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A Taxonomy of Dark Patterns on Digital Lending Platforms: Evidence from a Survey of 15 Digital Financial Platform

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Abstract: W With the growth of digital finance, platforms like JD Finance and ZhongAn Finance have become key public funding sources. However, they often embed "dark patterns", manipulative interface designs that undermine user rights. Based on a study of 15 major financial platforms, this paper identifies 10 prevalent dark patterns, including "forced registration" "ambiguous annualized rates" and "difficult account cancellation". Case studies reveal their manipulative logic by exploiting users' bounded rationality and restricting information access. Findings indicate that over 80% of platforms employ at least three such patterns, which disproportionately harm vulnerable groups like the elderly and students. To address these issues, we propose a tripartite governance framework integrating governmental regulation, platform self-assessment, and user empowerment, offering actionable insights for regulating digital financial services.

Keywords: Digital Finance; Dark Patterns; Financial Consumer Protection; Lending Platforms; Interface Manipulation

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1.Introduction

In recent years, digital finance has rapidly expanded into various markets, largely driven by its "ow entry barriers and high convenience". China's digital finance user base has reached 960 million, accounting for 68.6% of the total population. Key segments such as third-party payment, online lending, crowdfunding, online insurance, online funds, and online trusts have all shown rapid growth [1], with platforms such as JD Finance, ZhongAn Finance, and 360 Jietiao each maintaining over 10 million monthly active users. By leveraging algorithmic recommendations and streamlined procedures, these platforms enable users to complete loan applications seamlessly from home. Yet this apparent "convenience" masks underlying risks—some platforms deliberately employ interface designs that guide users toward unintended decisions, a strategy known as deploying "dark patterns".

Unlike dark patterns encountered in e-commerce—such as disguised cart additions—those embedded in financial platforms pose direct threats to users' fund security and credit history. For instance, some platforms present annualized interest rates deceptively, describing them merely as "0.02 yuan daily". Thereby obscuring high borrowing costs. Others require users to provide phone numbers before displaying loan terms, infringing on personal privacy. Still others hide account cancellation options deep within multi-layered menus, leaving users trapped in unwanted subscriptions. By 2025, complaints related to dark pattern manipulation already constituted a growing share of financial grievances handled by the China Consumers Association, even exceeding those related to traditional financial services in certain categories—underscoring the urgency of addressing this issue.

Current academic literature primarily examines dark patterns within e-commerce and social media contexts [2,3]. However, financial dark patterns—characterized by their high technical complexity and potential for rapid risk contagion—have not yet been systematically studied. This paper fills that gap by identifying and classifying ten forms of dark patterns observed across fifteen financial platforms. It aims to serve a dual purpose: first, to equip regulators with a clear, actionable taxonomy to support targeted supervision; and second, to enhance user awareness of manipulative designs, thereby helping to prevent financial harm. In doing so, it also encourages platforms to adopt more user-centered designs, supporting healthier and more sustainable development in the digital finance industry.

2.Definition and Types of Dark Patterns in Digital Financial Platforms

2.1 Definition of Financial Platforms and Their Dark Patterns

Digital financial platforms are online intermediaries that utilize digital technologies to deliver services such as credit lending, wealth management, and payment processing [4]. Representative examples include JD Finance, ZhongAn Finance, and Ant Group. These platforms, characterized by their algorithm-driven operations, have become integral components of the contemporary financial landscape.

Drawing on the foundational work of Mathur et al. [5], this study defines digital financial dark patterns as interface strategies embedded in the design of these platforms. These strategies manifest through visual layouts, information framing, or process flows. They exploit users' bounded rationality, including cognitive biases and information asymmetries, to guide or compel individuals toward financial decisions they would not otherwise make, such as undertaking excessive loans or agreeing to hidden costs. The existence of dark modes is not for consumers to gain more benefits, but for the benefit of digital financial platforms [6].

Compared to dark patterns in other domains, those found in financial contexts exhibit two distinctive traits. First, they carry direct financial consequences, immediately threatening users' fund security. For instance, ambiguous presentations of annualized interest rates can mislead borrowers into paying more than necessary. Second, they exert a persistent coercive influence: once users are engaged, they often encounter long-term constraints. A typical example includes interfaces that bury account cancellation functions deep within complex menus, effectively trapping users in ongoing relationships and continuously exposing them to promotions for high-interest financial products.

2.2 Types and Case Studies of Dark Patterns in Digital Financial Platforms

Table 1 presents a taxonomy of ten prevalent dark patterns identified across digital lending platforms. Each category is described in terms of its underlying manipulative logic, the platforms on which it was observed, and illustrative examples. The analysis covers major lending services, including Xiaoman Finance, JD Finance, and Zhonglian Finance.

Lengthy User Agreement Previews This pattern leverages users' reliance on intuitive judgment by presenting excessively long and complex user agreements or privacy policies, thereby discouraging careful review. Platforms such as Du Xiaoman Finance, Zhonglian Finance, Kejie Finance, Kaka Hua, Xiaofu Loan, 58 Haojie, Ctrip Finance, and Ping An Finance adopt this approach. For example, Ping An Finance employs an extended privacy policy and a separate list of third-party data sharing arrangements, making it difficult for users to locate key clauses. Several other platforms present lengthy agreements immediately upon app launch, effectively prompting users to grant broad permissions without thorough reading.

Concealing Key Information Before Verification Under the guise of identity verification, platforms deliberately withhold essential information—such as interest rates, handling fees, and guarantee fees—until users complete facial recognition. As a result, borrowers cannot assess the true cost of loans in advance. This practice is widespread across platforms including Du Xiaoman Finance, JD Finance, Zhaolian Finance, Doudou Qian, Anyihua, Xiaoying Card Loan, Jixiang Hua, 360 Jietiao, Zhongyi Rong, Kejie Finance, Kaka Hua, Huoshan Rong, Xiaofu Loan, 58 Haojie, Ctrip Finance, Didi Finance, and Ping An Consumer Finance. In these cases, users only gain access to fee details after submitting to biometric verification.

Compulsory Registration Platforms condition service access on the provision of personal information—typically a mobile phone number—effectively barring unregistered users from any form of engagement. Nearly all surveyed platforms enforce this policy, including Du Xiaoman Finance, JD Finance, ZhongAn Finance, Doudou Money, Anyi Hua, Xiaoying Card Loan, Jixiang Hua, 360 Jietiao, Zhongyi Rong, Kejie Finance, Kaka Hua, Huoshan Rong, Xiaofu Loan, 58 Haojie, Ctrip Finance, Didi Finance, and Ping An Consumer Finance. A typical example is the universal requirement to enter a mobile number and verification code before users can view their potential loan limits. Huoshan Finance imposes further restrictions by requiring users to provide two emergency contacts and specify their relationships before proceeding.

Repeated Exit Prompts When users attempt to leave the loan application interface, platforms deploy incentive-based or emotionally persuasive tactics to deter exit. This pattern is observed on JD Finance, Doudou Money, Xiaoying Card Loan, Jixiang Hua, Huoshan Rong, and Ping An Consumer Finance. For instance, when a user tries to exit the Doudou Money interface, a pop-up appears highlighting a pre-approved credit line of ¥20,000 and promising disbursement within three minutes—using urgency and high credit limits to persuade users to stay.

Visual Manipulation for Click Induction Platforms strategically deploy bold colors, enlarged typography, and dynamic animations to direct user attention toward loan-related functions. This technique is used by JD Finance, 360 Jietiao, Zhongyi Rong, Kejie Finance, Huoshan Rong, and Didi Finance. 360 Jietiao, for example, displays a prominent “New User Benefits” banner on its homepage, while Didi Finance promotes a “30-Day Interest-Free Voucher” with a visually striking “Exceptional Value” label to encourage engagement.

Automatic Matching of Lending Institutions This pattern removes user autonomy by automatically assigning a partner lending institution without offering a choice. Platforms such as Zhongchui Ronghe and Kejie Finance implement this approach. In some cases, even before users complete facial recognition—often after only entering an ID number—the system displays a “Lending institution matched” notification. Users subsequently receive unsolicited contact via SMS, phone calls, or WeChat from the assigned institution, with no option to select or switch providers.

Concealing Key Contract Terms Critical contractual clauses—such as those related to user data collection or liability disclaimers—are embedded within lengthy, complex agreements. Users must accept the entire document to proceed, with no option to object to specific terms. This practice is observed across Du Xiaoman Finance, JD Finance, Zhonglian Finance, Doudou Money, Anyihua, Xiaoying Card Loan, Jixiang Hua, 360 Jietiao, Zhongyi Rong, Kejie Finance, Kaka Hua, Huoshan Rong, Xiaofu Loan, 58 Haojie, Ctrip Finance, Didi Finance, and Ping An Consumer Finance. For instance, Du Xiaoman Finance buries clauses authorizing the collection and processing of user data by third-party entities such as Baidu and Megvii deep within its agreement, making them nearly impossible to identify without detailed scrutiny.

Ambiguous APR Disclosure Platforms use expressions such as “daily interest” or wide interest rate ranges to obscure the true cost of borrowing, leading users to underestimate repayment obligations. This occurs on Du Xiaoman Finance, Anyi Hua, Jixiang Hua, 360 Jietiao, Kejie Finance, Kaka Hua, 58 Haojie, Ctrip Finance, Didi Finance, and Ping An Consumer Finance. Ping An Consumer Finance, for example, states an “Annualised Interest Rate 4%–24%” alongside equivalent daily rates, but fails to specify the eligibility criteria for obtaining the lowest 4% rate.

Persistent User Accounts Even after users deactivate their accounts, platforms retain personal data and restore full account functionality upon re-login. Du Xiaoman Finance and JD Finance, among others, engage in this practice. For example, users who deactivate JD Finance or Du Xiaoman accounts and later log in again with the same mobile number will find their previous accounts fully restored—confirming that data were not permanently deleted.

Obstruction of Account Cancellation Platforms hide cancellation pathways and impose cumbersome procedures to raise barriers to exit. Affected platforms include Du Xiaoman Finance, JD Finance, ZhongAn Finance, Doudou Money, Anyi Hua, Xiaoying Card Loan, Jixiang Hua, 360 Jietiao, Kejie Finance, 58 Haojie, Ctrip Finance, Didi Finance, and Ping An Consumer Finance. In one instance, Doudou Qian requires a 15-day waiting period to finalize account closure. Many other platforms conceal cancellation options within the app interface, forcing users to navigate AI customer service systems to uncover the required procedure.

Table 1: Taxonomy and Manifestations of Financial Dark Patterns

Category	Manipulative Logic	Examples
Lengthy Agreement Previews	Exploits cognitive inertia by presenting complex texts to deter thorough review.	Ping An Finance uses extensive privacy policies; multiple platforms present agreements immediately upon app launch.

Category	Manipulative Logic	Examples
Pre-verification Information Concealment	Creates information asymmetry by withholding key terms until after identity verification.	Users across 15 platforms cannot view guarantee fees or final interest rates before completing facial recognition.
Compulsory Registration	Holds service access hostage to compel disclosure of personal information.	All platforms require registration to view loan limits; Huoshan Finance further demands emergency contact details.
Repeated Exit Prompts	Employs financial incentives or urgency to reverse user exit decisions.	Doudou Money displays a pop-up offering a ¥200,000 credit limit when a user attempts to exit the loan page.
Visual Manipulation	Guides user attention and clicks to loan products through salient visual design.	360 Jietiao highlights “New User Benefits”; Didi Finance uses “Exceptional Value” tags for loan vouchers.
Automatic Lender Matching	Deprives users of choice by auto-assigning a lending partner without consent.	Zhongyirong and KeJie Finance trigger “lender matched” notifications after users merely input an ID number.
Hidden Contract Terms	Buries critical clauses on data collection and liability in lengthy, complex agreements.	Duxiaoman Finance conceals clauses about sharing user information with Baidu and Megvii within its contract.
Ambiguous APR Disclosure	Obscures true borrowing costs using “daily interest” or wide ranges, misleading users.	Ping An Consumer Finance states an APR of 4%–24% but omits the eligibility criteria for the lowest rate.
Persistent Accounts	Prevents a clean break by retaining user data and reactivating accounts upon re-login.	JD Finance and Duxiaoman Finance accounts remain active with original usernames after cancellation.
Obstructed Account Cancellation	Increases exit costs by hiding cancellation entries and imposing cumbersome procedures.	DoudouQian imposes a 15-day waiting period; others hide the option, requiring contact with AI customer service.

2.3 Manipulation Mechanisms of Dark Patterns

The ten dark patterns previously identified primarily function by exploiting users’ bounded rationality. Proposed by Simon, this theory contends that human decision-making is inherently limited by cognitive capacity and information access [7]. Digital financial platforms intensify these limitations through two principal methods.

First, they induce information asymmetry. Practices such as concealing key information prior to verification or embedding critical clauses within lengthy contracts serve to delay or obscure essential details regarding interest rates and fees. As a result, users are deprived of the information necessary for informed decision-making and become more reliant on platform guidance.

Second, they leverage cognitive biases. For instance, lengthy agreement previews exploit cognitive inertia, whereby users tend to accept terms without thorough review due to the mental effort involved. Similarly, ambiguous annualised interest rates capitalize on numerical perception bias, leading users to perceive a cost phrased as “0.03 yuan daily” as significantly less impactful than the equivalent “10.95% per annum”.

The interplay of these mechanisms leaves even reasonably cautious users vulnerable to manipulation. Addressing these practices is thus critical; failure to do so may not only perpetuate user harm but also precipitate a broader loss of trust in digital financial markets.

3.The Multidimensional impacts of Dark Patterns in Digital Financial Platforms

3.1 Harm to Financial Consumers

Dark patterns inflict direct and escalating harm on financial consumers, with a pronounced tendency to disproportionately affect vulnerable groups. The adverse impacts progress from tangible financial losses to profound rights violations [8].

First, these designs lead to significant financial losses through hidden costs and misjudgment risks. Ambiguous annualized interest rates and undisclosed fees prior to verification are primary culprits. Most platforms display only broad APR ranges on their homepages or employ misleading promotions—such as “30 days interest-free” (JD Finance), “Exceptional Value” (Didi Finance), or “Borrow £1000 for 12 months, daily fee from 12 pence, APR from 7.2%” (360 Jietiao)—which create a false impression of low costs and prevent users from accurately assessing the true expense of loans.

Second, dark patterns facilitate privacy breaches through mandatory authorization and subsequent information misuse.

Practices like forced registration and contracts that conceal data-sharing clauses result in excessive collection of personal data. For instance, among the 15 lending platforms examined, many push advertisements claiming "You have a borrowing limit" immediately after obtaining users' mobile numbers. In more severe cases, some platforms share user identification details with third-party marketing firms, leading to a surge in nuisance calls and further violation of personal privacy.

Finally, users often find their rights entrapped, primarily due to difficult account closure and persistent data retention. Mechanisms such as perpetual accounts and intentionally cumbersome cancellation procedures prevent users from cleanly exiting platform ecosystems. JD Finance, for example, continues to retain user accounts and push advertisements long after borrowing activities have ceased. Meanwhile, Doudouqian's 15-day account closure review process can be invalidated by any accidental login during that period. These obstructive designs are particularly challenging for elderly users with lower digital literacy, who may struggle to locate closure options and thus remain perpetually subject to unwanted platform engagement.

3.2 Harm to Financial Markets

Dark patterns also inflict profound harm on financial markets, which manifests in two principal dimensions: the distortion of competitive order and the amplification of systemic risk.

On the one hand, they disrupt fair competition by encouraging monopolistic behavior among leading platforms and triggering a "race to the bottom" consistent with Gresham's Law. Resource-rich platforms—such as JD Finance and 360 Jietiao—leverage dark patterns to monopolize user traffic. For example, JD Finance prioritizes its own lending products in recommendation lists, while requiring external banks to pay for visibility, effectively suppressing lower-interest alternatives. In response, smaller platforms are compelled to adopt similar manipulative tactics—such as forced registration and ambiguous interest rate disclosures—in order to remain competitive. This dynamic creates a vicious cycle in which platforms that refrain from deploying dark patterns lose market share, thereby reinforcing industry-wide degradation.

On the other hand, dark patterns heighten the transmission of systemic risk by increasing user defaults and platform bad debt levels. Through repeated prompts and visual manipulation, users are induced to borrow impulsively. However, when they later realize the true cost of loans—obscured initially by ambiguous interest rates—many struggle to repay, leading to a rise in defaults. An increase in non-performing borrowers directly elevates platforms' bad debt ratios. If multiple institutions face such issues simultaneously, a liquidity crunch may ensue, potentially destabilizing the broader financial system.

3.3 Harm to Financial Institutions

Although dark patterns may temporarily improve key performance indicators for platforms, they ultimately undermine long-term sustainability by eroding user trust and satisfaction, which in turn leads to decreased user retention and borrowing activity in subsequent periods. A case in point is China UnionPay Finance, which was fined 2.9 million yuan in 2021 by the former China Banking and Insurance Regulatory Commission (CBIRC) for 19 regulatory violations, including the use of exaggerated and misleading marketing—a clear illustration of how such practices can inflict severe reputational damage.

Moreover, dark patterns inhibit meaningful financial innovation. By diverting resources toward the development of manipulative interface designs, platforms neglect the more socially valuable goal of creating accessible and transparent inclusive financial products. Examples include user-friendly wealth management tools tailored for rural populations or straightforward loan offerings for micro-enterprises. This misallocation of developmental focus fundamentally undermines the original policy intent of digital finance to promote broader financial inclusion.

4.Governance Recommendations for Dark Patterns in Digital Finance

Currently, countries worldwide have initiated regulatory and governance efforts targeting dark patterns across various sectors [9]. Addressing the dark patterns documented in this study requires a coordinated effort among regulators, platforms, and users. The following recommendations are structured to correspond directly to the issues identified in the preceding analysis.

4.1 Regulatory Authorities: Explicitly Prohibit Deceptive Practices

Regulators should establish and enforce a clear negative list that explicitly bans prevalent deceptive practices such as compulsory registration, hidden contractual terms, and unreasonably difficult account closure. For instance, platforms must be required to allow users to view loan products and interest rates prior to registration; the account cancellation process should be limited to no more than three steps, with any mandatory review period not exceeding one business day—thereby addressing excessively long waiting periods such as the 15-day closure process of DouDouQian or the three-day delay at KeJie Finance. Platforms identified as employing multiple dark patterns should be prioritized for inspection, and substantial penalties should be imposed to create a meaningful deterrent against such manipulative behaviors.

4.2 Lending Platforms: Enhance Transparency and Simplify Processes

Platforms referenced in this study should take targeted corrective actions corresponding to their specific dark pattern usage. Those displaying only annualised interest rate ranges on their homepages—such as Anyi Hua and 360 Jietiao—should be required to disclose the actual annualised interest rate applicable to the individual user, rather than presenting ambiguous ranges. Platforms with cumbersome account cancellation procedures, including JD Finance and DouDouQian, must introduce a clearly visible “Cancel Account” option within the homepage settings menu and eliminate protracted review periods. Furthermore, platforms that embed critical clauses within lengthy contracts—such as JD Finance and ZhongAn Finance—should summarise key information regarding data usage and fee structures in a single-page, easy-to-read format placed at the beginning of the agreement, sparing users the need to search through dense legal text.

4.3 Users: Strengthen Digital Literacy and Adopt Proactive Rights Protection

End users also play a critical role in mitigating the risks associated with dark patterns. It is recommended that individuals actively improve their financial literacy by using official educational resources such as the People’s Bank of China’s Financial Consumer Protection Platform to better understand concepts such as annualised interest rate calculation, thereby reducing their susceptibility to misleading representations like “low daily interest rates.” In cases where platforms are found to employ hidden interest schemes or other deceptive practices, users should not hesitate to assert their rights through official reporting channels such as the 12315 Platform or the central bank’s complaint hotline. It is worth noting that by 2024, some users have already successfully obtained compensation for interest losses through legal action, demonstrating that proactive rights protection can yield tangible outcomes.

5.Conclusion

Through an in-depth analysis of 15 digital finance platforms, we have identified and categorized ten distinct types of dark patterns prevalent in the online lending sector. We have elucidated their operational mechanisms, which systematically exploit users’ bounded rationality through information asymmetry and cognitive biases. The harms imposed by these deceptive designs are examined across three critical dimensions—financial consumers, market competition, and institutional integrity—revealing that such practices not only lead to direct financial harm and privacy infringement but also distort competitive fairness and constrain genuine financial innovation.

Although regulatory efforts targeting dark patterns have been initiated, we argue that current standards and supervisory capacity remain inadequate to fully address their evolving manifestations. The original ethos of digital finance—centered on inclusivity and accessibility—is fundamentally compromised by the proliferation of such manipulative designs. Moving forward, we emphasize the need for a collaborative governance framework that integrates rigorous government standard-setting, proactive self-rectification by platforms, and enhanced digital literacy among users. Such a multi-stakeholder approach is necessary to reorient the industry toward a more transparent and user-centric developmental path.

In further research, we intend to expand the scope and sample diversity of platform analysis, with particular attention to the disproportionate impact of dark patterns on vulnerable groups such as rural residents and micro-enterprise owners. We believe a more granular understanding of these differential effects will help in crafting targeted regulatory responses and fostering a more equitable digital financial ecosystem.

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