

Dark Patterns in Digital Finance: How Design Harms and Confuses Consumers in Digital Finance Products

Caroline Sinderson^{1,2,*}, Sophie Elizabeth Klitgaard³

¹Convocation Research + Design

²Interledger Foundation, San Francisco, California 94102, US

³University of California, Los Angeles, 405 Hilgard Avenue, Los Angeles, CA, 90095

Abstract

Neobanks are digital-only financial service platforms that offer services traditionally associated with banks, such as checking and savings accounts. Here, we consider the dark patterns present in neobank user design. Because neobanks are exclusively digital, dark patterns present a potent framework from which to analyze the potential harms these institutions may pose to consumers. Drawing from a series of interviews with industry experts and neobank users, as well as a case study of the user interface of the neobank Chime, we suggest neobanks may be using *hidden costs* to manipulate user behavior. We further propose a novel form of harmful design present in neobanking, namely that of obscuring their status as non-banks, and the significance of that status in terms of financial risk. We argue this new pattern, and that of hidden fees, disproportionately harms vulnerable populations.

Keywords

Dark Patterns, Financial Service Platforms, Digital Financial Inclusion, Neobanks

1. Introduction

Neobanks are digital-only financial service platforms that offer services traditionally associated with banks, such as checking and savings accounts [1]. The services offered by neobanks are typically smaller in scope than those of a traditional bank, seldom including loans, mortgages, or insurance [1]. Neobanks often offer advantages, such as ease of sign up, no monthly fees, or no minimum balance necessary. More broadly, digital banking has experienced large utilization rates, particularly among younger generations. A 2023 report sampling 87 financial institutions found 95% of Gen Zers and Millennials had adopted mobile banking, and almost 90% of Gen Xers [2]. Chime, one of the largest neobanking corporations, boasted over 9 million users in 2025 [3].

Critically, neobanks are not banks in the legal sense of the word [4]. Instead, they usually partner with traditional banks to offer banking services [5, 6]. Because they are not banks, neobanks thus lack many of the protections associated with traditional banking. For example, while neobanks may partner with traditional, FDIC-insured banks, they themselves are not FDIC-insured [7]. This means that any funds sent to a neobank are not eligible for FDIC insurance until the neobank deposits them into a traditional bank. Even if your money is sent to an FDIC-insured bank, the neobank must keep certain records in order for you to be eligible for coverage in the case that that secondary traditional bank fails [7].

The term *dark patterns* has been coined to denote harmful design patterns that inhibit a person's agency when using digital interfaces, often leading the user to make choices they otherwise would not have [8, 9]. Dark patterns can lead to a variety of consumer harms: they can violate data privacy by requiring consumers to disclose excess personal information [10], they can impose undue temporal and

Bridge Over Troubled Water: Aligning Commercial Incentives With Ethical Design Practice To Combat Deceptive Patterns. Workshop at the 2026 CHI Conference on Human Factors in Computing Systems (CHI EA '26), April 13–17, 2026, Barcelona, Spain

*Corresponding author.

✉ csinders@gmail.com (C. Sinderson); sklitgaard@ucla.edu (S. E. Klitgaard)

🌐 <https://carolinesinders.com/> (C. Sinderson)

🆔 0000-0002-0537-9318 (C. Sinderson); 0009-0009-3818-2923 (S. E. Klitgaard)



© 2026 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

monetary costs on users via an easy service registration process but difficult cancellation process [11], and they can push users towards rash purchase decisions via artificial scarcity cues [12].

Because neobanks have an exclusively digital presence, dark patterns are a particularly apt way to analyze the potential ethical risks and harms these institutions may pose to consumers. Despite widespread consumer use, limited research has applied the dark pattern framework to the world of digital financing. Here, we consider the applicability of this framework to neobanks. We review findings from a series of interviews with industry experts and neobank users regarding user design. Drawing from this testimony, we propose a novel form of harmful design present in neobanking, namely that of obscuring their status as non-banks, and the significance of that status in terms of financial risk. We investigate the presence of this pattern and *hidden costs* in a case study using the neobank Chime, highlighting how the impact of harmful user design in this context disproportionately falls on vulnerable populations.

2. Related Work

While design patterns generally adhere to principles such as minimalism, consistency, and visibility, online interfaces are able to strategically flout those principles in order to trick, confuse, or manipulate users into making decisions that do not align with their goals [8, 13]. Such practices have been termed dark patterns, and have been identified across contexts such as e-commerce, online gaming, social media, and privacy policies [14, 9, 12, 10, 15].

The banking and finance industry is a unique site of analysis for dark pattern research that necessitates careful consideration. The reasons for this are twofold. First and foremost, banking is a particularly sensitive and impactful aspect of everyday life for users, for whom the harms generated by dark patterns can be especially stark. Second, some otherwise undesirable aspects of user design are important and necessary in the context of banking. For example, financial interfaces often rely on necessary friction in order to protect institutions and customers [16, 17, 18]. Processes such as Know Your Customer (KYC) verification and multi-factor authentication serve not only as regulatory obligations but also as essential trust-building mechanisms [19]. In an interview conducted as a part of this research project, Ayden Férdeline, lead of public policy and government affairs at the foundation, explained:

“I actually would argue that friction can be a form of consumer protection. Friction can be positive. It can be constructive. And so if we’re talking about multi-factor authentication. In the European Union, we have the payment services directive two, PSD 2, which requires multi factor authentication and confirmation prompts. That is a protective mechanism, because it’s about preventing fraud. It’s about ensuring that the customer of the bank is aware of the intent behind the transaction and that they affirmatively agree to it.”

While friction, when intended to protect consumers, is a good thing, interface design in the financial industry can easily slip into the dark pattern space. A 2023 study by Rakovic and Inal analyzed 26 financial technology mobile apps available in Norway in order to identify and assess the prevalence of dark patterns [20]. Apps included both traditional banks and non-bank financial service platforms, including those that allow consumers to purchase stocks, funds, and cryptocurrencies. The authors found evidence of numerous different harmful design patterns, including forced registration, hidden information, hidden or disguised advertisements, and aesthetic manipulation. These patterns were disproportionately prevalent for non-bank applications as opposed to the digital interfaces of traditional banks.

3. Preliminary Findings

Informing this paper are a series of interviews with experts and everyday users, observational analysis of digital platforms, and a series of workshops with everyday users on harmful design and financial inclusion. We interviewed five experts in the field of financial technology and user design. Our expert participants include two former Consumer Financial Protection Bureau technologists, a lead of public

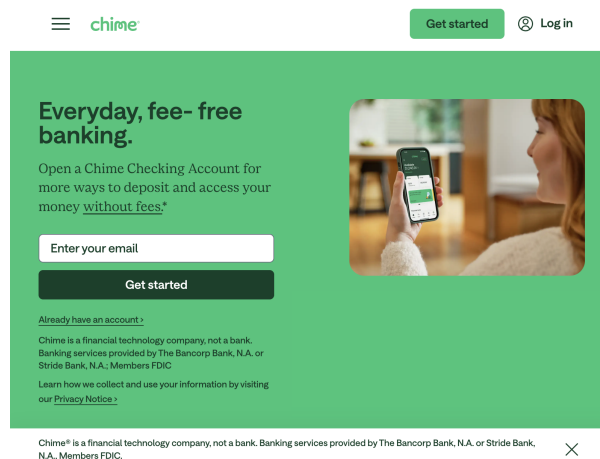


Figure 1: The front page (with a rotating carousel display) of Chime’s website prominently displays the message “everyday, fee-free banking.” The footnote associated with the asterisk next to this message can only be accessed via scrolling to the very bottom of their website, and must be identified amongst 18 similar footnotes.

policy and government affairs at the Integer Foundation, a member of the UK’s Competition and Markets Authority, and an internationally recognized user experience expert.

We conducted interviews and observations with four users of financial money-transfer applications, all of whom are immigrants to the UK from Chile. These participants relied on neobanks like Revolut for daily transactions and expense splitting, while maintaining accounts with Chilean banks for savings or family transfers; some used other money transfer sites for international transfers when their banks could not support those transfers.

We place neobank user and expert testimonies in conversation with a preliminary analysis of the Chime financial software in order to illuminate harmful design patterns and the risks they pose to consumers. All data was collected in 2025, with methods approved by all relevant human subjects and ethical review criteria for work conducted with the Integer Foundation.

Of the existing dark patterns outlined in Gray et al. [21], hidden costs represented the core of our findings. However, we also found a suite of design elements we argue do not fit into existing dark pattern ontologies. Instead, these represent a finance-specific harm engendered by flouting the term *banking* in a way that manipulates users’ preconceived ideas regarding traditional banks while obscuring the nature of neobanking institutions.

3.1. Hidden Costs

Hidden costs are a dark pattern that hides or obscures the actual cost of a purchase by delaying fee presentation or seeking to minimize fee presentation [21]. This practice deceives users about the total price of a product or service, ultimately “leading to them to make a purchase decision after they have expended effort on false pretenses” [21]. Some financial service companies, via marketing and advertising, portray their products as free services but then hide the actual costs later on when a user is already signed up and using the app.

Chime is one such company. While Chime advertises itself as devoid of fees, they do, in fact, levy fees against their customers. As displayed in Figure 1, the front page of Chime’s website prominently displays the message “everyday, fee-free banking.” The footnote associated with the asterisk next to this message can only be accessed via scrolling to the very bottom of their website, and must be identified amongst 18 similar footnotes.

With advertised features such as “Fee-free overdraft up to \$200,” and “Get paid up to 2 days early with direct deposit,” Chime markets itself to lower income customers attempting to make ends meet [22]. However, if a user wants to be paid early, they have to pay a fee, which is not disclosed in advertisements or the website homepage.

Chime marketing materials emphasize the instant nature of deposits and short term loans, featuring scenarios such as an individual in a store who realizes they do not have enough funds in their bank account, but who uses Chime to promptly deposit up to \$500 in their bank account [23]. However, in reality this scenario, which uses Chime's MyPay feature, would not be devoid of fees unless customers are willing to wait at least 24 hours during the transfer period. If customers wanted cash instantly, they would be subject to a fee. While the fee structure is drastically reduced in Chime's case, this is not altogether dissimilar to predatory payday loans, short term loans typically under \$500 that come with high interest rates if not repaid by the next payday [24].

As a dark pattern, hidden fees disproportionately impact vulnerable consumers. Low income users need access to funds expediently; not all consumers can wait 24 hours for a payment to clear. For these consumers, the immediate transfer option is the most likely selection. According to their 2025 SEC filings, 70% of transactions on Chime are non-discretionary expenses, such as food and groceries, gas, and utilities [25]. One of the experts interviewed for this project, Simon King, a design expert and technologist formerly of the Consumer Financial Protection Bureau, unpacked in an interview how the immediate transfer fees can feel disingenuous, especially for money lending apps advertised to working class users. Simon described, "The use case for [Chime] is making ends meet. And generally, when you're in a bad situation, and you've realized you don't have money to buy groceries, and you might even [be] at the grocery store. You're not waiting two days." This reality suggests Chime's marketing is not just disingenuous but is also predatory, as they marketed a free service, but the target audience for which that service is most appealing will be most likely to incur fees due to their vulnerable economic position. Chime appears to know this. In July 2025 the MyPay feature accounted for around 45% of year-over-year revenue growth during the prior two quarters [22].

Neobank users interviewed for this project attested to hidden costs as a significant source of frustration when trying to use these platforms. As immigrants, they frequently encounter hidden fees when making international money transfers. In this context, financial systems foster anxiety as one attempts to navigate between different potential banks or financial service providers, understanding the limitations of liability of the financial service platform or bank the user is using, and how to receive actionable and specific help in a timely manner when something goes wrong.

More than anything, participants valued transparency. One participant reported, "They don't discuss the fee. The fee is invisible. Which I think is so annoying because it's also part what I was telling you before. Like, you feel like they're stealing your money. It's not transparent." Platforms that provided visible exchange rates, clear fee structures, and explanations as to why an action couldn't be done when errors occurred, were valued above others. For this reason, the neobank Revolut was frequently praised for its legibility and interaction design, while traditional Chilean banks were criticized for requiring in-person assistance or concealing charges. At the same time, however, users expressed ambivalence about fully trusting digital banks. Revolut's lack of physical branches and slow customer support were sources of anxiety, particularly in cases of suspected fraud or technical errors.

3.2. Neobanks and Financial Service Platforms are not Banks

In this research, we are also proposing a new form of harmful design pattern: the lack of disclosure from financial service platforms regarding how they are not traditional banks. Chime, for example, touts itself as "The #1 most loved banking app" [26]. Chime's website has multiple prominent references to banking, including the visuals shown in Figure 1 and Figure 2.

Here, the usage of the word "banking" or "banked" can persuade a user into thinking that Chime is a bank, or that a financial service platform functions similarly to a traditional bank, with similar regulations and protections.

Here, it appears that Chime is leveraging the rather nuanced differences between the definition of bank as a noun, "an establishment for the custody, loan, exchange, or issue of money, for the extension of credit, and for facilitating the transmission of funds" and bank (banked, banking, banks) as a verb, "to deposit money or have an account in a bank" [27]. Critically, because there are aspects of financial security and protection that traditional banks offer that are not uniformly applied to financial service

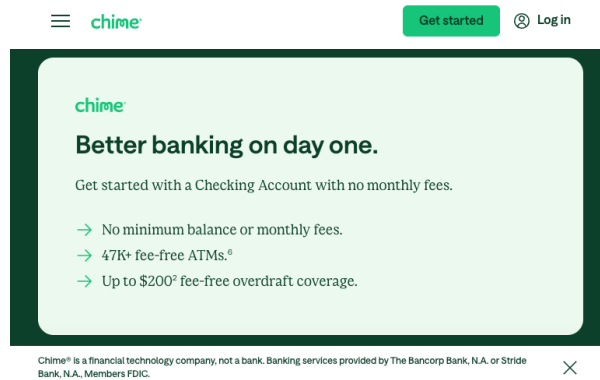


Figure 2: Scrolling down on Chime’s homepage reveals multiple references to banking, including the message “better banking on day one.” References to Checking Accounts and ATMs provide additional suggestions that Chime is a bank.

platforms and neobanks, use of these services to do banking introduces additional risk to consumers. Additionally, discerning the difference between a financial service platform offering “banking” and a traditional “bank” requires different types of financial knowledge from the consumer to adequately assess risk and harm.

Using Gray et al.’s 2024 [21] ontology of dark patterns, we can analyze the relative fit of existing terms. The clearest fit for an existing dark pattern is *language inaccessibility*, which Gray defines as subverting “the user’s expectation that guidance will be provided in a way that is understandable and intelligible, instead using unnecessarily complex language or a language not spoken by the user to decrease the likelihood the user will make an informed choice” [21]. The two subcategories listed for this pattern are *wrong language* and *complex language*. Wrong language is generally focused on actual language use, such as when important information is presented in English but the platform services individuals who primarily speak Spanish. Complex language focuses on the use of obscure or uncommon words, such as in legal documents or privacy policies. Neither of these appears to fit the neobank case, in which a fairly common word is used but in a way that subverts user expectations regarding its meaning.

Generally, neobanks use of the word bank might fit into *hiding information*, wherein the users expectation that relevant information (here, the distinction between a neobank and a bank) will be made available to them. However, neobanks do not hide information until later in the user journey, such as is the case with drip pricing or hidden fees. Instead, they often disclose that they are “not a bank” in fine print. We could consider this a form of visual prominence, in which “an element relevant to user goals” is placed “in visual competition with a more distracting and prominent element.” In this case, important information about the status of these institutions as banks is displayed in small font that is obscured by the more prominent visual displays that read “banking.” This information is thus inaccessible to users with visual impairments, and is easily glossed over by a casual user. However, this does not fully encapsulate the issue, as the information that is visually obscured does not fully portray its significance.

Instead, similar to how *confirmshaming* uses language to manipulate consumers to engage in behavior that goes against their goals, Chime’s use of the term banking weaponizes lay understandings of the term banking and bank in its visual interface and advertisements. Even if Chime discloses that they are not a bank in its fine print, users are presented with no explicit indication that the distinction between ‘doing banking’ and ‘being a bank’ matters. The everyday user, presented with terms like “Banking” alongside “ATM” and “Checking Account,” is unlikely to understand the significance of the fine print distinction. In other words, the interface feels like a bank, and is being used in the same way one would use a bank. Additionally, according to the Global Financial Literacy Excellence Center, approximately half of adults in the United States meet their definition of financial illiteracy, with the lowest performance for areas regarding financial risk comprehension [28].

The harm resulting from this dark pattern appears to impact users asymmetrically. Most users will

not have the legal or financial expertise necessary to discern the additional risks involved in using a neobank vs a traditional bank. The majority of participants interviewed did not have any kind of 'formal' training or background in finance, and only some had family members who could provide some kind of foundational knowledge related to financial literacy. One participant remarked, "I don't know how to invest really, if I'm completely honest. I've been hearing the word invest, but I don't have money to invest right now." Participants interviewed for this project attested to the similarities between neobank and bank interfaces, and the difficulty in discerning what these differences meant. One participant stated, "I know it's not a bank, but it feels like a bank."

As mentioned earlier, low financial literacy rates compound the effects of dark patterns, as users have limited ability to discern between relevant and irrelevant information insofar as financial risk is concerned. In the United States, financial literacy rates are lower for women, Gen Z, as well as Black and Hispanic Americans (compared to their counterparts) [28].

4. Conclusion

Chime is not alone in their utilization of harmful design practices at the expense of users. As such, this case study was not intended to shine a spotlight on their practices as an individual actor. Rather, our intention is to highlight how user design features risk consumer harm in the field of digital finance. More work is necessary to explore how usage of common terms like "bank" and "banking" may constitute a dark pattern that serves to manipulate users into engaging in higher levels of financial risk than they otherwise would have incurred.

Outside of academia, we believe consideration of financial (il)literacy should be considered a potential design responsibility for neobanks and other financial institutions. Simplifying user flows is not enough. Users need interfaces that explain and contextualize the significance of offered services. The totality of relevant constraints and concerns inherent in financial decision making should be packaged into a user-friendly and navigable system designed for all different types of people and backgrounds.

Outside of firms, external organizations, like thinktanks, nonprofits or educational groups, could offer training and programs to support communities who want to learn more about financial literacy. These same programs could also help teach communities how to recognize predatory or harmful financial practices, and financial products.

Acknowledgments

Data and materials are based on research financially supported by the Integer Foundation Ambassadorship.

Declaration on Generative AI

The author(s) have not employed any Generative AI tools.

References

- [1] What are neobanks and how do they work?, ???? URL: <https://stripe.com/en-de/resources/more/neobanks-101-what-they-are-how-they-work-and-whom-they-are-for>.
- [2] E. Gujral, R. Shevlin, 2023 Digital Banking Performance Metrics, Technical Report, Cornerstone Advisors, 2023. URL: <https://www.alkami.com/resources/research/reports/2023-digital-banking-performance-metrics-report/>.
- [3] S. Cocheo, Consumers Say It's Not You, It's Chime, 2025. URL: <https://thefinancialbrand.com/news/fintech-banking/chime-grabs-up-market-share-for-new-checking-accounts-193589>.

- [4] R. Mazzocchi, K. Spitzer, Neobanks: Relevance, benefits and challenges for the Banking Union, Technical Report PE 773.731, European Parliament Economic Governance and EMU Scrutiny Unit, 2026.
- [5] J. Prior, Chime forced to ditch use of word ‘bank’ after regulator’s push-back, *American Banker* (2021). URL: <https://www.americanbanker.com/news/chime-forced-to-scrub-use-of-word-bank-after-regulators-pushback>.
- [6] Neo Banks Vs. Traditional Banking, ????. URL: https://www.firstcomcu.org/post/neo_banks_vs_traditional_banking_know_the_difference.html.
- [7] F. D. I. Corporation, Banking With Third-Party Apps, 2024. URL: <https://www.fdic.gov/consumer-resource-center/2024-06/banking-third-party-apps>.
- [8] H. Brignull, M. Leiser, C. Santos, Deceptive Patterns – User Interfaces Designed to Trick You, 2023. URL: <https://www.deceptive.design/>.
- [9] A. Mathur, G. Acar, M. J. Friedman, E. Lucherini, J. Mayer, M. Chetty, A. Narayanan, Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites, *Proceedings of the ACM on Human-Computer Interaction* 3 (2019) 1–32. URL: <http://arxiv.org/abs/1907.07032>. doi:10.1145/3359183, arXiv:1907.07032 [cs].
- [10] V. H. Tran, A. Mehrotra, R. Sharma, M. Chetty, N. Feamster, J. Frankenreiter, L. Strahilevitz, Dark Patterns in the Opt-Out Process and Compliance with the California Consumer Privacy Act (CCPA), in: *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems, CHI ’25*, Association for Computing Machinery, New York, NY, USA, 2025, pp. 1–25. URL: <https://dl.acm.org/doi/10.1145/3706598.3714138>. doi:10.1145/3706598.3714138.
- [11] C. M. Gray, T. Mildner, R. Gairola, Getting Trapped in Amazon’s ”Iliad Flow”: A Foundation for the Temporal Analysis of Dark Patterns, in: *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems, CHI ’25*, Association for Computing Machinery, New York, NY, USA, 2025, pp. 1–10. URL: <https://dl.acm.org/doi/10.1145/3706598.3713828>. doi:10.1145/3706598.3713828.
- [12] R. Sin, T. Harris, S. Nilsson, T. Beck, Dark patterns in online shopping: do they work and can nudges help mitigate impulse buying?, *Behavioural Public Policy* 9 (2025) 61–87. URL: <https://www.cambridge.org/core/journals/behavioural-public-policy/article/dark-patterns-in-online-shopping-do-they-work-and-can-nudges-help-mitigate-impulse-buying/996B92402604A7E3D417ECBAE2C38362>. doi:10.1017/bpp.2022.11.
- [13] J. Nielsen, 10 Usability Heuristics for User Interface Design, 2024. URL: <https://www.nngroup.com/articles/ten-usability-heuristics/>.
- [14] R. R. Al-Tabakhi, M. H. Al Khasawneh, A. O. Dandis, Investigating Dark Patterns on Social Media: Implications for User Engagement and Impulse Buying Behavior, *Journal of Internet Commerce* 23 (2024) 469–502. URL: <https://doi.org/10.1080/15332861.2024.2403054>. doi:10.1080/15332861.2024.2403054, eprint: <https://doi.org/10.1080/15332861.2024.2403054>.
- [15] J. Zagal, S. Björk, C. Lewis, Dark patterns in the design of games, 2013. URL: <https://www.semanticscholar.org/paper/Dark-patterns-in-the-design-of-games-Zagal-Bj%C3%B6rk/19a241378b06d868eb5f6b76027172c3aaca86f4>.
- [16] A. Kreger, Friction In Digital Banking Is A Feature, Not A Bug, ????. URL: <https://www.forbes.com/councils/forbesbusinesscouncil/2024/12/27/friction-in-digital-banking-is-a-feature-not-a-bug/>, section: Small Business.
- [17] C. Sinders, ”By Design?” The Hidden Harms Within Banking Apps – ILF Ambassador Progress Report, 2025. URL: <https://community.interledger.org/carolinesinders/by-design-the-hidden-harms-within-banking-apps-ilf-ambassador-progress-report-35jo>.
- [18] C. Sinders, The Multiple Sides of Friction: The Good, the Bad and the How to Use it, 2025. URL: <https://community.interledger.org/carolinesinders/the-multiple-sides-of-friction-the-good-the-bad-and-the-how-to-use-it-25j4>.
- [19] Bank Secrecy Act Examination Manual, Board of Governors of the Federal Reserve System, Washington D.C., 1997.
- [20] I. Rakovic, Y. Inal, Dark Finance: Exploring Deceptive Design in Investment Apps, in: J. Abdelnour Nocera, M. Kristín Lárusdóttir, H. Petrie, A. Piccinno, M. Winckler (Eds.), *Human-*

Computer Interaction – INTERACT 2023, Springer Nature Switzerland, Cham, 2023, pp. 339–348. doi:10.1007/978-3-031-42280-5_20.

- [21] C. M. Gray, C. T. Santos, N. Bielova, T. Mildner, An Ontology of Dark Patterns Knowledge: Foundations, Definitions, and a Pathway for Shared Knowledge-Building, in: Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems, CHI '24, Association for Computing Machinery, New York, NY, USA, 2024, pp. 1–22. URL: <https://doi.org/10.1145/3613904.3642436>. doi:10.1145/3613904.3642436.
- [22] L. Beltran, Chime’s sticky user base makes it a winner for investors, analyst says, ????. URL: <https://fortune.com/2025/07/08/chime-sofi-affirm-cash-app-ipo-goldman-wall-street-kbw/>.
- [23] Chime ”NBA All The Way Up” Commercial, ????. URL: <https://www.youtube.com/watch?v=dIvISVDmRp0>.
- [24] Predatory Lending - NACA, ????. URL: <https://www.consumeradvocates.org/for-consumers/predatory-lending/>.
- [25] C. Britt, Chime Financial, Inc. Form S-1 Registration Statement, 2025. URL: https://web.archive.org/web/20260129011310mp_/https://www.sec.gov/Archives/edgar/data/1795586/000162828025025059/chimefinancialinc-sx1wq1da.htm.
- [26] Chime, Chime Fee-Free Banking - Checking, Savings, Credit & Cash Back, ????. URL: <https://www.chime.com>.
- [27] Merriam-Webster, Bank, 2026. URL: <https://www.merriam-webster.com/dictionary/bank>.
- [28] The TIAA Institute-GFLEC Personal Finance Index (P-Fin Index), ????. URL: <https://gflec.org/initiatives/personal-finance-index/>.