

CONTRASTING FINANCIAL ECOSYSTEMS: A COMPARATIVE ANALYSIS OF LOAN DELINQUENCY'S DIVERGENT PATHWAYS TO HOUSEHOLD WELL-BEING IN BOTSWANA'S RESILIENCE AND ZIMBABWE'S VOLATILITY

Costa Musandipa¹, Peter Nkala², Noble Malunguza³, Edson Mbedzi⁴

Department of Finance and Fiscal Sciences, National University of Science and Technology¹

Faculty of Business and Economic Sciences, National University of Science and Technology²

Department of Actuarial Science and Risk Management, National University of Science and Technology³

Department of Finance and Fiscal Sciences, National University of Science and Technology⁴

Email: cmusandipa@gmail.com

Abstract:

Households in many countries continue to experience historically low savings rates, rising loan delinquencies, and inadequate long-term financial planning, underscoring persistent concerns about household financial well-being (HFWB). Despite extensive scholarly attention, the relationship between loan delinquency and HFWB remains inconclusive due to inconsistent empirical findings and the broad conceptual scope of prior studies. Addressing this gap, the present study aims to examine the association between loan delinquency measured through non-performing loans (NPLs) and HFWB measured using human development indices in the contexts of Botswana and Zimbabwe. Employing a quantitative research design, the study applies Generalized Additive Models (GAMs) to capture potential non-linear dynamics between the variables. The results show that although economic growth substantially enhances HFWB, its benefits can be attenuated by rising loan delinquency. There are also counterintuitive findings, particularly the direct effect of NPLs on HFWB in Botswana, indicating the need for further qualitative investigation and refinement of HFWB metrics. These findings highlight the importance of strong institutions, effective regulatory frameworks, and proactive credit risk management in building financial resilience. The study offers policy recommendations for governments, financial institutions, and households to foster sustainable improvements in financial well-being.

Keywords: Life Cycle Theory, Household Financial Well-Being, Loan Delinquency, Macro-Economic Variables, Psychological Perspective, Economics Perspective, Modelling

INTRODUCTION

Household financial well-being (HFWB), the bedrock of economic stability and social progress, hinges on a household's capacity to navigate financial obligations, achieve aspirations, and absorb unforeseen shocks. In the dynamic landscape of developing economies, access

to credit serves as a vital catalyst, empowering investments in human capital, housing, and entrepreneurial ventures, thereby promising enhanced HFWB. However, this promise remains fragile, susceptible to the insidious erosion wrought by loan delinquency, the failure of borrowers to honour their debt commitments. When left unchecked,

escalating loan delinquency can unleash a cascade of destabilizing effects, ranging from the tightening of credit conditions by financial institutions to a broader impairment of household financial health and, ultimately, the vitality of the entire economy (Nissim & Ziv, 2001; Ajanthan, 2013). This study presents a compelling comparative analysis of Botswana and Zimbabwe, two nations with sharply divergent economic trajectories, offering a unique lens through which to explore the intricate relationship between loan delinquency and HFWB. Botswana stands as a testament to prudent macroeconomic stewardship and robust democratic institutions, cultivating a relatively stable financial sector conducive to growth and public investment. In this context of expanding credit, understanding the nuanced role of loan delinquency is paramount, particularly given ongoing challenges such as income inequality and unemployment (Jefferis et al., 2012; Okatch, 2012). Conversely, Zimbabwe's economic narrative is marked by profound volatility, characterized by prolonged hyperinflation, currency crises, and political upheavals. These extreme conditions have fractured its formal financial system, fostering a pervasive informal economy and compelling households to forge unique, often resilient, coping mechanisms. Consequently, conventional financial metrics, including loan delinquency, may manifest in unconventional ways when assessing their true impact on broader well-being within such a turbulent environment (RBZ, 2021; Sanderson, Mokumako, Mukarati, & Le Roux, 2025). The prevailing educational discourse underscores the multifaceted nature of HFWB, with non-performing loans (NPLs) occupying a central, albeit contentious, position in determining a household's

financial health as a going concern (Uwuigbe, Jafaru, & Ajayi, 2012). While the intuitive link between sound debt management and positive financial outcomes is clear, the precise nature of this relationship in developing nations, particularly concerning NPLs, remains ambiguous and empirically inconclusive (Castro, 2013; Curak, Pepur, & Poposki, 2013; Adeola & Ikpesu, 2016; Agić & Jeremić, 2018; Pop, Chicu, & Răduțu, 2018; Mohamed, Abd Hamid, Hosin, & Md Isa, 2021). Classical economic thought, notably Keynes (1936) and Duesenberry (1949), rooted HFWB primarily in income and relative social standing, implicitly sidelining the direct impact of debt-related issues like NPLs. While modern theories, such as Friedman's (1957) Permanent Income Theory and Ando & Modigliani's (1963) Life Cycle Hypothesis, broadened this understanding to include real economic considerations, the explicit role of NPLs has often been overlooked in empirical studies utilizing proxies for HFWB such as literacy rates, health, cost of living, and Human Development Indices. The recent surge in loan delinquency crises across various low-income countries since the mid-2000s, including Bosnia and Herzegovina, Pakistan, Morocco, and Nicaragua, has reignited academic interest, according to Chen, Rasmussen, Reille, and Rozas (2010). This renewed interest, as articulated by Kempson and Collard (2021), seeks to forge a more integrated understanding of HFWB by bridging social and economic factors, encompassing financial policies, individual behaviours, attitudes, and skills. However, this holistic endeavour remains in its nascent theoretical and methodological stages (Kempson & Collard, 2021). Compounding this urgency are persistent, alarming trends in Botswana and Zimbabwe. Di

Maggio et al. (2017) highlighted the deterioration of HFWB in developing nations such as Botswana, as evidenced by persistent household loan repayment problems. The sheer scale of household debt, with ratios to disposable income reaching concerning levels in countries like Canada (173.8%), New Zealand (163.7%) and South Africa (71.9%), compared to Botswana's 40-70% in 2021, underscores a global pervasive issue of over-indebtedness (Xiao & Yao, 2011; Meniago, Mukuddem-Petersen, Petersen, & Mongale, 2013; Jian Xiao & Yao, 2014). In Botswana, 57% of bank lending is to households, predominantly unsecured personal consumer loans (Jefferis, et al., 2012). Meanwhile, in Zimbabwe, household loan access surged, with non-performing loans reaching worrisome averages of 18.5% between 2009 and 2016, far exceeding international benchmarks (RBZ, 2021; Sanderson, Mokumako, Mukarati, & Le Roux, 2025). Against this backdrop of rising loan repayment problems and the compelling, yet ambiguous, empirical evidence, this research seeks to address a critical gap, the general disregard for NPLs' impact on household financial well-being in prior studies. By focusing on Botswana and Zimbabwe, where individual loan repayment problems are pronounced and robust data are available, this study aims to examine the nature of the relationship between NPL and households' financial well-being. Improving household financial well-being directly contributes to national prosperity (Bagwell & Bush, 2000; Kim, Garman, & Sorhaindo, 2003; Kim & Henager., 2017).

Statement of the problem

Theoretically, loan delinquency negatively impacts household financial well-being, potentially undermining the benefits of

economic growth. However, empirical evidence, particularly in diverse developing contexts like Botswana and Zimbabwe, remains underexplored and often counterintuitive. Existing macroeconomic models frequently overlook non-linear dynamics and country-specific factors, leading to potentially misleading policy prescriptions. This study addresses this gap by proposing a robust regression model to simultaneously analyse loan default and household financial well-being, thereby enhancing understanding and practical application within the broader economy.

Research Questions

1. Does loan delinquency (Non-Performing Loans - NPLs) impact household financial well-being in Botswana and Zimbabwe?
2. Are there significant differences in the nature and strength of these relationships between Botswana and Zimbabwe, and if so, what factors explain these disparities?

Objectives of the Study

1. To analyse the direct impact of loan delinquency on household financial well-being in Botswana and Zimbabwe using non-linear modelling techniques.
2. To compare and contrast the findings between Botswana and Zimbabwe, providing insights into the adverse effects of loan delinquency on HFWB.

LITERATURE REVIEW

The intricate tapestry of household financial well-being (HFWB), a multi-dimensional construct reflecting a household's capacity to meet obligations,

achieve aspirations and weather economic shocks is widely recognized as a linchpin of broader economic stability. Across diverse nations and developmental stages, judicious access to credit is a critical enabler of well-being, fuelling investments in education, housing, and entrepreneurial endeavours. However, this vital resource carries an inherent risk of loan delinquency. When borrowers falter in their repayment commitments, the benefits of credit can rapidly unravel, threatening to destabilize financial institutions, constrict credit markets, and ultimately erode the financial health of households and entire economies (Nissim & Ziv, 2001; Ajanthan, 2013). While the ubiquity and potential impact of loan delinquency are widely acknowledged, a scholarly consensus on its precise relationship with HFWB remains elusive, fostering persistent ambiguity that challenges foundational economic theories such as the Income Hypothesis, Relative Income Hypothesis, Permanent Income Hypothesis, and Life Cycle Hypothesis. Central to this debate is the Life Cycle Model, which posits that household indebtedness and consumption patterns are intrinsically linked to age, savings, and transitory income shocks (Modigliani & Brumberg, 1954). Empirical investigations across continents lend partial support to this model. In Thailand, Debt-to-Income (DTI) ratios reportedly peak in middle age before declining (Thaicharoen, Ariyapruchya, and Chuched, 2004), while in Italy, the demand for bank loans is observed to crest around age 30 (Magri, 2007). Although country-specific nuances exist, with the impact of household head age varying between the UK, Germany, and the (U.S.A. Brown & Taylor, 2008), a consistent thread emerges, as age often dictates household debt accumulation,

with a demonstrable negative impact of high debt-to-income ratios on HFWB for younger demographics (Thaicharoen, Ariyapruchya, & Chuched, 2004; Magri, 2007; Bolibok, 2018). This extends beyond broad ratios; for instance, escalating credit card debt among college students has been directly linked to increased financial stress (Grable & Joo, 2006). Furthermore, studies in Germany have identified age as a statistically significant negative determinant of debt-related financial problems, such as perceived credit burdens or inability to save (Wagner, Frick, & Schupp, 2007). The influence of debt on HFWB extends to periods of economic duress. During the Great Recession, carrying a credit card balance was a statistically significant determinant of household financial condition, as consumers used credit to smooth consumption, thereby inadvertently increasing their vulnerability to economic shocks. High levels of unsustainable debt were demonstrably linked to a deterioration in household financial positions (Hunter & Heath, 2017). This behaviour aligns with the Permanent Income and Life Cycle Hypotheses, suggesting that households often borrow against anticipated future income for immediate consumption, a practice long supported by classical works (Bernthal, Crockett, & Rose, 2005). However, criticisms of such studies highlight the need for longer temporal analyses to fully capture household adaptation to economic crises and the complex interplay of demographic factors, beyond age, marital status, number of children, education and income, in financial decision-making (Dunkelberg & Stafford, 1971; Kim & DeVaney., 2001; Soman & Cheema, 2002; Hunter & Heath, 2017). Beyond macroeconomic shocks,

individual attributes like financial literacy emerge as crucial determinants of loan delinquency. In Tanzania, both economic and financial literacy were found to be significantly negatively correlated with loan delinquency rates, underscoring that financial illiteracy can lead to imprudent borrowing and heightened vulnerability to excessive debt, reinforcing the Life Cycle Hypothesis's tenets (OECD, 2008; Lusardi & Mitchell, 2014; Mori, Nyantori, & Olomi, 2017). While such studies support economic theory, their general nature often limits the specificity of remedial measures for HFWB challenges, thereby advocating for the inclusion of more variables and bidirectional analyses. Further investigations into low-income households globally reinforce the Life Cycle Hypothesis. Studies using U.S. survey data demonstrate that, while the probability of holding debt increases with income, households in the most severe poverty categories are less likely to meet debt-to-income guidelines and are more likely to delinquent (Bieker & Yuh, 2015; Kim & Henager, 2017). This suggests that debt, particularly for low-income households, can serve as a consumption-smoothing tool during economic shocks, though it also requires careful monitoring to sustain their financial security. However, this perspective is not without critics, who argue that persistent debt among low-income households may also constitute a strategic investment in future economic improvement (Bridges & Disney, 2004). The intricacies of debt policy are further illuminated by studies on student loan debt, where, contrary to traditional life cycle models assuming perfect credit markets, student loans are consistently associated with a negative impact on net worth, highlighting the substantial and complex effects of debt on post-college

outcomes (Rothstein & Rouse, 2011; Elliott & Nam, 2013). The nexus between debt burdens and health, a critical component of HFWB, has also garnered scholarly attention. Studies, such as those using Spanish household data, reveal a significant correlation between debt burdens and deteriorating health, supporting the economic deprivation hypothesis (Brown & Taylor, 2008; Duygan-Bump & Grant, 2009; Blázquez, Budría, & Moro-Egido, 2021).

Similarly, research using British and German household data indicates that debt carries important psychological costs and exerts moderate effects on health (Brown & Taylor, 2008; Bridges & Disney, 2004; Keese & Schmitz, 2014). The voluminous literature on household debt and HFWB, though replete with diverse findings, underscores the inherent complexities and occasional inconclusiveness of empirical results. This enduring "puzzle" continues to demand rigorous inquiry, particularly regarding the causal links among variables, a limitation frequently cited in prior studies. Specifically, for countries such as Botswana and Zimbabwe, where individual loan repayment problems are pronounced, a timely examination of the impact of loan delinquency on household financial well-being is imperative.

While existing research often posits a negative relationship between loan delinquency and HFWB, rooted in the Life Cycle Theory, the precise nature of this causal transmission of information about prospective future well-being remains a contested domain (Elliott & Nam, 2013; Hunter & Heath, 2017; Kim et al., 2017; Mori et al., 2017). This study aims to address these critical concerns, positing a significant link where loan delinquency

directly impacts households' financial well-being and, consequently, individuals' overall wellness. It is thus hypothesized that:

H1: There is a significant negative link between loan delinquency and household financial well-being.

METHODOLOGY

Generalized Additive Models (GAMs) have been the primary analytical tool for modelling the relationships between variables. GAMs allow flexible nonlinear relationships between the dependent variable and individual predictors via smooth functions. This is particularly suitable for economic time series where relationships may not be strictly linear. Additionally, this study employs a rigorous quantitative research design to illuminate the intricate, non-linear relationships between loan delinquency and household financial well-being in Botswana and Zimbabwe. Leveraging observational time-series data, the methodological cornerstone is the application of Generalized Additive Models (GAMs), a sophisticated analytical tool adept at discerning flexible, complex associations that are often elusive to conventional linear methods. This approach is further enriched by a mediation analysis framework, enabling the precise examination of hypothesized indirect effects. The investigation encompasses both Botswana and Zimbabwe, using annual observations over a consistent period (1990-2024) to ensure comparability and capture dynamic shifts in their respective economic and financial systems. The selection of this period is strategically motivated, enabling examination of pivotal economic events, including the 2007-2009 Global Financial Crisis, the commodity boom, and the post-COVID-2019 credit legislation's impacts on

household financial well-being and bank asset quality in Botswana and Zimbabwe. Key variables are meticulously operationalized, as Household Financial Well-being (HFWB) is comprehensively proxied by the Human Development Index (HDI), a composite measure reflecting life expectancy, education, and per capita income (Comim, 2016). Loan Delinquency is measured using non-performing loans (NPLs) as a percentage of total loans, consistent with established practices in the literature (Castro, 2013; Imbierowicz & Rauch, 2014). Data are predominantly sourced from authoritative international repositories, such as the World Bank's World Development Indicators, the International Monetary Fund (IMF) databases, national statistical agencies (e.g., Statistics Botswana and the Zimbabwe National Statistics Agency), Bank of Botswana reports, and UNDP websites. The diversity and magnitude of these international sources ensure robust data coverage and facilitate meaningful statistical inferences. The analytical pipeline begins with descriptive statistics to characterize the distributions of variables. The core of the analysis, GAMs, employs the $s(0)$ function to estimate smooth, non-linear effects of predictors without imposing restrictive functional forms. Model outputs provide critical insights, including Pseudo R-squared values to quantify explained variance, Effective Degrees of Freedom (EDoF) to indicate the linearity or non-linearity of smooth terms, and p-values for statistical significance. Partial dependence plots offer a crucial visual representation of these nonlinear relationships. The standard sample size for the GAM models comprises 35 observations per country. Acknowledging potential data challenges, particular attention is paid to missing observations. While national secrecy laws

Although not found to be a barrier (Kowalczyk, 2017), the study addresses any remaining gaps using the R software package, specifically employing spline regression. This method, lauded for its superiority in handling missing variables (Ahmada & Flachaire, 2010), segments observations and estimates linear relationships while accommodating nonlinear forms, thereby mitigating errors in time-series regression and statistical analysis (Colin & Trivedi, 2005; Cameron, 2022). The choice of data measurement scales is also critically addressed, recognizing their impact on data analysis (Nissan & Naghshpour, 2014; Parsons & Naghshpour, 2023). The study employs nominal scales to identify distinct periods, ordinal scales to rank HFWB and NPL levels, treated as interval scales in line with social science research practices (Perry, 1998), and predominantly ratio-scale data for robust econometric testing (Blumberg, Cooper, & Schindler, 2014). The determination of sample size considers both statistical and non-statistical factors.

While acknowledging the sensitivity of linear regression to sample size (Tabachnick & Fidell, 2007), the study is guided by the established benchmark of 30 cases per variable as a pragmatic balance between the risk of sampling error and data collection costs (Imbens & Rubin, 2010). The imperative to minimize Type I and Type II errors, inversely related and both influenced by sample size (Ott & Hoffmann, 1988), also informed the decision. The regression function used is given below.

$$HDI_t = \gamma_0 + s(NPL_t) + \delta_t \dots \dots \text{Equation (1)}$$

Where HDI_t Is the Human Development Index at time t, NPL_t Are the Non-performing loans at time t? δ_t , is the error term, and $s(\cdot)$ again represents a smooth, non-linear function.

Analysis and Discussion

```

LinearGAM
=====
Distribution:      NormalDist Effective DoF:      7.6483
Link Function:    IdentityLink Log Likelihood:    -160.0171
Number of Samples: 35 AIC:      337.3307
                  AICc:      343.9134
                  GCV:      61.9637
                  Scale:     38.1967

Pseudo R-Squared:      0.3189

Feature Function      Lambda      Rank      EDoF      P > x      Sig. Code
=====
s(0)                  [0.6]      20       7.6      9.92e-02    .
intercept              1         1        0.0      1.11e-16    ***
Significance codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Botswana Generalized Linear Models (GLMs), Results

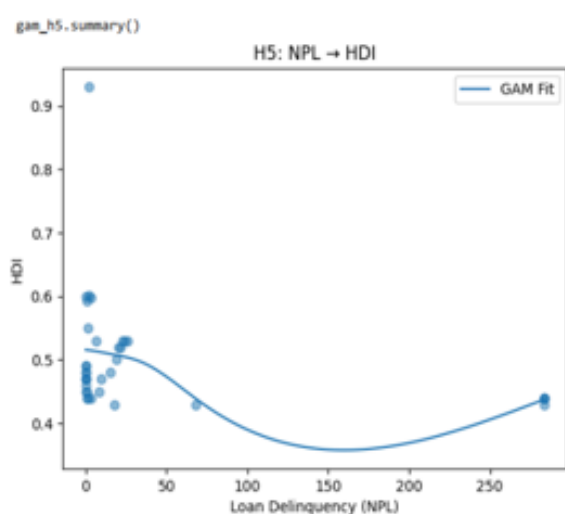
```

LinearGAM
=====
Distribution:      NormalDist Effective DoF:      3.9111
Link Function:    IdentityLink Log Likelihood:    -1759.82
Number of Samples: 35 AIC:      3529.4622
                  AICc:      3531.4581
                  GCV:      0.0102
                  Scale:     0.0082
                  Pseudo R-Squared: 0.0912

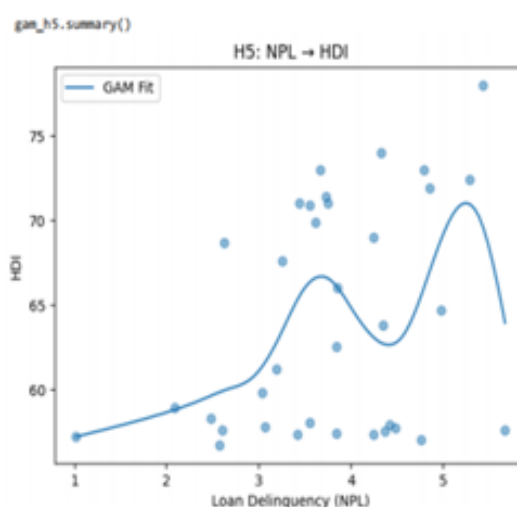
Feature Function      Lambda      Rank      EDoF      P > x      Sig. Code
=====
s(0)                  [0.6]      20       3.9      6.89e-04    ***
intercept              1         1        0.0      4.05e-06    ***
Significance codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Zimbabwe Generalized Linear Models (GLMs), Results



Botswana Partial Dependence Plot (a)



Zimbabwe Partial Dependence Plot (b)

Unravelling the intricacies of Loan Delinquency and Household Financial Well-being in Botswana and Zimbabwe. This analysis examines the nuanced relationship between Loan Delinquency (non-performing loans, NPLs) and Household Financial Well-being (HFWB), as proxied by the Human Development Index (HDI), in Botswana and Zimbabwe. Utilizing Generalized Additive Models (GAMs), the findings present both theoretically consistent and strikingly counterintuitive insights, underscoring the imperative for context-specific interpretation. In Botswana, the direct path from NPLs to HDI yields a highly statistically significant positive coefficient of 2.0223 ($p=0.001$). This finding is profoundly counterintuitive, challenging established economic theories, including Financial Intermediation Theory, Household Finance Theory, and Financial Stability Frameworks, which posit that rising loan delinquency has a detrimental impact on household financial well-being. Further elucidation through the partial dependence plot for Botswana reveals a complex, non-linear trajectory. While an initial increase in NPLs (from

near 0 to 10-20) corresponds to a decline in HDI, aligning with theoretical expectations of financial distress, a perplexing phenomenon emerges at extremely high NPL values (above 180) where the GAM fit indicates a rise in HDI. This paradoxical upward trend, despite the scarcity of data points at these extremes, strongly suggests that the aggregate HDI measure might not fully capture the micro-level financial distress induced by NPLs. Several plausible explanations for this unexpected positive association in Botswana warrant consideration. HDI's comprehensive nature, encompassing life expectancy, education, and income, may obscure the direct negative effects of NPLs. Concurrent improvements in health or education, perhaps driven by other development initiatives, could lead to a positive overall correlation with the HDI. Credit expansion and Financial inclusion are such that the rise in NPLs could be a by-product of increased credit access for previously underserved populations. Even with defaults, initial access to housing, business capital, or education financing might contribute to an overall improvement in aspects of their HDI before

the full ramifications of delinquency manifest at an aggregate level. The temporal relationship between NPL measurement and HDI components, coupled with Botswana's robust financial sector and regulatory framework, might imply that NPLs, though present, are effectively managed and do not translate into severe systemic effects on HDI as might be observed in less stable economies. The current model may be susceptible to omitted variable bias, whereby unmodeled factors that positively influence HDI are inadvertently correlated with NPLs. Unique economic cycles or policy interventions in Botswana may have produced atypical dynamics among these variables. The significant yet counterintuitive positive relationship warrants further investigation through qualitative analysis of financial sector development and socio-economic policies, reassessment of HFWB measurement, additional control variables, and exploration of nonlinear or lagged effects. Additionally, the findings for Botswana did not align with the classical economic postulate that NPLs invariably undermine household financial well-being (Uwuigbe, Jafaru, & Ajayi, 2012). Instead, the analysis suggests that changes in NPLs alone may not reliably signal prospective shifts in household financial well-being in Botswana. This unexpected association may be attributed to a confluence of institutional and market developments during the review period, which coincided with a sustained accumulation of household debt (Cecchetti, Mohanty, & Zampolli, 2011). Botswana, like many economies, progressively liberalized its financial markets, systematically removing lending restrictions and expanding borrowing opportunities for households. This liberalization, coupled with advancements in financial theory and

information technology, spurred significant financial innovation. The enhanced ability to price complex financial products facilitated their proliferation, and a prevailing sense of economic stability, characterized by low inflation, encouraged both increased household borrowing and lender participation (Borio, Disyatat, & Rungcharoenkitkul, 2019). Furthermore, tax policies, particularly preferential treatment of interest payments, such as generous mortgage interest relief and implicit guarantees, may have inadvertently contributed to rising household indebtedness, even if they do not fully explain its rapid acceleration (Cecchetti, Mohanty, & Zampolli, 2011; Caballero, Farhi, & Gourinchas, 2017). These findings imply that, at moderate levels and in the short term, household debt can unexpectedly enhance welfare and foster growth, consistent with prior research (Cecchetti, Mohanty, & Zampolli, 2011).

However, this contrasts sharply with a substantial body of literature that consistently links loan delinquency to detrimental impacts on household life satisfaction (Grable & Joo, 2006; Hair, Black, Babin, Anderson, & Tatham, 2008; Elliott & Nam, 2013; Hunter & Heath, 2017; Kim & Henager., 2017; Mori, Nyantori, & Olomi, 2017). This divergence may stem from contextual specificities, such as variations in national economic structures or differing definitions of loan delinquency across studies. The results also reveal a more complex, multidimensional dynamic of household financial well-being, suggesting that a purely quantitative approach is insufficient and requires qualitative inquiry. Furthermore, the study indicates that families grappling with economic downturns often resort to public welfare for

support (Kim & Henager, 2017), signifying underlying material hardship where basic needs (food, clothing, healthcare) are met through borrowing (Mimura & Griffiths, 2008; Rios & Zautra, 2011). Consequently, the study underscores that both loan delinquency and household financial well-being are complex, multidimensional constructs that require assessment using a broader set of measures beyond traditional income-based poverty thresholds (Iceland & Bauman, 2007). Continuous examination of economic hardship, encompassing challenges related to food, housing, healthcare, education, and bankruptcy (Hirai & Ikemoto, 2016), is crucial for a nuanced understanding of families' experiences in Botswana, particularly in the aftermath of worsening economic conditions. To reconcile Botswana's counterintuitive positive association between NPLs and HDI, future research must meticulously examine the scale and nature of financial inclusion initiatives and their initial benefits on specific HDI components, even amid rising delinquency. Concurrently, a deeper investigation into Botswana's robust financial sector, its NPL management strategies, and the evolution of its regulatory frameworks is crucial for understanding how systemic risks were potentially mitigated. Furthermore, disaggregating HDI components, analysing income distribution shifts, and accounting for the influence of key economic drivers like the diamond sector, fiscal policies, and social safety nets, alongside the effects of major policy interventions and external shocks, will provide the nuanced contextual understanding necessary to reconcile these empirical findings with established economic theory. For Zimbabwe, the direct path from NPLs to HDI yields a negative coefficient of -0.0001, but critically, with a p-value of 0.296, indicating a lack of statistical significance. While the negative

direction is consistent with theoretical predictions that NPLs undermine HFWB, the lack of statistical significance suggests that, within this model, formal loan delinquency does not exert a detectable influence on broader human development in Zimbabwe. The partial dependence plot for Zimbabwe further complicates the narrative, displaying a highly oscillating and predominantly counterintuitive relationship between NPL and HDI. The curve exhibits an increase in HDI at both very low (1 to 3.5) and higher (4.5 to 5.5) NPL values, interspersed with a period of decline. This erratic behaviour reinforces the conclusion that a robust, theoretically consistent relationship is absent in this context. Several factors likely contribute to this lack of statistical significance and the perplexing plot dynamics. Zimbabwe's pervasive macroeconomic instability, including hyperinflation and currency crises, likely overshadows the impact of formal sector NPLs on aggregate HDI. These systemic shocks likely exert a far greater and more immediate influence on broad measures of human development. A substantial portion of Zimbabwe's economic activity occurs within the informal sector. Formal NPL statistics may not adequately capture the financial health of a significant segment of the population, resulting in a weak or non-significant relationship with a broad aggregate measure such as the HDI. In an environment of extreme economic distress, the components of HDI may not be sufficiently sensitive to reflect the nuanced impact of formal financial sector issues like NPLs. The quality and consistency of NPL and other financial data in a volatile economic environment such as Zimbabwe's could contribute to a lack of statistical significance. Even if a negative effect truly exists, its magnitude might be too small to

be statistically detected given the data and model limitations. In conclusion, for Zimbabwe, the study finds no statistically significant impact of formal loan delinquency on household financial well-being (proxied by HDI). This suggests that, in a context marked by profound economic volatility and a large informal sector, other, more dominant macroeconomic forces dictate the trajectory of human development. Further research using more granular data or alternative modelling approaches is crucial to fully elucidate this complex relationship within Zimbabwe's unique economic landscape.

Implications and Limitations

This study challenges the conventional view that loan delinquency directly undermines household financial well-being in Botswana and Zimbabwe, despite economic growth. The contrasting country experiences underscore how institutional strength, robust regulation, and macroeconomic stability critically mitigate the adverse effects of loan delinquency. Ultimately, achieving sustainable household financial health necessitates not only economic growth but also proactive credit risk management and financial resilience strategies, demanding further qualitative and quantitative scrutiny and refinement of well-being measurements to account for omitted variables and non-linear dynamics.

REFERENCES

Adeola, O., & Ikpesu, F. (2016). An empirical investigation of the impact of bank lending on agricultural output in Nigeria: A vector autoregressive (VAR) approach. *The Journal of Developing Areas*, 50(6), pp.89-103.

Agić, Z., & Jeremić, Z. (2018). Macroeconomic and specific banking determinants of nonperforming loans in Bosnia and Herzegovina. *Industrija*, 46(1).

Ahamada, I., & Flachaire, E. (2010). *Non-parametric econometrics*. OUP Catalogue.

Ajanthan, A. (2013). The Relationship between Dividend Payout and Firm Profitability: A Study of Listed Hotels and Restaurant Companies in Sri Lanka. *International Journal of Scientific and Research*, 3(6):, 1- 6.

Akee, R., Stockly, S., Darity Jr, W., Hamilton, D., & Ong, P. (2017). The role of race, ethnicity and tribal enrolment on asset accumulation: an examination of American Indian tribal nations. *Ethnic and racial studies*, , 40(11), pp.1939-1960.

Ando, A., & Modigliani, F. (1963). The "life cycle" hypothesis of saving: Aggregate implications and tests. *The American economic review*,, 53(1), 55-84.

Bagwell, M. M., & Bush, H. A. (2000). Improving health promotion for blue-collar workers. *Journal of nursing care quality*,, 14(4), 65-71.

Baradaran, M. (2015). *How the other half banks: Exclusion, exploitation, and the threat to democracy*. Harvard University Press.

Belsley, D. K., & Welsch, R. (2005). *Regression diagnostics: Identifying influential data and sources of collinearity*. John Wiley & Sons.

Bernthal, M. J., Crockett, D., & Rose, R. L. (2005). Credit cards as lifestyle facilitators. *Journal of Consumer Research*, , 32(1), 130-145.

- Bieker, R., & Yuh, Y. (2015). Homeownership and financial strain following the collapse of the housing market: A comparative study on loan delinquencies between black and white households. *Journal of Financial Counseling and Planning*, 26(1), pp.79-93.
- Blázquez, M., Budría, S., & Moro-Egido, A. (2021). Job insecurity, debt burdens, and individual health. *Review of Income and Wealth*, 67(4), pp.872-899.
- Blumberg, B., Cooper, D., & Schindler, P. (2014). *EBOOK: Business research methods*. McGraw Hill.
- Bolibok, P. (2018). The Macroeconomic Drivers Of Household Debt-To-Income Ratio: An Evidence Frome The Oecd Countries. *Copernican Journal of Finance & Accounting*, 7(2), pp.29-41.
- Borio, C., Disyatat, P., & Rungcharoenkitkul, P. (2019). What anchors for the natural rate of interest?.
- Bridges, S., & Disney, R. (2004). Use of credit and arrears on debt among low-income families in the United Kingdom. *Fiscal Studies*, 25(1), pp.1-25.
- Brown, S., & Taylor, K. (2008). Household debt and financial assets: evidence from Germany, Great Britain and the USA. *Journal of the Royal Statistical Society Series A: Statistics in Society*, 171(3), pp.615-643.
- Caballero, R., Farhi, E., & Gourinchas, P. (2017). The safe assets shortage conundrum. *Journal of economic perspectives*, 31(3), pp.29-46.
- Cameron. (2022). The measurement of human growth. In *Human growth and development*. Academic Press., (pp. 317-345).
- Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI. *Economic Modelling*, 31, 672-683.
- Cecchetti, S., Mohanty, M., & Zampolli, F. (2011). The real effects of debt.
- Célérier, C., & Matray, A. (2017). Public Health Insurance and Access to Credit. (No. 2017-3).
- Chen, G., Rasmussen, S., Reille, X., & Rozas, D. (2010). Indian microfinance goes public: The SKS initial public offering. *Focus Note*, 65.
- Churchill, G., & Iacobucci, D. (2006). *Marketing research: methodological foundations* (Vol. 199, No. 1). New York: Dryden Press.
- Cohen, J. C., & Aiken, L. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences*. Routledge.
- Colin, C., & Trivedi, P. K. (2005). *Microeconometrics Methods and Applications*.
- Comim, F. (2016). Beyond the HDI? Assessing alternative measures of human development from a capability perspective. UNDP.
- Costanza, R., Daly, L., Fioramonti, L., Giovannini, E., Kubiszewski, I., Mortensen, L. F., & Wilkinson, R. (2016). Modelling and measuring sustainable wellbeing in connection with the UN Sustainable Development Goals. *Ecological Economics*, 130, 350-35.
- Curak, M., Pepur, S., & Poposki, K. (2013). Determinants of non-performing loans—evidence from Southeastern European banking

- systems. Banks & bank systems, (8, Iss. 1), pp.45-53.
- Deidda, M. (2015). Economic hardship, housing cost burden and tenure status: Evidence from EU-SILC. . *Journal of family and economic issues*,, 36, pp.531-556.
- Di Maggio, M., Kermani, A., Keys, B. J., Piskorski, T., Ramcharan, R., Seru, A., & Yao, V. (2017). Interest rate pass-through: Mortgage rates, household consumption, and voluntary deleveraging. . *American Economic Review*, 107(11), 3. 550-3588.
- Dreher, A. (2006). IMF and economic growth: The effects of programs, loans, and compliance with conditionality. . *World Development*, , 34(5), pp.769-788.
- Duesenberry, J. S. (1949). Income, saving, and the theory of consumer behavior.
- Dunkelberg, W. C., & Stafford, F. P. (1971). Debt in the consumer portfolio: Evidence from a panel study. . *The American economic review*,, 61(4), 598-613.
- Duygan-Bump, B., & Grant, C. (2009). Household debt repayment behaviour: what role do institutions play? *Economic Policy*, 24(57), pp.108-140.
- Elliott, W., & Nam, I. (2013). Is student debt jeopardizing the short-term financial health of US households? . *Federal Reserve Bank of St. Louis Review*, 95(September/October 2013).
- Faber, M. B., & D'Mello, S. (2018). An automated behavioral measure of mind wandering during computerized reading. . *Behavior Research Methods*, , 50, pp.134-150.
- Ferne, B. G., & Wright, M. (2008). 21st Century pavement design and maintenance of the English road network. In *Efficient Transportation and Pavement Systems: Characterization, Mechanisms, Simulation, and Modeling*. CRC Press., (pp. 823-838). .
- Friedline, T. C., & Morrow, S. (2021). Families' financial stress & well-being: The importance of the economy and economic environments. . *Journal of Family and Economic Issues*, , 42, pp.34-51.
- Friedman, M. (1957). The permanent income hypothesis A theory of the consumption function . *Princeton University Press*, (pp. 20-37): .
- George, G., Maughan-Brown, B., Beckett, S., & Evans, M. (2019). An examination of men's wealth and age disparate partnerships in South Africa: A nationally representative cross-sectional survey. . *Sexuality & Culture*, , 23, pp.45-56.
- Grable, J. E., & Joo, S.-H. (2006). Student racial differences in credit card debt and financial behaviors and stress. *College Student Journal*,. 40(2), 400-409.
- Grullon, G., Michaely, R., & Swaminathan, B. (2002). Are Dividend Changes a Sign of Firm Maturity? *The Journal of Business*,, 75(3): , 387-424.
- Habibi, F., Habibi, M., Gharavinia, A., Mahdavi, S., Akbarpour, M., Baghaei, A., & Emami, M. (2017). Quality of life in inflammatory bowel disease patients: A cross-sectional study. *Journal of Research in Medical Sciences*,, 22(1), p.104.

- Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2008). *Multivariate Data Analysis* (6th Eds) Pearson Prentice Hall. New Jersey.
- Hirai, T. C., & Ikemoto, Y. (2016). Happiness and human development: A capability perspective. *Journal of International Development*, 28(7), pp.1155-1169.
- Hunter, J. L., & Heath, C. J. (2017). The Relationship between Credit Card Use Behavior and Household Well-Being during the Great Recession: Implications for the Ethics of Credit Use. *Journal of Financial Counseling and Planning*, 28(2), 213-224.
- Iceland, J., & Bauman, K. (2007). Income poverty and material hardship: How strong is the association?. *The Journal of Socio-Economics*, 36(3), pp.376-396.
- Imbens, G., & Rubin, D. (2010). Rubin causal model. In *Microeconometrics*. London: Palgrave Macmillan UK., (pp. 229-241).
- Imbierowicz, B., & Rauch. (2014). The relationship between liquidity risk and credit risk in banks. *Journal of Banking & Finance*.
- Isenhower, L. U., & Saffman, M. (2010). Demonstration of a neutral atom controlled-NOT quantum gate. *Physical review letters*, 104(1), p.010503.
- Jefferis, K., von Rudloff, L., Kenewendo, B., Sigwele, H., Tlali, B., & Moyo, T. (2012). Status of Agricultural and Rural Finance in Botswana. .
- Jian Xiao, J., & Yao, R. (2014). Consumer debt delinquency by family lifecycle categories. *International Journal of Bank Marketing*, 32(1), 43-59. .
- Keese, M., & Schmitz, H. (2014). Broke, ill, and obese: Is there an effect of household debt on health? *Review of Income and Wealth*, 60(3), pp.525-541.
- Kempson, E., & Collard, S. (2021). *Developing a vision for financial inclusion*. Bristol, University of Bristol for friends Provident.
- Keynes, J. M. (1936). *The general theory of employment, interest and money*. Kessinger Publishing.
- Kim, & DeVaney. (2001). The determinants of outstanding balances among credit card revolvers. *Financial Counseling and Planning*, 12(1), 67-77.
- Kim, J., Garman, E. T., & Sorhaindo, B. (2003). Relationships among credit counseling clients' financial wellbeing, financial behaviors, financial stressor events, and health. *Journal of Financial Counseling and Planning*, 14(2).
- Kim, K., & Wilmarth, M. (2016). Government subsidies and household debt burden after the Great Recession. *Journal of Family and Economic Issues*, 37, pp.349-358.
- Kim, T. K., & Lee, J. (2019). Comparison of international guidelines for noninvasive diagnosis of hepatocellular carcinoma: 2018 update. *Clinical and molecular hepatology*, 25(3), p.245.
- Kim, W., & Henager. (2017). Poverty Levels and Debt Indicators Among Low-Income Households Before and After the Great Recession.
- Kinnear, K. (1993). Generality and Difficulty in Genetic Programming: Evolving a Sort. In *ICGA* (pp. 287-294).

- Kowalczyk, S. (2017). Modelling the research data lifecycle. . *International Journal of Digital Curation*, 12(2), pp.331-361.
- Lee, J. P., & Nam, J. (2018). SampleCNN: End-to-end deep convolutional neural networks using very small filters for music classification. . *Applied Sciences*, , 8(1), p.150.
- Lusardi, A., & Mitchell, O. (2014). The economic importance of financial literacy: Theory and evidence. *American Economic Journal: Journal of Economic Literature*, 52(1), pp.5-44.
- Magri, S. (2007). Italian households' debt: the participation to the debt market and the size of the loan. . *Empirical Economics*, , 33(3), 401-426.
- Malhotra, Y., & Galletta, D. (1999). Extending the technology acceptance model to account for social influence: Theoretical bases and empirical validation. . In *Proceedings of the 32nd annual Hawaii international conference on systems sciences*. 1.
- Meeker, L., & Gray, L. (1987). A note on non-performing loans as an indicator of asset quality. *Journal of banking & finance*, 11(1), pp.161-168.
- Meniago, C., Mukuddem-Petersen, J., Petersen, M. A., & Mongale, I. P. (2013). What causes household debt to increase in South Africa? . *Economic Modelling*, 33, 482-492.
- Mimura, C., & Griffiths, P. (2008). A Japanese version of the Perceived Stress Scale: cross-cultural translation and equivalence assessment. . *BMC psychiatry*, , 8, pp.1-7.
- Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An interpretation of cross-section data. *Franco Modigliani*. 1(1), pp.388-436.
- Mohamed, S., Abd Hamid, M., Hosin, H., & Md Isa, M. (2021). Non-performing loans issues in Malaysian banking industry. *International Journal of Academic Research in Business and Social Sciences*, 11(3), pp.877-891.
- Montgomery, R. (2001). A new solution to the three-body problem. *differential equations*, . 1001, p.d2xi.
- Mori, N., Nyantori, T., & Olomi, D. (2017). Effects of Clients' Literacy on Default and Delinquency of Savings and Credit Co-operative Societies in Tanzania. *Business Management Review*, 19(2), 1-12.
- Nissan, E., & Naghshpour, S. (2014). Comparing US regions for selected economic and financial variables. . *Journal of Economics and Finance*, , 38, pp.528-540.
- Nissim, D., & Ziv, & A. (2001). Dividend Changes and Future Profitability. *The Journal of Finance*, 56, 2111-2133.
- OECD. (2008). Outlook, A.A., OECD-F.
- Okatch, Z. (2012). Determinants of income inequality in Botswana: A regression-based decomposition approach. Master's thesis, University of Western Australia.
- Ott, K., & Hoffmann, H. (1988). Evaluation of the bias of the isotonic regression. *Communications in Statistics-Simulation and Computation*, . 17(3), pp.745-764.
- Parsons, B., & Naghshpour, S. (2023). Panel data analysis of internal conflict and income inequality. . *European Journal of Government*

- and Economics (EJGE), , 12(1), pp.79-101.
- Perry, C. (1998). Processes of a case study methodology for postgraduate research in marketing. . European journal of marketing,, 32(9/10), pp.785-802.
- Plano Clark, V. (2017). Mixed methods research. . The Journal of Positive Psychology, , 12(3), pp.305-306.
- Pop, I., Chicu, N., & Răduțu, A. (2018). Non-performing loans decision making in the Romanian banking system. Management & Marketing, 13(1), pp.761-776.
- RBZ. (2021). Microfinance Quarterly Industry Report,. Harare: Bank Supervision Division.
- Remenyi, D. S., & Williams, B. (1998). Doing research in business and management: an introduction to process and method.
- Rhine, S. D., Greene, W., & Perlmeier, E. (2016). Savings account ownership during the great recession. . Journal of Family and Economic Issues, , 37, pp.333-348.
- Rios, R., & Zautra, A. (2011). Socioeconomic disparities in pain: the role of economic hardship and daily financial worry. . Health Psychology, , 30(1), p.58.
- Rothstein, J., & Rouse, C. (2011). Constrained after college: Student loans and early-career occupational choices. Journal of Public Economics, 95(1-2), pp.149-163.
- Rothstein, J., & Valletta, R. (2017). Scraping by: Income and program participation after the loss of extended unemployment benefits. . Journal of Policy Analysis and Management, , 36(4), pp.880-908.
- Russell-Smith, J. Y., & Gill, A. (2007). Bushfires 'down under': patterns and implications of contemporary Australian landscape burning. I.
- Sanderson, A. C., Mokumako, T., Mukarati, J., & Le Roux, P. (2025). Modelling Loan Defaults by Sugarcane Farmers. International Journal of Economics and Financial Issues, 15(3), p.262.
- Soman, D., & Cheema, A. (2002). The effect of credit on spending decisions: The role of the credit limit and credibility. . Marketing Science,, 21(1), 32-53.
- Tabachnick, B., & Fidell, L. (2007). Experimental designs using ANOVA (Vol. 724). Belmont, CA: Thomson/Brooks/Cole.
- Thaicharoen, Y., Ariyaprichya, K., & Chuched, T. (2004). Bank of Thailand. 2004.
- Uwuigbe, U., Jafaru, J., & Ajayi, & A. (2012). the Relationship between Dividend Payout and Firm Performance: A Study of Listed Companies in Kenya. European Scientific Journal,, 8(9):, 1857 - 7881.
- Villar, C. P.-B., & Ghauri, P. (2020). Learning from foreign operation modes: The virtuous path for innovation. . BRQ Business Research Quarterly, , 23(2), pp.159-171.
- Wagner, G., Frick, J., & Schupp, J. (2007). Enhancing the power of household panel studies: The case of the German Socio-Economic Panel Study (SOEP). Schmollers Jahrbuch, 127(1), pp.139-169.
- WDI. (2010). World Bank Development Indicators.
- Western, B. (1995). Concepts and suggestions for robust regression analysis. . American Journal of Political Science, , pp.786-817.

- WHR. (2024). The World Happiness Report.
- Williams, M. G., & Kurkiewicz, D. (2019). Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research, and Evaluation*, 18(1), p.11.
- Williams, M. G., & Kurkiewicz, D. (2013). Practical assessment, research & evaluation. *Journal Articles*, 18, pp.1-14.
- Xiao, J. J., & Yao, R. (2011). Debt holding and burden by family structure in 1989-2007. *Networks financial institute working paper*.