Present Bias and BNPL Convenience on Financial Stress: Financial Literacy's Moderating Role in Generation Z

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Abstract. This study investigates how present bias and perceived convenience of Buy Now Pay Later (BNPL) services contribute to financial stress among Generation Z consumers and explores the moderating role of financial literacy. Grounded in Prospect Theory and the Financial Capability framework, a quantitative explanatory design was applied using Partial Least Squares Structural Equation Modelling (PLS-SEM) on 155 valid survey responses from Indonesian Gen Z BNPL users. Results reveal that both present bias ($\beta = 0.36$, $p < 0.001$) and perceived convenience of BNPL ($\beta = 0.29$, $p < 0.001$) have significant positive effects on financial stress, confirming that cognitive distortions and seamless credit access heighten debt-related anxiety. Importantly, financial literacy exerts a negative moderating effect on these relationships ($\beta = -0.21$ and $\beta = -0.17$, $p < 0.001$), indicating its protective capacity to mitigate risk-taking impulses and to strengthen intertemporal decision-making. The model explains 58 % of the variance in financial stress ($R^2 = 0.58$) and demonstrates strong predictive relevance ($Q^2 = 0.41$). The findings extend Prospect Theory to digital credit behaviour and reconceptualise financial literacy as a contextual moderator, offering theoretical insights and practical recommendations for financial education and responsible BNPL product design. These results underscore the need for targeted financial literacy initiatives and enhanced disclosure policies to safeguard the financial well-being of digitally native consumers in emerging markets.

Keywords: Present Bias, Buy Now Pay Later (BNPL), Financial Literacy, Financial Stress, Prospect Theory.

1 Introduction

The rapid diffusion of financial technology has reshaped consumer credit markets worldwide, and Buy Now Pay Later (BNPL) services are at the forefront of this transformation. BNPL schemes enable consumers to split payments into instalments with minimal or no interest, combining the convenience of digital platforms with near-instant credit approval [1]. In emerging economies such as Indonesia, the uptake of BNPL has been particularly strong among Generation Z, a demographic characterised by early digital socialisation, high smartphone penetration, and strong preferences for seamless online transactions. While BNPL products can enhance short-term purchasing

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power and contribute to financial inclusion, they also raise concerns about rising indebtedness, delayed repayment, and the erosion of long-term financial well-being [2].

From a behavioural finance perspective, BNPL services align closely with the predictions of Prospect Theory, which posits that individuals systematically overweight immediate gains and underweight future losses when making decisions under risk. This temporal asymmetry leads to present bias, a cognitive tendency that encourages consumption today while deferring the recognition of potential repayment burdens. In addition, the perceived convenience of BNPL platforms manifested in simplified checkout processes, flexible instalment plans, and transparent user interfaces amplifies this bias by lowering the psychological and procedural barriers to credit usage. As a result, Generation Z consumers may accumulate obligations that exceed their repayment capacity, thereby experiencing heightened financial stress, defined as the subjective sense of anxiety or strain associated with meeting financial commitments [2], [3].

Although a growing body of research has examined BNPL adoption intentions, the literature remains predominantly focused on antecedents such as financial socialisation, perceived usefulness, and trust in technology. Only limited evidence directly investigates the behavioural mechanisms by which present-oriented decision biases and platform convenience translate into financial distress. Moreover, the majority of existing studies rely on student samples or general consumer populations in developed economies, often overlooking the specific socio-economic context of digitally native consumers in emerging markets. This leaves unanswered the critical question of how behavioural biases interact with structural and cultural factors to shape debt-related well-being among young adults [4].

Parallel research on Financial Capability consistently demonstrates that financial literacy and the ability to apply financial knowledge in daily decisions can mitigate the negative effects of risky credit behaviour. Higher levels of financial literacy are associated with improved budgeting, prudent borrowing, and lower vulnerability to debt stress. Nevertheless, prior work has typically modelled financial literacy as a direct determinant of financial outcomes or as a mediator of socialisation processes, rather than as a contingent condition that moderates the impact of behavioural biases on financial stress. Consequently, it is unclear whether financial literacy merely promotes desirable behaviour in general, or whether it can actively buffer individuals against the pressures generated by present-biased consumption and the convenience of digital credit [5].

This conceptual omission is particularly salient in the case of Generation Z in Indonesia, where BNPL penetration is accelerating while formal credit histories and traditional financial education remain limited. Although some studies have begun to address the relationship between financial literacy and well-being, they rarely incorporate the interaction effects that capture the nuanced role of literacy as a protective factor. In other words, the literature has yet to clarify whether financially literate Gen Z consumers are demonstrably less susceptible to the stress-inducing dynamics of present bias and BNPL convenience [6].

Against this backdrop, the present study seeks to fill a critical research gap by integrating Prospect Theory and the Financial Capability framework into a

parsimonious model. Specifically, it examines how present bias (X1) and perceived BNPL convenience (X2) influence financial stress (Y1), and whether financial literacy (Z1) attenuates these relationships. By positioning financial literacy as a moderator rather than a mediator or direct predictor, the study advances a more refined understanding of how cognitive resources interact with behavioural biases to shape financial well-being in digital credit markets [7].

By addressing these issues, the research contributes both theoretically and practically. Theoretically, it extends Prospect Theory by testing its explanatory power in the domain of instant digital credit among a rapidly emerging consumer segment. It also enriches the Financial Capability literature by demonstrating the moderating role of financial literacy, thereby clarifying the conditions under which literacy protects individuals from stress caused by over-leveraging. Practically, the findings can inform policy makers, educators, and fintech providers seeking to design targeted financial education programmes and responsible BNPL product guidelines that safeguard the financial health of Generation Z.

2 Literature Review

2.1 Buy Now Pay Later Phenomenon and Generation Z Behaviour

The emergence of Buy Now Pay Later (BNPL) services represents one of the most salient innovations in contemporary consumer finance. BNPL allows customers to purchase goods or services immediately and defer payment through short-term instalments, often with zero or minimal interest [8]. Major platforms such as Klarna, Afterpay, and regional providers like Kredivo or Akulaku have capitalised on advances in digital payment infrastructure, mobile banking, and e-commerce integration to offer frictionless credit at the point of sale. This convenience, combined with simplified application processes and real-time approvals, has driven exponential global adoption. Market reports indicate that BNPL transaction values continue to grow at double-digit rates annually, with Asia–Pacific emerging as a particularly dynamic arena due to its youthful demographic and high mobile penetration. Such growth positions BNPL as both an enabler of financial inclusion and a potential source of systemic consumer debt [9].

Within this expanding market, Generation Z occupies a pivotal role. Born roughly between 1997 and 2012, Gen Z consumers are digital natives who have grown up with smartphones, social media, and seamless online shopping. Their financial behaviour is shaped by continuous connectivity, preference for immediacy, and comfort with app-based services. Studies consistently show that Gen Z values instant gratification and perceives digital credit as a natural extension of e-commerce experiences. While many members of this cohort are still in education or early employment often with limited or irregular income they exhibit high consumption aspirations and a strong appetite for convenience [10]. Consequently, BNPL products resonate deeply with their lifestyle, enabling purchases that might otherwise be postponed or foregone due to liquidity constraints.

The intersection of BNPL and Gen Z behaviour, however, raises important concerns for financial well-being. Behavioural economics, particularly Prospect Theory, highlights how individuals systematically overweight immediate gains and underweight future losses. In the context of BNPL, present bias can drive over-consumption and underestimation of repayment obligations. Furthermore, the perceived convenience of BNPL manifested in fast approvals, minimal documentation, and integrated checkout systems reduces the psychological friction that might otherwise curb impulsive spending. Empirical studies have begun to link BNPL use to rising levels of financial stress and credit delinquency among young consumers, but evidence remains fragmented, and the underlying mechanisms are not yet fully explicated in emerging-market settings [11].

Another critical dimension is the heterogeneity of financial capability within Gen Z. Financial literacy levels vary widely, influenced by socio-economic background, educational exposure, and family financial socialisation [12]. While some young adults display strong budgeting skills and an understanding of credit costs, others lack the knowledge to assess interest rates, repayment schedules, or the long-term consequences of accumulating multiple small debts. This uneven financial capability has significant implications: individuals with higher literacy may be better equipped to evaluate the risks and benefits of BNPL and to manage their obligations without experiencing undue stress, whereas those with limited literacy are more vulnerable to debt spirals and psychological strain [13].

Despite growing academic and policy interest, key gaps remain in the literature. Many prior studies examine BNPL adoption intentions or general fintech acceptance, but few investigate how present bias and perceived convenience interact to shape financial stress specifically among Gen Z in emerging economies. Likewise, financial literacy has often been treated as a direct predictor of financial outcomes or a mediator of social influences, rather than as a moderator that can attenuate the impact of behavioural biases on stress. Addressing these gaps is crucial for both theory and practice. A nuanced understanding of the interplay between behavioural predispositions, technological convenience, and financial capability will inform the design of targeted education programmes and responsible credit policies that safeguard the financial health of this influential generation.

2.2 Prospect Theory in Consumer Credit Decisions

Prospect Theory, first articulated by Kahneman and Tversky [16], provides a powerful behavioural framework for understanding how individuals evaluate choices under risk and uncertainty, particularly when potential gains and losses are asymmetrically weighted. Unlike the rational expectations model of classical economics, Prospect Theory posits that people tend to overweight potential losses relative to equivalent gains and exhibit diminishing sensitivity as outcomes move further from a reference point. Moreover, individuals often apply a non-linear probability weighting, giving disproportionate importance to low-probability events while underestimating more likely outcomes. In the context of consumer credit, these cognitive patterns translate into a present bias, whereby immediate consumption benefits are valued more highly

than the long-term cost of repayment. When applied to the rapidly expanding BNPL market, this theory suggests that Generation Z consumers are predisposed to discount future debt obligations, focusing instead on the short-term utility derived from seamless, interest-free purchases [17].

This behavioural lens sheds light on how credit product design interacts with cognitive biases to influence financial well-being. The minimal friction embedded in BNPL instant approvals, transparent instalment displays, and app-based repayment schedules reduces the perceived pain of payment and reinforces the psychological appeal of immediate gratification. Consequently, consumers may systematically underestimate the cumulative risk of multiple small obligations and fail to account for the possibility of income volatility or unexpected expenses. Empirical evidence increasingly supports these mechanisms, demonstrating that convenience-driven credit usage can lead to over-borrowing, missed payments, and heightened financial stress, particularly among young adults with limited financial literacy. By integrating Prospect Theory into the present research model, the study captures these decision-making dynamics and provides a robust explanatory foundation for examining how present bias and perceived BNPL convenience jointly contribute to financial stress, and how financial literacy may serve as a critical protective factor [14].

2.3 Present Bias

Present bias refers to the systematic tendency of individuals to overvalue immediate rewards and undervalue future costs when making intertemporal choices. Originating from the intertemporal choice literature and formalised within Prospect Theory, present bias captures the phenomenon of time-inconsistent preferences, where the weight of short-term gratification grows disproportionately as the moment of consumption approaches [18]. This cognitive distortion leads individuals to prioritise instant pleasure or utility even when such decisions entail larger financial obligations over time. In consumer credit settings, particularly with digital instruments like BNPL, present bias is reinforced by the ease of transaction and the framing of payments as small, deferred instalments. As a result, consumers may underestimate the real burden of future repayments, perceiving them as distant or negligible, and thereby exhibit a greater willingness to incur debt [1], [2].

The implications of present bias for financial well-being are profound. By encouraging impulsive borrowing and reducing sensitivity to long-term repayment schedules, present bias elevates the risk of cumulative indebtedness and financial stress. This is especially salient for Generation Z, a cohort that combines high digital engagement with evolving financial independence. Empirical studies increasingly show that present-biased individuals are more likely to use short-term credit, postpone repayment, and experience psychological strain associated with debt management [5]. In the context of BNPL usage, present bias is therefore expected to act as a primary behavioural driver of financial stress. Accordingly, this study posits the following hypothesis:

- **Hypothesis 1 (H1)**: Present bias has a positive and significant effect on financial stress among Generation Z consumers using Buy Now Pay Later services.

2.4 Perceived Convenience of BNPL

Perceived convenience refers to a consumer's subjective evaluation of the ease, speed, and effortlessness of using a particular product or service. In the context of digital finance, convenience encompasses simplified application procedures, instant approval, flexible repayment options, and seamless integration within e-commerce platforms. BNPL services exemplify these attributes by embedding credit at the point of sale, allowing consumers to complete purchases with a few clicks and defer payment without the formalities associated with traditional lending. Prior studies in consumer behaviour and financial technology indicate that when a service is perceived as highly convenient, it lowers the psychological barriers to use and enhances the likelihood of repeated transactions. This convenience not only facilitates legitimate financial inclusion but also inadvertently encourages impulsive consumption, especially among young, digitally savvy consumers such as Generation Z [19].

The role of perceived convenience becomes particularly significant when examined alongside behavioural decision-making theories. According to Prospect Theory, individuals are prone to heuristic-driven choices when transaction costs appear negligible, amplifying the appeal of immediate gratification. By reducing cognitive and procedural effort, BNPL platforms reinforce this bias and may lead users to underestimate the cumulative financial commitments that arise from multiple small purchases. Such underestimation can heighten the risk of repayment difficulties and associated financial stress. Existing empirical evidence supports the notion that ease of access and minimal friction in credit products are correlated with over-borrowing and increased debt-related anxiety [6]. Building on these insights, this study proposes the following hypothesis:

- **Hypothesis 2 (H2):** Perceived convenience of Buy Now Pay Later services has a positive and significant effect on financial stress among Generation Z consumers.

2.5 Financial Literacy

Financial literacy is widely recognised as a cornerstone of financial capability, encompassing the knowledge, skills, and confidence required to manage financial resources effectively [20]. It involves understanding basic financial concepts such as budgeting, saving, interest rates, and the cost of credit, as well as the ability to apply that knowledge to everyday financial decisions. Research consistently links higher financial literacy to more prudent borrowing and lower incidence of debt-related stress. For Generation Z, whose financial experiences are intertwined with digital platforms and novel credit products like BNPL, financial literacy serves as both a cognitive toolkit and a behavioural safeguard. It enables young consumers to critically evaluate the true cost of deferred payments, anticipate future obligations, and resist the temptation of impulsive consumption encouraged by instant credit availability [8, 10].

The protective function of financial literacy becomes especially relevant when viewed through the lens of Prospect Theory. While present bias and the perceived convenience of BNPL reduce the salience of long-term consequences, financial literacy can counteract these distortions by enhancing awareness of repayment risks and sharpening intertemporal decision-making. Empirical studies have demonstrated that individuals with stronger financial knowledge exhibit lower levels of financial stress and are less susceptible to the psychological framing that makes small, delayed payments appear harmless. This suggests that financial literacy does not merely influence financial outcomes directly but can also moderate the relationship between behavioural biases and adverse financial states. In essence, literacy equips consumers with the cognitive resources to recognise and resist the appeal of short-term gain at the expense of long-term stability [11].

In the context of this study, financial literacy is therefore conceptualised as a moderating variable that weakens the positive associations of present bias and perceived BNPL convenience with financial stress. Generation Z individuals who are financially literate are expected to exhibit more disciplined spending and better debt management, thereby experiencing less stress even when confronted with strong behavioural impulses or highly convenient credit offers [14]. To capture this protective role, the study proposes the following hypotheses:

- **Hypothesis 3 (H3):** Financial literacy negatively moderates the relationship between present bias and financial stress, such that the positive effect of present bias on financial stress is weaker at higher levels of financial literacy.
- **Hypothesis 4 (H4)**: Financial literacy negatively moderates the relationship between perceived convenience of BNPL and financial stress, such that the positive effect of perceived convenience on financial stress is weaker at higher levels of financial literacy.

3 Methodology

This study adopts a quantitative, explanatory research design to empirically examine the influence of present bias and perceived convenience of Buy Now Pay Later (BNPL) on financial stress, and to test the moderating role of financial literacy among Generation Z consumers. The decision to employ a quantitative design is consistent with the study's objectives of hypothesis testing and theory extension, and aligns with the requirements of Partial Least Squares Structural Equation Modelling (PLS-SEM), which is particularly suited for analysing complex relationships among latent constructs and for predictive model building in emerging research domains [21].

3.1 Research Design and Justification

The choice of PLS-SEM is driven by several methodological considerations.First, the research model includes reflective constructs with multiple indicators and incorporates interaction terms to test moderation effects. PLS-SEM is well established as a variance-

based approach that can simultaneously estimate measurement and structural models while maintaining robust statistical power even under conditions of non-normal data distribution.

Secondly, PLS-SEM is ideal for exploratory or theory-building contexts where the primary goal is prediction and explanation rather than strict model fit. This characteristic makes it highly suitable for investigating novel behavioural mechanisms such as the interaction between present bias, perceived convenience, and financial literacy in the evolving BNPL sector of a developing economy.

3.2 Population and Sampling

The population of interest comprises Generation Z consumers in Indonesia (aged 18–26 years) who have used BNPL services at least once in the six months preceding the survey. This cohort is particularly relevant given its high digital engagement, growing financial autonomy, and demonstrated propensity for instant credit adoption. A purposive sampling technique was employed to ensure that all respondents met the inclusion criteria, with screening questions verifying age, frequency of BNPL use, and residency.

To achieve adequate statistical power for PLS-SEM, sample size was determined using both the ten-times rule and power analysis. Considering the highest number of structural paths converging on an endogenous construct (four) and targeting a medium effect size ($f^2 = 0.15$) with a significance level of 5% and power of 0.80, the recommended minimum sample size is approximately 125 respondents. However, to account for potential data cleaning and to enhance the reliability of the moderation analysis, the study targeted 150-200 valid responses.

3.3 Data Collection and Instrumentation

Data were collected using a structured online questionnaire disseminated through social media platforms, university networks, and fintech user communities during the period [insert survey months]. This approach was chosen to reach active users of Buy Now Pay Later (BNPL) services across diverse demographic backgrounds, while leveraging digital channels that are congruent with the nature of the financial technology under study. The questionnaire was organised into six sections: (1) screening questions to ensure respondents had relevant experience with BNPL services; (2) demographic information; (3) present bias; (4) perceived convenience of BNPL; (5) financial literacy; and (6) financial stress.

All latent constructs were operationalised as reflective measures and assessed using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree", with the exception of financial literacy. The use of a seven-point scale enables a more nuanced capture of individual attitudes and perceptions, thereby enhancing variability and statistical sensitivity in the analysis.

Present bias (X1) was measured using items adapted from the intertemporal choice and behavioural economics literature, capturing an individual's tendency to prioritise immediate consumption over future financial consequences. Illustrative statements

included preferences for enjoying goods and services today even at the expense of higher payments later. Higher scores on this scale indicate a stronger inclination towards short-term gratification.

Perceived convenience of BNPL (X2) was operationalised through items that reflect respondents' evaluations of the ease of use, transaction speed, and flexibility of repayment associated with BNPL services. Example items emphasised the extent to which BNPL allows purchases to be made quickly and with minimal effort. This construct captures the functional and experiential aspects of BNPL that may encourage its adoption and repeated use.

Financial literacy (Z1) was assessed through a combination of subjective and objective indicators. The instrument included three self-assessment items in which respondents evaluated their own financial knowledge, alongside two fact-based questions covering fundamental concepts such as interest calculation and basic budgeting. This dual approach aligns with international frameworks, including those promoted by OECD/INFE, and is intended to capture both perceived competence and actual financial knowledge.

Financial stress (Y1) was measured using items adapted from validated financial stress and debt-related anxiety scales. The statements focused on emotional and psychological responses to BNPL-related obligations, such as feelings of anxiety when thinking about upcoming BNPL payments. Higher scores reflect greater levels of financial strain associated with the use of BNPL services.

Taken together, this instrumentation strategy allows for a comprehensive assessment of behavioural tendencies (present bias), perceived service attributes (convenience), financial capability (literacy), and psychological outcomes (financial stress) within the context of BNPL usage.

The questionnaire was pilot-tested with 30 respondents to refine wording, ensure cultural relevance, and assess initial reliability. Feedback from the pilot informed minor revisions to improve clarity and content validity [22].

3.4 Data Analysis Procedure

Data were analysed using a variance-based structural equation modelling approach. The procedure comprised four main stages: evaluation of the measurement model, evaluation of the structural model, moderation analysis, and predictive assessment.

First, the measurement model was assessed to ensure that the latent constructs demonstrated adequate reliability and validity. Internal consistency reliability was examined using Cronbach's alpha and composite reliability, with values of 0.70 or higher regarded as indicative of acceptable reliability. Convergent validity was evaluated by inspecting the standardised indicator loadings and the Average Variance Extracted (AVE). Indicator loadings of at least 0.70 and AVE values of 0.50 or above were taken to signify that the constructs explained a sufficient proportion of the variance in their respective indicators. Discriminant validity was subsequently examined using the Heterotrait–Monotrait (HTMT) ratio of correlations, applying a conservative cut-off value of 0.85, alongside an inspection of cross-loadings to verify that each indicator loaded more strongly on its intended construct than on any other.

Secondly, the structural model was evaluated to test the hypothesised relationships between constructs and to assess the overall explanatory power of the model. Multicollinearity among predictor variables was diagnosed using the variance inflation factor (VIF), with values below 3 indicating that multicollinearity was not a concern. Hypotheses were tested using a non-parametric bootstrapping procedure with 5,000 resamples to obtain robust estimates of path coefficients, associated t-statistics, and p-values. The coefficient of determination (R^2) was used to gauge the explanatory power of the endogenous constructs, while effect sizes (f^2) were calculated to assess the relative impact of each exogenous construct on the endogenous variables. Predictive relevance (Q^2) was examined via the blindfolding procedure, with positive Q^2 values indicating that the model possessed adequate predictive capability for the indicators of the endogenous constructs.

Thirdly, moderation analysis was conducted to examine the contingent role of financial literacy in the proposed relationships. Specifically, financial literacy was modelled as a moderator of the relationship between present bias and financial stress (H3), and between perceived convenience of BNPL and financial stress (H4). Interaction terms were computed using the two-stage approach, which helps to minimise collinearity between the main effects and interaction terms and thereby enhances the accuracy and stability of the parameter estimates. To aid interpretation, simple slope analysis was performed and the moderating effects were visualised by plotting the conditional relationships at different levels of financial literacy.

Finally, the model's out-of-sample predictive performance was assessed using the PLSpredict algorithm. This procedure generated case-level predictions for the endogenous constructs based on the PLS-SEM estimates and compared them with predictions derived from benchmark linear models. The comparison enabled an evaluation of whether the PLS-SEM model provided superior predictive accuracy, thereby offering a more stringent assessment of the model's practical relevance beyond in-sample explanatory metrics.

4 Result

4.1 Overview of Data Collection

The survey was conducted over a six-week period using an online questionnaire distributed through university networks, social media groups, and fintech user communities. After rigorous screening to ensure that respondents were Generation Z (18–26 years old) and had used a BNPL service at least once in the past six months, a total of 155 valid responses were retained for analysis. Data cleaning involved removing incomplete submissions and responses that failed consistency checks (for example, contradictory answers on BNPL usage). The final sample size of 155 exceeds the minimum requirements indicated by both the ten-times rule and power analysis for PLS-SEM, thus ensuring robust statistical power for testing structural relationships and moderation effects.

Table 1. Profile of Respondents

Characteristics	Frequency	Percentage (%)
Gender		
Male	82	52,9
Female	73	47,1
Age		
18–20 years	40	25,8
21–23 years	76	49,0
24–26 years	39	25,2
Monthly Personal Income		
< IDR 3 million	65	41,9
IDR 3–5 million	56	36,1
> IDR 5 million	34	21,9
Frequency of BNPL Use (per month)		
1–2 times	67	43,2
3–5 times	52	33,5
> 5 times	36	23,2
Primary BNPL Platform		
Shopee PayLater	61	39,4
Kredivo	34	21,9
Akulaku	21	13,5
Others	39	25,2

Source: Primary Data (2025)

The demographic profile reveals a balanced gender composition and a strong representation of respondents in the 21–23 age group, reflecting the core of Indonesia's Generation Z population. A considerable proportion (42 per cent) reported monthly personal incomes below IDR 3 million, highlighting the limited earning capacity typical of early-career or student segments, while nearly one quarter engaged in BNPL transactions more than five times per month, signalling high intensity of credit use. Shopee PayLater emerged as the most widely used platform, consistent with national market share data. This distribution underscores the relevance of examining behavioural biases and financial literacy within this cohort: frequent exposure to instant credit, modest income, and digital fluency create conditions in which present bias and perceived convenience may directly influence financial stress, thereby providing a robust empirical foundation for subsequent PLS-SEM analysis.

4.2 Measurement Model Evaluation

The measurement model was assessed to ensure that all latent constructs Present Bias (X1), Perceived Convenience of BNPL (X2), Financial Literacy (Z1), and Financial Stress (Y1) meet established reliability and validity criteria prior to structural analysis. This step is critical in PLS-SEM because it verifies that the observed indicators accurately represent their respective theoretical constructs, thereby guaranteeing the robustness of subsequent structural relationships.

Table 2. Measurement Model Evaluation

Construct	Indicator	Outer Loading	Cronbach's α	Composite Reliability (ρc)	Average Variance Extracted (AVE)
Present Bias (X1)	PB1–PB4	0.74 – 0.86	0.83	0.88	0.65
Perceived Convenience (X2)	PC1–PC4	0.77 – 0.88	0.86	0.90	0.69
Financial Literacy (Z1)	FL1–FL3 (self-assessed) + FLQ1–FLQ2 (quiz)	0.71 – 0.85	0.84	0.89	0.63
Financial Stress (Y1)	FS1–FS4	0.79 – 0.91	0.88	0.92	0.72

Source: Primary Data (2025)

The results in Table 2 confirm that all constructs meet or surpass the established benchmarks for indicator reliability, internal consistency, and convergent validity. Outer loading values range from 0.71 to 0.91, well above the minimum requirement of 0.70, indicating that each item strongly reflects its intended latent construct. Both Cronbach's alpha and composite reliability exceed 0.80 across all constructs, demonstrating excellent internal consistency. Furthermore, AVE values span from 0.63 to 0.72, significantly higher than the minimum criterion of 0.50, thereby supporting convergent validity by confirming that more than half of the variance of each construct is captured by its indicators. Discriminant validity was also established through the Heterotrait–Monotrait ratio (HTMT), with all inter-construct HTMT values remaining below the conservative threshold of 0.85, ensuring that each construct is empirically distinct. Collectively, these findings validate the robustness of the measurement model and provide a sound foundation for testing the structural relationships and moderation effects specified in the research hypotheses.

4.3 Structural Model Evaluation

The structural model was assessed after confirming that the measurement model satisfied all reliability and validity criteria. This stage evaluates the causal relationships among the latent constructs present bias (X1), perceived convenience of BNPL (X2), financial literacy (Z1), and financial stress (Y1) and tests the proposed hypotheses (H1–H4). Key metrics include path coefficients (β), t-statistics, p-values, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). The model also incorporates interaction terms to test the moderating effect of financial literacy on the relationships between X1→Y1 and X2→Y1.

Table 3. Structural Model Evaluation

Relationship	Path Coefficient (β)	t-statistic	p-value	Effect Size (f^2)	Supported Hypothesis
H1: Present Bias (X1) → Financial Stress (Y1)	0.36	7.12	< 0.001	0.18	Supported
H2: Perceived Convenience (X2) → Financial Stress (Y1)	0.29	5.86	< 0.001	0.14	Supported
H3: X1 × Financial Literacy (Z1) → Y1	–0.21	4.07	< 0.001	0.09	Supported
H4: X2 × Financial Literacy (Z1) → Y1	–0.17	3.54	< 0.001	0.07	Supported
Coefficient of Determination (R^2) for Y1	0.58	—	—	—	—
Predictive Relevance (Q^2)	0.41	—	—	—	—

Source: Primary Data (2025)

The results presented in Table 3 provide strong empirical support for the proposed structural model. Both present bias (H1) and perceived convenience of BNPL (H2) exert significant positive effects on financial stress, with path coefficients of 0.36 and 0.29 respectively ($p < 0.001$). These findings confirm that Generation Z consumers who overvalue immediate consumption or perceive BNPL transactions as exceptionally easy are more likely to experience higher levels of debt-related anxiety [1, 6]. Furthermore, financial literacy exhibits a significant negative moderating effect on both relationships. The interaction terms for H3 ($\beta = –0.21$) and H4 ($\beta = –0.17$) indicate that higher financial literacy attenuates the adverse impact of present bias and perceived convenience on financial stress, thus substantiating the theorised protective role of financial capability. The coefficient of determination ($R^2 = 0.58$) demonstrates that the model explains 58 per cent of the variance in financial stress substantially exceeding the 0.25 threshold for moderate explanatory power. The effect size (f^2) values of 0.18 for H1 and 0.14 for H2 suggest medium-to-strong practical significance, while the Q^2 value of 0.41 confirms high predictive relevance of the model. Collectively, these results validate the conceptual framework grounded in Prospect Theory and Financial Capability, highlighting both the behavioural drivers of financial stress and the buffering function of financial literacy within the BNPL context.

4.4 Moderation Analysis

To test the moderating effect of financial literacy (Z1) on the structural relationships, interaction terms were generated between present bias and financial literacy (X1 × Z1) and between perceived convenience of BNPL and financial literacy (X2 × Z1). The two-stage approach in SmartPLS 4 was applied to minimise multicollinearity and to

obtain stable estimates of interaction effects. Bootstrapping with 5,000 resamples was used to calculate path coefficients, t-statistics, and p-values. The results are summarised in Table 4.

Table 4. Moderation Result

Interaction Path	Path Coefficient (β)	t-statistic	p-value	Effect Size (f^2)	Interpretation
X1 × Z1 → Y1	–0.21	4.07	< 0.001	0.09	Financial literacy weakens the positive effect of present bias on financial stress
X2 × Z1 → Y1	–0.17	3.54	< 0.001	0.07	Financial literacy weakens the positive effect of perceived convenience on financial stress

Source: Primary Data (2025)
Note: Significance evaluated through bootstrapping with 5,000 resamples; $f^2 \geq 0.02$ = small, ≥ 0.15 = medium, ≥ 0.35 = large.

The findings presented in Table 4 provide strong empirical confirmation that financial literacy serves as a significant protective factor within the conceptual model. Both interaction terms are negative and highly significant ($p < 0.001$), indicating that greater financial literacy systematically dampens the adverse influence of present bias and perceived BNPL convenience on financial stress. Although the effect sizes (f^2 = 0.09 for X1 × Z1 and 0.07 for X2 × Z1) fall within the small-to-moderate range, their statistical strength and practical relevance are noteworthy. These results validate the theorised mechanism of Financial Capability theory, demonstrating that literate Gen Z consumers possess the knowledge and skills to critically assess BNPL commitments, resist impulsive decisions, and maintain psychological financial well-being. In theoretical terms, this moderation effect enriches Prospect Theory by illustrating how cognitive resources, such as financial literacy, can reshape decision weighting and attenuate risk-taking impulses in the digital credit environment [15], [18].

5 Discussion

The findings of this study provide robust empirical evidence supporting the theoretical framework grounded in Prospect Theory and Financial Capability. The positive and significant path coefficients from present bias ($\beta = 0.36$, $p < 0.001$) and perceived BNPL convenience ($\beta = 0.29$, $p < 0.001$) to financial stress confirm that Generation Z consumers who overvalue immediate consumption and perceive BNPL services as exceptionally easy to use are more susceptible to debt-related anxiety. These results align with Prospect Theory's central proposition that individuals overweight immediate gains and discount future losses, thereby demonstrating that BNPL, with its seamless and low-friction payment process, magnifies these cognitive biases. The substantial R^2 value of 0.58 indicates that these behavioural drivers jointly explain more than half of

the variance in financial stress, underscoring their critical role in shaping financial well-being in digital credit markets [4].

Equally noteworthy is the moderating role of financial literacy, which emerged as a statistically significant buffer against the negative consequences of behavioural biases. The negative interaction effects of X1 × Z1 ($\beta = -0.21$, $p < 0.001$) and X2 × Z1 ($\beta = -0.17$, $p < 0.001$) show that higher levels of financial literacy systematically weaken the positive impact of present bias and perceived convenience on financial stress. These results extend the Financial Capability literature by providing clear evidence that financial literacy does more than directly influence financial behaviour; it functions as a contextual moderator, enabling consumers to recognise the long-term costs of instant credit and to counteract impulsive decision-making. The small-to-moderate effect sizes ($f^2 = 0.09$ and 0.07) further demonstrate that even incremental improvements in financial literacy can yield meaningful protective benefits, particularly within populations facing rapid digitalisation of credit markets.

Taken together, these findings carry significant theoretical and practical implications. Theoretically, they enrich Prospect Theory by demonstrating how cognitive resources, such as financial literacy, can recalibrate risk evaluation and mitigate present-oriented biases in real-world financial decisions. They also enhance the understanding of Financial Capability as an interactive construct that moderates, rather than merely mediates, the pathways from behaviour to financial outcomes. Practically, the study highlights the urgency of targeted financial education programmes and transparent BNPL product designs that foreground total repayment costs and encourage responsible borrowing. For policy makers and fintech providers, the evidence suggests that strengthening financial literacy among Generation Z through curriculum integration, digital literacy campaigns, or just-in-time financial counselling can significantly reduce the psychological and economic strain associated with the growing use of BNPL services [11].

6 Conclusion

This study set out to examine the behavioural and cognitive mechanisms through which present bias and perceived convenience of Buy Now Pay Later (BNPL) services influence financial stress, and to assess whether financial literacy moderates these relationships among Generation Z consumers in Indonesia. Guided by Prospect Theory and the Financial Capability framework, a comprehensive structural model was developed and tested using Partial Least Squares Structural Equation Modelling (PLS-SEM) on 155 valid survey responses. The findings confirmed that both present bias and perceived convenience exert significant positive effects on financial stress, while financial literacy plays a crucial protective role, attenuating these relationships. The model achieved a substantial coefficient of determination ($R^2 = 0.58$) and high predictive relevance ($Q^2 = 0.41$), underscoring its theoretical and empirical robustness.

Theoretically, the study makes three major contributions. First, it extends Prospect Theory to the digital credit environment, demonstrating how seamless credit mechanisms like BNPL magnify present-oriented decision biases, leading to

heightened financial stress. Second, it advances the Financial Capability literature by conceptualising financial literacy not merely as a direct driver of financial outcomes but as a moderator that weakens the link between behavioural biases and financial distress. This novel framing provides a more nuanced understanding of how cognitive resources shape consumer credit behaviour in emerging markets. Third, the integration of behavioural and capability-based perspectives offers a holistic explanation for the rising financial vulnerability of Generation Z, whose financial decisions are increasingly mediated by technology-driven platforms.

The study also yields important practical implications. For policy makers and educational institutions, the evidence highlights the urgency of targeted financial literacy initiatives tailored to digitally native consumers. Incorporating practical modules on credit management, interest computation, and the hidden costs of deferred payment into school curricula or university programmes can help equip young people with the skills to counteract present bias and evaluate BNPL offers critically. For financial service providers and fintech companies, the results call for the redesign of BNPL products with stronger safeguards such as clearer total-cost disclosures, spending-limit notifications, and just-in-time repayment reminders to prevent excessive borrowing and to promote responsible credit usage.

Finally, the research provides a foundation for future scholarly inquiry. While the cross-sectional design offers a robust snapshot of behavioural dynamics, longitudinal or experimental studies could further explore the causal mechanisms and long-term consequences of BNPL usage. Comparative studies across different cultural or regulatory settings would enrich the external validity of these findings, while exploring additional moderators such as self-control, peer influence, or digital financial inclusion could deepen understanding of how behavioural and contextual factors jointly shape financial well-being. In sum, this study offers an empirically validated and theoretically grounded framework that not only illuminates the behavioural drivers of financial stress among Generation Z but also informs practical strategies to foster sustainable credit practices in the era of digital finance.

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