



Asian Financial Economics and Policy

Volume I, Issue 2, October 2026

ISSN: 3116-5575 (Online)

<https://journal.ijhba.com/index.php/afep>

<https://slsipress.com>

Boom, Bust, and Catch-Up: Non-Fungible Tokens, Informal Financial Inclusion, and Regulatory Lag in Southeast Asia

Ramon George Atento, PhD
Andrea Gwyneth B. Atento, MBAC

Abstract

The Philippines was briefly the world's largest market for non-fungible token (NFT) ownership, driven by the play-to-earn game Axie Infinity during the pandemic, with Vietnam and Thailand close behind. This conceptual paper examines that episode as a case in which NFT-based play-to-earn income functioned as an informal financial-inclusion mechanism during an economic shock, while regulatory and fiscal responses across the Philippines, Vietnam, Thailand, and Indonesia lagged behind adoption. Because no bulk dataset exists for NFT activity at the country level, the paper builds a thematic literature synthesis — drawing on financial-inclusion theory, fintech regulatory-lag theory, NFT/play-to-earn market scholarship, and comparative Southeast Asian digital-asset regulation — rather than an econometric analysis. The review finds that informal, unregulated income channels are theoretically and empirically recognized as legitimate resilience mechanisms under shock, and that fintech regulation generally follows rather than anticipates adoption. Applied to the four focal countries, the evidence shows genuine variation in regulatory posture but a shared pattern of reactive timing, with attention arriving after play-to-earn adoption had already peaked. The paper's central finding is that NFT-based play-to-earn income cannot be resolved into either an inclusion narrative or a fragility narrative alone; it exhibits both simultaneously, a hybridity the existing literature does not directly reconcile. This reframes the region's regulatory-lag problem as one of protecting participants after a cycle has contracted, not only shaping innovation still underway, and points toward retrospective consumer-protection instruments and earlier monitoring infrastructure as complementary policy responses. The paper is explicitly positioned as a precursor to future survey- or transaction-data-based empirical work.

Keywords: *Non-fungible tokens; financial inclusion; regulatory lag; play-to-earn; Southeast Asia; fintech regulation; consumer protection*

1. Introduction

Between 2020 and 2022, Southeast Asia became the unexpected epicenter of a global financial-technology experiment that formal economic policy was not built to anticipate. Driven almost entirely by the play-to-earn game Axie Infinity, the Philippines was, for a period, identified by industry trackers as the single largest national market for non-fungible token (NFT) ownership in the world, with Vietnam and Thailand not far behind. What distinguished this episode from earlier waves of speculative digital-asset interest elsewhere was its labor-market character: participants, many of them unemployed or underemployed during pandemic-era lockdowns, treated in-game NFT assets not as collectibles but as an income-generating activity, with reported earnings for some “scholars” exceeding local minimum wage at the peak of adoption. The phenomenon therefore sits uneasily between two literatures that rarely speak to one another — the study of financial inclusion, which is concerned with how households gain access to income and savings mechanisms during periods of economic stress, and the study of digital-asset markets, which is typically concerned with volatility, speculation, and investor behavior. This paper treats that overlap, rather than either literature alone, as its object of analysis.

The economic and policy relevance of this overlap is not confined to a historical curiosity about a gaming trend. It raises a substantive question for financial-economic policy: what obligations, if any, do regulators and fiscal authorities have toward an informal, technology-driven income channel that emerges spontaneously, absorbs meaningful numbers of economically vulnerable participants, and then contracts sharply once its underlying token economics prove unsustainable? In the Philippine case, the Bangko Sentral ng Pilipinas weighed whether Axie's operator should be classified as a payment-system entity only after adoption had already peaked, and Philippine tax

authorities moved to tax play-to-earn income only after much of that income had already evaporated. This sequencing — adoption first, regulatory recognition second, often well after the activity it targets has begun to wind down — is not unique to the Philippines, and it is not unique to NFTs. It is a recurring pattern in fintech regulation more broadly, one that the literature on innovation-regulation gaps has described as regulatory lag. What the Southeast Asian NFT/GameFi episode offers is an unusually well-documented, regionally comparative instance of that pattern, with meaningful cross-country variation in both the scale of adoption and the shape of the regulatory response across the Philippines, Vietnam, Thailand, and Indonesia. Related work on the Philippine telecommunications sector has likewise situated fintech services such as GCash within a period of regulatory reform and digital ecosystem convergence (Dela Costa & Atento, 2025).

The problem, then, is twofold. First is the empirical-conceptual problem: NFT-based play-to-earn activity functioned, for a defined window, as an informal financial-inclusion mechanism in economies where formal safety nets proved insufficient to pandemic-era income shocks, yet this activity carried none of the consumer protections, prudential oversight, or risk disclosure that formal financial-inclusion channels are generally expected to provide. Second is the policy-design problem: by the time regulatory and fiscal institutions across the region began to respond, the market that prompted their attention had already entered a period of contraction, followed by what more recent industry data suggest is a slower stabilization around non-speculative applications such as ticketing, loyalty programs, and digital collectibles rather than a resurgence of the play-to-earn model. This raises the question of what an anticipatory, rather than reactive, regulatory posture toward similar informal fintech phenomena might look like in the future — a question of direct relevance not only to NFTs but to whatever the next boom-bust cycle in informal digital-asset income turns out to be.

Why this matters specifically for Asia and emerging-market contexts deserves emphasis. The Philippines, Vietnam, Thailand, and Indonesia differ meaningfully in their baseline levels of formal financial inclusion, their fintech regulatory infrastructure, and their exposure to informal-sector income more broadly, which makes the region a natural setting for comparative institutional analysis rather than a single-country case study. Even within a single economy, digital financial inclusion has been found to differ between firms with higher and lower digital access (R. G. O. Atento, Quinto, Espelita, & A. G. Atento, 2026). At the same time, no World Development Indicators-style bulk dataset exists for NFT ownership or transaction activity at the country level, which forecloses the panel-regression approach available to more conventional macro-financial topics. What is available instead is a body of documented case evidence — market and adoption data from industry trackers, ownership surveys, and central-bank and tax-authority statements — that is rich enough to support a rigorous conceptual argument but not structured enough to support statistical estimation. A structured, thematically organized conceptual review is therefore the methodologically honest way to build an analytically disciplined argument from this evidence base at this stage, while leaving open a clearly marked path toward a future survey- or transaction-data-based quantitative study once such data become available.

Accordingly, this paper pursues four objectives. It characterizes NFT-based play-to-earn activity in Southeast Asia during 2020–2022 as an instance of informal financial inclusion under economic shock, situating it within existing financial-inclusion and regulatory-lag theory. It examines, comparatively, how regulatory and fiscal responses across the Philippines, Vietnam, Thailand, and Indonesia have unfolded relative to the pace of market adoption and subsequent contraction. It evaluates the underlying tension between the genuine inclusion benefits this channel appeared to offer and the speculative, welfare-relevant risks it carried for participants who had few formal alternatives. And it draws measured, non-causal policy implications for how regulators might design more proportionate and anticipatory frameworks for the next informal digital-asset episode, rather than repeating a reactive pattern after adoption has already peaked.

2. Review of Related Literature

2.1 Financial Inclusion Theory and Informal/Alternative Channels Under Economic Shock

Contemporary financial-inclusion scholarship increasingly departs from a narrow focus on formal banking access and instead treats informal financial arrangements as a structural feature of inclusion rather than evidence of market failure. Institutional and dual-structure frameworks position informal mechanisms as functional complements that provide liquidity and resilience precisely where formal systems contract (Sethi et al., 2025; Posada et al., 2025), while digital platforms are increasingly understood to embed non-traditional monetary activity directly into household survival strategies (Wanzala & Obokoh, 2025). This theoretical repositioning is supported by a substantial empirical record: across highly varied contexts — pandemic-era Peru (Talledo, 2024), post-COVID Bangladesh (Mamun et al.,

2026), health-shock-affected rural India and Vietnam (Dureja & Negi, 2024; Nguyen et al., 2025; Vo, 2024), and synergistic shocks in China (Jiang & Liu, 2022) — economic disruption consistently accelerates household reliance on informal credit, asset liquidation, and adaptive livelihood strategies once formal credit access tightens or public safety nets prove insufficient. Notably, this literature already documents the Philippine case directly: urban informal-sector workers, including platform and street vendors, rely on alternative income and informal savings to sustain absorptive and adaptive capacity during economic shocks (Esguerra et al., 2024). Related Philippine work adds further context: crisis-response analysis identifies non-bankable and informally employed households as the population for whom cash transfers remain the primary instrument under shock (A. G. Atento, Quinto, et al., 2026), remittance inflows have been associated with household consumption rather than capital formation (R. G. Atento, Feng, et al., 2026), and oil-price and dollar-strength movements have been examined alongside new business formation, with associations running opposite to the commonly assumed cost channel (R. G. O. Atento, Quinto, Espelita, A. G. Atento, et al., 2026). Conceptual work on Filipino attitudes toward government assistance similarly asks whether reliance on a distrusted government reflects a fixed disposition or a structurally conditioned response (Dela Cruz & Atento, 2026). Taken together, this body of work establishes that informal, unregulated income channels are a recognized and theorized form of financial inclusion under stress, not an anomaly — the conceptual premise this paper extends to a channel the literature has not yet examined in these terms: NFT-based play-to-earn income during the pandemic-era shock.

2.2 Fintech Innovation and the Regulation-Innovation Gap

The fintech-regulation literature converges on a consistent temporal pattern: regulatory response follows rather than anticipates rapid innovation adoption. Ahern (2021) frames this directly as regulatory lag, arguing that enabling frameworks routinely trail technological change and remain absent or embryonic while markets move ahead; comparative and review studies across both developed and emerging-market-and-developing-economy (EMDE) contexts reach the same conclusion, noting that regulators typically observe market developments before extending the regulatory perimeter (Vijayagopal & Jain, 2024; Feyen et al., 2023; Anifa et al., 2022; Alaassar et al., 2022). This lag is not incidental; rapid diffusion creates grey zones and arbitrage opportunities that persist until rules catch up, and reactive rulemaking frequently follows risk events rather than preceding them (Obeng et al., 2024; Bu et al., 2021). Against this reactive baseline, the same literature identifies adaptive and proportionate regulatory design — regulatory sandboxes, test-and-learn supervisory approaches, and risk-calibrated requirements — as the more consistently favored alternative, associated with reduced uncertainty and earlier identification of emerging harms (Ahern, 2021; Feyen et al., 2023; Vijayagopal & Jain, 2024). Direct outcome evidence remains thinner than the conceptual consensus, though what exists is suggestive: in China, undersupervised innovation has been linked to elevated risk events, while later, more calibrated fintech regulation is associated with reduced bank risk-taking (Bu et al., 2021; Wu et al., 2024). This regulatory-lag framework, together with its adaptive-design counterpoint, supplies the theoretical lens through which this paper interprets Southeast Asian regulatory responses to NFT-driven play-to-earn activity.

2.3 NFT Markets, Play-to-Earn Economies, and Digital-Asset Volatility

Empirical finance scholarship characterizes NFT and play-to-earn token ecosystems overwhelmingly as speculative and cycle-driven rather than self-sustaining. Across multiple independent methodologies — bubble date-stamping, multifractal volatility analysis, and large-sample token studies — NFT and metaverse-token prices display explosive phases decoupled from underlying fundamentals such as organic game transactions, driven instead by social-media sentiment and cryptocurrency-market contagion (Vidal-Tomás, 2022; Wang et al., 2022; Giri et al., 2025; Szydlo et al., 2023). This volatility is not a peripheral feature but a defining one: secondary NFT markets show clustered, heavy-tailed pricing vulnerable to wash trading and pump-and-dump dynamics, with price movement tied more closely to investor attention than to cash-flow generation (Westland, 2024; Ante, 2022). Within this volatile market structure, the qualitative literature on play-to-earn specifically — most directly Delic and Delfabbro's (2022) study of Axie Infinity players — documents labor-like gameplay functioning as a genuine alternative income channel, while simultaneously exposing participants to platform risk and exploitation under scholarship arrangements. This is a meaningful asymmetry worth flagging: the broader digital-finance literature on mobile money and consumption smoothing in emerging markets is comparatively mature and shows measurable welfare stabilization effects (Apeti, 2023; Wang et al., 2025), but scholarship linking play-to-earn income specifically to household-level welfare outcomes remains nascent and largely qualitative rather than quantitative (Delic & Delfabbro, 2022; Lee & Park, 2023). Adjacent ASEAN-5 panel evidence on digital reach shows that lagged internet access was positively associated with equity market capitalization but not with household consumption growth (Lantin-Magana & Atento, 2026).

Volatility and sentiment have also been examined in Philippine and ASEAN capital markets, including investor sentiment and market efficiency among Philippine Stock Exchange-listed firms (R. G. Atento, 2025b), volatility clustering in Philippine equity returns (R. G. O. Atento, A. G. Atento, et al., 2026), and portfolio-investment volatility with repeated net-flow reversals in the Philippines (Chen et al., 2026). The literature therefore supports treating NFT/P2E markets as structurally volatile with clear income-channel characteristics, while cautioning that direct, quantified welfare evidence for this specific channel — as distinct from digital finance generally — is still thin.

2.4 Southeast Asian Fintech/Digital-Asset Regulatory Landscape and Comparative Country Responses

Regulatory posture toward digital assets varies meaningfully across the paper's four focal countries, and this variation is itself informative. Indonesia is consistently described as partial and fragmented: cryptocurrency is banned for payment use but permitted as a traded commodity, oversight has been split across agencies, and comprehensive statute-level regulation remains absent (Tauda et al., 2023; Sufian & Ghapa, 2024; Berutu et al., 2025). Thailand shows a narrower but more clearly delineated perimeter, with regulated exchanges permitted to arrange crypto trades while NFTs, meme coins, and utility tokens were explicitly excluded from those channels by mid-2021 (Paesano & Siron, 2022). The Philippines occupies a middle position in regional mappings, permitting virtual-asset use while restricting in-person payment applications rather than imposing an outright ban, and Vietnam is repeatedly characterized as still under review, without a settled legal regime (Wiwoho et al., 2023; Juanda et al., 2025). Philippine digital-banking supervision offers a related illustration: the BSP's ex post reclassification response to fintech licence-category arbitrage has been analyzed as potentially relevant to regulators facing similar dynamics elsewhere in Southeast Asia (Geca et al., 2026). Despite this variation, the dominant regional pattern is reactive rather than anticipatory: Indonesia's regulatory shifts have followed rapid adoption rather than preceding it (Tauda et al., 2023; Berutu et al., 2025), and the broader ASEAN pattern shows governments tolerating or channeling activity before tightening licensing, taxation, and anti-money-laundering rules once scale and risk become visible (Paesano & Siron, 2022; Judijanto et al., 2025). The play-to-earn literature narrows this picture further and speaks most directly to the Philippine case: Francisco et al. (2022) document Filipino players explicitly naming volatility, price manipulation, privacy, and security as unresolved concerns, and caution that taxing play-to-earn income without a sound governance framework risks destabilizing the very income channel it targets — a concern realized in the Bangko Sentral ng Pilipinas's and Philippine tax authorities' after-the-adoption-peak responses described in this paper's Introduction. Qualitative accounts of predominantly Filipino Axie “scholars” similarly attribute exploitation risk to weak user protection and light governance (Zaucha & Agur, 2023; Ali & Vidan, 2025). This subsection therefore confirms, with country-level granularity, both the comparative regulatory variation and the reactive-timing pattern central to this paper's argument.

2.5 Consumer Protection, Financial Risk, and Welfare Implications of Informal Digital-Asset Income

The literature on household exposure to unregulated digital-asset income identifies a consistent risk-amplification pattern that stands in contrast to the more protective profile of regulated digital financial inclusion. Where regulated digital inclusive finance is generally associated with reduced poverty and eased borrowing constraints (Liu et al., 2024; Qian et al., 2024), reliance on volatile or unhedged digital instruments is linked to a distinct U-shaped fragility relationship, in which deepening digital exposure raises household leverage and financial distress once thresholds are crossed (Zhou & Tian, 2026), alongside documented tendencies toward excessive debt and speculative overreach among financially vulnerable participants (Ye, 2026). Philippine survey work likewise examines risk tolerance, capital-market knowledge, and trust in government as correlates of individual investment decisions (Lantin-Magana et al., 2026). Consumer-protection and supervisory architecture has not kept pace with this exposure: because existing statutes were built around physical intermediation and bilateral contracts, oversight of decentralized, cross-border digital assets remains piecemeal across jurisdictions, leaving retail participants exposed to structural abuses including algorithmic information asymmetry and platform-liability gaps (Ariawan, 2025; Uzougbo & Adewusi, 2024; Bahtera et al., 2025). Asian evidence on digital financial inclusion likewise treats consumer-protection frameworks, together with payment interoperability and digital identity infrastructure, as part of the regulatory and institutional environment that conditions whether digital connectivity becomes active financial participation (A. G. Atento, R. G. O. Atento, et al., 2026). A particularly consequential gap is the near-total absence of formal dispute-resolution or restitution mechanisms for digital-asset users, meaning that fraud or platform collapse typically leaves participants without recourse (Uzougbo & Adewusi, 2024; Ng, 2025). As in the fintech-regulation literature reviewed in Section 2.2, the prescriptive response favored here is not prohibition but adaptive, outcome-oriented oversight — regulatory sandboxes and risk-based supervision rather than rigid, retrospective bans (Teng et al., 2026). This literature substantiates the

paper's welfare-risk tension directly: informal digital-asset income of the kind generated by Southeast Asian play-to-earn activity plausibly delivered genuine inclusion benefits during a period of acute economic shock, while simultaneously exposing already-vulnerable participants to balance-sheet risks that existing consumer-protection frameworks were not equipped to address.

2.6 Synthesis of Literature

Read together, the five themes converge on a single underlying pattern, even though each was developed from a different literature. Financial-inclusion scholarship (2.1) establishes that informal, unregulated channels function as legitimate resilience mechanisms when formal systems contract under shock — not a market failure, but a structural feature of how economies adapt. Fintech-regulation scholarship (2.2) establishes, independently, that regulatory response to financial innovation is characteristically reactive rather than anticipatory, trailing adoption rather than shaping it. The Southeast Asian regulatory literature (2.4) then confirms this general pattern with country-level specificity: Indonesia, the Philippines, and Vietnam show regulation arriving after adoption had already scaled, with Thailand's narrower but earlier perimeter the partial exception. And the household-risk literature (2.5) shows that this same reactive gap has direct welfare consequences, producing a documented U-shaped relationship between digital-asset exposure and financial fragility precisely because consumer-protection architecture was not designed for decentralized, cross-border instruments. The NFT/play-to-earn market literature (2.3) supplies the missing empirical bridge between these strands, confirming that the specific channel this paper examines is both structurally volatile and — through the Axie Infinity case — a documented instance of labor-like alternative income generation under exactly the conditions Themes 1 and 2 describe in the abstract.

A genuine tension runs beneath this convergence, however, and the literature does not resolve it. Theme 1 frames informal channels affirmatively, as resilience-building complements to formal systems; Theme 5 frames functionally similar unregulated digital-asset channels as sources of balance-sheet fragility and debt escalation. These are not strictly contradictory — the household-coping literature in 2.1 concerns informal credit and consumption smoothing, while the digital-asset-risk literature in 2.5 concerns speculative asset exposure — but NFT-based play-to-earn income sits uncomfortably between the two categories: it is neither pure informal credit nor pure investment, but volatile, token-denominated labor income. No paper in this review base explicitly reconciles which framing better fits that hybrid case. A second, methodological tension is worth noting: the literatures underpinning Themes 1, 2, 4, and 5 are comparatively mature, drawing on panel data, econometric bubble tests, and comparative legal analysis, while the literature connecting play-to-earn income specifically to household welfare outcomes (2.3) remains almost entirely qualitative, anchored substantially in a single study (Delic & Delfabbro, 2022). The empirical maturity of the adjacent literatures therefore outpaces the empirical maturity of the literature on the paper's actual subject.

2.7 Gaps in the Literature

Four gaps follow directly from the synthesis above. First, no study applies the household-financial-fragility frameworks developed for digital finance broadly (2.5) to NFT- or play-to-earn-specific income, leaving a conceptual gap between a well-developed measurement tradition and a nascent, largely qualitative evidence base for the precise channel this paper addresses. Second, the evidence base across the four focal countries is markedly asymmetric: the play-to-earn-specific literature (2.3, 2.4) is heavily concentrated on the Philippines and the predominantly Filipino Axie “scholar” population, while comparable country-level evidence for Vietnam, Thailand, and Indonesia's play-to-earn adoption and regulatory experience is thin relative to their documented market scale. Third, while regulatory-lag theory (2.2) and Southeast Asian digital-asset regulation (2.4) are each well studied, no identified study explicitly applies regulatory-lag theory as a comparative, multi-country analytical frame to the play-to-earn case specifically — existing regional literature treats NFTs and crypto broadly, without isolating play-to-earn income as a distinct policy object with its own boom-bust timeline. Fourth, the tension identified in 2.6 between inclusion-affirming and fragility-inducing framings of informal digital-asset income is nowhere addressed directly; the literature offers both framings but does not test or theorize which better characterizes a hybrid case like play-to-earn labor income. A fifth, more policy-oriented gap follows from this: the adaptive-regulation prescriptions in the fintech literature (2.2, 2.5) — sandboxes, proportionate design, test-and-learn supervision — are framed as ex-ante tools for innovation still underway, and the literature says comparatively little about how regulators should respond once an informal financial-inclusion channel has already peaked and begun contracting by the time sustained attention arrives, which is precisely the position Southeast Asian regulators found themselves in with play-to-earn NFTs.

2.8 Contribution of the Present Paper

This paper's contribution is integrative rather than empirical in the primary sense: it draws together financial-inclusion theory, regulatory-lag theory, and the NFT/play-to-earn market and regulatory literatures — bodies of scholarship that have so far developed largely in parallel — into a single conceptual account of the Southeast Asian play-to-earn episode as a case that is simultaneously an informal financial-inclusion mechanism and a textbook instance of regulatory lag. In doing so, it directly engages the inclusion-versus-fragility tension identified in 2.6, treating it as the paper's central analytical problem rather than resolving it by assumption in either direction. It also addresses the geographic-imbalance gap identified in 2.7 by design: rather than generalizing from the well-documented Philippine case to the region, the paper explicitly structures its comparative discussion around the documented asymmetry in adoption scale and regulatory posture across the Philippines, Vietnam, Thailand, and Indonesia, treating that asymmetry as analytically informative rather than as a limitation to be minimized. Finally, the paper's policy contribution responds to the fifth gap above: where the existing fintech-regulation literature is oriented toward anticipatory tools for innovation still in progress, this paper's recommendations are oriented toward the harder and less-examined problem of regulatory design for informal financial-inclusion channels that have already peaked and begun to contract — a sequencing problem with relevance well beyond NFTs, to whatever comparable informal fintech phenomenon emerges next in the region.

3. Methodology

This paper adopts a conceptual, thematic-synthesis design, structured as a documentary and analytical review rather than an empirical study employing primary data collection, survey instruments, or econometric estimation. The design choice follows directly from the absence of a World Development Indicators-style bulk dataset for NFT or play-to-earn activity at the country level, which forecloses the panel-regression approaches used on companion manuscripts in this research program. In its place, the paper builds an interpretive argument from two analytically distinct evidence streams, kept explicitly separate throughout rather than blended into a single undifferentiated source base.

The primary evidence stream is peer-reviewed academic literature, retrieved through structured, theme-driven searches of the academic corpus (via Consensus) organized around the five guide-question pairs specified in the Literature Framework. Inclusion favored studies with direct thematic relevance to financial-inclusion theory under economic shock, fintech regulatory-lag theory, NFT/play-to-earn market dynamics, Southeast Asian digital-asset regulation, and household-level financial-risk outcomes from digital-asset exposure, with particular weight given to studies published from 2021 onward given the recency of the episode under study, and to studies with explicit country-level findings for the Philippines, Vietnam, Thailand, or Indonesia where available. Within each theme, sources were evaluated and grouped by evidentiary type — econometric/quantitative studies (e.g., bubble date-stamping tests, panel-data fragility models), qualitative and interview-based studies (e.g., player-experience accounts of Axie Infinity), and comparative legal/regulatory analyses — so that the review could distinguish, per the editorial rules governing this manuscript, established empirical findings from theoretical framing, interpretation, and normative recommendation, rather than treating all sourced claims as equivalent in evidentiary weight.

The second evidence stream is documented industry, market, and regulatory-action material — ownership and adoption figures (e.g., Finder's ownership survey, Chainalysis regional data, DappRadar/NonFungible.com market tracking) and specific institutional actions (the Bangko Sentral ng Pilipinas's classification deliberations, Philippine tax authorities' after-the-fact taxation moves). This material is used illustratively, to anchor the paper's real-world narrative arc and to supply country-specific detail that the peer-reviewed literature does not yet cover at the same resolution, but it is not treated as citation-equivalent to the academic literature stream. Consistent with the evidentiary caveat carried over from this paper's initial framing outline, these figures have not yet been subjected to a full Google Scholar/DOI verification pass; they are presented in the manuscript as documented industry and news-sourced context rather than as peer-reviewed findings, and are flagged as such wherever they appear.

The paper's geographic focus is Southeast Asia, with the Philippines, Vietnam, Thailand, and Indonesia treated as primary comparative cases on the basis of their documented prominence in play-to-earn adoption during the 2020–2022 period. Singapore appears only secondarily, where the regulatory literature uses it as a comparative reference point for a more structured regulatory posture; it is not a primary case. The analytical criterion applied across the four primary cases is deliberately asymmetric rather than uniform: because the underlying literature itself is asymmetric — substantially deeper for the Philippines and the Axie Infinity case than for the other three countries — the paper treats that asymmetry as an analytical finding in its own right (Section 2.7) rather than concealing it through artificially even treatment.

Thematic grouping in Section 4 follows directly from the five-theme literature structure but is reorganized around the paper's own analytical claims rather than around the source literatures: NFTs as an informal financial-inclusion mechanism (drawing primarily on Themes 1 and 3), market cooling and structural maturation (drawing primarily on Theme 3), comparative regulatory responses across the four countries (drawing primarily on Themes 2 and 4), and the tension between speculative risk and genuine inclusion (drawing primarily on Themes 1 and 5). This grouping logic allows the paper to move from literature synthesis to an original integrative argument without introducing claims unsupported by the reviewed evidence base.

Several limitations follow from this design and are treated as boundaries on interpretation rather than defects to be minimized. The paper offers no statistical estimate of the scale, direction, or magnitude of any relationship it discusses; all claims are qualitative and interpretive. The evidence base is asymmetric across the four focal countries in the manner described above, and conclusions about Vietnam, Thailand, and Indonesia specifically should be read as more tentative than those concerning the Philippines. The industry/market data stream, while useful for narrative and policy context, carries a lower evidentiary standard than the peer-reviewed stream and has not yet completed the citation-verification pass the broader research program applies before a manuscript is considered submission-ready. Finally, because the NFT/play-to-earn market continues to evolve, the paper's characterization of the 2022–2025 “cooling” period reflects the literature and data available at the time of writing and should not be read as a claim about the market's current or future trajectory.

4. Analytical Synthesis / Results and Discussion

4.1 NFTs as an Informal Financial-Inclusion Mechanism

The financial-inclusion literature reviewed in Section 2.1 provides a coherent theoretical basis for treating NFT-based play-to-earn income as an instance of informal financial inclusion rather than a purely speculative or recreational phenomenon. Institutional and dual-structure models of inclusion hold that informal mechanisms function as resilience-building complements precisely where formal systems contract under shock (Sethi et al., 2025; Posada et al., 2025), and the empirical record supporting that theory is drawn from contexts structurally similar to the one this paper examines: households turning to informal, adaptive income and credit strategies when pandemic-era disruption outstripped formal safety nets (Talledo, 2024; Mamun et al., 2026). The Philippine case is directly documented within this literature — urban informal-sector workers, including platform and street vendors, relied on alternative income arrangements to sustain absorptive capacity during pandemic-era economic shocks (Esguerra et al., 2024) — which places Axie Infinity “scholarship” income within an already-recognized pattern of informal livelihood adaptation, rather than requiring a novel theoretical category to accommodate it.

What the financial-inclusion literature does not yet examine directly, however, is the specific mechanism through which this income was generated: labor-like gameplay compensated in a volatile, token-denominated asset rather than cash, credit, or a conventional informal wage. The qualitative play-to-earn literature closes part of this gap. Delic and Delfabbro's (2022) study of Axie Infinity players documents this labor-like structure directly, describing gameplay that functioned as a genuine income channel for participants while simultaneously exposing them to platform-specific risks — scholarship-arrangement dependency, token devaluation, and exploitation risk — that have no direct analogue in the informal-credit or informal-savings literature reviewed in 2.1. This is the analytical seam this paper is positioned to address: NFT-based play-to-earn income satisfies the functional definition of informal financial inclusion under shock developed in the general literature, while introducing a risk profile — asset-price volatility rather than credit or liquidity risk — that the general financial-inclusion literature was not built to characterize. Treating the phenomenon as informal financial inclusion is therefore accurate as far as it goes, but incomplete without the volatility-specific evidence reviewed in the following subsections.

4.2 Market Cooling and Structural Maturation, 2022–2025

The NFT and play-to-earn market literature establishes, with considerable methodological convergence, that the 2020–2022 boom period was characterized by explosive, sentiment-driven price behavior decoupled from underlying fundamentals such as organic game activity (Vidal-Tomás, 2022; Wang et al., 2022; Giri et al., 2025). Cho et al. (2024) extend this picture across boom and subsequent slump periods specifically, documenting that initial NFT sales dynamics differ structurally from the trading patterns that follow once speculative interest recedes — a pattern consistent with the contraction this paper's Introduction describes for the Southeast Asian play-to-earn episode. Multifractal and volatility-clustering analyses reinforce that this instability is a persistent structural feature of the asset

class rather than a transitional artifact of the initial boom (Chowdhury et al., 2023; Szydlo et al., 2023), which is consistent with — though does not, on its own, confirm — an ongoing market rather than a single completed cycle.

Here a clear evidentiary distinction is necessary. The peer-reviewed literature gathered for this review substantiates the boom-and-volatility pattern robustly but does not, within the sources reviewed, provide direct empirical confirmation of the more specific claim that post-2022 NFT activity has stabilized around non-speculative applications such as ticketing, loyalty programs, and digital collectibles. That characterization originates from the industry and market-tracking sources (Chainalysis, DappRadar/NonFungible.com, Statista) identified in this project's framing materials, which — per the Methodology (Section 3) — are treated as illustrative, documented context rather than as peer-reviewed evidentiary claims, and remain subject to the citation-verification pass not yet completed. Accordingly, this paper characterizes the 2022–2025 period as one of documented market contraction, on solid academic footing, while treating the specific “structural maturation toward non-speculative use” narrative as an industry-reported trend requiring further scholarly verification rather than an established finding. This distinction matters for the paper's overall argument: the regulatory-lag problem examined in Section 4.3 depends on the contraction being real and documented, not on any particular account of what the market is stabilizing into.

4.3 Comparative Regulatory Responses Across the Philippines, Vietnam, Thailand, and Indonesia

The comparative regulatory literature supports a two-part claim central to this paper's thesis: meaningful cross-country variation in regulatory posture coexists with a dominant regional pattern of reactive, post-adoption timing. On posture, Indonesia's regulatory environment is characterized as partial and fragmented, permitting cryptocurrency as a traded commodity while banning its payment use, with oversight split across agencies and comprehensive statutory regulation still absent (Tauda et al., 2023; Berutu et al., 2025). Thailand's regime is narrower but more clearly bounded, with regulated exchanges permitted to facilitate crypto trades while NFTs and related token categories were explicitly excluded from those channels by mid-2021 (Paesano & Siron, 2022) — a materially different regulatory posture from Indonesia's, despite both countries sitting within the same “reactive” regional pattern. The Philippines occupies a middle position, permitting virtual-asset use while restricting in-person payment applications (Wiwoho et al., 2023), and Vietnam remains characterized in the literature as still under review, without a settled regime (Juanda et al., 2025).

On timing, the evidence is more uniform than on posture. Across all four countries, the literature describes regulatory action following, rather than anticipating, periods of rapid adoption — a pattern consistent with the general regulatory-lag theory reviewed in Section 2.2 (Ahern, 2021) and confirmed with country-specific detail for Indonesia, where regulatory shifts are explicitly documented as trailing adoption rather than preceding it (Tauda et al., 2023; Berutu et al., 2025). The play-to-earn-specific literature sharpens this picture for the Philippine case in particular: Francisco et al. (2022) document Filipino players themselves identifying volatility, manipulation, and security as unresolved concerns during the period when adoption was already substantial, and caution explicitly that taxing play-to-earn income without a sound governance framework risks destabilizing the very channel being taxed. This is directly consistent with the sequencing this paper's Introduction describes — the Bangko Sentral ng Pilipinas's classification deliberations and Philippine tax authorities' taxation moves both arriving after adoption had already peaked. Read comparatively, then, the four-country evidence does not support a single regional regulatory story; it supports a story of genuine institutional variation operating within a shared reactive timing pattern, which is itself the more analytically interesting finding, since it indicates that the regulatory-lag problem is not attributable to any one country's institutional weakness but reflects a structural feature of how fintech regulation across the region responds to fast-moving informal financial innovation.

4.4 Tensions Between Speculative Risk and Genuine Inclusion

The synthesis in Section 2.6 identified an unresolved tension between two framings available in the literature: informal financial channels as resilience-building (Section 2.1) and unregulated digital-asset exposure as fragility-inducing (Section 2.5). This tension cannot be resolved by classifying NFT-based play-to-earn income as belonging cleanly to one category or the other; the evidence indicates it exhibits properties of both simultaneously, and that hybridity is the more accurate — and more policy-relevant — characterization. On the inclusion side, the mechanism functioned, during the shock period, in the manner Section 4.1 describes: as documented, labor-compensated income filling a gap left by contracted formal-sector opportunity. On the fragility side, the household-risk literature shows that unregulated digital-asset exposure is associated with a documented U-shaped relationship between exposure and financial distress, with debt escalation and speculative overreach concentrated among financially vulnerable participants — precisely the population most likely to have relied on play-to-earn income in the first place (Zhou & Tian, 2026; Ye, 2026). Compounding this, the consumer-protection literature establishes that the institutional gap is

not merely regulatory delay but a near-total absence of recourse: dispute-resolution and restitution mechanisms for digital-asset users are largely absent, leaving participants without formal remedy when platform value collapses (Uzougbo & Adewusi, 2024; Ng, 2025).

The analytical implication is that “informal financial inclusion” and “unregulated financial risk” are not competing descriptions to choose between but two faces of the same underdetermined institutional position: a channel was permitted to operate, absorbed real economic need, and was left without the protective architecture that would have let its inclusion benefits be realized without its fragility risks being borne almost entirely by participants. The adaptive-regulation literature's standard prescription — sandboxes, proportionate design, test-and-learn supervision (Ahern, 2021; Teng et al., 2026) — is oriented toward innovation still in progress, anticipating harm before it scales. The Southeast Asian play-to-earn case presents the harder variant of this problem: by the time sustained regulatory attention arrived, in each of the four focal countries, the market that prompted it had already peaked and begun to contract. This distinction — between anticipatory regulation of innovation still underway and regulatory design for a channel that has already peaked — is the specific analytical problem this paper carries forward into its discussion of findings and policy implications.

4.5. Discussion of Findings

The preceding analysis carries implications that extend beyond the specific case of Southeast Asian NFT play-to-earn activity, though those broader implications should be stated carefully, given the conceptual rather than estimative nature of this paper's design. The central finding — that informal financial inclusion and unregulated financial fragility are not alternative characterizations to be resolved in favor of one, but simultaneous properties of the same channel — has a direct bearing on how financial economics treats informal digital-asset activity more generally. Much of the existing financial-inclusion literature and much of the existing digital-asset-risk literature have developed largely independently of one another, as the synthesis in Section 2.6 noted; this paper's contribution is to show that at least one real-world episode requires both literatures simultaneously, and that treating either in isolation produces an incomplete account. For financial economics as a discipline, this suggests that future work on informal, technology-mediated income channels — whether NFT-based, DeFi-based, or built on whatever platform emerges next — should be designed from the outset to measure both inclusion benefit and fragility exposure together, rather than defaulting to one frame and treating the other as a caveat.

For Asian and emerging-market policy audiences specifically, the comparative finding in Section 4.3 is the more actionable one. The four-country evidence shows that regulatory posture toward digital assets varies meaningfully across Indonesia, the Philippines, Thailand, and Vietnam, but that this variation in posture does not translate into variation in timing: all four countries show regulatory attention arriving after adoption had already scaled. This decoupling of posture from timing matters for policy interpretation because it indicates that the reactive pattern is not simply a function of weaker regulatory capacity in any one jurisdiction — Thailand's comparatively well-bounded perimeter was still established only after, not ahead of, the period of peak play-to-earn adoption. The implication is that regulatory lag in this case is better understood as a structural feature of how fast-moving informal fintech innovation interacts with conventional rule-making processes across the region, rather than as an institutional deficiency specific to any single country's regulatory apparatus. This reframing has practical consequence: it suggests that closing the lag requires earlier monitoring and anticipatory capacity-building broadly, not simply the diffusion of stronger regulatory models from higher-capacity jurisdictions to lower-capacity ones. Regional work on governance integrity and economic resilience in ASEAN-6 (R. G. Atento, 2025a) and on data governance and institutional quality across ASEAN+3 (R. G. O. Atento, Espelita, et al., 2026) offers broader context for such institutional differences.

The theoretical contribution of the paper is best understood as a boundary condition on existing regulatory-lag theory rather than a wholesale revision of it. Regulatory-lag scholarship, and the adaptive-regulation prescriptions that follow from it, are oriented toward innovation still in progress — the sandbox and test-and-learn literature reviewed in Section 2.2 presupposes a regulator acting while there is still market activity left to shape. The Southeast Asian play-to-earn case demonstrates a variant that existing theory addresses only implicitly: a channel that had already substantially contracted by the time sustained regulatory attention arrived. In that circumstance, the standard anticipatory toolkit — sandboxes designed to observe and calibrate rules for live innovation — has diminished relevance, because there is less remaining activity to observe. This is a meaningful gap for regulatory-lag theory to address going forward, since informal fintech channels driven by speculative asset cycles are, almost by definition, prone to this pattern of adoption and contraction outpacing institutional response.

Practically, this reframing points toward a distinction policymakers may find useful going forward: between regulation designed to shape an ongoing innovation cycle and regulation designed to protect participants and preserve

institutional learning after a cycle has already turned. The former is well served by the existing adaptive-regulation literature. The latter — which is closer to the position Philippine, Vietnamese, Thai, and Indonesian regulators actually occupied with respect to play-to-earn NFTs — requires different instruments: retrospective consumer-protection and restitution mechanisms for participants left exposed by the contraction, and monitoring infrastructure built specifically to detect the next informal, technology-mediated income channel earlier in its adoption curve, rather than assuming the current episode's regulatory lessons will transfer automatically to a structurally different future phenomenon.

Several boundaries on these conclusions should be stated explicitly. This paper offers no quantified estimate of how many households relied on play-to-earn income, how much welfare benefit or financial harm resulted, or how the four countries compare on any measurable dimension; all of the above is interpretive synthesis from qualitative and comparative-legal literature, not empirical estimation. The evidentiary asymmetry noted throughout — substantially deeper documentation for the Philippines than for Vietnam, Thailand, or Indonesia — means the comparative claims in Section 4.3 are more firmly grounded for the Philippine case than for the other three, and should be read with that asymmetry in mind. Finally, the “structural maturation” narrative for the 2022–2025 period remains, as noted in Section 4.2, an industry-reported characterization pending academic verification, and no claim in this discussion depends on that narrative being accurate.

5. Conclusions and Recommendations

This paper set out to characterize NFT-based play-to-earn activity in Southeast Asia as a case of informal financial inclusion under economic shock, and to examine, comparatively, how regulatory and fiscal responses across the Philippines, Vietnam, Thailand, and Indonesia unfolded relative to the pace of adoption and contraction. As a conceptual, literature-grounded synthesis rather than an empirical study, its conclusions are interpretive rather than estimative, and are offered with that limitation held firmly in view.

The strongest supported insight is that the episode does not resolve into a single clean category. NFT-based play-to-earn income satisfies the functional criteria the financial-inclusion literature applies to informal channels under shock, while simultaneously exhibiting the risk profile the digital-asset-fragility literature associates with unregulated, volatile financial exposure. Treating it as only the former risks minimizing genuine participant harm; treating it as only the latter risks dismissing a documented instance of informal livelihood adaptation during a period when formal safety nets were demonstrably insufficient. The more defensible reading, and the one this paper advances, is that both were true at once, and that this coexistence — not a preference for one framing over the other — is the paper's central analytical claim.

The second supported insight concerns regulatory timing rather than regulatory design. Across all four focal countries, meaningful variation in regulatory posture coexisted with a shared pattern of reactive timing: attention and rule-making arrived after adoption had already peaked, in every case examined. This consistency across otherwise differently positioned regulatory systems suggests the lag reflects a structural mismatch between fast-moving, technology-mediated informal income channels and conventional rule-making timelines, rather than a deficiency specific to any one jurisdiction's institutional capacity.

From these two insights, three measured recommendations follow, offered for research, policy, and institutional reflection rather than as prescriptive certainties.

For research, the clearest next step is the survey- or transaction-data-based quantitative study this conceptual paper was explicitly designed to precede, as noted in the original framing outline. Priority should go to measuring, where data allow, the scale of household reliance on play-to-earn income relative to formal income sources, and the distribution of financial outcomes among participants once the market contracted — the empirical gap this paper's literature review identified as the least developed of the five reviewed themes.

For policy, the relevant distinction developed in Section 5 — between regulation designed to shape an ongoing innovation cycle and regulation designed to protect participants after a cycle has already turned — suggests that Southeast Asian regulators facing a comparable channel in the future would be better served treating early monitoring infrastructure as a standing capability rather than assembling it in response to a specific technology once adoption has already become visible. Where a channel has already contracted, as play-to-earn NFTs largely had by the time formal attention arrived, the more relevant policy instrument is retrospective: consumer-protection and restitution mechanisms for participants left exposed, rather than rules calibrated for innovation still in progress.

For institutional reflection, the four-country asymmetry documented throughout this paper — richer evidence and more developed regulatory engagement for the Philippines than for Vietnam, Thailand, or Indonesia — is itself worth noting as a regional research and policy-attention gap, independent of any conclusion about play-to-earn NFTs

specifically. Regional bodies and comparative policy researchers may find value in closing that asymmetry before the next informal, technology-mediated income channel emerges, rather than after.

No claim in this paper should be read as establishing that NFT-based play-to-earn income caused improved household welfare, caused financial harm, or caused any particular regulatory outcome. The evidence reviewed supports association, documented pattern, and theoretically grounded interpretation — not causal inference — and the paper's contribution should be understood accordingly.

References

- Ahern, D. (2021). Regulatory lag, regulatory friction and regulatory transition as FinTech disenablers: Calibrating an EU response to the regulatory sandbox phenomenon. *European Business Organization Law Review*, 22, 395–432. <https://doi.org/10.1007/s40804-021-00217-z>
- Alaassar, A., Mention, A., & Aas, T. (2022). Facilitating innovation in FinTech: A review and research agenda. *Review of Managerial Science*, 17, 33–66. <https://doi.org/10.1007/s11846-022-00531-x>
- Ali, J., & Vidan, G. (2025). Playing, earning, crashing, and grinding: Axie Infinity and growth crises in the Web3 economy. *Big Data & Society*, 12. <https://doi.org/10.1177/20539517251357296>
- Anifa, M., Ramakrishnan, S., Joghee, S., Kabiraj, S., & Bishnoi, M. (2022). Fintech innovations in the financial service industry. *Journal of Risk and Financial Management*, 15(7), 287. <https://doi.org/10.3390/jrfm15070287>
- Ante, L. (2022). Non-fungible token (NFT) markets on the Ethereum blockchain: Temporal development, cointegration and interrelations. *Economics of Innovation and New Technology*, 32, 1216–1234. <https://doi.org/10.1080/10438599.2022.2119564>
- Apeti, A. E. (2023). Household welfare in the digital age: Assessing the effect of mobile money on household consumption volatility in developing countries. *World Development*, 161. <https://doi.org/10.1016/j.worlddev.2022.106110>
- Ariawan, A. (2025). Regulatory barriers to consumer protection in digital marketplaces. *Journal of Human Rights, Culture and Legal System*, 5(3). <https://doi.org/10.53955/jhcls.v5i3.782>
- Atento, A. G., Atento, R. G. O., Espelita, C. A. M. H., & Lantin-Magana, L. M. (2026). Digital Connectivity and Financial Inclusion in Asia: A Thematic Review of Mobile Infrastructure, Account Ownership, and Policy Implications Using Global Findex 2025 Evidence. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/9h1wkj82>
- Atento, A. G., Quinto, L. F., & Atento, R. G. O. (2026). Relief or Recovery? A Comparative Policy Assessment of Household Cash Transfers and MSME Credit Support as Crisis-Response Instruments in the Philippines. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/p4hr6f59>
- Atento, R. G. (2025a). The Credibility Imperative 2025: Governance Integrity, Economic Resilience, and Strategic Adaptability in Philippine Diplomacy. *International Journal of Health & Business Analytics*, 1(2). <https://doi.org/10.65166/6amaz997>
- Atento, R. G. (2025b). Valuation Metrics, Market Efficiency, and Investor Sentiment: A Descriptive Analysis of Philippine Stock Exchange–Listed Firms. *International Journal of Health & Business Analytics*, 1(1). <https://doi.org/10.65166/6kbeat87>
- Atento, R. G., Feng, T., & Tolentino, G. (2026). Do Remittances Save or Spend? Testing the Consumption-Investment Allocation Hypothesis for the Philippines Using WDI Time-Series Evidence, 2000–2023. *Journal of Enterprise Strategy and Management Innovation*, 1(2). <https://doi.org/10.65166/dewg3q39>
- Atento, R. G. O., Atento, A. G., Espelita, C. A. M. H., Del Mundo, F., Nonog, R. G., Mangubat, M. M., Dela Costa, V. G., Manzana, P., & Espina, A. (2026). Value and Size Premiums in the Philippine Equity Market: Evidence from an Extended Dataset with Volatility Analysis. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/nbsg0j88>
- Atento, R. G. O., Espelita, C. A. M. H., & Atento, A. G. (2026). Public Data Openness, Institutional Quality, and Foreign Direct Investment Attraction in ASEAN+3: An Integrative Thematic Review. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/a8tr9r86>
- Atento, R. G. O., Quinto, L. F., Espelita, C. A. M. H., & Atento, A. G. (2026). Digital Financial Inclusion and Supply Chain Resilience in Manufacturing: A Comparative Analysis Across the Digital Access Divide. *Journal of Enterprise Strategy and Management Innovation*, 1(3). <https://doi.org/10.65166/dg5t7027>
- Atento, R. G. O., Quinto, L. F., Espelita, C. A. M. H., Atento, A. G., Teodosio, G. M., Feng, T., Tan, Q., & Chen, S. (2026). Global Shocks, Local Ventures: Oil Prices, Dollar Strength, and China's Economic Shifts as

- Determinants of Entrepreneurial Activity in the Philippines, 2006–2022. *Journal of Enterprise Strategy and Management Innovation*, 1(3). <https://doi.org/10.65166/dyv5eh53>
- Bahtera, H. R. A., Setiono, J., & Fadri, I. (2025). Legal protection for crypto asset investors in Indonesia within an incomprehensive regulatory framework and its implications for legal certainty. *Jurnal Greenation Sosial dan Politik*, 3(3). <https://doi.org/10.38035/jgsp.v3i3.433>
- Berutu, J. R., Yuhelson, Y., & Prasetyo, D. (2025). Regulatory shifts and legal certainty in cryptocurrency trading: Towards an integrated supervision model in Indonesia. *Asian Journal of Social and Humanities*, 3(9). <https://doi.org/10.59888/ajosh.v3i9.578>
- Bu, Y., Li, H., & Wu, X. (2021). Effective regulations of FinTech innovations: The case of China. *Economics of Innovation and New Technology*, 31, 751–769. <https://doi.org/10.1080/10438599.2020.1868069>
- Chen, S., Atento, R. G. O., Feng, T., Tan, Q., Refozar, R. F., & Manalo, L. (2026). Capital Depth and Entrepreneurial Vitality: Market Capitalization Growth and Cross-Border Investment Flows in the Philippines and ASEAN. *Journal of Enterprise Strategy and Management Innovation*, 1(3). <https://doi.org/10.65166/b4vrsd73>
- Cho, E., Jensen, G. H., Yoo, Y., Mahanti, A., & Kim, J.-K. (2024). Characterizing the initial and subsequent NFT sales market dynamics: Perspectives from boom and slump periods. *IEEE Access*, 12, 3638–3658. <https://doi.org/10.1109/access.2023.3333897>
- Chowdhury, M. A. H., Abdullah, M., Alam, M., Abedin, M., & Shi, B. (2023). NFTs, DeFi, and other assets efficiency and volatility dynamics: An asymmetric multifractality analysis. *International Review of Financial Analysis*, 89. <https://doi.org/10.1016/j.irfa.2023.102642>
- Dela Costa, V., & Atento, R. G. (2025). Financial Performance and Market Viability of Globe Telecom, Inc.: An Integrated Fundamental–Technical Analysis. *International Journal of Health & Business Analytics*, 1(1). <https://doi.org/10.65166/v5x9d097>
- Dela Cruz, W., & Atento, R. G. (2026). Chicken, Egg, or Both? Disentangling Disposition and Distrust in Filipino Attitudes Toward Government Dole-Outs. *International Journal of Behavioral and Social Analytics*, 1(3). <https://doi.org/10.65166/mmpyyx09>
- Delic, A., & Delfabbro, P. (2022). Profiling the potential risks and benefits of emerging “play to earn” games: A qualitative analysis of players' experiences with Axie Infinity. *International Journal of Mental Health and Addiction*, 22, 634–647. <https://doi.org/10.1007/s11469-022-00894-y>
- Dureja, A., & Negi, D. (2024). Smoothing consumption in times of illness: Household recourse mechanisms. *Health Economics*. <https://doi.org/10.1002/hec.4830>
- Esguerra, J., Jardin, R. A., & Tayco, R. O. (2024). Livelihood resiliency of selected informal sectors in Cebu City, the Philippines. *Human Behavior, Development and Society*, 25(3). <https://doi.org/10.62370/hbds.v25i3.273015>
- Feyen, E. H. B., Natarajan, H., & Saal, M. I. (2023). Fintech and the future of finance: Market and policy implications. World Bank. <https://doi.org/10.1596/978-1-4648-1914-8>
- Francisco, R., Rodelas, N., & Ubaldo, J. E. T. (2022). The perception of Filipinos on the advent of cryptocurrency and non-fungible token (NFT) games. *ArXiv*, abs/2202.07467. <https://doi.org/10.25147/ijesr.2017.001.1.89>
- Geca, M., Atento, A. G., Espelita, C. A. M. H., & Atento, R. G. O. (2026). Closing the Backdoor: Fintech License Strategies, Regulatory Reclassification, and the Architecture of Digital Bank Supervision in the Philippines. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/d0m0k596>
- Giri, S., Du, D.-P., & Beruvides, M. (2025). A systematic approach to predicting NFT prices using time series forecasting and macroeconomic factors in digital assets. *Cogent Economics & Finance*, 13. <https://doi.org/10.1080/23322039.2025.2468387>
- Jiang, Y.-X., & Liu, Y. (2022). Does financial inclusion help alleviate household poverty and vulnerability in China? *PLoS ONE*, 17. <https://doi.org/10.1371/journal.pone.0275577>
- Juanda, R., Falahuddin, F., Muttaqien, M., Ilham, R. N., Ramansyah, F. P., & Multazam, M. (2025). The miracle of cryptocurrency: Opportunity at global transaction management, future market and present value reality. *International Journal of Engineering, Science and Information Technology*. <https://doi.org/10.52088/ijesty.v5i1.1111>
- Judijanto, L., Myint, A., & Hlaing, N. (2025). Cryptocurrency taxation frameworks: Comparative analysis between the EU, US, and Southeast Asia. *Journal Markcount Finance*, 3(2). <https://doi.org/10.70177/jmf.v3i2.2578>
- Lantin-Magana, L. M., & Atento, R. G. O. (2026). Digital Reach, Consumption, and Equity Market Deepening: Evidence from ASEAN-5. *Asian Financial Economics and Policy*, 1(1). <https://doi.org/10.65166/nxnfv94>
- Lantin-Magana, L. M., Espelita, C. A. M. H., Habana, C. A., Atento, R. G. O., & Atento, A. G. (2026). Predictors of Investment Decision among Selected Individuals in Key Cities of Laguna: An Extended Theory of Planned Behavior Approach. *Journal of Enterprise Strategy and Management Innovation*, 1(1). <https://doi.org/10.65166/a60b0c75>

- Lee, M., & Park, C. (2023). Examining consumer motivations for play-to-earn gaming: Application of analytic hierarchy process analysis. *Sustainability*, 15(18), 13311. <https://doi.org/10.3390/su151813311>
- Liu, J., Chen, Y., Chen, X., & Chen, B. (2024). Digital financial inclusion and household financial vulnerability: An empirical analysis of rural and urban disparities in China. *Heliyon*, 10. <https://doi.org/10.1016/j.heliyon.2024.e35540>
- Mamun, M. A. A., Uddin, K. F., Uddin, M. S., & Sarker, M. N. I. (2026). Resilience and recovery in the informal economy: Social networks, social protection, and adaptive strategies among post-COVID workers in Bangladesh. *Public Health Challenges*, 5. <https://doi.org/10.1002/puh2.70295>
- Ng, Y. K. I. (2025). The legal recognition and regulation of digital assets. *Highlights in Business, Economics and Management*. <https://doi.org/10.54097/ybywwm42>
- Nguyen, L. D., Nguyen, T. T., Nguyen, T., & Grote, U. (2025). Health shock and indebtedness: Does having access to health insurance reduce the reliance on borrowing as a shock coping strategy? *Applied Economic Perspectives and Policy*. <https://doi.org/10.1002/aep.13495>
- Obeng, S., Iyelolu, T. V., Akinsulire, A. A., & Idemudia, C. (2024). The transformative impact of financial technology (FinTech) on regulatory compliance in the banking sector. *World Journal of Advanced Research and Reviews*. <https://doi.org/10.30574/wjarr.2024.23.1.2184>
- Paesano, F., & Siron, D. (2022). Cryptocurrencies in Asia and beyond: Law, regulation and enforcement (Working Paper No. 38). Basel Institute on Governance. <https://doi.org/10.12685/bigwp.2022.38.1-69>
- Posada, H. M., Gaviria-Garcés, C. F., & Londoño, D. (2025). The effects of formal financial inclusion on informal credit use: Evidence from Colombia. *Emerging Markets Finance and Trade*, 61, 2590–2615. <https://doi.org/10.1080/1540496x.2025.2456547>
- Qian, Y., Yan, L., & Huang, W. (2024). How does digital inclusive finance affect household financial vulnerability? *Emerging Markets Finance and Trade*, 61, 1293–1314. <https://doi.org/10.1080/1540496x.2024.2409291>
- Sethi, M., Das, C., Bindu, S., & Bisoyi, T. (2025). Financial inclusion and financial resilience: Insights from current literature and future research agenda through bibliometric and content analysis approach. *Discover Sustainability*, 6. <https://doi.org/10.1007/s43621-025-00997-1>
- Sufian, M., & Ghapa, N. (2024). Regulatory framework for cryptocurrency: A comparative analysis of Malaysia, Indonesia and Singapore. *Malaysian Journal of Social Sciences and Humanities*, 9(11). <https://doi.org/10.47405/mjssh.v9i11.3113>
- Szydło, P., Wątorrek, M., Kwapien, J., & Drożdż, S. (2023). Characteristics of price related fluctuations in non-fungible token (NFT) market. *Chaos*, 34(1). <https://doi.org/10.1063/5.0185306>
- Talledo, M. (2024). Economic shocks and household consumption smoothing strategies. *Economía*. <https://doi.org/10.18800/economia.202501.001>
- Tauda, G. A., Omara, A., & Arnone, G. (2023). Cryptocurrency: Highlighting the approach, regulations, and protection in Indonesia and European Union. *BESTUUR*, 11(1). <https://doi.org/10.20961/bestuur.v11i1.67125>
- Teng, H.-W., Härdle, W., Osterrieder, J., Pele, D., Baals, L., Papavassiliou, V. G., Bolesta, K., Kabašinskas, A., Filipovska, O., Thomaidis, N., Moukas, A.-I., Goundar, S., Nasir, J. A., Weinberg, A. I., Arakelian, V., Truică, C.-O., Akar, M., Kabaklarlı, E., Apostol, E.-S., ... Xhumari, E. (2026). Digital assets: Risks, regulations, mitigation. *Financial Innovation*, 12. <https://doi.org/10.1186/s40854-025-00848-y>
- Uzougbo, N. S., & Adewusi, A. O. (2024). Enhancing consumer protection in cryptocurrency transactions: Legal strategies and policy recommendations. *International Journal of Science and Research Archive*. <https://doi.org/10.30574/ijrsra.2024.12.1.0801>
- Vidal-Tomás, D. (2022). The new crypto niche: NFTs, play-to-earn, and metaverse tokens. *Finance Research Letters*. <https://doi.org/10.1016/j.frl.2022.102742>
- Vijayagopal, P., & Jain, B. (2024). Regulations and fintech: A comparative study of the developed and developing countries. *Journal of Risk and Financial Management*, 17(8), 324. <https://doi.org/10.3390/jrfm17080324>
- Vo, T. (2024). Adverse shocks, vulnerability, and coping by rural households in Vietnam. *Development Policy Review*. <https://doi.org/10.1111/dpr.12768>
- Wang, X.-J., Li, X., & Zhou, H. (2025). Digital finance use and household consumption inequality: Evidence from rural China. *Review of Development Economics*. <https://doi.org/10.1111/rode.13194>
- Wang, Y., Horky, F., Baals, L. J., Lucey, B. M., & Vigne, S. (2022). Bubbles all the way down? Detecting and date-stamping bubble behaviours in NFT and DeFi markets. *Journal of Chinese Economic and Business Studies*, 20, 415–436. <https://doi.org/10.1080/14765284.2022.2138161>
- Wanzala, R., & Obokoh, L. (2025). Financial inclusion of the informal sector of marginalized counties in Kenya. *Cogent Social Sciences*, 11. <https://doi.org/10.1080/23311886.2025.2522291>

- Westland, J. (2024). Periodicity, Elliott waves, and fractals in the NFT market. *Scientific Reports*, 14. <https://doi.org/10.1038/s41598-024-55011-x>
- Wiwoho, J., Pratama, A. M., & Pati, U. K. (2023). Examining cryptocurrency use among Muslim affiliated terrorists: Case typology and regulatory challenges in Southeast Asian countries. *AL-IHKAM: Jurnal Hukum & Pranata Sosial*. <https://doi.org/10.19105/al-lhkam.v18i1.7147>
- Wu, Z., Li, L., Wang, B., & Zhang, X.-M. (2024). FinTech regulation and banks' risk-taking: Evidence from China. *PLOS ONE*, 19. <https://doi.org/10.1371/journal.pone.0311722>
- Ye, Y. (2026). The impact of digital finance on household asset allocation from a literature review perspective. *Financial Engineering and Risk Management*. <https://doi.org/10.23977/ferm.2026.090106>
- Zaucha, T., & Agur, C. (2023). Playbor, gamble-play, and the financialization of digital games. *New Media & Society*, 27, 1279–1298. <https://doi.org/10.1177/14614448231190907>
- Zhou, W., & Tian, X. (2026). Digital financial inclusion and household financial fragility: Evidence of a U-shaped relationship in China. *Risks*, 14(7), 164. <https://doi.org/10.3390/risks14070164>