried out as a partnership.

Staking Your Crypto: What are the Stakes?

general partnership	staking	yield farming	liquidity mining	crypto lending
purpose = common business with view of profit	✓	✓	✓	✗
two or more persons	-	✓	✓	-
co-ownership of partners	✗	✗	✗	✗
distribution of profits between partners	-	✓	✓	✗

Table 4: general partnership

E. Trusts

Trusts are an institution with ancient origins in English private law and are used today for a wide range of purposes: succession, family estates, company law, and, notably, investment purposes. In the U.S., mutual funds are organized as trusts under state law, and many investment vehicles in the U.K., e.g., pension funds and "unit trusts," are structured in trust-like forms. In many cases, managers of such "investment trusts" have certain fiduciary duties towards investors, who enjoy certain rights in the assets of the fund.[66]

However, in line with the purpose of this paper, we eschew references to national trusts laws, but instead refer primarily to the Hague Trusts Convention,[67] as it aims to build bridges between common law and civil law countries, and to "establish common provisions on the law applicable to trusts and to deal with the most important issues concerning the recognition of trusts." As such, we defer to Article 2 of the Hague Trusts Convention, under which a trust refers to the legal relationships created when assets have been placed under the control of a trustee for the benefit of a beneficiary or a specified purpose; and which has the following characteristics: (a) the assets constitute a separate fund and are not a part of

66. Rounds, *supra* note 35, at 483.

67. Signatories include Australia, Canada, China, Cyprus, France, Italy, Liechtenstein, Luxembourg, Malta, Monaco, the Netherlands, Panama, San Marino, Switzerland, the United Kingdom of Great Britain and Northern Ireland, and the United States. Convention on the Law Applicable to Trusts and on their Recognition, *opened for signature* July 1, 1985, https://www.hcch.net/en/instruments/conventions/status-table/?cid=59 (last visited Sept. 6, 2023).

the trustee's own estate; (b) title to the trust assets stands in the name of the trustee or in the name of another person on behalf of the trustee; (c) the trustee has the power and the duty, in respect of which he is accountable, to manage, employ or dispose of the assets in accordance with the terms of the trust and the special duties imposed upon him by law.[68]

Taking stock of the above, it should be noted that the word "trust" is not definitive. Substance should prevail over form: the characteristics outlined in the Hague Trusts Convention reflect its ambition to fit trust-like arrangements that might exist outside the common law world.[69] This is not to say, however, that stricter criteria as regards the form or substance of trusts beyond what the Hague Trusts Convention provides may not be set under national law.[70]

It is also worth noting that the Hague Trusts Convention applies only to trusts created voluntarily and evidenced in writing.[71] Such conditions call for some brief comments. First, the expression "trusts created voluntarily" is to be understood in contradistinction with trusts created by the operation of law or following a judicial decision.[72] The intent to create a trust does not, however, necessarily need to be expressed, as it may be inferred from the relevant factual circumstances.[73] Second, the requirement of a written instrument reflects the fact that most express trusts are created by a deed, but it also serves evidentiary purposes.[74] A trust may well exist, even if it is formed orally or tacitly, under national law.[75] Moreover, the written form is not restricted to paper. It is commonly admitted today by the law of various legal systems that electronic documents fulfill the written form requirement insofar as they are stored durably. Under the arrangements scrutinized in this paper, the evidence of a trust may therefore be sought after in the general terms and conditions of platforms, and possibly even in the code and meta-data of the smart contracts used if these are humanly readable and understandable.

68. Emmanuel Gaillard, *Hague Convention on Private International Law: Explanatory Report by Alfred von Overbeck on the Hague Convention on the Law Applicable to Trusts and on Their Recognition*, 25 INT'L LEGAL MATERIALS 593, 601 (1986).

69. *Id. at 598.* See for instance the case of the "fiducie" under French law, as set out in CODE CIVIL [C. CIV.] [CIVIL CODE] art. 2011-2030 (Fr.).

70. Gaillard, *supra* note 68, at 605.

71. Convention on the Law Applicable to Trusts and on Their Recognition art. 3, July 1, 1985, 23 I.L.M. 1389; on the interpretation of international treaties see *see also* RICHARD K. GARDINER, TREATY INTERPRETATION (2d ed. 2017) (describing the interpretation of international treaties).

72. Gaillard, *supra* note 68, at 601.

73. *Id.*

74. *Id.*

75. *Id.*

One particular obstacle to the qualification of the arrangements described above in Section A as trusts may stem, however, from the difficulties in distinguishing between settlors, trustees, and beneficiaries. In the case of direct staking, for instance, crypto holders would tend to be settlors, trustees, and beneficiaries at the same time. Even if the roles may be mingled to some extent,[76] such an overlap of statuses would in all likelihood defeat the trust qualification. The same cannot be said of the staking-with-an-intermediary model, where the intermediary would play the role of a trustee. The difficulty arises here, however, from the fact that crypto holders would qualify as both settlors and beneficiaries. Nevertheless, it is undisputed that the intermediary would manage and stake the cryptoassets for the benefit of the former. The remaining question would then be whether the cryptoassets of the holders are comingled with the platform's own assets. If yes, the qualification of trust must fail. If, however, the cryptoassets received by the platform are held separately, the trust qualification might apply. In other words, where staking arrangements involve an intermediary as described in Section A above, the trust qualification cannot be discarded without further detailed analysis.

Yield farming may *prima facie* present itself as a complex case since the platform intermediary would simultaneously be the trustee and the ultimate beneficiary of the arrangement. Indeed, we must remember that yield farming arrangements purport to stabilize the value of the cryptoassets issued and managed by the platform itself, and this is for its own benefit. The broad transnational notion of trust enshrined in the Hague Trusts Convention can nevertheless accommodate such a situation, as its Article 2(3) expressly states that the fact that the trustee may himself have rights as a beneficiary is not necessarily inconsistent with the existence of a trust. Additionally, it is worth recalling that the transnational notion of trust under the Hague Trusts Convention entails that trustees may act for a specific purpose.[77] Thus, even if the yield farming platform ultimately fends for itself as the main beneficiary of the arrangement, it still arguably acts in accordance with and for the fulfillment of the specific purpose of the yield farming arrangement, which is principally the stabilization of its cryptoasset protocol. Moreover, it can be argued that a protocol with stable tokens also ultimately benefits their holders, who receive interest payments and have a right to reclaim assets whose value they helped to stabilize. Therefore, the very nature of yield farming arrangements does not irremediably defeat the trust qualification. Also, yield

76. *Id.*

77. Convention on the Law Applicable to Trusts and on Their Recognition art. 2, July 1, 1985, 23 I.L.M. 1389.

farming arrangements imply that cryptoassets are transferred outright. Yet, as for the case of staking-with-an-intermediary arrangements, the crucial question that a case-by-case analysis must answer is whether the cryptoassets received by the platform are comingled or not with its own assets.

A similar line of reasoning applies to liquidity mining, where similar conclusions can be drawn. In the case of crypto lending, however, a specificity should be underlined: As described in Section A above, initial holders' cryptoassets are generally not segregated from the platform's. As already mentioned, such characteristics would defeat the trust qualification, which leads to the conclusion that crypto lending arrangements are likely to fail to qualify as trusts.

The consequence of a trust characterization for risk-bearing is the following: The customer (staker) as the settlor of the trust completely transfers any legal rights in the assets to the trustee who is, nevertheless, constrained by the trust to exercise legal powers in accordance with the trust. Critically, if the trustee goes bankrupt, the assets provided to the trust will not form part of his insolvency estate, as the beneficiaries will generally be able to require that they be removed from the insolvent trustee's estate and transferred to a new trustee. Thus, the particular attraction to a trust characterization in any insolvency is because it tends to make the assets at least seem "insolvency-proof."

trusts	staking	yield farming	liquidity mining	crypto lending
three identifiable parties (settlor, trustee and beneficiary)	-	-	-	✗
transfer of legal ownership	-	✓	✓	✓
trustee's power of disposal	✗	✗	✗	✗
fiduciary duties towards investors	✗	✗	✗	✗

Table 5: trusts

F. Summary

All things considered, there are some legal categories that lend themselves better than others for the characterization of the operations analyzed here. The crypto-market is, however, rapidly evolving, and the characteristics of the operations may change accordingly. Also, legal doctrine and case law vary significantly around the globe. Therefore, we refrain from specifying a definite legal category for each operation, but merely suggest various options which might be open for discussion. Rather, we focus on the distribution of risks that will result from the different characterizations, assuming the underlying transaction is valid and the parties have achieved their intentions regarding the basis of the transfer under the relevant applicable laws.

If the characterization as a secured transaction creating a limited right *in rem*—as opposed to an outright transfer—is adopted, the customer who engages in such an operation remains the owner of the cryptoassets. In case of insolvency of the intermediary, he could thus ask for the return of his assets or their transfer to another intermediary. In contrast, if a transaction is characterized as a loan or as an irregular deposit, then the customer transfers property to the intermediary. Should the latter go bankrupt, he is merely a creditor who must register his claim in the insolvency proceedings. Where a transaction is seen as a (general) partnership, the assets would be jointly held between the intermediary and all participating customers. At the same time, however, all parties involved would assume full liability for the debt of the enterprise. Finally, in the case of a trust characterization, the customer would no longer be the legal owner of the assets that are now held by the trust. At the same time, he would generally not run the risk of insolvency of the trustee.

Drawing these strands together, two broad conclusions may be drawn. First, the protection of the customer depends on the transaction he was engaged in. If this transaction amounts to a transfer of assets, his risk in the event of insolvency of the intermediary is likely to be much higher. Second, the precise risk cannot be predicted because it is subject to the legal characterization of the transaction by a court. The same operation may be viewed very differently, with the consequence of diverging risk profiles. For example, even if the *lex fori concursus* concludes that the issue in dispute is, say, a loan contract, it will still be the law to which the conflicts rule points that ultimately determines whether the parties have concluded a valid contract of loan. In this sense, a conclusive determination of what the parties intended to achieve in law can only be made once the applicable law is known.

	staking	yield farming	liquidity mining	crypto lending
secured transaction	3	1	1	1
deposit	1	2	2	2
loan	1	1	1	3
general partnership	1	3	3	0
trust	0	1	1	1

Summary Table: probability scale 0 = min; 4 = max.

IV. THE LAW APPLICABLE TO CRYPTOASSET TRANSACTIONS

The traditional approach of the "conflict of laws," sometimes known as "private international law,"[78] in determining the applicable law is to look for the "most significant" or "closest" connection between the facts and a particular legal system. Possible connecting factors include, for example: for property matters, the location of the property at the time of the disputed acquisition; for tort, the place where the damage was sustained; or in contract, the place of the characteristic performance of the contract. Different connecting factors are used thus for different substantive areas of law,[79] which makes it necessary to characterize—again—the operations analyzed, this time, however, not for substantive law, but for conflict-of-laws purposes.

Even if this is done, finding a connecting factor is particularly difficult not only for staking transactions, but for any application of Distributed Ledger Technology ("DLT") as originally conceived of as a decentralized network based purely on peer-to-peer trust.[80] Such phenomena are deliberately designed to avoid any centralization of power or trust in a particular participant; as a result, they have no significant connection with any one specific jurisdiction through any one "significant" actor. Accordingly, the usual method of recourse to auxiliary connecting factors—such as the jurisdiction in which the majority of the servers hosting nodes of the respective blockchain are located, the core team of software developers maintaining the protocol, or the location of the parties involved in a blockchain transaction—does not always assist. As these are often equally difficult to localize in a single jurisdiction or have only limited relevance to the legal issue in question, they will mostly be a somewhat contrived or arbitrary choice.

These problems are compounded in the Decentralized Finance ("DeFi") environment, where actors mostly are—and wish to remain—anonymous. Notwithstanding the fact that it is possible in some jurisdictions for

78. *See* COLLINS, *supra* note 10, at 1-088 et seq.; PAUL TORREMANS ET AL., CHESHIRE, NORTH & FAWCETT: PRIVATE INTERNATIONAL LAW 15–16 (2017).

79. For an overview, see generally Michael Wilderspin, *Contractual Obligations*, *in* ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW *supra* note 11, at 473; Thomas Kadner Graziano, *Torts*, *in* ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW, *supra* note 11, at 1710; Louis d'Avout, *Property and Propriety Rights*, in ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW, *supra* note 11, at 1429.

80. Matthias Lehmann, *National Blockchain Laws as a Threat to Capital Markets Integration*, 26 UNIF. L. REV. 148, 168 (2021); Florence Guillaume, *Aspects of Private International Law Related to Blockchain Transactions*, *in* BLOCKCHAINS, SMART CONTRACTS, DECENTRALISED AUTONOMOUS ORGANISATIONS AND THE LAW (Daniel Kraus et al. eds., 2019).

Decentralized Autonomous Organizations ("DAOs") to register or acquire corporate personality under dedicated legal provisions, this remains a rarely utilized option. Very few DeFi platforms are hosted or operated by an entity with legal personality; instead, the typical DeFi enterprise operates through a suite of smart contracts stored on a blockchain. Such enterprises are, thus, neither legal persons nor amenable to any localization exercise. Accordingly, it will often be near impossible to find any satisfactory connecting factor to link a staking transaction to a particular legal system. Nevertheless, in the absence of a *lex cryptographica* or other autonomous legal system, the reality is that disputes will be brought before national courts, which will apply the existing law of a recognized legal jurisdiction. As such, notwithstanding the difficulties surrounding the selection of an appropriate connecting factor, a choice must be made. Consequently, in this section, we consider the conflict-of-laws rules applicable to the transactions and legal relationships outlined in Section C above.

A. Contracts

According to the characterizations outlined in Section C, the vast majority of crypto operations considered here fall under the broad umbrella of contract. For contracts, the general rule for the applicable law reflects the near-universally accepted principle of party autonomy:[81] contractual matters are governed by the law chosen by the parties. In the absence of a choice of law or the choice is not clear, different approaches are taken.

In the U.S., many states apply a multi-factorial test, which utilizes a variety of connecting factors. These include the domicile of either of the contracting parties, the place where the contract is concluded, or the place of performance of the contractual obligations.[82] In the EU and the UK,[83] Article 4 of the Rome I Regulation provides for the applicable law in the absence of a choice. If the contract does not fall within the special provisions for specified types of contract in Article 4(1), or aspects of the contract would fall within several of those special provisions, Article 4(2) provides that the law of the place where the party rendering the "characteristic performance" of the contract—usually the non-monetary

81. SYMEON SYMEONIDES, CODIFYING CHOICE OF LAW AROUND THE WORLD: AN INTERNATIONAL COMPARATIVE ANALYSIS 113–15 (2017); GILLES CUNIBERTI, CONFLICT OF LAWS: A COMPARATIVE APPROACH 390 (2d ed. 2022).

82. RESTATEMENT (SECOND) ON THE CONFLICT OF LAWS § 188(2) (AM. L. INST. 1971).

83. The UK has retained the application of the Rome I Regulation after Brexit. *See* The Law Applicable to Contractual Obligations and Noncontractual Obligations 2018, SI 2018/0000, art. 2 (UK).

obligation—has her habitual residence will apply.[84] Under Article 4(3), however, these provisions give way if it is clear from the all circumstances of the case that there is another country with which the contract is clearly "manifestly more closely connected" in favor of that country. Article 4(4) is the final fallback provision, which provides, essentially, that if all else fails, the law of the country with the "closest connection" with the contract applies.

Given that it remains rare for DeFi agreements to contain governing law clauses, the following analyses focus on the applicable law in the absence of a choice by the parties. In this regard, the broader difficulty explicated above of identifying and then localizing actors in the DeFi environment is present in varying degrees, depending on whether the relevant choice of law rule refers to the customer, or his intermediary and/or DeFi construct. Hence, it is worth noting that characterization as either a secured transaction, loan, or a deposit has consequences, not only for the substantive question of who bears the risk of the intermediary's insolvency, but also for the question of private international law as to who the relevant party is when determining the applicable law.

1. Secured Transactions

Very few jurisdictions have specific conflict-of-laws rules for secured transactions in cryptoassets. One example is Switzerland, which submits pledge agreements to the law chosen by the parties or, in the absence of a choice, to the law of the state in which the pledgee has her habitual residence.[85] This rule, which traditionally applied to negotiable instruments, was recently extended to "similar right", with the intention of placing digital tokens on an equal footing with their paper equivalents.[86] Whilst the Swiss rule remains an outlier, it is, in principle, sound. Theoretical and practical considerations suggest that other legislators may follow suit.[87]

The Swiss provision, however, also aptly serves as an illustration of why it is important to distinguish contractual and property matters in

84. Art 4(2) Regulation (EU) 593/2008, of the European Parliament and of the Council of June 17, 2008 on the Law Applicable to Contractual Obligations (Rome I), 2008 O.J. (L 177). For an overview, *see* SYMEONIDES, *supra* note 81, at 178–81.

85. Bundesgesetz über das Internationale Privatrecht [Swiss Federal Private International Law Act] SR 291, art. 105, para. 2 (Switz.).

86. *See* FF 2020 223, 234 (2019).

87. *See generally* Matthias Haentjens & Matthias Lehman, *The Law Governing Secured Transactions in Digital Assets*, *in* BLOCKCHAIN AND PRIVATE INTERNATIONAL LAW 456-478(Andrea Bonomi et al. eds., 2023).

private international law. Given that the Swiss choice of law provision applies broadly to secured transactions, it might be thought to apply to property disputes relating to the underlying security itself. However, it is important to note that the provision remains purely contractual: it expressly provides that the choice of law made according to that provision cannot be asserted against third parties;[88] and where the underlying thing pledged is a claim against a debtor, the only law that may be asserted against the debtor is the law applicable to the underlying claim itself.[89] This means that the proprietary effects of the pledge agreement—e.g., where the validity of the pledge is to be determined relative to third-party claims to the underlying object of the pledge, the question of whether the security interest was validly constituted, or the question of when the property passed—cannot be determined by the law as agreed between the pledgor and pledgee pursuant to the Swiss rule.

Thus, the choice of law is valid only as between the pledgor and pledgee in disputes regarding the contractual aspects of their agreement, e.g., whether there was a default on the secured obligation and the intention that property rights should not pass with possession or control unless there has been a default.

2. Loan

Determining the law applicable to crypto-loan agreements in the absence of a choice of law has a striking precedent in the U.S. Here, courts have faced difficulties in applying the multifactorial test to loan agreements concluded and performed online,[90] and it seems likely that similar difficulties will arise in applying the test to crypto loans. Nevertheless, there is some indication of how the courts may decide the issue as some U.S. courts have favored the law of the lender, particularly for larger transactions.[91]

In the EU, where the parties have not indicated a choice of law, the law of the place where the lender has his habitual residence will be

88. Bundesgesetz über das Internationale Privatrecht [Swiss Federal Private International Law Act] art. 105, para. 1 (Switz.).

89. Bundesgesetz über das Internationale Privatrecht [Swiss Federal Private International Law Act] art. 105, para. 3 (Switz.).

90. *See supra* Section B.4.

91. *See, e.g.*, Gainer Bank, N.A. v. Jenkins, 672 N.E.2d 317, 319 (Ill. App. Ct. 1996); Tuition Plan, Inc. v. Zicari, 70 Misc.2d 918, 922 (Sup. Ct. N.Y. Cnty. 1972); Bowmer v. Dettelbach, 672 N.E.2d 1081, 1085-86 (Ohio Ct. App. 1996); Pac. Gamble Robinson Co. v. Lapp, 622 P.2d 850, 855-56 (Wash. 1980). However, a part of the literature assumes the location of the debtor to be decisive when determining the applicable law. *But see* HAY, *supra* note 12, at 1163.

applied under Article 4(2) of the Rome I Regulation. Under the Court of Justice of the European Union ("CJEU") case law, it is the lender, not the borrower, who renders the characteristic performance of the contract.[92] This, however, is without prejudice to Article 6, which provides that where one party to the contract is a consumer, the law of the place of the consumer's habitual residence applies.[93] Accordingly, if the customer is characterized as the lender, or is treated as a consumer, identifying the law applicable to a crypto lending agreement under the EU rules might be relatively simpler than where it is the DeFi staking intermediary who falls to be characterized as the lender.

Finally, it is important to note that crypto lending activities may well be structured as chains of loan contracts, which must be considered separately in any conflict-of-laws analysis. For example, the contract by which the customer transfers his cryptoassets to the crypto lending platform's pool is very likely to be a separate one from that entered into by the crypto lending platform when lending out the assets in its pool. These contracts will be governed by their own laws, which will not necessarily be the same.

3. Deposit

Characterization of a staking operation as taking effect via a deposit agreement, on the other hand, yields a contrary result. Here, the characteristic performance of the contract centers around the *receipt* of the asset deposited, which falls upon the person *receiving* the asset, i.e., the custodian. Thus, it is this person who provides the characteristic performance and to whose habitual residence the contract is most closely connected. This result is sensible for yield farming, and possibly also for crypto lending, but is not easy to defend in the case of staking.[94] Given that this remains the staking intermediary, identifying the applicable law will likely face all the difficulties of identifying and localizing an actor in the DeFi space.

92. Case C-249/16, Kareda v. Benkö, ECLI:EU:C:2017:472, ¶ 41 (June 15, 2017); *see also* Matthias Lehmann, *Bonds and Loans*, in ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW, *supra* note 11, at 215, 217.

93. Art 6 Regulation (EU) 593/2008, of the European Parliament and of the Council of 17 June 2008 on the Law Applicable to Contractual Obligations (Rome I), 2008 O.J. (L 177).

94. *See supra* Section C.3.

B. Partnerships

Where it is asserted that a staking operation has been carried out as a partnership, the first, and only real, question in the insolvency context will be whether a partnership has been validly formed or entered into. There are, however, two main prevailing approaches to determining the law applicable to the question of whether a partnership, corporation, or other entity has been validly formed (or, conversely, has been validly dissolved). Usually, the questions with which an insolvency practitioner will be concerned in these circumstances—i.e., the legal consequences as to the intended property rights in partnership assets, and any limitations of liability—are governed by the same law. The first approach looks to the place where the entity was founded (or purportedly founded), which is known in some jurisdictions as the "incorporation theory."[95] The second approach looks to the place where the entity has its effective place of management, which is sometimes known as the "seat theory." Both theories, however, are difficult to apply in the staking environment.

For the incorporation theory, it will not generally be possible to localize the foundational act — whatever may be said — to create the entity used for staking purposes. Save for those DAOs and other associations that have opted for incorporation in those jurisdictions where this is a possibility,[96] the vast majority of DeFi platforms do not incorporate or register as a legal entity in any formally recognized sense. Rather, the platform "entity" comes into existence with some "foundational" act that takes place under online and decentralized circumstances, such as the launch of a blockchain or Initial Coin Offering of the native cryptoassets of the newly founded platform. Insofar as the foundational act remains rooted in contract—i.e., for any partnership that takes legal form entirely as a nexus of contracts—it may be possible to apply the conflicts of law rules for contract. Such analysis will likely lead to the application of the law of the state with which the general partnership is most significantly connected.

Seat theory faces different considerations. Although DeFi entities generally have no centralized method of governance, but instead rely on direct voting by participants holding relevant cryptoassets, there are nevertheless several candidates for the place of an effective seat of

95. From a European perspective, see STEPHAN RAMMELOO, CORPORATIONS IN PRIVATE INTERNATIONAL LAW: A EUROPEAN PERSPECTIVE 95–96 (2006). from a U.S. perspective, see HAY, *supra* note 12, at 1339–44 (2018); Marc-Philippe & Chris Thomale, *Companies*, *in* ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW, *supra* note 11, at 405–06.

96. For example, see VT. STAT. ANN. tit. 11, § 4173 (2018); WYO. STAT. ANN. §§ 17-31-101–116 (2021).

management. First, management could be localized by reference to the decentralized method of governance itself, such that the effective place of management is the place where the majority of the voting participants have their habitual residence or registered office. A second approach could be to look to the "core team" of software developers who, as approved by the voting participants, are responsible for programming and maintaining the underlying algorithms and front-end aspects of the platform, such as the website. As noted above, the common difficulty, however, remains that although these persons, particularly the core team, can be identified to some extent, in many cases their physical locations are dispersed across the world in a vast range of jurisdictions, or their place of residence is simply unknown. This does not change even if the focus shifts from the persons to their activities, such as where the core team might coordinate maintenance of the algorithms because regular and consistent use of specific premises is highly unlikely for the vast majority of DeFi platforms.

In sum, the characterization of staking and similar operations being carried out as partnership businesses pose difficulty not only for characterization itself but also for private international law. This is somewhat ironic, given the extent to which these operations, considered from the commercial perspective of investment funds, are amenable to the partnership analysis. It may well be, therefore, that modifications to the rules on registration may be forthcoming to accommodate some forms of staking activity.

C. Trusts

Specific rules of private international law for trusts are comparatively rare. Perhaps unsurprisingly, they are practically unknown in those, typically civil law, jurisdictions where the trust institution is neither known nor recognized.[97] Courts in these jurisdictions tend to look to the context in which the trust has been used, and then apply the most appropriate rule in the circumstances, e.g., those for inheritance, family, debt, or property law.[98]

Even in common law jurisdictions or where the Hague Trusts Convention applies, the applicable rules are difficult to state with complete certainty, given the complexity of the trust institution and the vast range of

97. Anatol Dutta, *Trust*, *in* ENCYCLOPEDIA OF PRIVATE INTERNATIONAL LAW, *supra* note 11, at 1753.

98. *Id.* at 1757.

legal issues that may arise in a trust dispute.[99] As with the partnership's analysis, however, the present insolvency context calls only for a broad examination of the law applicable to the validity, construction, effects, and administration of a trust. In this respect, the Hague Convention provides two rules. The primary rule is that these matters are governed by the law chosen by the settlor, express or implied, in the instrument creating or writing evidencing the trust, interpreted if necessary in the circumstances of the case.[100] In the absence of such choice, the law of the place with which the trust has its closest connection will be applied; with particular regard to be had to: (a) the place of administration of the trust designated by the settlor,[101] (b) the situs of the assets of the trust,[102] (c) the place of residence or business of the trustee,[103] (d) the objects of the trust and the places where they are to be fulfilled.[104]

Given the rarity of express choices of law, the question of whether a staking operation gave rise to a trust will be determined by a law either impliedly chosen or the law with which the alleged trust has its closest connection. Hence, it is worth noting several differences and similarities with contracts and partnerships.

First, an implied choice of law by reference to the instrument creating or evidencing the trust may play a greater role than for outright contracts. Depending on the purported written instrument evidencing the alleged trust and the circumstances in which the trust was created, this may be of significant assistance in determining the law governing the trust.

Second, similar challenges of identifying and locating the parties seen in the contexts of contracts and partnerships arise in the trust context: the factors prescribed by the Hague Convention tend to focus on the intermediary or DeFi construct as the trustee and/or person administering

99. These include, for example, the capacity of all parties involved, the validity of the act transferring the trust assets, the question of resulting and constructive trusts.

100. *See* Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 6, July 1, 1985, 1664 U.N.T.S 331; RESTATEMENT (SECOND) OF CONFLICT OF LAWS §§ 269(b)(i), 270(a), 271(a), 272(a) (AM. L. INST. 1971); Loi portant le Code de droit international privé [Private International Law Act], M.B., July 27, 2004, art. 124, § 1(1), https://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2004071631&table_name=loi.

101. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 7(2)(a), July 1, 1985, 1664 U.N.T.S 331.

102. From a U.S. perspective, *see* HAY, *supra* note 12, at 1275, 1278; Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 7(2)(b), July 1, 1985, 1664 U.N.T.S 331.

103. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 7(2)(c), July 1, 1985, 1664 U.N.T.S 331.

104. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 7(2)(d), July 1, 1985, 1664 U.N.T.S 331.

the trust. Identifying these persons and their location, or the location where they carry out "trust business" will therefore be problematic.

Third, recourse to the *situs* of the assets and the objects of the trust raises further considerations that are specific to the trust context. *Situs* will be treated in greater depth below in the context of the law applicable to proprietary issues; for present purposes, it suffices to state that this connecting factor remains problematic. The objects of a trust, on the other hand, is interesting in the present context; not only because it is a factor to be considered only in the trust context, but also because it provides a direct link between connecting factors for the purpose of private international law, and the ultimate objective of the parties to the transaction. The object of a purported "staking trust" can be analyzed in various ways, but the best analysis probably is that the broad objective is to generate profits, which is carried out by the trustee applying the staked assets to a particular staking operation in accordance with the terms of the trust. Accordingly, some connecting factors relating to the object of the trust are more problematic than others. The blockchain itself, or the location of notes, faces the broad issues set out above, whereas localizing the broad objective of profits may well find some common ground, however with the familiar issue of localizing financial loss.

Finally, in the present broader context of insolvency rights, it remains important to stress that the Hague Convention does not prevent the application of mandatory provisions of the law designated by the conflict of law rules of the forum relating to, inter alia, the transfer of title to property and security interests in property;[105] the protection of creditors in matters of insolvency;[106] and the protection of third parties acting in good faith.[107] The latter is particularly important to note, given that the traditional approach in English private law is that a beneficiary's rights under a trust are not effective against a third party bona fide purchaser for the value of the trust asset without notice of the beneficiary's interest.

In sum, the overall position under the Hague Convention remains that, once the validity or invalidity of an alleged trust has been established by the relevant governing law, identified using the conflict of laws rules of the Convention; questions of property rights in the trust assets—including claims by third parties and creditors in insolvency—will be governed

105. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 15(d), July 1, 1985, 1664 U.N.T.S 331.

106. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 15(2), July 1, 1985, 1664 U.N.T.S 331.

107. Hague Convention on the Law Applicable to Trusts and on Their Recognition art. 15(f), July 1, 1985, 1664 U.N.T.S 331.

by the mandatory provisions of the law that applies to the specific matter arising under the conflicts rule of the forum.

D. Proprietary Issues

Determining the law applicable to cryptoassets' proprietary issues is arguably the most difficult issue of conflict of laws.[108] However, this question is of prime importance in the context of the customer rights of those engaged in staking or a similar operation with an intermediary in the latter's insolvency.

As noted above, when determining the legal consequences that flow from any transfer of assets from one person to another, the first question is to ascertain the basis for the transfer itself. In the insolvency context, however, this is only the first step; the key question will ultimately be whether or not property rights have passed from the transferor to the (now insolvent) transferee or have otherwise been validly created between the parties. As illustrated above, concerns about security interest creation are not a simple matter of the parties' intentions but also depend on the validity of the agreement and any applicable mandatory requirements.

First, even in the case where parties intend that the transferee becomes the owner of the asset being transferred (i.e., a sales contract), different jurisdictions take different approaches as to *when* the buyer becomes the owner of the asset transferred. This takes on prime importance in cases where either party becomes insolvent before the transaction has been properly completed. Where the dispute has cross-border dimensions such that the rules of private international law are engaged, the general rule, consistent across jurisdictions, that remains is that property matters are governed by the *lex situs*, i.e., the law of the place where the object of the property rights is situated at the time of the relevant acquisition. Thus, if two citizens of State A enter into a contract governed by Law A for the sale of a horse situated in State X, Law A will govern the contractual aspects of the contract; but the question of when the buyer becomes the owner of the horse will be determined by the law of State X. This question is of prime importance as it determines what rights both parties have should one become insolvent before the price has been paid and/or property has been passed.

108. *See, e.g.*, Andrew Dickinson, *Cryptocurrencies and the Conflict of Laws*, *in* CRYPTOCURRENCIES IN PUBLIC AND PRIVATE LAW para. 5.93–5.94 (David Fox & Sarah Green eds., 2019); see generally Michael Ng, *Choice of Law for Property Issues Regarding Bitcoin Under English Law*, 15 J. PRIV. INT'L L. 315–38 (2019).

Second, different jurisdictions take different approaches to determining property rights where there has been a transfer of the asset in fact, but the underlying basis for the transfer is held to be invalid under its applicable law. Assume, for example, that pursuant to the contract for the sale of a horse governed by Law B the seller delivered the horse to the possession of the buyer, which is sufficient to transfer property, and the buyer has paid the price. If, however, that contract for sale is held, under Law B, to be for some reason invalid—say on formal grounds of capacity—the seller's ownership of the horse does not change, and he may therefore bring a claim as *owner* for recovery of the horse as against the buyer. By contrast, Law C may provide that, in the same circumstances, property in the horse remains in the buyer, and the seller only has a personal claim against the buyer for unjustified enrichment.[109] Again, the question of what the transferor has will be of prime importance in an insolvency; should any of the transactions considered above be held invalid under the applicable governing law, the question of what rights the parties have in the assets undeniably in control of the intermediary will fall to be determined by the *lex situs*.

Third, if, according to the proper law of the relevant transaction identified in Section D(1-4), the legal basis underpinning the transfer is invalid—i.e., the contract is invalid, or a partnership or trust has not been validly constituted—the ultimate question of who has proprietary rights in relation to which assets will be determined by the *lex situs*. As noted, the general rule of private international law, consistent across jurisdictions, is that such proprietary issues are governed by the *lex situs*. These rules, however, are extremely problematic for cryptoassets for two main reasons. First, such assets are essentially intangible data objects without any physical situation at all; as such, they cannot sensibly be said to be "situated" anywhere in any meaningful sense for the purpose of the rules based on situs. This is not inherently problematic: the general approach of private international law for such intangible assets lacking a physical existence, notably claims and intermediated securities, is to ascribe to them an artificial location to which the situs rules can then be applied. Thus, a debt is often held for the purpose of conflict of laws to be located at the place where it can be enforced; intermediated securities held with an intermediary are located at the place of the relevant intermediary account.[110] A closer analysis of the fictitious "situs" of such intangible

109. Such is the case under German property law. *See* Jürgen Oechsler, in Münchener Kommentar zum Bürgerlichen Gesetzbuch § 929, para 5 (Reinhard Gaier ed., 9th ed., 2023).

110. *See* Hague Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary art. 4, July 5, 2006, T.I.A.S. 17-401, 46 I.L.M. 649.

objects reveals that all that is really being done is using an alternate connecting factor. As such, it may well be possible to localize a cryptoasset by reference to a variety of other factors, such as the location of the private key, the blockchain, or the habitual residence of the programmer of the smart contract or blockchain protocol.[111]

This leads to the second reason why cryptoassets pose such a challenge to the traditional approach of private international law to property issues: none of these alternative connecting factors are particularly compelling. Each provides only a very tenuous connection to the object, may point to several places at a time, and may involve a choice of law that has nothing to do with the parties or the issues in the dispute. This is, furthermore, hardly surprising: as noted at the outset of Section D, the ideology pursued by the original decentralized ledger and cryptoasset results in a thing that exists, quite literally, not just "nowhere" but "nowhere and everywhere at once." In these circumstances, isolating one connecting factor over another results in a choice that can only feel unsatisfactorily arbitrary.

The situation is further complicated by the various degrees of centralization and intermediation which, although running counter to this original ideal of decentralized trust, tends to be by far the norm in commercial practice. Hence, generally the greater the degree of centralization or intermediation, the easier it is to justify a choice of connecting factor based on the entities that facilitate centralization and/or intermediation. Thus, for networks run by a central operator who, furthermore, grants or denies access to the participants permitted to join the network and trade in its cryptoassets, such central operator might be said to be able to choose the law applicable to the network as a whole.[112] In the absence of such a choice, the central operator itself can be taken as the relevant connecting factor, giving rise to possibilities such as its registered office or habitual residence. Similarly, for cryptoassets that have an issuer or are held with an intermediary, such as a custodian or exchange, it may be sufficient to apply the law chosen by the issuer or in the intermediary's terms and conditions.[113]

111. FIN. MKT. L. COMM., DISTRIBUTED LEDGER TECHNOLOGY AND GOVERNING LAW: ISSUES OF LEGAL UNCERTAINTY (2018).

112. For example, see ASX SETTLEMENT CORP., CHESS: CLEARING HOUSE ELECTRONIC SUBREGISTER SYSTEM (2011).

113. *See* UNIDROIT, *Principles on Digital Assets and Private Law*, Study LXXXII – W.G.8 – Doc. 2, Principles 5(1)(c), (6) (Mar. 9, 2023).

E. The Applicable Law to Torts

For the sake of completeness, we will also address the question of the law applicable to torts committed regarding staked cryptos, like "rug pulls" or similar delicts. It is possible for the parties to a tort claim to choose the applicable law. However, such a choice is much more limited than a choice made in a contract.[114] Typically, a distinction in torts is made between a choice made prior to the occurrence of the event giving rise to the claim and a choice made after this event. The latter is largely uncontroversial and permissible without restriction. By contrast, a choice of law prior to the arising of the claim resulting from a tort is only possible under certain conditions or is otherwise completely excluded.[115] However, since the parties will often not be able to agree on a law to be chosen in the event of a dispute, the choice of law for torts is only of very minor importance. In the absence of a choice of law, the determination of the applicable law for a tort claim is typically linked to a pre-existing relationship,[116] to the common domicile of the parties of the tort,[117] or the place of the tort—the *lex loci delicti*.[118] This comprises both the place where the tort was committed and the place where the damage resulting from the tort occurred.

Due to the large number of tort claims potentially arising in connection with DeFi, it is not possible to address all potential situations on a case-by-case basis. Instead, the following is intended to describe in abstract terms the connecting factors potentially relevant in these cases, as well as the difficulties in determining those factors. In doing so, it is necessary to consider, as a starting point, the typical factual circumstances in which tort claims may arise in connection with DeFi. Torts involving cryptoassets typically have at least three factual reference points that can be used to determine the applicable law: each of the two parties to the tort, and the smart contract into which the cryptoassets at issue are introduced. These points of reference provide a multitude of connecting factors, which in turn raise the question of localization. If the traditional connecting factors for non-contractual obligations arising in connection with DeFi described above are taken as a basis, identifying the applicable law is straightforward insofar as a legal relationship, like a staking agreement

114. Graziano, *supra* note 79, at 1710–11; CUNIBERTI, *supra* note 81, at 436; SYMEONIDES, *supra* note 81, at 40–42, 51–53.

115. SYMEON SYMEONIDES, CODIFYING CHOICE OF LAW AROUND THE WORLD: AN INTERNATIONAL COMPARATIVE ANALYSIS 99–102 (2017).

116. Graziano, *supra* note 79, at 1712–13; *see* HAY, *supra* note 12, at 806–07.

117. Graziano, *supra* note 79, at 1712–13; *see* HAY, *supra* note 12, at 794–800, 801–04.

118. Graziano, *supra* note 79, at 1710–11; CUNIBERTI, *supra* note 81, at 436; SYMEONIDES, *supra* note 81, at 40–42, 51–53.

or an agreement on the deposit of cryptoassets, exists to which the determination of the applicable law can be linked. In these cases, the law applicable to this legal relationship is also decisive for the tort.

The place where the tort was committed may be helpful where it can actually be identified (e.g., where a hacker has intruded into a DeFi construct from his home). However, in other cases, it will be impossible to determine. The question of determining the place where the damage occurred is even trickier. From a legal point of view, it is already questionable how precisely this place is to be determined. For instance, one could refer to the location of the cryptoassets, the location of one of the parties, the location of an intermediary, or the location of the smart contracts by means of which the DeFi construct is realized. From a factual point of view, these places often cannot be located. For example, what criteria should be used to determine the location of cryptoassets recorded on a decentralized blockchain? How can an intermediary be geographically located if it has no legal personality and no physical presence? Insofar as the place where the damage occurred depends on the DeFi location, it has already been shown that this is possible in some cases under certain conditions, but as a rule, one is confronted with almost insurmountable hurdles based on DeFi functionality.[119]

Realistically, using the connecting factors described above, a court will often not be in a position to determine the applicable law to a tort in the DeFi context. Instead, a court could apply the law of the forum. However, this would incentivize claimants to shop for the forum that has the law most favorable to their claim. A preferable approach would be to follow the law at the place of domicile of the victim. This will result in the application of the same law regardless of where a claim is brought. Such an approach can be justified under the traditional prevailing European approach where the victim's domicile is the "place where the damage occurs." There are some cases in which such a view has been accepted by the European Court of Justice, specifically with regard to torts committed online.[120] This could provide the basis for a larger acceptance in other cases as well.[121] The advantage of this view is that it protects the victim of rug pulls and other scams.

119. *See supra* Section D.

120. Case C-375/13, Kolassa v. Barclays Bank, ECLI:EU:C:2015:37, para 55 (Jan. 28, 2015); Case C-509/09, eDate Advert. GmbH v. X v. MGN Ltd., 2011 E.C.R. I-10269, paras 49 and 52.

121. *See* Matthias Lehmann & Emeric Prévost, *Table Ronde sur la Methode de la Localisation dans L'espace Digital* [*Roundtable on the Method of Localisation in Digital Space*], 2022 INT'L BUS. L.J. 725, 736 (2022).

The determination of the applicable law for torts is therefore fraught with considerable difficulties in legal and factual terms, insofar as these cannot be linked to an existing contractual relationship. In view of the limited admissibility of a choice of law, such a choice also offers an adequate possibility for a legally secure determination of the applicable law only in the rarest of cases. Unless the law cannot be determined otherwise, the law of the victim's domicile should be applied.

CONCLUSION

This contribution has sought to explore the insolvency risks customers run when using cryptoassets to generate passive income through an intermediary. As has been demonstrated, there is considerable legal uncertainty on the rights a customer has on the intermediary's insolvency, which, absent legislation or authoritative case law, cannot be mitigated. Some general points can however be made.

First, it is important to recognize that, whilst the term staking is loosely understood in practice to mean using cryptoassets as an investment asset, it is not a term of art. This paper has demonstrated that there are a wide range of practices that resemble staking in the proper sense of the word but must be distinguished from it. This is primarily because, from a legal perspective, they give rise to a very different set of legally relevant facts—such as an outright transfer of the asset—and different legal inferences as to the parties' intentions with respect to those facts.

Second, the rights of the customer who has engaged in such transactions on the intermediary's insolvency will depend, in the first instance, on how a court will characterize the asset transfer transactions. This is relevant for the conflict-of-laws rule that will ultimately be followed by the forum to determine the law governing those transfer transactions. This governing law will, then, have the final say on whether the parties have agreed on a transfer.

Third, the ultimate question of whether a transfer of ownership has taken place, e.g., from the staker to the intermediary, with the result that the former will only have a personal right against the latter, will fall to be determined by reference to the relevant property law. This law will set out the conditions for the transfer, besides a valid agreement.

Finally, it is important to note that since the conflicts of law rules are different from court to court, the law applied ultimately depends on where the intermediary's insolvency is opened, i.e., the location of the bankruptcy court. As this cannot always be predicted, an element of uncertainty remains. Nevertheless, it is possible to draw a spectrum of risks. It can be safely predicted, for instance, that a direct staking agreement is

likely to involve the least risks for the customer in the event of insolvency of the intermediary, whereas a crypto lending arrangement carries high risks for him. All other transactions are situated between these two extremes. Which risks are actually incurred can be said only after the national law applicable to the operation and the underlying cryptoasset as an object of property rights has been identified.

Staking Your Crypto: What are the Stakes?