# The Trigger Mechanism of the Dynamic Evolution of Loan Customers' Lost-Linking Modes and the Influence of the External Environment

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**Abstract: The dynamic evolution of loan customers' lost-linking modes poses significant challenges to risk prevention in the context of financial digitalization. This research constructs a three-dimensional "behavior-asset-relationship" trigger mechanism to systematically analyze the evolutionary logic of lost-linking modes, ranging from intermittent avoidance (Hide and Seek, HS) to systematic evasion (Flee with the Money, FM) or deliberate social disconnection (False Disappearance, FD). By integrating external environmental factors-such as economic cycles, industry strategies, and unexpected events-the research reveals their moderating effects on the evolutionary pathways. Findings indicate that the evolution of lost-linking modes reflects a systemic escalation of evasion strategies, while external environments accelerate or inhibit this process by altering evasion costs and behavioral motivations. Based on these insights, the study proposes practical strategies for financial institutions, including dynamic monitoring systems, tiered intervention approaches, and enhanced external environmental responsiveness, to optimize post-loan risk management.**

**Keywords: Loan Customers; Lost-Linking Modes; Dynamic Evolution; Trigger Mechanisms; External Environment**

## 1. Introduction

The rapid expansion of credit services driven by financial technology (FinTech) has been accompanied by a notable dynamic evolution in loan customers' lost-linking behavior [1]. Loan customers may initially adopt intermittent avoidance tactics, termed Hide and Seek (HS) (e.g., periodically rejecting calls or providing temporary address disguises), which can escalate into systematic asset transfers (Flee with the Money, FM) or complete social disconnection (False Disappearance, FD) [2]. This behavioral evolution not only intensifies the challenges of post-loan management for financial institutions but also risks amplifying financial exposure due to missed critical intervention windows. Traditional risk control systems, reliant on static classification criteria (e.g., overdue days, repayment records), fail to capture qualitative behavioral shifts or risk transmission during mode transitions, underscoring the urgent need for a theoretical framework to analyze dynamic evolution.

By investigating the trigger mechanisms and external environmental factors influencing the dynamic evolution of lost-linking modes, this study addresses the limitations of static classification. It reveals the intrinsic logic and external drivers behind behavioral escalation while providing financial institutions with an early identification framework to shift risk control strategies from post-incident resolution to preemptive intervention, thereby reducing management costs and asset losses.

Existing research has made progress in identifying and tracking lost-linking modes. For instance, social reputation loss models quantify the impact of default amounts and lost-linking duration on creditworthiness, offering new perspectives for risk assessment [3]. The derived virtual product-layer risk control model further explores the dynamic relationship between penalty mechanisms and repayment willingness [4]. In tracking technologies, cross-platform collaborative search models enhance address association accuracy through multi-agent algorithms, validating the efficacy of multi-source data fusion [5]. However, these studies focus on

static classification or localized tracking innovations, neglecting systematic analysis of the evolutionary pathways from HS to FM/FD. While prior literature acknowledges macroeconomic influences (e.g., economic fluctuations) on overdue behavior, it inadequately examines how external environmental factors-such as regulatory shifts or public emergencies-interact with the escalation of evasion strategies [6]. Mobile social data matching models leverage behavioral trajectory similarity for multi-dimensional tracking but exclude external variables from quantitative frameworks [7]. Subsequent path correlation index models analyze address association features in consumption networks but fail to clarify how external environments regulate evasion costs and motivations to drive strategic upgrades [8]. Current research faces two critical gaps: (1) insufficient systematic definition of key drivers (e.g., behavioral persistence, asset transfer intensity, and social disconnection) in evolutionary pathways; and (2) limited exploration of external environmental mechanisms, particularly the quantitative relationships between economic cycles, policy changes, and strategic escalation.

This study bridges these gaps by proposing a three-dimensional "behavior-asset-relationship" trigger mechanism under the backdrop of financial digitalization. It elucidates the evolutionary logic from tentative evasion to systematic disconnection and examines how external environmental factors (e.g., economic cycles, industry policies, and unexpected events) modulate evasion cost thresholds and behavioral motivations to accelerate or inhibit progression. Compared to existing research, the contributions are twofold: (1) establishing a dynamic evolutionary framework that integrates core indicators (e.g., lost-linking persistence, asset transfer intensity, and social disconnection) to enhance pattern recognition; and (2) revealing the interaction between external environments and internal indicators (e.g., early detection of asset transfer signals during economic downturns and optimized outreach strategies under policy adjustments), offering actionable insights for financial institutions to improve dynamic monitoring and tiered interventions.

## 2. Key Trigger Indicators for the Dynamic

**Evolution of Lost-Linking Modes**
The dynamic evolution of lost-linking modes reflects a progressive escalation in customers' evasion strategies, driven by three critical dimensions of indicators: lost-linking persistence, asset transfer intensity, and social relationship fracture. These dimensions collectively form a logical chain of "behavioral testing → strategy escalation → pattern stabilization".

### 2.1 Lost-Linking Persistence: From Intermittent Avoidance to Complete Concealment

Lost-linking persistence reflects the degree of development of loan customers' debt-evasion behavior through two core indicators: lost-linking duration (denoted as $T$) and contact rate (denoted as $R$) [2]. The lost-linking duration is defined as the time difference (in days) from the moment when the lending institution first fails to contact the customer via the reserved contact information to the current investigation time. The contact rate represents the proportion of the number of successful contacts with the customer through legal means to the total number of attempted contacts during a fixed inspection period by the lending institution.

During the dynamic evolution of the lost-linking mode, lost-linking persistence exhibits stage-by-stage characteristics, and different stages can be identified by preset thresholds.

(1) Hide and seek (HS) mode

The lost-linking duration $T \leq T_1$ (e.g., $T_1 = 90$ days, referring to the industry collection cycle standard). Customers maintain partial accessibility by selectively responding to contact attempts, such as periodic phone calls. The contact rate $R \geq R_1$ (e.g., $R_1 \in [10\%, 30\%]$, based on the historical contact success rate statistics of financial institutions), indicating that customers still retain a certain willingness to communicate.

Example: A customer answers the phone once a week or replies to one text message, which meets the threshold range of $T \leq 90$ days and $R_1 \in [10\%, 30\%]$, reflecting the characteristics of tentative evasion.

(2) Evolutionary transition period (strategic concealment)

The lost-linking duration $T_1 < T \leq T_2$ (for example, $T_2 = 180$ days, set according to the overdue risk upgrade warning model). Customers start to frequently change contact information or refuse to respond to any contact attempts. The contact rate $R < R_1$ (for example, $R_1 = 10\%$), indicating that customers actively reduce their accessibility.

Example: The lost-linking duration is more than 90 days but less than 180 days, and the contact rate is less than 10%. Customers may evade collection through false addresses or short-term shutdowns, which is a sign of transition to the "False Disappearance" mode.

(3) False disappearance (FD) mode stabilization

The lost-linking duration $T > T_2$, and the contact rate $R \approx 0$. Customers completely cancel their common contact methods (such as mobile phone numbers and social media accounts) and cut off their social relationship networks.

Example: The lost-linking duration is more than 180 days and the contact rate is zero. Customers completely break away from the original contact channels and enter a state of "complete concealment", which significantly increases the difficulty of collection.

## 2.2 Asset Transfer Intensity: From Local Transfer to Systematic Evasion

Asset transfer intensity is a key dimension reflecting the severity of loan customers' debt-evasion behavior. Changes in their asset disposal strategies embody a qualitative change in evasion behavior. Different stages can be defined by the following threshold indicators.

(1) Hide and seek (HS) mode and the evolutionary transition period (local transfer)

Collateral value fluctuation threshold ($V = \dfrac{\Delta C}{\Delta t}$, where $\Delta C$ represents the change in collateral value, $\Delta t$ is the time interval.). A collateral-value fluctuation range $V \leq V_1$ (e.g., $V_1 = 20\%$) indicates that customers only perform local transfers of liquid assets (such as demand deposits and short-term investments).

Threshold for the Gap between Overdue Loans and Recoverable Assets $G$. When the gap is lower than (e.g., $G_1 = 20\%$), customers still retain the willingness to negotiate and resolve debts.

Example: With a 15% fluctuation in collateral value and a 15% gap ratio, customers maintain their basic credit relationships through partial repayments or debt restructuring.

(2) "Flee with the money" (FM) mode (systematic evasion)

Collateral value decline threshold: The decline in collateral value $V > V_2$ (e.g., $V_2 = 25\%$), or there is a large-scale dispersion of funds transferred from associated accounts $M > M_1$ (or the proportion of a single-fund transfer exceeds $G_2 = 50\%$ of the loan balance).

Gap Breakthrough Threshold: When the gap between overdue loans and recoverable assets exceeds $G_2$ (e.g., $G_2 = 50\%$), customers choose to "abandon assets and flee" due to insolvency risks.

Example: When the collateral value drops by 30% and the gap ratio reaches 60%, customers transfer 80% of their realizable assets via associated accounts, resulting in systematic evasion.

## 2.3 Social Relationship Fracture: From "Relationship Dependency" to "Network Severance"

The integrity of social networks plays a critical role in the dynamic evolution of loan customers' lost-linking modes, serving as a key indicator of evasion severity and risk escalation [2]. This progression is quantified through two variables: number of valid contacts (denoted as $N$) and proportion of immediate family members among emergency contacts (denoted as $K$), with thresholds defining three distinct stages:

(1) Relationship dependency phase (HS Mode) $N \geq N_1$ (e.g., $N_1 = 5$) and $K \geq K_1$ (e.g., $K_1 = 60\%$)

Example: A customer retains multiple valid contacts (e.g., parents, spouse) and relies on their social network to obscure their whereabouts while maintaining partial accessibility. Financial institutions can still extract limited information through these contacts (e.g., emergency contact's mobile number state or SMS signaling features).

(2) Relationship weakening phase (transition to FD)

$N \leq N_2$ (e.g., $N_2 = 3$ ) and $K \leq K_2$ (e.g., $K_2 = 20\%$ ).

Example: Emergency contacts increasingly provide invalid responses (e.g., "unreachable" or "unknown person"), and non-family or fake contacts dominate. This signals deliberate efforts to weaken social ties (e.g., invalid emergency contact's dialing records or e-mail features), reducing the lender's ability to trace the customer.

(3) Network severance phase (FD mode)

$N \leq N_3$ (e.g., $N_3 = 0$ ) and $K \leq K_3$ (e.g., $K_3 = 0\%$ )

Example: The customer severs all verifiable social connections (e.g., deactivating permanent address validity, deleting APP/applet/public account traces), creating a "social vacuum." Financial institutions lose all third-party tracking channels (e.g., emergency contact's SMS signaling), drastically increasing recovery difficulty.

## 2.4 Logical Correlations of the Trigger Mechanism

During the dynamic evolution of loan customers' lost-linking modes, there are close logical correlations among the key indicators of the three dimensions: lost-linking persistence, asset transfer intensity, and social relationship fracture. These correlations form the core identification markers of dynamic evolution. The specific comparisons are shown in **Table 1**.

**Table 1. Core Identification Markers for the Dynamic Evolution of Three Lost-Linking Modes**

| Mode Characteristics | Hide and Seek (HS) Mode | Flee with the Money (FM) Mode | False Disappearance (FD) Mode |
|---|---|---|---|
| Lost-Linking Persistence | Lost-linking duration $T \leq T_1$ (e.g., $T_1 = 90$ days); Contact rate $R \geq R_1$ (e.g., $R_1 \in [10\%, 30\%]$ ) | Lost-linking duration $T \in [T_1, T_2]$ days accompanied by asset transfer; Contact rate $R < R_1$ (e.g., $T \in [T_1, T_2]$ ) | Lost-linking duration $T > T_2$ days (e.g., $T_2 = 180$ days, high-risk early warning threshold); Contact rate $R \approx 0$ |
| Asset Transfer Intensity | Local transfer (liquid assets, collateral fluctuation $V \leq V_1$ (e.g., $V_1 = 20\%$ )) | Systematic transfer $V > V_2$ (collateral decline (e.g., $V_2 = 25\%$ ), or proportion of asset transfer $M > M_1$ (e.g., $M_1 = 50\%$ single transfer exceeding 50% of the loan balance)) | Insignificant asset transfer (emphasis on concealment rather than transfer, $V < V_1$ and $G \leq G_1$ ) |
| Social Relationship Fracture | Number of valid contacts $N \geq N_1$ (e.g., $N_1 = 5$ ); Proportion of immediate family members among contacts $K \geq K_1$ (e.g., $K_1 = 60\%$ ) | Number of valid contacts $N \leq N_2$ (e.g., $N_2 = 3$ ); Proportion of immediate family members among contacts $K \leq K_2$ (e.g., $K_2 = 20\%$ ) | Number of valid contacts $N \leq N_3$ (e.g., $N_3 = 0$ ); Proportion of immediate family members among contacts $K \leq K_3$ (e.g., $K_3 = 0\%$ ) |
| Core Trigger Conditions | Periodically rejecting calls, temporary address disguise | Excessive rate of asset loss, expanding overdue gap | Canceling contact methods, completely severing social relationships |
| Evolutionary Direction | May escalate to False Disappearance or resume contact | Directly form a stable escape state | Maintain a concealed state for a long time |

As can be seen from Table 1, there are significant differences in key indicators among different lost-linking modes. In terms of lost-linking persistence, the HS mode is in a relatively early stage, and customers still maintain a certain degree of contact with lending institutions. As the mode evolves towards the FD mode, the lost-linking duration continuously increases, and the contact rate approaches zero. In terms of asset transfer intensity, the asset transfer in the HS mode is relatively minor, while the FM mode exhibits obvious characteristics of systematic asset transfer. The degree of social relationship fracture also deepens gradually with the evolution of the mode, and in the FD mode, the customer's social relationship network is completely severed.

## 3. Influence of the External Environment on the Evolution of Lost-Linking Modes

The external environment adjusts the evolutionary path by changing customers' evasion costs and behavioral motivations, which is mainly reflected in three dimensions:

### 3.1 Economic Cycle: Macroeconomic Adjustment of Risk Tolerance

Expansion Phase (Economic Growth): Customers are optimistic about future income expectations. The "Hide and Seek" (HS) behavior is mostly a short-term capital-turnover strategy. They tend to resolve debts through negotiation, and the probability of evolving into "False Disappearance" (FD) is low. For example, when consumer finance customers experience temporary income fluctuations, they are more likely to retain basic contact information and resume repayments after the economy recovers.

Contraction Phase (Economic Downturn): Rising unemployment and asset depreciation increase customers' debt pressure [9]. If business owners face rapid depreciation of collateral (such as a housing valuation drop of over 30%), they are more likely to choose to "Flee with the Money" (FM) to reduce losses. Personal customers with a sharp income decline and weak social relationships are prone to cutting off contact and entering the "False Disappearance" state. At this time, economic pressure resonates with internal indicators, accelerating the mode upgrade [10].

### 3.2 Industry Policies: The Transmission Effect of Compliance Costs

Tightened supervision (such as the compliance of debt collection): Limiting the frequency of debt collection (e.g., no more than one contact per day) and its scope (prohibiting the harassment of irrelevant contacts) reduces customers' evasion costs. This may cause customers in the "Hide and Seek (HS)" state to shift from "intermittent responses" to "complete silence", and then evolve into the "False Disappearance (FD)" state. For example, after the implementation of the interest rate cap policy in the online lending industry, some customers chose to remain hidden for a long time to avoid repayment because they perceived a decrease in the intensity of debt collection.

Lenient policies (such as support for debt restructuring): Policies like extended repayment periods and interest waivers reduce customers' motivation to evade debts. They encourage HS customers to maintain communication and may even reverse the evolutionary path of lost-linking modes. In this case, customers are more willing to resolve debt problems through formal channels, reducing the likelihood of an upgrade in the lost-linking mode.

### 3.3 Emergencies: Sudden Catalysts for Evasion Behavior

Public Health Incidents (such as pandemic lockdowns): Regional lockdowns render offline contact ineffective. Customers may take the opportunity to cancel their regular contact methods, switch to temporary numbers or cut off social media accounts, resulting in "environment-forced" FD. This type of evolution is often accompanied by a sharp decrease in the number of valid contacts ($N$: a drop of over 50% in the short term) because the lockdown also affects the accessibility of their relatives and friends.

Regional Financial Turmoil (such as local debt crises): The collapse of market trust triggers the "herd effect". Influenced by surrounding "runaway" cases, some customers may transfer assets in advance and cut off contact even if their own debts have not deteriorated, leading to a concentrated outbreak of the FM mode. This type of evolution is sudden and is often accompanied by abnormal fluctuations in asset transfer intensity indicators (such as

transferring over 80% of realizable assets within a week).

The action paths of the above three external environment influences regulate the evolution of lost-linking modes in two ways:

(1) Threshold Adjustment: During an economic downturn, customers face increased financial pressure, and the asset-loss trigger threshold for "Flee with the Money" decreases. For example, when asset losses reach $V > 25\%$ (assumed threshold), customers may initiate asset transfers. When regulation is tightened, it becomes more difficult for lending institutions to reach customers, and the contact-difficulty threshold for "False Disappearance" increases. For example, if only 1 out of 10 consecutive contact attempts $R \leq 10\%$ (assumed threshold) is successful, customers may give up communication and enter the "False Disappearance" state.

(2) Motivation Reinforcement: Emergencies can significantly change customers' risk perceptions and trigger sudden changes in evasion strategies. For example, during the COVID-19 pandemic lock downs, many customers experienced income disruptions, were pessimistic about their repayment abilities, and worried about debt and legal risks. These psychological changes prompted them to shift from "temporary evasion" to "permanent disconnection", cutting off contact with lending institutions.

## 4. Management Implications: Optimization Paths for Financial Institutions' Dynamic Risk Control

Financial institutions need to build a full-cycle risk management loop. They can effectively respond to the dynamic evolution of loan customers' lost-linking modes through four paths: dynamic monitoring, precise intervention, environmental adaptation, and technological innovation.

### 4.1 Establish a Multi-Dimensional Dynamic Monitoring System

Financial institutions should integrate multi-dimensional data on behavior, assets, and social relationships to build a hierarchical early-warning mechanism. At the behavioral level, they need to track the changes in customers' lost-linking duration and contact rate in real-time. Customers with a sharp increase in the number of lost-linking days or a significant drop in the contact rate in a short period should be marked as risks. At the asset level, they need to monitor the fluctuations in the valuation of collateral and abnormal fund flows. Once signals such as a significant depreciation of collateral or the dispersal of funds from accounts are detected, an asset preservation plan should be launched. At the social relationship level, they need to dynamically analyze the number of valid contacts and the degree of kinship. For customers with a sharp decrease in the number of contacts, they should restore their social network by combining social security records, communication base station positioning, and other technologies to prevent the breakage of the information chain.

### 4.2 Implement a Precise Intervention Strategy by Stage

Differentiated intervention measures should be taken according to the customers' lost-linking stages. For early-stage "Hide and Seek (HS)" customers, it is preferred to convey the willingness to negotiate repayment through their relatives or colleagues, and provide personalized repayment plans (such as interest waivers, extended installments). Cross-verify the customers' reserved addresses with their utility bill payment addresses and online shopping delivery addresses to identify temporary address disguises, and conduct targeted online interviews (such as confirming the repayment plan via video) to avoid deteriorating the relationship due to excessive debt collection. For customers who have entered high-risk stages such as "Flee with the Money (FM)" or "False Disappearance (FD)", once abnormal transactions of collateral or the dispersal of funds are detected, financial institutions should cooperate with judicial authorities to freeze abnormal accounts and restrict asset transfers. At the same time, send legal risk notice letters to emergency contacts and open channels for assisted repayment to reduce the likelihood of customers completely losing contact.

### 4.3 Establish an External Environment Response Mechanism

Financial institutions need to flexibly adjust their risk control strategies according to economic cycles and policy changes. During

an economic downturn, they should strengthen the monthly monitoring of the collateral and accounts receivable of small and micro enterprises, intervene in debt restructuring negotiations in advance to prevent asset transfers. During an economic recovery period, they should adopt a gentle contact strategy (such as sending text message reminders) for HS customers, focusing on maintaining customer relationships and reducing unnecessary upgrades of the lost-linking mode. In the face of tightened regulatory policies, they should screen high-interest online lending customers in batches, actively interpret the policy details, and provide compliant interest rate conversion plans to reduce the risk of "False Disappearance" caused by policy impacts. During public health emergencies or regional financial turmoil, online green channels for debt negotiation can be opened to support remote signing and repayment plan adjustments, maintaining contact with customers while reducing their excuses for evading repayment.

## 4.4 Deepen the Integration of Intelligent Technology and Compliance

Rely on technological tools to improve risk control efficiency while strictly adhering to the bottom line of data compliance. Use knowledge graph technology to visualize customers' social relationship networks and identify potential lost-linking risk nodes. Analyze keywords in debt collection records (such as "don't contact me again", "no ability to repay") through natural language processing technology to capture signals of sudden strategy changes in real-time. In terms of data use, strictly follow personal information protection regulations, only collect contact information within the authorized scope, and use privacy-enhancing computation technology to desensitize sensitive data to achieve the dual goals of risk prevention and privacy protection.

## 5. Conclusions

This research constructs a three-dimensional "behavior-asset-relationship" trigger mechanism to systematically reveal the dynamic evolution logic of loan customers' lost-linking modes and the influencing mechanism of the external environment. The research shows that the evolution of customers' lost-linking behavior is essentially a systematic

upgrade of evasion strategies, and the process exhibits stage-by-stage characteristics from "Hide and Seek (HS)" to "Flee with the Money (FM)" or "False Disappearance (FD)". Lost-linking persistence, asset transfer intensity, and social relationship fracture, as core trigger indicators, form a dynamic risk transmission chain through logical correlations. External environments such as economic cycles, industry policies, and unexpected events significantly accelerate or inhibit the evolutionary path of the modes by adjusting evasion costs and behavioral motivations.

For financial institutions, traditional static risk control systems struggle to cope with such dynamic risks. Based on the research findings, this paper proposes a four-dimensional optimization path of "monitoring-intervention-response-technology". It involves integrating a multi-dimensional dynamic monitoring system to capture early-stage risk signals, implementing phased and differential intervention strategies to precisely defuse risk upgrades, constructing a flexible external environment response mechanism to enhance risk resilience, and relying on the integration of intelligent technology and data compliance to achieve a balance between efficiency and security.

Future research can quantify key trigger thresholds by combining empirical data and explore the application of technologies such as blockchain in tracking asset transfers to improve the accuracy of risk early-warning.

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