

Situation Report

Buy Now, Pay Later's Latent Credit Stress

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We analyze the trends observable in the Buy Now Pay Later industry along with the macroeconomic fundamentals beginning in 2020. We find that increases in BNPL spending over this time period are mostly attributable to increases in financial strain for consumers, rather than merely providing an alternative or more convenient means of payment.

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Executive Summary

A main sequence star spends most of its life fusing hydrogen into helium. The core of a star exists in hydrostatic equilibrium, where the expansionary pressure from the core is balanced by the compressive pressure of gravity. When this hydrogen is exhausted, a supergiant star burns helium for a brief period before exploding into a supernova. With U.S. consumers increasingly exhausting traditional credit sources, many have turned to “Buy Now, Pay Later” to cover essentials. But BNPL is the helium of the consumer credit market and, like the helium in the core of a star, it will not burn for long. When a star dies, the result is magnificent and beautiful. When overleveraged consumers collapse, the result is misery, hardship, and systemic risk. We believe this ‘helium phase’ of the debt market will end soon—and the fallout could be severe. The prevailing microeconomic analyses of BNPL emphasize welfare gains from expanded spending power; our credit stress framework suggests these benefits may mask material risks to household and systemic financial stability. The divergence stems from fundamentally different lenses: individual utility maximization vs. aggregate balance sheet resilience.

Our results show that BNPL’s post-2020 expansion is not primarily a story of benign adoption but of tightening household constraints. Using a borrower-quality factor built from household credit indicators, we find BNPL spending is disproportionately concentrated among weaker borrowers even after controlling for aggregate debt. High debt levels amplify this relationship, and the marginal propensity to use BNPL accelerates non-linearly once constraints bind. These patterns are consistent with “BNPL-on-card” stacking, in which installment obligations are effectively serviced with revolving credit—precisely the behavior associated with rising repayment frictions and latent default risk.

To separate stress-driven usage from secular growth, we construct a counterfactual BNPL path that holds borrower quality fixed at its 2020–2021 median while leaving household debt unchanged. The gap between the observed series and this counterfactual defines our Stress Attribution Index (SAI). The counterfactual is flatter—and at times declining—while the realized path diverges steadily through 2024–2025. In the most recent quarter, nearly 30 percentage points of BNPL spending (relative to a 2020Q4 baseline) are attributable directly to borrower-quality deterioration. Put plainly: absent weakening household finances, BNPL activity would have been materially lower.

Because stress is often latent until losses surface, we also develop a complementary Latent Stress Composite (LSC) that captures the underlying strain embedded in BNPL usage. The

composite averages two standardized components: an essentials-spend measure that tracks the extent to which BNPL is financing necessities like groceries, fuel, and utilities, and a late-payment pressure measure that reflects the dollar exposure among users reporting missed payments. This composite functions as an intuitive, dimensionless indicator of systemic BNPL fragility.

Linking the borrower and system levels, we regress LSC on SAI (both standardized). The mapping is tight, implying a one-standard-deviation increase in stress-attributed BNPL spending is associated with nearly a one-standard-deviation rise in latent systemic stress. A resilient credit mechanism would damp shocks originating with fragile borrowers; BNPL instead amplifies them. This near one-for-one transmission explains how seemingly modest deterioration in borrower quality can scale into system-level risk during the downswing of the household credit cycle.

Taken together, the evidence is clear. BNPL usage rises most where balance-sheet constraints are tightest, is magnified by leverage, and exhibits non-linear sensitivity near constraint thresholds. The counterfactual decomposition demonstrates that stress—not adoption—is a material driver of the category’s growth since 2020. And the LSC–SAI linkage shows that borrower strain is not contained; it travels through the system with limited attenuation. For consumers, this means BNPL is increasingly a bridge for everyday liquidity gaps rather than a convenience tool. For allocators and risk managers, it means reported performance in placid periods can mask fragility: provisioning and underwriting frameworks that ignore stacking effects and non-linear loss dynamics are unlikely to be sufficient as conditions tighten.

The lesson is clear: BNPL does not resolve financial strain; it merely grants consumers a fleeting extension, a final burst of borrowed time that delays but does not prevent collapse. Like a star that has exhausted its hydrogen, the consumer credit system has turned to helium to briefly sustain itself at the cost of inevitable collapse. BNPL is unstable, short-lived, and unsustainable. And just as a star’s last burn ends in supernova, BNPL’s glow conceals destructive forces at its core. When stars explode, the result is magnificent. When households collapse, the result is misery, hardship, and systemic risk.

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Acknowledgements: The author would like to thank Profs. Stijn Maesen and Benedict Guttman-Kenney for their assistance in providing additional information which was invaluable to the development of this report.

1 Introduction

The prevailing microeconomic analyses of BNPL emphasize welfare gains from expanded spending power; our credit stress framework suggests these benefits may mask material risks to household and systemic financial stability. The divergence stems from fundamentally different lenses: individual utility maximization vs. aggregate balance sheet resilience.

Recent behavioural and marketing research on BNPL generally concludes that it yields increases in consumption and perceived control by consumers, with consumers reporting they feel less financially constrained, and exhibits low short-term delinquency.

Under conventional consumer theory, these outcomes would imply a net welfare gain but the macro perspective tells a different story. BNPL can represent second-order leverage, as a growing subset of BNPL obligations are serviced via traditional credit sources, thereby converting short-term installment plans into high-interest debt. Further, BNPL adoptions shift future consumption into the present, creating the potential for a post-adopting spending cliff, especially as the share of essentials increases as a proportion of BNPL purchases. Even without immediate default, higher gross obligations reduce household capacity to absorb shocks, such as from loss of income or the increase in interest rates; especially relevant in the current uncertain macroeconomic climate. Finally, private BNPL firms rarely disclose granular portfolio performance. The dominant FinTech playbook—running at sustained losses to capture market share, then providing exit liquidity to founders and early-stage investors via acquisition or IPO—creates strong incentives to downplay underlying credit risk.

2 Empirical Motivation

U.S. household leverage has quietly re-accelerated, even as headline unemployment rates remain low, with household debt-service ratios up almost 24% from its 5 year low in 2021 and approaching pre-GFC levels.¹ Important to note is that headline unemployment figures likely underestimate present market conditions; the official U-3 rate omits underemployed and marginally attached workers that show up in broader BLS measures like U-6.² Unemployment among recent university graduates is significant, with a recent report from Oxford Economics noting that they account for 12% of the rise in the national unemployment rate, while only accounting for 5% of the labour force.³ This also discounts the impact of labour force participation which, on current readings, remains near late-1970s levels.⁴ Additionally, the July 2025 jobs report shows that most payroll gains were concentrated in health care and social assistance categories that include elder-care settings such as home health and nursing/residential care facilities, rather than in higher-wage cyclicals.⁵ Within those elder-care roles, wages are relatively low and part-time work is common (e.g., the median annual wage for home health and personal care aides was about \$34.9k in May 2024, and BLS notes part-time is common), making these jobs unlikely to materially ease financial stress for younger, BNPL-heavy borrowers.⁶ The skew of employment gains toward care work also aligns with structural aging pressures: the 65+ population is rising quickly, with older adults outnumbering children in 11 states and nearly half of all U.S. Counties and is projected to represent about one-fifth of the U.S. by 2030.⁷ Further, although “business creation” headlines are strong, the surge has been disproportionately driven by applications

1. Board of Governors of the Federal Reserve System (US), *Household Debt Service Payments as a Percent of Disposable Personal Income (TDSP)*, accessed August 22, 2025, <https://fred.stlouisfed.org/series/TDSP>.

2. U.S. Bureau of Labor Statistics, *Total Unemployed, Plus All Persons Marginally Attached to the Labor Force, Plus Total Employed Part Time for Economic Reasons, as a Percent of the Civilian Labor Force Plus All Persons Marginally Attached to the Labor Force (U-6)*, accessed August 22, 2025, <https://fred.stlouisfed.org/series/U6RATE>.

3. Matthew Martin, *Educated but unemployed, a rising reality for US college grads*, Oxford Economics, 25 May 2025, accessed August 22, 2025, <https://www.oxfordeconomics.com/resource/educated-but-unemployed-a-rising-reality-for-us-college-grads/>.

4. Board of Governors of the Federal Reserve System (US), *Labor Force Participation Rate (CIVPART)*, accessed August 22, 2025, <https://fred.stlouisfed.org/series/CIVPART>.

5. U.S. Bureau of Labor Statistics, *The Employment Situation - July 2025*, January 2025, accessed August 22, 2025, <https://www.bls.gov/news.release/pdf/empst.pdf>.

6. U.S. Bureau of Labor Statistics.

7. United States Census Bureau, *Older Adults Outnumber Children in 11 States and Nearly Half of U.S. Counties*, 26 June 2025, accessed August 22, 2025, <https://www.census.gov/newsroom/press-releases/2025/older-adults-outnumber-children.html>.

and formations consistent with nonemployer (solo/gig) businesses rather than employer firms^{8, 9}, with research finding the pandemic-era application boom shifted toward lower-propensity-to-hire entities.^{10,11} Taken together, this looks more like households patching income gaps via low-margin gigs than scaling durable, payroll-adding enterprises.

Real earnings among low-income workers have stalled, with some evidence showing them to have decreased^{12, 13} and dollar stores are seeing the warning signs of rising living costs pushing low-income households into financial strain forcing households to bridge the gap between income and expenses by financing essentials with credit.¹⁴ Revolving credit balances are at record nominal highs, and the household debt-service burden as a percentage of disposable income now stands more than 20% above its 2021 trough.¹⁵ Delinquency rates on consumer loans are near GFC levels,¹⁶ household debt balances continue to increase and Q4 of 2024 saw an increase of 3% of auto loans transitioning into serious delinquency; the highest level since 2010.^{17,18} U.S. credit card defaults are also at their highest level since 2010.¹⁹ Taken together, these indicators suggest that the most liquidity-sensitive—and financially constrained—households are increasingly relying on short-tenor, low-friction credit.

Buy Now, Pay Later (BNPL) financing has been one of the fastest growing components of that shift. Industry and government estimates place BNPL spending at roughly \$2 billion in 2019, rising to \$34 billion in 2022 and reaching approximately \$75 billion online in 2023, a year-over-year increase of around 14%.²⁰ Additionally, a December 2024 research note from the Federal Reserve found that nearly a third of adults who had credit scores of 659 or below used BNPL, with the majority of that cohort saying their use was due to BNPL representing the only way they could afford their purchases.²¹ The second most common reason among users with credit scores below 659 was that it was the only payment method available to them; this cohort applied for credit cards at a higher rate and also had higher rates of credit card delinquency. More striking than the aggregate growth is the shift in category mix: BNPL spending on groceries, utilities, and fuel increased by over 400% between 2020 and 2022,²² with Citizens Advice finding that one in 12 Americans are using BNPL to cover

8. Adam Grundy and Lucie Alleyne, “Nonemployer Statistics Show Continued Growth in ‘Gig Economy’ Activities,” January 2025, accessed August 22, 2025, <https://www.census.gov/library/stories/2025/07/nes-gig-economy.html>.

9. Jurgen Appelo, “Are Large Corporations Too Big to Fail?,” *Medium*, March 2025, accessed August 22, 2025, <https://substack.jurgenappelo.com/p/large-corporations-too-big-to-fail>.

10. Oudom Hean and Nattanicha Chairassamee, “The effects of the COVID-19 pandemic on U.S. entrepreneurship,” *Letters in Spatial and Resource Sciences* 16 (1 2023), <https://doi.org/https://doi.org/10.1007/s12076-023-00327-x>.

11. John C. Haltiwanger, *Entrepreneurship During the COVID-19 Pandemic: Evidence from the Business Formation Statistics*, Working Paper 28912, NBER Working Paper (June 2021).

12. Howard Schneider, “US real earnings stalled across age, income groups in past year, study shows,” *Reuters*, 22 May 2025, accessed August 22, 2025, <https://www.reuters.com/business/world-at-work/us-real-earnings-stalled-across-age-income-groups-past-year-study-shows-2025-05-22/>.

13. David Tinsely et al., *Consumer Checkpoint: Gains and gaps*, Bank of America, August 2025, accessed August 22, 2025, <https://institute.bankofamerica.com/economic-insights/consumer-checkpoint-august-2025.html>.

14. Jinjoo Lee, “Dollar Stores Are Flashing a Warning Sign About Lower-Income Consumers,” *The Wall Street Journal*, 13 December 2024, accessed August 22, 2025, <https://www.wsj.com/economy/consumers/dollar-store-economic-outlook-1e1d9f9f>.

15. Board of Governors of the Federal Reserve System (US), *Household Debt Service Payments as a Percent of Disposable Personal Income (TDSP)*.

16. Board of Governors of the Federal Reserve System (US), *Delinquency Rate on Consumer Loans, All Commercial Banks (DRCLACBS)*, accessed August 22, 2025, <https://fred.stlouisfed.org/series/DRCLACBS>.

17. Federal Reserve Bank of New York, *Household Debt Balances Continue Steady Increase; Delinquency Transition Rates Remain Elevated for Auto and Credit Cards*, accessed August 22, 2025, <https://www.newyorkfed.org/newsevents/news/research/2025/20250213>.

18. Andrew Dorn, “Late car payments hit highest level in decades,” *NewsNation*, July 2025, accessed August 22, 2025, <https://www.newsnationnow.com/business/your-money/late-car-payments-highest-level/>.

19. Stephen Gandel, “US credit card defaults jump to highest level since 2010,” *Financial Times*, 29 Dec 2024, accessed August 22, 2025, <https://www.ft.com/content/c755a34d-eb97-40d1-b780-ae2e2f0e7ad9>.

20. Joanna Stavins, “Buy Now, Pay Later: Who Uses it and Why,” *Federal Reserve Bank of Boston*, 22 May 2024,

21. Jeff Larrimore et al., “*The Only Way I Could Afford It: Who Uses BNPL and Why*, technical report, FED Notes (20 December 2024), <https://doi.org/https://doi.org/10.17016/2380-7172.3675>, <https://www.federalreserve.gov/econres/notes/feds-notes/the-only-way-i-could-afford-it-who-uses-bnpl-and-why-20241220.html>.

22. Lauren Aratani, “How did I get approved for \$30,000?: is buy now, pay later headed for a fall?,” *The Guardian*, December 2025, <https://www.theguardian.com/us-news/2025/jun/12/buy-now-pay-later-fall>.

essentials.²³ A product originally marketed for discretionary retail purchases is now widely used to finance essentials, a transition that strongly suggests households are managing liquidity constraints rather than simply choosing a more convenient payment method.

Consumer adoption patterns reinforce this interpretation. By 2022, approximately one in five consumers with a credit record had used BNPL—with 71% of BNPL users having credit card debt²⁴—and a similar proportion of those users were “heavy” borrowers, taking out at least one loan per month, with more than 60% of users having simultaneous loans and most loans went to consumers with subprime or lower credit scores.²⁵ Survey-based and official statistics show a clear rise in late payments: in 2021, around 15% of BNPL users reported making a late payment; by 2024, the figure was 24%, and in a 2025 survey, 41% of users reported at least one late payment in the prior year, most within a week of the due date.²⁶ Academic evidence supports the view that this pattern is not random. A retailer-level panel study found an increasing proportion of BNPL purchases are funded directly with credit cards. This “BNPL-on-card” behavior, which is disproportionately common among younger and more economically deprived consumers, effectively transforms 0% installment loans into high-APR revolving debt with potentially long amortization tails.²⁷ In the U.S., while debit and ACH are the dominant repayment methods, central bank analysis and provider disclosures indicate that a non-trivial share of repayments are still funded via credit cards, creating stacked obligations that further strain liquidity and obscure arrears in BNPL-only statistics.²⁸

Headline BNPL delinquency rates, often cited as below 2%, appear benign in comparison to credit-card delinquency rates.²⁹ However, providers increasingly permit due-date extensions and informal forbearance, practices that suppress measured past-due rates while loss provisions quietly rise.^{30,31} In the second quarter of 2025, for example, Klarna reported a global delinquency rate of just 0.89% while its provisions increased from roughly \$106 million to \$174 million and actual losses represented 0.45% of volume.³² A widening gap between provisions and reported delinquency rates suggests that official figures likely understate the true degree of borrower stress. Bankrate’s 2025 consumer survey finds about half of BNPL users have experience at least one problem using these services, with 16% missing a payment and 24% admitting they overspent because of BNPL.³³

Other consumer-credit markets are flashing similar warning signs. Subprime auto loan delinquencies are at their highest level ever recorded, since records began in 1994, and U.S. credit-card defaults are at their highest since 2010, with a record share of cardholders making only the minimum

23. Citizens Advice, “One in 12 now using Buy Now Pay Later to cover essentials,” November 2022, accessed August 22, 2025, <https://www.citizensadvice.org.uk/about-us/media-centre/press-releases/one-in-12-now-using-buy-now-pay-later-to-cover-essentials/>.

24. Hannah Lang, “Who are buy now, pay later borrowers, and what are they buying?,” *Reuters*, October 2024, accessed August 22, 2025, <https://www.reuters.com/technology/who-are-buy-now-pay-later-borrowers-what-are-they-buying-2024-10-10/>.

25. Consumer Financial Protection Bureau, *CFPB Research Reveals Heavy Buy Now, Pay Later Use Among Borrowers with High Credit Balances and Multiple Pay-in-Four Loans*, 13 January 2025, accessed August 22, 2025, <https://www.consumerfinance.gov/about-us/newsroom/cfpb-research-reveals-heavy-buy-now-pay-later-use-among-borrowers-with-high-credit-balances-and-multiple-pay-in-four-loans/>.

26. Matt Schulz and Dan Shepard, “BNPL Tracker: 41% of Users Late in Past Year, More Using Loans for Groceries,” *LendingTree*, 13 Aug 2025, accessed August 22, 2025, <https://www.lendingtree.com/personal/buy-now-pay-later-loan-statistics/>.

27. Benedict Guttman-Kenney, Chris Firth, and John Gathergood, “Buy Now, Pay Later (BNPL)...On Your Credit Card,” *Journal of Behavioral and Experimental Finance* 37 (March 2023).

28. Cortnie Shupe, Greta Li, and Scott Fulford, “Consumer Use of Buy Now, Pay Later,” *Consumer Financial Protection Bureau*, March 2023.

29. Zhu Wong, *Buy Now, Pay Later: Market Impact and Policy Considerations*, No. 25-03, Economic Brief (January 2025), <https://www.richmondfed.org/publications/research/economic.brief/2025/eb-25-03>.

30. Financial Conduct Authority, *Rent-to-own, buy-now pay-later and pawnbroking agreements and coronavirus: temporary guidance for firms*, 24 April 2020, accessed August 22, 2025, <https://www.fca.org.uk/publications/finalised-guidance/rent-own-buy-now-pay-later-and-pawnbroking-agreements-and-coronavirus-temporary-guidance-firms>.

31. Consumer Financial Protection Bureau, *CFPB Takes Action to Ensure Consumers Can Dispute Charges and Obtain Refunds on Buy Now, Pay Later Loans*, 22 May 2024, accessed August 22, 2025, <https://www.consumerfinance.gov/about-us/newsroom/cfpb-takes-action-to-ensure-consumers-can-dispute-charges-and-obtain-refunds-on-buy-now-pay-later-loans/>.

32. Akila Quinio, “Klarna’s loss widens as fintech readies another shot at New York listing,” *Financial Times*, 14 August 2025, accessed August 22, 2025, <https://www.ft.com/content/f83d5e2d-9c80-408b-9018-9f74ca440123>.

33. Lauren Nowacki, *Survey: About half of buy now, pay later users have experienced issues like overspending and missing payments*, May 2025, accessed August 22, 2025, <https://www.bankrate.com/loans/personal-loans/buy-now-pay-later-survey/>.

payment.³⁴ Stress is not limited to the lowest-income households; nearly half of households earning over \$100,000 report being behind or delinquent on BNPL obligations.³⁵ This diffusion of financial stress up the income distribution amplifies systemic risk.

BNPL accounting practices can also mask emerging stress. Providers typically recognize merchant and network fees as revenue near origination, while expected losses are booked under CECL or IFRS-9 allowances, which are sensitive to optimistic assumptions in fast-growth vintages.^{36,37} Some providers securitize loans or sell receivables, recognizing a gain-on-sale while transferring credit risk off-balance-sheet. In such cases, rising allowances alongside low reported delinquencies may be an early red flag, indicating latent deterioration in credit quality.

These patterns support a forward-looking risk hypothesis: as households increasingly use BNPL to finance essentials and short-term lateness rises, they are effectively pulling forward future consumption while depleting their available liquidity. Further research shows that BNPL adoption is associated with increased transaction frequency and value through a reduction in perceived financial constraints, consistent with a “capacity pool burn” dynamic.³⁸ If BNPL’s share of payment volume within essential categories continues to rise, it may foreshadow a deceleration in retail sales growth once the capacity pool is exhausted. In a stress scenario, rising BNPL arrears combined with a contraction in discretionary spending could exert pressure on unsecured asset-backed securities, retail equities, and the balance sheets of both FinTech and traditional lenders.

3 BNPL Spend

To begin our empirical analysis, we test whether borrower quality is systematically related to BNPL spending. Our hypothesis is straightforward: if BNPL is disproportionately used by financially constrained households, then higher borrower quality should be associated with lower BNPL adoption and spending. Conversely, rising BNPL spend should coincide with deteriorating borrower quality metrics. We therefore run a series of regressions that relate our BNPL spending measure to household credit indicators, treating these exercises as a prelude to the more structured latent stress model developed in the next section.

3.1 Data Collection

The quarterly BNPL spending dataset was compiled by collating figures from multiple industry sources, including Adobe Analytics, the CFPB, and market research estimates. Because no single source provided complete coverage, we combined available anchors (e.g., annual totals, specific quarterly figures, and month-level YoY growth rates) and used scaling factors to reconcile differences between loan origination data (CFPB) and total retail spend (Adobe). Where only partial quarters were available (such as Adobe’s Nov–Dec holiday numbers or single-month anchors), we interpolated missing values and then rescaled each year to ensure that quarterly sums matched known annual totals. This method preserves consistency with both published aggregate figures and reported year-over-year growth rates, yielding a balanced, regression-ready dataset that reflects the best available view of U.S. consumer BNPL spending across 2020–2025.

3.2 Borrower Quality Factor Construction

To examine the relationship between BNPL spend and borrower quality, we combined this BNPL dataset with the Federal Reserve Bank of New York’s Household Debt and Credit data. From HHDC, we identified 7 borrower quality indicators which capture the underlying financial condition of U.S. households.³⁹ As raw units differ, each series is standardized using Z-score normalization to have

34. Gandel, “US credit card defaults jump to highest level since 2010.”

35. Paulina Cachero, “Americans Are Racking Up ‘Phantom Debt’ That Wall Street Can’t Track,” *Bloomberg*, August 2024, accessed August 22, 2025, <https://www.bloomberg.com/news/articles/2024-05-07/-buy-now-pay-later-has-americans-racking-up-phantom-debt>.

36. Affirm Holdings Inc., *Form 10-K 2024*, <https://investors.affirm.com/static-files/a829bc03-568c-42bb-9b73-1a7851b090b8>.

37. Affirm Holdings Inc., *Form 10-Q March 2024*, <https://www.sec.gov/Archives/edgar/data/1820953/000182095324000014/afirm-20240331.htm>.

38. Dionysius Ang and Stijn Maesen, “Buy Now, Pay Later: Impact of Installment Payments on Customer Purchases,” *Journal of Marketing* 89, no. 3 (January 2024), <https://doi.org/https://doi.org/10.1177/00222429241282414>.

39. These are the share of new auto loans and mortgages taken out by individuals with FICO scores below 659, percentage utilization of credit cards, percentage of loans under collections, share of loans in serious delinquency, and shares of loans in delinquency for 60, 90, and 120 days.

a mean of zero and unit variance. The resulting borrower-quality factor is defined using Principal Component Analysis (PCA) as.

$$BQ_t = \sum_{j=1}^p w_j^{(1)} \bar{X}_{jt} \quad (1)$$

For each $\bar{X}_{jt}$ the standardized value of variable j at time t and $w_j^{(1)}$, the loading from the first principal component on variable j .

3.3 Low-Frequency Econometric Projection

As our time period is limited to a five-year window, to ensure statistical robustness, we employ the Low-Frequency Econometrics approach developed by Müller and Watson (2017).⁴⁰ This framework is specifically designed to extract reliable relationships from short macroeconomic panels by projecting series onto low-frequency cosine bases before regression. Using this method allows us to mitigate the small-sample problems that arise when working with quarterly data over only a few years, while aligning our analysis with established best practice.

For a series y_t of length T , we define the cosine basis functions

$$\psi_j(t; T) = \sqrt{2} \cos\left(\frac{\pi j(t - \frac{1}{2})}{T}\right), j = 1, \dots, q \quad (2)$$

Stacking these basis functions across $j = 1, \dots, q$ gives the $T \times q$ matrix Ψ_T . For each explanatory variable $x_t^{(k)}$, the corresponding low-frequency cosine coefficients are

$$X_{jT}^{(k)} = \frac{1}{T} \sum_{t=1}^T \psi_j\left(\frac{t - \frac{1}{2}}{T}\right) x_t^{(k)}, \quad j = 1, \dots, q. \quad (3)$$

Collecting these into a $q \times 1$ vector $X_T^{(k)} = (X_{1T}^{(k)}, \dots, X_{qT}^{(k)})'$, and stacking across regressors $k = 1, \dots, n$ yields the $q \times n$ coefficient matrix

$$\mathbf{X}_T = [X_T^{(1)}, X_T^{(2)}, \dots, X_T^{(n)}].$$

Let $Y_T = (Y_{1T}, \dots, Y_{qT})'$ denote the cosine coefficients for $\ln(\text{BNPL spend})$. The low-frequency regression is then written compactly as

$$Y_T = \mathbf{X}_T \beta, \quad (4)$$

or, equivalently at each frequency j ,

$$Y_{jT} = \beta_1 X_{jT}^{(1)} + \beta_2 X_{jT}^{(2)} + \dots + \beta_n X_{jT}^{(n)}. \quad (5)$$

Our specification speaks directly to recent evidence that BNPL increases spending by relaxing perceived financial constraints—especially among credit-reliant shoppers—by testing whether BNPL spend co-moves more strongly with borrower stress under higher leverage and whether that relationship is nonlinear at tighter constraint levels.⁴¹

3.4 Results

We estimate several specifications of the low-frequency regression defined above, progressively adding controls and interaction terms to test the robustness of the borrower-quality effect. Table 1 reports the main results. Model (1) includes only the borrower-quality factor. Model (2) adds a control for aggregate household debt. Model (3) introduces an interaction term to test whether high debt amplifies the effect of low borrower quality. Model (4) allows for nonlinearity by including a squared borrower-quality term.⁴²

These regressions show quite clearly the relationship between borrower quality and BNPL spend. When controlling for aggregate debt, BNPL spend is concentrated among lower-quality borrowers

40. Ulrich Müller and Mark Watson, “Low-Frequency Econometrics” (November 2017), 53–94, ISBN: 9781108414982, <https://doi.org/10.1017/9781108227223.003>.

41. Ang and Maesen, “Buy Now, Pay Later: Impact of Installment Payments on Customer Purchases.”

42. All analysis was conducted in Python 3.11 using standard econometric libraries, including `statsmodels`, `pandas`, and `scikit-learn`.

Table 1. Regressions of ln(BNPL) Spend on Borrower Quality

	(1) Baseline	(2) Debt Control	(3) Amplification	(4) Nonlinearity
Borrower Quality	0.115** (0.009)	-0.203 [†] (0.076)	-5.212*** (0.000)	-0.328*** (0.000)
ln(Total Debt)		8.799** (0.003)	14.838*** (0.000)	11.963*** (0.000)
Borrower Quality × Debt			1.705*** (0.000)	
(Borrower Quality) ²				0.039** (0.002)
R^2	0.434	0.901	0.996	0.979

Robust standard errors; p-values in parentheses.

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and when introducing interactions, we see that high debt amplifies the impact of lower borrower quality. This shows that BNPL spend is especially elevated among the weakest borrowers carrying the heaviest obligations. Finally, the nonlinear specification suggests that the stress effect is not linear; deterioration accelerates as borrowers cross certain thresholds, which is consistent with the suspicion of fragility building beneath the surface before becoming visible in arrears. These aggregate patterns are consistent with ‘BNPL-on-card’ stacking, where installment obligations are serviced via revolving credit; amplifying stress among already constrained households.⁴³ Further, these results demonstrating that BNPL spend concentrates where constraints bind and intensifies when balance sheet debt is high, describes precisely the cohorts which have been observed to exhibit the highest BNPL uplift.⁴⁴

Taken together, the regressions tell a consistent story: BNPL is used most heavily by financially constrained households, with its impact intensifying under higher debt burdens. This provides preliminary aggregate evidence that BNPL amplifies latent financial stress, which we investigate in greater detail in the following sections.

4 Counterfactual Analysis

Having established that BNPL spending is disproportionately concentrated among lower-quality borrowers, we next ask a natural counterfactual question: how much of the observed expansion in BNPL spending would have occurred if borrower quality had remained constant? This exercise is critical for distinguishing between secular adoption effects and stress-driven usage. If borrower quality deterioration accounts for a material portion of BNPL growth, then BNPL can be seen not only as a retail innovation but as a transmission channel for household financial fragility.

4.1 Methodology

We implement the counterfactual using the regression specification of Model (2) in Table 1, which regresses ln(BNPL spend) on the borrower-quality factor and aggregate household debt. This choice balances parsimony and interpretability, while still controlling for the secular effect of rising leverage. To construct the counterfactual, we hold borrower quality fixed at its 2020-2021 median level, BQ^* . We then recompute predicted BNPL spending, leaving debt unchanged. This procedure removes the time-varying contribution of borrower quality from observed BNPL spending, yielding a trajectory that answers what BNPL spending would have been if borrower quality had not deteriorated.

Finally, we define the Stress Attribution Index (SAI) as the gap between actual and counterfactual BNPL spending, scaled to pre-pandemic levels:

$$SAI_t = 100 \times \frac{y_t - \tilde{y}_t}{y_{2020Q4}}, \quad (6)$$

43. Guttman-Kenney, Firth, and Gathergood, “Buy Now, Pay Later (BNPL)...On Your Credit Card.”

44. Ang and Maesen, “Buy Now, Pay Later: Impact of Installment Payments on Customer Purchases.”

where y_{2020Q4} is the level of BNPL spending in 2020Q4. The SAI therefore measures, in percentage terms, how much incremental BNPL activity is attributable to deteriorating borrower quality relative to the 2020 baseline.

4.2 Results

Figure 1 compares the actual BNPL series to the counterfactual path under fixed borrower quality. The divergence is immediate: actual spending rises significantly above the counterfactual, with the gap widening steadily through 2024–2025. The counterfactual series remains considerably flatter, suggesting that much of the observed BNPL growth cannot be explained by secular adoption alone but is linked directly to worsening borrower quality.

Further, the counterfactual path does not remain flat but steadily declines over time. This outcome is consistent with our framework: because actual BNPL adoption rose disproportionately during periods of worsening borrower quality, removing that stress-linked component yields a residual path of slower growth. In other words, the decline in the counterfactual illustrates precisely the extent to which deteriorating credit conditions were required to sustain the observed BNPL expansion.

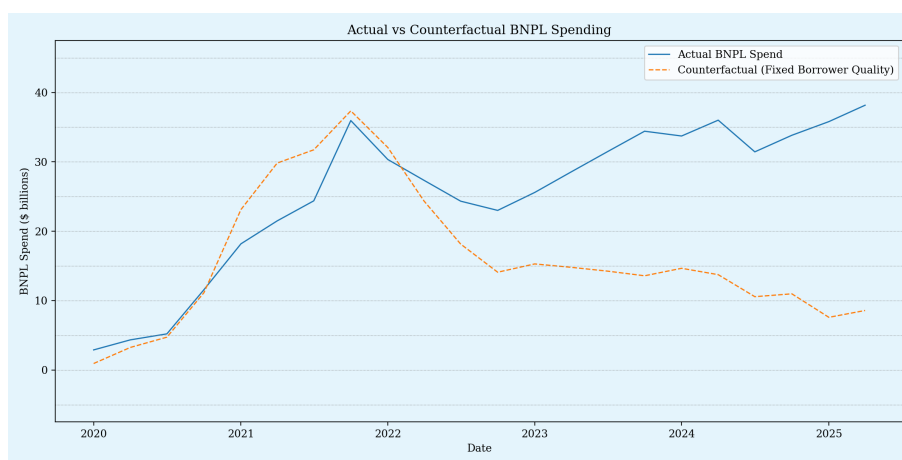


Figure 1. Actual vs Counterfactual BNPL Spending (Borrower Quality Fixed at 2020–2021 Median)

The Stress Attribution Index (Figure 2) quantifies this effect. The SAI begins near zero in 2020, rises modestly during the reopening period, and then accelerates sharply into 2023–2025. By the most recent quarter, the SAI indicates that nearly 30 percentage points of BNPL spending—relative to the 2020Q4 baseline—can be directly attributed to borrower quality deterioration. In other words, absent weakening household financial conditions, BNPL spending would have been substantially lower than observed.

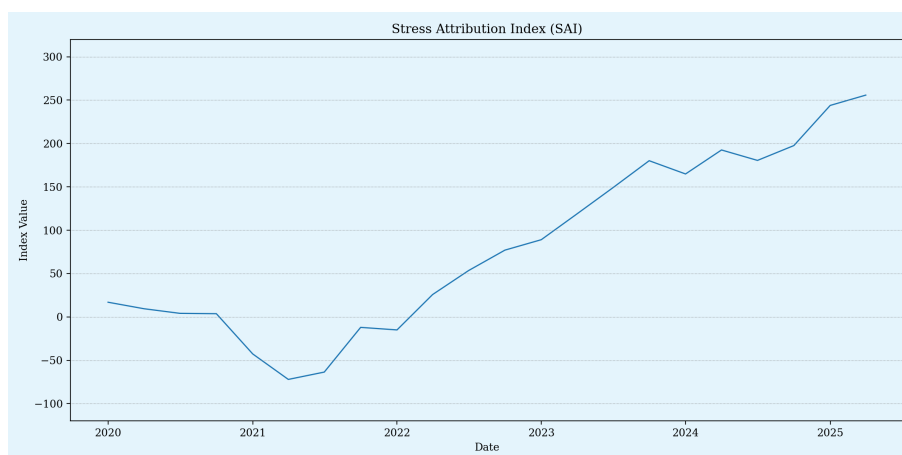


Figure 2. Stress Attribution Index (SAI)

This counterfactual analysis highlights two important insights. First, it confirms that BNPL expansion has not been purely an innovation-driven phenomenon; a significant share of growth reflects rising stress among lower-quality households. Second, it provides a direct measure—the SAI—that can be compared to broader systemic stress indicators. As we show in Section 5, movements in the SAI track closely with our Latent Stress Composite (LSC), suggesting that borrower-quality-driven BNPL dynamics are part of the same underlying stress cycle captured by macroeconomic indicators.

This linkage is crucial: it situates BNPL not as an isolated consumer finance quirk, but as an amplifier of systemic fragility. When households deteriorate, BNPL rises; and when BNPL rises due to borrower stress, the system as a whole shows elevated fragility. This feedback provides a bridge between micro credit usage and macro stress conditions.

5 BNPL Latent Stress Composite

At its core, we are concerned with the latent stress placed upon consumers by the BNPL industry. By definition, latent stress cannot be directly observed, so we must alternative measure that signal such stress. We define the Latent Stress Composite (LSC) as the joint signal derived from two observable components of BNPL usage: the share of spending devoted to essentials and the prevalence of late-payment behavior. These reflect distinct but complementary dimensions of household strain. Essentials-reliance captures the motive side of stress, as constrained households redirect BNPL usage away from discretionary categories toward groceries, fuel, and utilities. Late-payment prevalence captures the repayment side of stress, as financially strained borrowers exhibit greater difficulty meeting contractual obligations. In combination, these measures span both the front end of BNPL demand and the back end of repayment performance, thereby capturing the dual pressures that characterize constraint-driven usage.

To construct LSC, we first scale each component by standardizing relative to its historical distribution, thereby removing differences in units and levels. This allows us to interpret each as a signal of relative stress intensity rather than as an absolute dollar measure. The standardized components are then averaged to produce a single composite path. This approach parallels the logic of latent factor models: stress is not directly observable, but inferred from the co-movement of theoretically motivated indicators.

To measure the underlying financial stress embedded within BNPL spending, we construct two complementary components: the Essentials Transaction Measure (ETM) and the Late Payment Pressure Measure (LPPM). These are combined into a single Latent Stress Composite (LSC) that captures variation in the extent to which BNPL is used for essential consumption and the prevalence of repayment frictions.

5.1 Essentials Transaction Measure

We first anchor the share of BNPL transactions used for essential goods using external survey benchmarks.⁴⁵ These anchors are interpolated quarterly and aligned to our BNPL spending dataset, yielding a continuous estimate of essential-share over time. Multiplying this share by total BNPL spending produces a dollar-valued series for BNPL-financed essentials (ETM). To account for cyclical drivers of essential reliance, we augment ETM with standardized macroeconomic controls. Their average forms an ETM macro factor, which is detrended and smoothed using a discrete cosine transform (DCT) basis. This adjustment captures cyclical fluctuations in household stress beyond the anchored trend. This is then adjusted for total consumer debt, in order to isolate the structural shift in borrowing behaviour rather than merely tracking debt growth.

5.2 Late Payment Pressure

In parallel, we construct a measure of repayment strain. Survey benchmarks on the share of BNPL users missing payments are interpolated quarterly and multiplied by BNPL spending to yield a dollar-valued exposure series (LPPM). Importantly, this captures the volume of BNPL transactions attributable to users who report paying late; conceptually, a measure of exposure to repayment risk. As with ETM, we supplement this with standardized macroeconomic correlates of repayment stress. After standardization, these indicators are averaged to form an LPPM macro factor, detrended and smoothed via DCT. The resulting adjustment ensures that LPPM reflects both survey-anchored late-payment prevalence and contemporaneous labor market and credit cycle conditions. This is then, like with essentials, adjusted for total debt.

45. Anchors: 1.66% in 2020Q4 and 8.3% in 2022Q4, drawn from survey data.

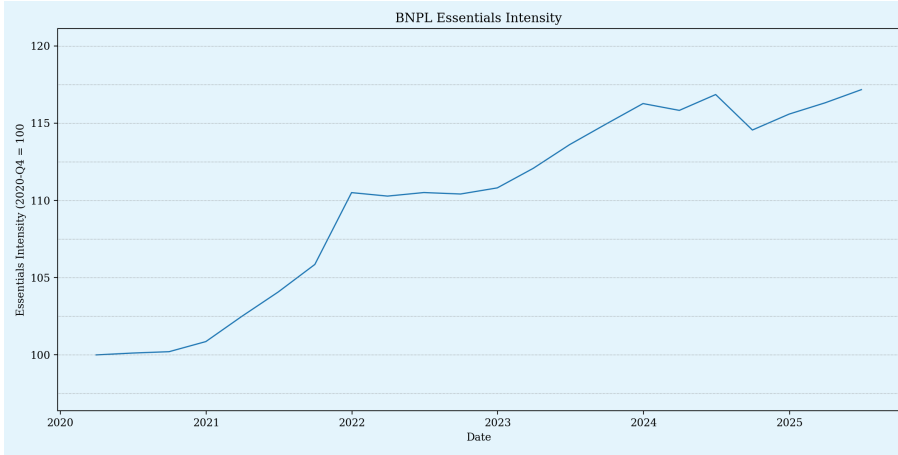


Figure 3. Essentials Transaction Measure (ETM)

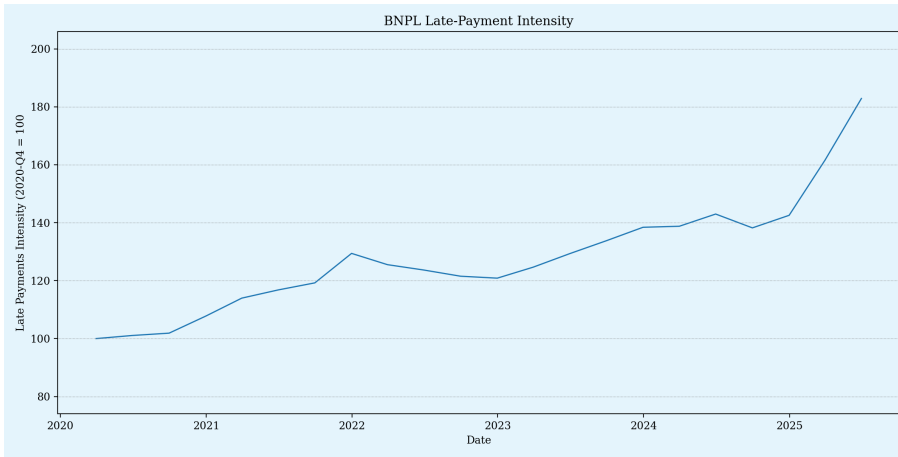


Figure 4. Late Payment Pressure

5.3 Latent Stress Composite

Both ETM and LPPM are standardized to mean zero and unit variance before aggregation. Their average defines the latent stress component:

$$LSC_t = \frac{1}{2} \left(\frac{ETM_t - \overline{ETM}}{\sigma_{ETM}} + \frac{LPPM_t - \overline{LPPM}}{\sigma_{LPPM}} \right). \quad (7)$$

This procedure removes scale differences and yields a dimensionless composite capturing the co-movement of essentials reliance and repayment strain. LSC thus serves as a baseline indicator of latent BNPL stress, against which counterfactual decompositions can be evaluated.

6 Linkage Between Borrower and Systemic Stress

Up to this point, we've demonstrated how BNPL spending deteriorates even in the counterfactual, how borrower quality erodes over time, and how systemic stress magnifies those effects. But the most direct way to quantify BNPL's fragility is to ask: how closely do borrower-level stress attributions map into overall systemic stress?

To answer this, we regress the Latent Stress Composite (LSC) on the Stress Attribution Index (SAI). The intuition is straightforward: if BNPL is structurally fragile, then shocks attributed to borrowers will feed directly into system-wide stress. A resilient market would dampen those shocks; a fragile one will amplify them.

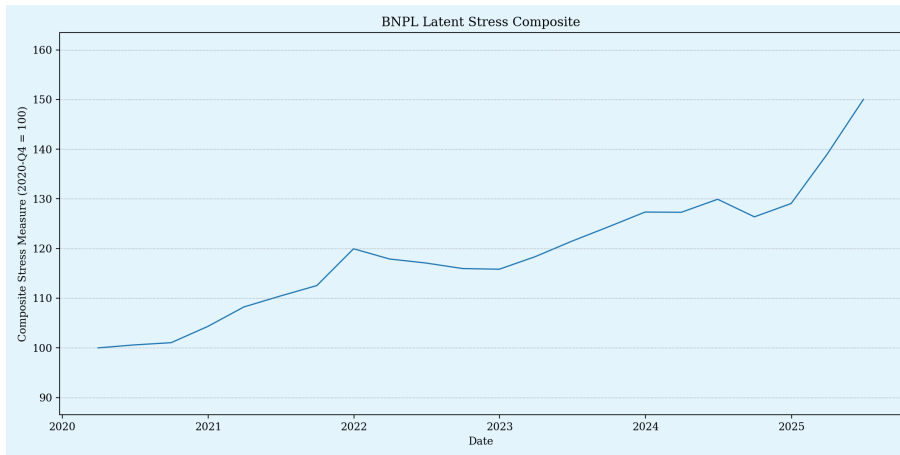


Figure 5. Latent Stress Composite (LSC)

6.1 Methodology

Both the Latent Stress Composite (LSC) and the Stress Attribution Index (SAI) are constructed as described in Section 5. For regression analysis, we use quarterly observations from 2020Q1–2025Q2.

To formally quantify the linkage between borrower-level stress and systemic amplification, we estimate a simple linear regression of the Latent Stress Composite (LSC) on the Stress Attribution Index (SAI). Both series are standardized using Z-score normalization to ensure comparability and to interpret coefficients in standard deviation units.

$$LSC_t = \alpha + \beta SAI_t + \varepsilon_t \quad (8)$$

where LSC_t denotes the latent systemic stress at time t , SAI_t is the borrower stress attribution index, α is a constant, and ε_t is the error term.

Estimation is performed using ordinary least squares (OLS) with heteroskedasticity-robust (HC1) standard errors to guard against small-sample bias. The coefficient β therefore captures the marginal effect of systemic amplification (SAI) on latent stress (LSC), expressed in standardized units. In practice, this means that β can be read as the change in systemic loss severity associated with a one-standard-deviation increase in borrower stress attribution.

6.2 Results

Table 2. Regression of LSC on SAI

Latent Stress Composite	
Stress Attribution Index	0.842*** (0.135)
R^2	0.709

Robust standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

As shown in Table 2, the regression leaves no doubt: systemic stress (LSC) and borrower stress attributions (SAI) move nearly one-for-one. A one-standard-deviation increase in SAI predicts almost a one-standard-deviation increase in LSC. In other words, the very conditions that make BNPL appear benign in normal times make it catastrophically fragile under stress.

This is the essence of why BNPL is such a dangerous financial innovation: while presented as magnifying spending, it also magnifies fragility. Once borrower stress emerges, the system transforms small shocks into large-scale losses. For lenders, regulators, and investors, the lesson is stark: BNPL is not merely risky; it is structurally designed to amplify risk.

7 Conclusion

This report began with a simple question: what does BNPL actually do to the financial resilience of households? By tracing the erosion of borrower quality, projecting stress dynamics in counterfactual scenarios, and finally linking borrower-level fragility to systemic amplification, we have built a comprehensive picture of BNPL as not merely another consumer credit product, but as a structural amplifier of risk.

The evidence is unambiguous. Borrower stress does not dissipate in the BNPL ecosystem; it compounds. Our regression analyses demonstrate that when borrowers stumble, the system does not catch them; it stumbles with them. What appears benign in times of growth becomes catastrophic under pressure.

For households, this means rising fragility masked by the veneer of easy credit. For lenders and investors, it means exposures are more tightly coupled to systemic conditions than they might appear, and for regulators, it underscores the urgency of treating BNPL as a source of amplification, not diversification. The explosive rise in BNPL should therefore not be seen as an innovation in household financing but rather as a proverbial canary in the coal mine of rapidly deteriorating household financial conditions.

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