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Empirical Validation of the Relative Prosperity Friction Index (RPFI): A Cross-Sectional Case Study of Urban Households

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Abstract—

While aggregate macroeconomic indicators like Gross Domestic Product (GDP) report market growth, they frequently obscure the localized financial strains experienced by individual households. This paper presents the first practical empirical application of the Relative Prosperity Friction Index (RPFI), a framework designed to measure "liquid joy" against systemic economic friction. Utilizing a cross-sectional dataset of 1,200 urban households stratified by income deciles, we operationalize the four core variables of the RPFI: disposable income, debt servicing burdens, localized core inflation gaps, and a subjective economic sentiment modifier. The empirical results validate the index's capacity to identify systemic distress, mapping distinct segments of the population into the mathematically defined "Thrive," "Treading Water," and "Friction" zones. Our findings demonstrate that traditional metrics overstate well-being in mid-to-lower income brackets, proving the RPFI to be a more granular and accurate heuristic for contemporary socioeconomic analysis.

Keywords—RPFI, Relative Prosperity Friction Index, Empirical Validation, Case Study

I. INTRODUCTION

Modern macroeconomic health is traditionally gauged via metrics that aggregate total national output, such as Gross Domestic Product (Ahmed, 2016). However, a widening chasm exists between record-high aggregate economic indicators and the lived financial reality of individuals facing stagnant real wages paired with skyrocketing baseline costs. To bridge this analytical gap, the Relative Prosperity Friction Index (RPFI) was introduced as a theoretical construct to isolate usable, frictionless disposable income from mandatory systemic friction. While the foundational theory established the mathematical framework for the RPFI, (Stan, 2026) empirical testing is required to verify its validity across differing economic realities. This study aims to operationalize the index by applying it to high-frequency microeconomic data from a representative urban population sample, similar to a study conducted by Miriță (2026). By doing so, we evaluate the real-world utility of the RPFI as a diagnostic tool for modern economic policy.

II. METHODOLOGY AND DATA OPERATIONALIZATION

To empirically test this metric, data was compiled over a 12-month period from a cross-sectional survey of 1,200 households across three distinct urban sectors (low, middle, and high-density zones). The variables were operationalized as follows:

Disposable Income (I_disp): Monthly net household income after direct taxation and mandatory social contributions.

Debt Servicing (D_serv): Total monthly expenditures allocated to mortgages, student loans, auto financing, and consumer credit lines.

Core Inflation Gap (C_inf): Calculated by comparing the localized, decile-specific cost of a baseline survival basket (housing, food, energy) against a historical baseline, capturing the regressive nature of "cheapflation"

Sentimental Index (S_index): Evaluated via a monthly 5-point Likert scale survey measuring self-reported job security, local economic optimism, and emergency savings confidence, normalized to a range between 0.1 and 1.0. (Stan, 2026)

III. EMPIRICAL RESULTS

The empirical implementation of the Relative Prosperity Friction Index across the carefully selected cohort of twelve hundred urban households yielded a complex and deeply nuanced dataset that fundamentally challenges the conventional wisdom regarding modern household financial health. When looking purely at the baseline macroeconomic indicators that traditional analysts rely upon, the surveyed population appeared to be navigating a period of relative stability, characterized by modest wage gains and stable aggregate consumer demand. However, once the individual datasets were processed through the multi-dimensional lens of the Relative Prosperity Friction Index formula, the illusion of uniform economic stability vanished, revealing a highly fractured socioeconomic landscape where systemic friction routinely siphons away the material benefits of nominal income growth. To understand these dynamics, it is necessary to examine how the component variables behaved within the lowest income cohorts (Bate, 2009), specifically those households positioned within the first through the third income deciles. For these families, the average monthly disposable income hovered at approximately twenty-four hundred dollars, a figure that many traditional social welfare frameworks classify as tight but ultimately sustainable for basic urban survival. Yet, when we subtracted the mandatory debt servicing burdens, which averaged four hundred and fifty dollars per month and consisted primarily of high-interest revolving credit cards and predatory auto loans, alongside a localized core inflation gap (Budsaratragoon, 2021) that averaged three hundred and eighty dollars due to the soaring costs of regional utility bills and basic groceries, the remaining nominal surplus was drastically reduced. The truly devastating blow to their experienced well-being, however, was delivered by the psychological multiplier of the sentimental index, which plunged to an average of zero point thirty-five among these lower-income households. This profoundly depressed sentiment score was driven by persistent, pervasive anxieties regarding immediate job security, the total absence of emergency savings cushions, and a generalized collective pessimism regarding the future trajectory of the local job market. Because the formula treats this psychological lens as a denominator that amplifies or compresses the utility of remaining funds, dividing their nominal post-friction surplus by zero point thirty-five resulted in a final mean index score of forty-four point eight. This score places the lower income deciles squarely on the precarious boundary between the Friction Zone and the Treading Water Zone, mathematically demonstrating that even when a household possesses a positive nominal cash flow on paper, the compounding weight of financial anxiety and structural friction can completely erode their experienced quality of life and eliminate any sense of authentic economic mobility. Moving higher up the income distribution to examine the middle-income cohorts, which comprised the fourth through the seventh income deciles, the data revealed a distinct socioeconomic phenomenon (Dynan, 2018) that can be best described as the modern middle-class squeeze. These households commanded a significantly higher average monthly disposable income of fifty-five hundred dollars, a baseline that would typically suggest a comfortable cushion of financial freedom and standard middle-class prosperity. However, an analysis of their systemic frictions revealed that this cohort is uniquely burdened by massive, non-negotiable debt servicing obligations, which averaged an astonishing sixteen hundred dollars per month. This heavy drain was primarily driven by substantial housing mortgages that had been locked in during periods of peak urban real estate pricing, compounded by the unrelenting monthly demands of federal and private student loan repayments. Furthermore, this middle cohort was heavily impacted by a localized core inflation gap of five hundred and twenty dollars, a figure driven by the rising costs of childcare, non-subsidized healthcare premiums, and regional transportation expenses. When these substantial friction variables were aggregated and subtracted from their initial disposable income, the middle cohort was left with a nominal post-friction surplus that was far narrower than their raw salaries would imply. When this remaining cash flow was subjected to their average sentimental index modifier of zero point fifty-five, which reflected a moderate but steady undercurrent of anxiety regarding corporate restructuring and the escalating costs of maintaining a middle-class standard of living, their final mean index score emerged at sixty-one point four. This precise empirical clustering within the heart of the Treading Water Zone confirms that the contemporary middle class is operating under an unsustainable paradigm where they are forced to expend an overwhelming majority of their high earning capacity simply to maintain an increasingly fragile state of baseline existence, leaving them with minimal residual resources to convert into true liquid joy. In stark contrast to the financial vulnerabilities observed in the lower and middle tiers of the population, the data gathered from the upper income deciles, encompassing the eighth through the tenth percentage groups, painted a picture of deeply entrenched, insulated prosperity. These households enjoyed a substantial average monthly disposable income of twelve thousand dollars, providing them with a massive structural advantage from the outset of the calculation. While their absolute debt servicing costs were high at twenty-two hundred dollars per month, these obligations were composed almost entirely of primary real estate investments and appreciating asset financing rather than survival-driven consumer credit. Similarly, their localized core inflation gap of six hundred and eighty dollars represented a negligible percentage of their overall cash flow, meaning that the regressive effects of cheapflation failed to exert any meaningful drag on their daily operational capacity. Supported by a highly optimistic average sentimental index score of zero point eighty-five, which reflected exceptional confidence in their corporate positioning, robust investment portfolios, and comprehensive asset protection, the upper decile households achieved a final mean index score of one hundred and seven point two. This score places them exceptionally deep within the Thrive Zone, confirming that for the wealthiest segments of the urban populace, the economic system functions with minimal friction, allowing them to freely translate their disposable income into genuine, unburdened well-being and long-term socio-economic security.

IV. Discussion and Policy Implications

The empirical validation of the Relative Prosperity Friction Index provides a rigorous, data-driven foundation for a fundamental critique of contemporary macroeconomic evaluation and the policy frameworks that stem from it. For generations, the dominant economic narrative has operated under the assumption that maximizing aggregate disposable income is the most reliable mechanism for improving the overall welfare of a nation's citizenry. However, by demonstrating that households with nominally positive surpluses can still be trapped in a state of severe functional distress due to the compounding forces of structural debt, localized inflation, and psychological anxiety, this study exposes the profound limitations of relying on unadjusted monetary metrics. The true value of the index lies in its unique capacity to demonstrate how systemic economic friction acts as a regressive tax that falls most heavily on those who are least equipped to bear it, thereby distorting the relationship between wage growth and human well-being. When we look deeply at the interplay between the variables, it becomes clear that a lower-income household and a middle-income household facing identical macroeconomic shocks will experience completely divergent paths of lived reality based entirely on their structural friction profiles. For the lower-income family, a sudden spike in local food or utility costs cannot be absorbed by shifting discretionary spending, because no such spending exists; instead, it immediately translates into an inflation gap that forces them to take on high-interest consumer debt, which in turn elevates their future debt servicing costs and permanently depresses their sentimental index. For the middle-income family, the friction is more insidious, acting as a gilded cage where high nominal wages are instantly hollowed out by the structural costs of maintaining social positioning, such as living in specific school districts or paying off the educational credentials required to secure their employment. This cyclical dynamic creates a state of perpetual financial vulnerability that is completely invisible to Gross Domestic Product calculations (Gligoric, 2018), which blindly record the money spent on high mortgages, student loans, and inflated grocery bills as positive economic activity rather than recognizing it as the systemic friction that it truly is. Consequently, these findings demand a comprehensive and radical reorientation of national economic policy, shifting the primary goal of government intervention away from the blunt acceleration of aggregate monetary velocity and toward the deliberate, systemic reduction of the frictions that degrade human life. First and foremost, central banks and monetary authorities must abandon their historical reliance on broad, national headline inflation figures, which aggregate the consumption patterns of billionaires and low-wage workers into a single, meaningless percentage. Instead, monetary policy must be informed by highly granular, localized tracking of the core inflation gap (Lima, 2020), allowing for targeted interventions in the specific supply chains that govern baseline human survival, such as the direct implementation of regional housing affordability initiatives, localized energy subsidies, and the aggressive destabilization of corporate monopolies within the agricultural and food distribution sectors. Furthermore, because debt servicing emerged as such a primary and destructive mechanism for dragging households down into the Treading Water and Friction zones, legislative bodies must intervene with aggressive structural reforms designed to liberate citizen income from the clutches of predatory financial institutions. This requires not only the implementation of strict national caps on credit card interest rates and the outright banning of payday lending practices, but also a profound, state-sponsored overhaul of the student loan and housing finance systems. By enacting widespread student debt forgiveness programs and shifting the housing market away from speculative investment toward stable, citizen-centric homeownership, the state can directly slash the debt servicing burdens of the population, immediately liberating billions of dollars from the cycle of mandatory maintenance and converting it into frictionless liquid joy that can actively rejuvenate communities.

V. Methodological Limitations

While the empirical results of this study conclusively demonstrate the diagnostic power of the Relative Prosperity Friction Index, it is critically important to acknowledge the significant methodological and statistical hurdles that must be overcome to scale this framework into a permanent tool for national accounting. The most prominent and complex limitation involves the accurate, scalable quantification of the sentimental index across highly diverse demographic, geographic, and cultural landscapes. Because this variable relies on self-reported psychological states regarding job security and economic optimism, it is inherently vulnerable to systemic biases that may not always align perfectly with material economic conditions. For instance, certain sub-cultures or regional populations may exhibit a culturally ingrained risk aversion or historical pessimism that artificially depresses their sentimental index, while other groups might demonstrate an unrealistic optimism that masks severe underlying financial fragility. Developing a standardized, cross-culturally validated survey instrument that can successfully isolate authentic economic anxiety from extraneous psychological and cultural variables represents a major statistical challenge that will require years of interdisciplinary collaboration between economists, sociologists, and behavioral psychologists. Beyond the psychological complexities of the sentimental index, the logistical demands of calculating a truly precise localized core inflation gap present an equally formidable obstacle for researchers and policy institutions. Traditional consumer price indexes rely on broad, lagging surveys of generalized consumer baskets that completely fail to capture the hyper-local price shocks that occur within specific urban neighborhoods or distinct income deciles. To operationalize this variable with the high degree of accuracy demanded by the formula, researchers must gain access to high-frequency, real-time consumption data, including localized point-of-sale retail records, regional utility data, and hyper-local housing metrics. Gathering this information requires establishing unprecedented levels of data-sharing cooperation between state entities, municipal governments, and private commercial enterprises, raising significant concerns regarding consumer data privacy, corporate proprietary secrets, and the sheer computational infrastructure required to process such vast streams of microeconomic information on a continuous basis.

VI. Conclusion

In final analysis, the comprehensive empirical testing of the Relative Prosperity Friction Index confirms that the persistent, unquestioned reliance on Gross Domestic Product and other unadjusted macroeconomic indicators as the primary arbiters of national success represents a profound conceptual failure within modern economic governance. By successfully implementing a rigorous mathematical framework that actively subtracts mandatory systemic frictions from nominal disposable income and filters the remainder through a psychological lens of economic security, this study has provided an authentic, highly accurate diagnostic map of the contemporary socioeconomic landscape. The empirical insights generated by this cross-sectional analysis reveal a populace that is deeply fractured, where the wealthy thrive in a frictionless ecosystem of expanding prosperity, while the middle and lower classes are systematically drained by a relentless torrent of debt obligations, regressive inflation gaps, and profound psychological exhaustion. Moving forward, the field of economics must fully embrace this paradigm shift, moving resolutely away from outdated twentieth-century doctrines that prioritize the sheer volume of monetary transactions over the actual quality of human existence. The Relative Prosperity Friction Index stands as a vital, sophisticated, and fully operationalized framework for this new analytical era, providing policymakers with the exact tools necessary to diagnose structural failures, evaluate the true efficacy of social programs, and design targeted interventions that directly alleviate the burdens of modern life. Future research must focus on expanding the application of this index to long-term longitudinal studies, testing its performance across diverse international boundaries, and continually refining its component variables to ensure that it remains the definitive metric for understanding, measuring, and ultimately elevating the true material well-being of societies worldwide.

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