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The legal legitimacy of cross-border RWA financing: challenges and responses

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Abstract. RWA financing across borders combines recognition of real-world assets on the one hand, and issuance in the form of tokens and their subsequent automated settlement on the other. This combination poses issues of enforceability of the underlying rights, classification of securities, cross-border capital controls, and institutional responsibility. The present paper considers the hypothetical structure which includes RWA from Mainland China and its issuance through a SPV in Hong Kong. The analysis involves doctrinal research of the laws of Mainland China and Hong Kong, structured regulatory coding, transaction modelling and limited comparison with the Howey test in the U.S. In total, three cumulative criteria are identified that determine the legality of such transactions. First, the rights attached to the assets need to be effectively transferred or allocated. Second, the regulatory requirements concerning the issuance and settlement must be satisfied. Finally, investor rights should be enforceable against particular entities. Smart contract automation might redistribute the responsibilities without changing contractual and regulatory liabilities. The transaction node approach enables the connection between asset origination, issuance, custodianship, oracles, settlement, and secondary transfer and relevant parties, rights, and authorities.

Keywords: real-world assets, cross-border financing, tokenised securities, legal legitimacy, digital asset regulation

1. Introduction

Tokenisation refers to the creation of digitally transferrable token representations of legally enforceable claims over physical or financial assets, but such a token would not automatically carry any property, contractual or priority right attached to the underlying asset [1]. Therefore, for tokenisation, there should exist an effective legal link between on-chain record and off-chain right, especially when assets, issuers, investors, custodians and trading platforms are domiciled in various jurisdictions [1]. Security token offerings, for example, show how blockchain instruments continue to be shaped by securities laws, issuer governance, and the regulatory regime of issuance [2, 3]. Recent studies therefore move from categorisation to legal certainty and functional regulation of blockchain [4]. As shown by the experience of MiCA, adoption of blockchain heavily relies on clearly defined regulatory categories and corresponding obligations [4, 5]. Approaches to functional regulation of decentralised finance state that regulatory responsibility should follow economic function and related market failures rather than the label assigned to particular protocol [6]. Similarly, research on crypto-finance

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finds information asymmetry, operational concentration, agency problems and interconnectedness which are characteristic of conventional finance [7]. This becomes especially important for situations of separation of issuance, settlement and asset custody in a legal sense. Settlement layer creates additional fragmentation. MiCA scholarship points to the fact that stablecoin regulation should take into account innovation in conjunction with reserve, governance and investor protection limitations [8], whereas Basel-related analysis demonstrates the increasing connection of tokenised assets with blockchain settlement and banking regulation [9]. Even though US GENIUS Act has formalised the regulation of payment-stablecoins, custody, liquidity and cross-border implementation questions still arise [10]. How does a Mainland asset/Hong Kong issued RWA transaction uphold effective rights and institutions at all points in its lifecycle? This paper considers issues related to the transfer of the asset, the characteristics of the token, cross-border financing, custody, settlement, and investor recourse. Contribution is in the form of a transaction node-based legal framework linking law with transaction actors and activities.

2. Literature review

2.1. RWA tokenisation and the legal reconstruction of asset rights

RWA tokenisation decouples the digital embodiment of the value from legal means that establish ownership, security interest, receivables or cash flow rights. Fractionalisation and automatic transfer could increase divisibility and the efficiency of settlement, however the practical significance of such effects could be achieved only if the acquisition of a token is legally linked to an enforceable right against some specific pool of assets or obligor. Cross-border structures amplify this link since governance laws, situs of assets, insolvency regime, perfection requirement and remedies could pertain to different parts of one and the same transaction [1-5]. Legal legitimacy thus presupposes the link between the token, underlying asset, issuer's obligations, and the set of rights available upon default.

2.2. Decentralised algorithms and regulatory attribution

The distributed ledger technology enables the decentralisation of the accounting records and automation of the transfer through smart contracts; still RWA financing has the points of substance control identified. The originator controls asset quality, the special purpose vehicle establishes rights for the financing, custodian preserves the assets or the keys, oracles supply off-chain data, licensed intermediaries control access of the investors. The question is the difference between technical and legal decentralisation [6, 7]. If an institution has control over the issuance parameters, settlement process, selection of oracles, management of the reserve, enforcement of the underlying claims, then the regulatory attribution could be established. Thus functional re-centralisation could be used as a ground for attribution.

2.3. Securities characterisation and cross-border regulatory mismatch

The financing with the use of tokens could be characterised with the use of securities, asset-backed products, collective investment arrangement, payments or contractual rights, depending on the jurisdiction and structure of the transaction. The classification based on the type of financial instrument becomes fragile where there is a separation between the issuance of token, ownership of the asset, settlement and secondary trading [8-10].

3. Methodology

3.1. Regulatory corpus and structured legal coding

The legal collection includes 2023–2026 materials from the PBOC, CSRC, NDRC, and SAFE for Mainland China, the SFC and HKMA for Hong Kong legislation, and pertinent American laws related to stablecoins and securities classifications. Legal coding is done in NVivo 15 for provisions across nine categories including asset classification, issuance authorization, investor eligibility, disclosure, custody, settlement, foreign exchange controls, data governance, and enforcement jurisdiction. Each provision is coded for legal authority, regulated party, stage of transaction, mandatory/permissive effects, and territorial trigger. The second iteration links duplicate provisions to the transaction node for assessment of regulatory density and conflict of attribution rather than mere coding. Reliability is measured through double-coding of 20% of the sample using Cohen's Kappa, and legal uncertainty is maintained where a provision relies on licensing, investor classification, or asset classification criteria not discernible from the token itself.

3.2. Cross-border RWA transaction mapping

The transaction-level regulatory structure is illustrated in Figure 1. An illustrative transaction is diagramed using Microsoft Visio. The Mainland company transfers income-generating assets or flow-of-cash claims to a Hong Kong SPV, which issues security tokens backed by assets using the services of a licensed intermediary. The settlement is made using an HKMA-authorized fiat-based stablecoin, and smart contracts handle the process of token issuance and distribution of flows of cash. The transaction is broken down into asset generation, asset transfer to SPV, token issuance, token distribution, token custody, settlement, oracle update, cash flow allocation, and secondary token transfer.

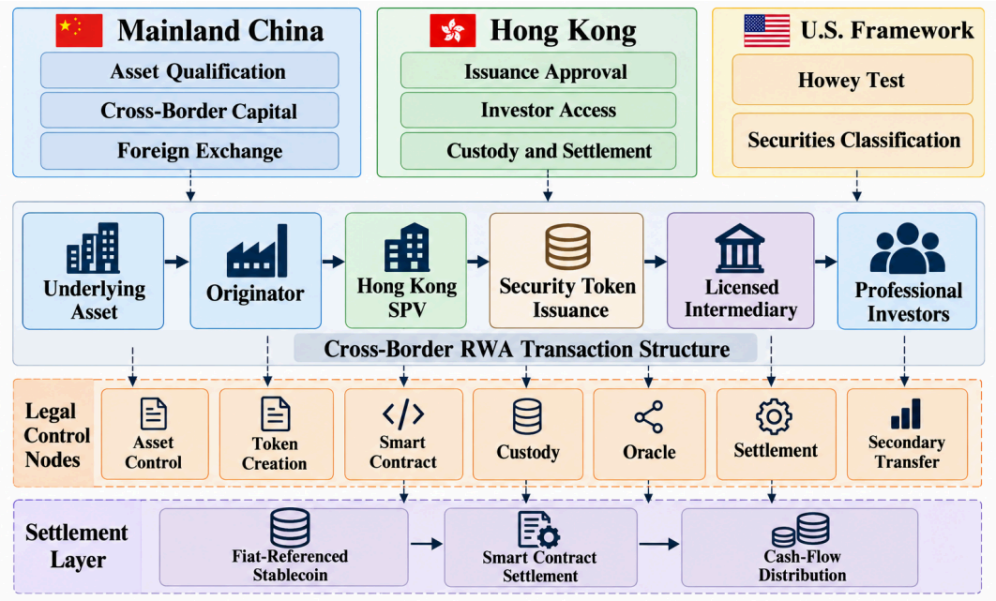


Figure 1. Transaction-level legal control and regulatory attribution framework for cross-border RWA financing

3.3. Algorithmic decentralisation and legal control analysis

The concept of legal responsibility is discussed based on the control of resources, control over the operation of algorithms, control of physical information, rights to economic rewards, and the duty to enforce claims. All these are issues of interpretation, not components of a mathematical formula used to compute liability. For instance, the payment obligation of the SPV cannot be extinguished even when there is automation of payments; the custodian is only responsible depending on the type of resource or key held; and the oracle gives rise to issues about verification and liability for false information. Responsibilities are derived from contract law, legislation, and regulation. When more than one party controls different aspects of a process, their responsibilities can be determined.

3.4. Comparative securities classification

The token architecture is evaluated with respect to Mainland securities laws and asset securitisation laws, the Securities and Futures Ordinance of Hong Kong, and the four elements of Howey test. Python version 3.12 and pandas library are employed to generate a binary plus weighted categorisation matrix based on the token, transactions and financing arrangements level. For each category, a satisfaction score is provided, along with the legal basis for this categorisation and uncertainty tag in cases where the relevant law includes some facts not observable from the token architecture. Then, pairwise divergence between the jurisdictions is carried out in order to discover whether identical economic function is categorised via different legal gateways.

4. Application and regulatory validation

4.1. Transaction-level legal legitimacy test

In the analysis of the transaction, the following aspects have been taken in sequential order: domestic asset creation; issuance offshore; stablecoin settlement; and subsequent transfer. Five aspects have been kept constant in the entire range of scenarios: the legality of the asset, approval for financing, cross-border investment compliance, the enforceability of investor rights, and the traceability of the transaction. All these aspects have been rated between 0 to 1 based on the codified law and the documents. A transaction will be deemed valid only if the critical node rating does not go below 0.60 and the average weighted rating is above 0.75, which would ensure that no aspect of the transaction makes up for the other in terms of legal compliance.

4.2. Howey-based regulatory stress test

Three hypothetical levels of automation of the smart contract are presented with the constant level of the pool of assets and economic rights of investors. Such scenarios will vary in terms of discretion by the issuer, use of oracle, voting of token holders and automatic distribution. Their aim is to find out whether there are any differences in the reliance on managers' actions, in the content of investors' rights or in the category of persons who should be regulated. Such scenarios will be analyzed in terms of Howey test and further, in terms of Mainland and Hong Kong classification.

4.3. Regulatory response and framework validation

Observed deficiencies become an actionable node-based structure for asset originations, issuances, algorithmic controls, custodies, settlements, disclosures, and investor access. Responsibility depends on actual control and legal interests and not on where the server happens to physically be located or where the token is nominally based. The node-based structure is back-tested using requirements from the 2026 Mainland filing requirements

and Hong Kong tokenized securities requirements. Verification shows how each required permission, filing, licensed activity, investor prohibition, custodial responsibility, and settlement protection can be attributed to a unique node.

5. Results and discussion

5.1. Conditions for the legal legitimacy of cross-border RWA financing

The study shows that a structure of cumulative legality exists. The asset used should guarantee a legitimate right which can be transferred. The SPV should have the enforceable right or properly formulated claim. Lastly, there should be a legal right available to the investor through tokens. There are challenges if the token can be transferred on-chain but the off-chain claim is not enforceable. There may be contractual mechanisms which work well, but there are still problems with capital flow. Insolvency protection is very crucial as the recovery process will depend on the isolation of the asset, priority, and claims available against the obligor. There are no percentages to define legal-legitimacy in these terms. In particular, choice of law in the contract is not enough to override the financial regulation. Moreover, the promise of redemption in case of tokens may not be helpful if the obligor has no assets.

5.2. Decentralisation algorithms and inadequacies of traditional securities classification

From the proposed scenarios, it is clear that an increase in automation would involve redistribution of discretion without altering many of the existing legal relationships. Money could be allocated according to code, but asset servicing, data validation, default handling, and enforcement would still need to be done by someone. While for the Howey comparative test, the changes in dependency on management might influence characterisation, classification under the rules of both jurisdictions would have to be carried out independently from the respective legal tests.

5.3. Regulatory disparities and node-based responsibility framework

The most important cross-border challenges relate to capital flow, investor protection, and settlement. An asset can have its creation governed by the law of the Mainland but the issuance of securities and intermediary activities can be regulated by the law of Hong Kong. The dispute may thus include several jurisdictions' laws and enforcement regimes. The networked approach provides a clear identification of who performs each task and which law applies to it. Specifically, oracle data, custody, and settlement directions need clear assignment of responsibilities and regulation. Overlap in responsibilities could be legitimate when it serves different stakeholders' interests, like ownership and market protection of the investors.

6. Conclusion

Cross-border RWA financing is legal only if the token, underlying asset, financing authority, settlement, and investor remedy maintain an enforceable legal relationship among each other. Technical decentralisation does not exempt from regulatory responsibility in cases where originator, SPV, custody, intermediation, oracle, and settlement institutions retain substantive control. Comparisons also reveal that classification of instruments might differ across jurisdictions despite the similarity of economic functions. Node-based functional framework proves to be more consistent tool for distribution of responsibility in asset formation in Mainland, Hong Kong issuance and settlement, and cross-border participation of investors.

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