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(Review Article)

Analyzing behavioral economics in enhancing voluntary tax compliance in the us among self-employed informal sector workers

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Abstract

Voluntary tax compliance remains a significant challenge in the United States, particularly among self-employed workers operating within the informal sector. Traditional enforcement mechanisms—such as audits and penalties—often prove inefficient and costly in curbing tax evasion in this decentralized and under-regulated population. This paper explores how insights from behavioral economics can offer a more nuanced and cost-effective approach to fostering tax compliance. It begins by examining foundational behavioral economic principles, including loss aversion, social norm activation, mental accounting, and the power of framing, which collectively influence taxpayer decision-making beyond purely rational calculations. Drawing on empirical studies and experimental interventions from both domestic and international contexts, the paper highlights how behavioral nudges—such as personalized communication, moral reminders, simplified filing processes, and timely prompts—can improve compliance rates without increasing enforcement intensity. Special focus is given to the unique cognitive biases and economic realities of self-employed informal sector workers, including gig workers, freelancers, and sole proprietors, who often lack employer-based withholding systems and face complex tax filing requirements. The paper reviews IRS pilot programs and third-party research that reveal promising behavioral strategies tailored for this demographic. In narrowing its focus, the study proposes a framework for integrating behavioral tools into federal and state-level tax outreach programs targeting informal earners. Policy implications include the need for cross-agency collaboration, digital platform engagement, and privacy-conscious nudging mechanisms that respect autonomy while promoting civic duty. The paper concludes that behavioral economics offers a valuable, scalable supplement to traditional tax policy tools, capable of enhancing compliance and public revenue while preserving taxpayer trust and dignity.

Keywords: Behavioral Economics; Tax Compliance; Informal Sector; Self-Employment; IRS Nudges; Public Finance

1. Introduction

1.1. Contextualizing Tax Compliance Challenges in the U.S.

Tax compliance is essential for maintaining the fiscal health of governments, yet in the United States, voluntary compliance remains uneven, particularly among certain economic groups. The Internal Revenue Service (IRS) has estimated the annual tax gap—the difference between taxes owed and collected—at over $500 billion, a figure that undermines both government revenue and perceived fairness in the tax system [1]. While wage earners operating under third-party reporting systems (such as W-2 employees) generally demonstrate high compliance, this is not the case for taxpayers whose incomes are self-reported and unverified. The U.S. tax system largely relies on voluntary compliance, which is inherently influenced by perceptions of fairness, fear of audits, cognitive biases, and socioeconomic realities [2].

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1.2. Importance of Informal Sector and Self-Employed Populations

The informal sector, while traditionally associated with developing economies, has seen a growing footprint within the United States, particularly through the rise of gig economy platforms, freelance markets, and off-the-books labor arrangements. Approximately 60 million Americans engage in freelance or contract-based work, accounting for nearly 36% of the workforce [3]. These individuals, who include rideshare drivers, home-based entrepreneurs, and digital freelancers, often fall outside conventional payroll systems. Consequently, their income reporting, tax filing, and payment compliance are often inconsistent and prone to underreporting [4].

Self-employed individuals face distinct challenges: lack of withholding mechanisms, variable incomes, complex filing requirements, and limited access to advisory services. The informal nature of their earnings often translates to fragmented recordkeeping and reduced institutional engagement, further exacerbating non-compliance risks. Tax agencies, in response, have struggled to effectively reach and regulate this group using traditional tools [5].

1.3. Limitations of Traditional Tax Enforcement Mechanisms

Historically, U.S. tax compliance policy has emphasized audit-based deterrence, civil penalties, and information return systems. While these mechanisms work relatively well for salaried employees, they are less effective among self-employed or informal earners due to the absence of real-time third-party verification. Audit rates for individual returns have steadily declined over the past decade, especially for filers reporting less than $200,000, making enforcement increasingly reactive and selective [6].

Moreover, the administrative cost of auditing self-employed taxpayers is disproportionately high compared to the revenue it generates. For this demographic, fear of penalties often competes with short-term cash flow constraints and cognitive biases, such as discounting future obligations. Consequently, deterrence-based approaches tend to overlook the behavioral and psychological dynamics underlying tax decisions, particularly in decentralized, informal settings [7]. A one-size-fits-all strategy, focused narrowly on enforcement, fails to address the nuanced barriers facing these workers.

1.4. Rationale for Applying Behavioral Economics

Given the limitations of conventional compliance frameworks, behavioral economics offers a compelling alternative. Behavioral economics recognizes that individuals are not purely rational actors; rather, their financial decisions are shaped by heuristics, biases, social norms, and cognitive constraints [8]. In the context of tax compliance, this means that even when individuals understand their legal obligations, they may not act on them unless prompted, reminded, or socially motivated.

Insights from behavioral economics have been increasingly applied to public policy through mechanisms known as "nudges"—subtle interventions that influence decision-making without restricting choice [9]. For instance, simplification of tax forms, personalized reminders, and norm-based messages can significantly enhance compliance at a fraction of the cost of audits. Several IRS pilot programs have already demonstrated the potential of such behavioral interventions in improving payment rates among delinquent taxpayers [10]. Moreover, behavioral tools align well with the decentralized nature of the informal sector, offering scalable, low-friction solutions.

Importantly, applying behavioral economics to tax compliance also respects taxpayer autonomy and dignity. Unlike punitive approaches, nudges are generally non-intrusive and can be designed to promote a sense of civic responsibility. For self-employed and informal workers—who may already feel disconnected from formal institutions—such human-centered strategies are not only more effective but also more equitable [11].

1.5. Research Objectives and Scope

This paper aims to explore how behavioral economics can be systematically leveraged to improve voluntary tax compliance among self-employed informal sector workers in the United States. Specifically, it addresses the following research questions:

- What are the primary behavioral barriers to tax compliance for informal and self-employed individuals?
- Which behavioral interventions have shown the greatest efficacy in promoting compliance in similar populations?
- How can tax authorities incorporate these insights into policy design and implementation frameworks?

The scope of this research includes empirical analysis of U.S.-based behavioral interventions, comparative studies from international tax authorities, and synthesis of behavioral theory. The target population consists of self-employed and informal earners not covered by employer withholding, including but not limited to gig workers, sole proprietors, and freelance professionals [12].

This investigation draws on interdisciplinary perspectives, integrating public finance, psychology, behavioral economics, and administrative law. The aim is not to propose a singular intervention, but rather to outline a framework for behaviorally informed tax compliance strategies that can be adapted across contexts.

To understand how behavioral insights can improve voluntary tax compliance, it is essential first to explore the theoretical underpinnings of behavioral economics. Unlike neoclassical economics—which assumes individuals are rational utility maximizers—behavioral economics posits that decision-making is bounded by cognitive limitations, emotional influences, and context-dependent judgments [13]. These tendencies are particularly pronounced in environments of uncertainty, complexity, or temporal delay—all of which characterize the informal tax environment.

In the following section, the paper delves into the major behavioral concepts relevant to taxpayer decision-making, including loss aversion, social norm activation, mental accounting, and present bias. This theoretical foundation provides the lens through which real-world compliance behavior can be better understood, predicted, and influenced—particularly among self-employed individuals navigating the ambiguous and fluid terrain of informal economic activity.

2. Theoretical framework and literature review

2.1. Behavioral Economics and Tax Compliance

Traditional economic theory assumes that individuals behave rationally, acting in their own self-interest to maximize utility. In tax contexts, this means individuals are presumed to comply when the expected cost of non-compliance—fines, audits, penalties—exceeds the expected benefit of evasion. This deterrence model, based on Allingham and Sandmo's economic theory of income tax evasion, has long guided tax policy frameworks [6]. Yet, empirical evidence consistently shows that compliance rates often exceed what would be expected from purely rational cost-benefit calculations. Taxpayers frequently choose to comply despite minimal risk of detection or penalty. Such anomalies have led to a broader reconsideration of the psychological and social dimensions of tax behavior.

Behavioral economics responds to this gap by recognizing that individuals are not fully rational agents. Instead, they are subject to bounded rationality, relying on mental shortcuts (heuristics) to make decisions under uncertainty [7]. In tax compliance, individuals often misjudge the probability of audits or overweigh the cognitive burden of tax preparation. These bounded decision processes are compounded by behavioral biases such as present bias (overvaluing immediate rewards) and optimism bias (underestimating future obligations or penalties) [8].

Furthermore, behavioral insights demonstrate that decisions are not made in a vacuum; they are shaped by context, peer behavior, framing of options, and perceptions of fairness. For example, a taxpayer's willingness to comply may hinge less on economic incentives and more on whether they believe others are paying their fair share or whether the tax authority treats them respectfully [9].

Thus, while classical economics assumes tax behavior is an outcome of enforcement pressure, behavioral economics reframes it as a product of psychological, social, and contextual forces. This shift allows for more human-centric, cost-efficient interventions that go beyond punitive measures.

2.2. Key Behavioral Concepts Relevant to Tax Behavior

Several core behavioral concepts offer specific insight into how taxpayers make decisions—and how those decisions can be influenced through non-coercive means. One of the most widely observed is loss aversion, which posits that people experience the pain of losses more intensely than the pleasure of equivalent gains. In tax compliance, this means that taxpayers may be more responsive to messages that highlight what they stand to lose (e.g., penalties, future benefits, reputation) than what they might gain by being compliant [10].

Closely linked to this is the framing effect, where the way choices are presented—positively or negatively—influences decisions. A tax reminder that states "most people in your area pay their taxes on time" can increase compliance by leveraging descriptive social norms. Conversely, emphasizing penalties without context can induce anxiety or avoidance [11].

Mental accounting is another critical concept. Taxpayers often allocate income and expenses into different mental "buckets," which may lead them to perceive tax obligations as less urgent than other liabilities. This can be especially relevant for self-employed individuals who receive gross income and must later remit taxes, unlike salaried workers whose taxes are withheld automatically [12].

Another powerful behavioral lever is social norm activation. Humans are inherently social, and compliance increases when individuals believe their peers are also compliant. Research shows that norm-based messaging—especially personalized to neighborhoods or income brackets—can significantly influence behavior without coercion [13].

Finally, intrinsic motivation—the internal drive to act ethically or civically—can be harnessed to encourage voluntary compliance. When tax systems are perceived as fair, and authorities are seen as legitimate, individuals are more likely to comply voluntarily, even in the absence of enforcement [14].

These behavioral concepts form the basis for designing "nudges" that subtly guide taxpayer behavior. Importantly, they also support more empathetic public policy approaches, particularly for underserved or marginalized groups.

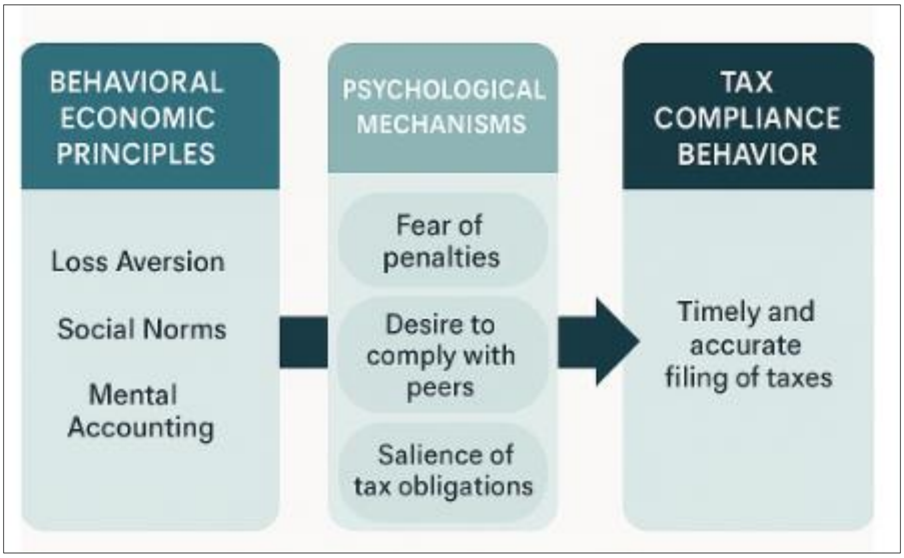

Figure 1 Conceptual framework linking behavioral economics to tax compliance behavior

2.3. Voluntary Tax Compliance in the Informal Sector

The informal sector in the United States is diverse, encompassing a wide range of workers including gig economy participants, sole proprietors, home-based service providers, and undocumented laborers. While their economic contributions are substantial, their relationship with the tax system is tenuous. Unlike salaried employees, informal workers often lack automatic payroll deductions, standardized income reporting, and institutional support for tax preparation [15].

These structural gaps are compounded by psychological and contextual factors. Informal workers often face income volatility, lack clarity on tax obligations, and exhibit high levels of distrust toward government institutions. In behavioral terms, they may be more prone to present bias, prioritizing immediate financial needs over future tax obligations [16]. Additionally, complex filing requirements and perceived procedural unfairness act as demotivators, further reducing voluntary compliance.

In international contexts, several governments have experimented with behavioral interventions targeting informal earners. In Guatemala, simple SMS reminders increased compliance among market vendors by framing tax as a shared civic duty. In Kenya, commitment devices—like pre-filing pledges—were used to reinforce intrinsic motivations [17]. These findings suggest that even among marginalized groups, behavioral nudges can shift compliance outcomes when tailored to local realities.

Within the U.S., the IRS has begun to recognize these challenges. Pilot programs involving behaviorally designed notices, personalized risk indicators, and simplified digital communication channels have shown promising results. One such initiative targeted freelance workers through an online tax prep tool that broke tax obligations into weekly “bites,” reducing mental accounting errors and improving on-time payment [18].

However, gaps remain. Many informal workers still operate outside formal banking or digital ecosystems. Others fear exposing themselves to scrutiny due to prior non-compliance or immigration concerns. These concerns highlight the need for behaviorally sensitive policy tools that do not rely on enforcement alone but instead engage informal earners respectfully, predictably, and transparently [19].

As such, voluntary compliance in the informal sector must be seen not merely as a legal issue, but as a behavioral one. Tax design for this population must integrate empathy, simplicity, and psychological realism, emphasizing fairness, trust-building, and gradual onboarding into the formal economy. These principles will be critical in shaping effective interventions.

3. Methodological considerations

3.1. Research Design

This study employs a qualitative, multi-source synthesis design anchored in case study methodology. The decision to focus on qualitative evidence stems from the need to understand the behavioral mechanisms, decision-making contexts, and institutional nuances that underlie voluntary tax compliance among self-employed and informal sector workers. Quantitative studies often underrepresent informal earners due to sampling limitations, while qualitative inquiry allows for richer, contextual interpretation of behavioral cues and motivations [11].

The design is informed by an exploratory multiple-case approach, allowing for triangulation across diverse evidence types. It incorporates case data from internal IRS behaviorally-informed outreach pilots, academic behavioral experiments, and cross-national tax compliance studies. The integration of these varied sources enhances generalizability without sacrificing contextual specificity [12].

The research also adopts principles from realist evaluation, which emphasize "what works, for whom, and under what circumstances"—a critical lens when dealing with informal economic actors who vary widely in socio-economic profile, trust in institutions, and tax knowledge [13]. By applying thematic synthesis to existing cases, the study moves beyond surface-level outcomes to uncover underlying cognitive, emotional, and situational determinants of behavior.

This methodological triangulation ensures that insights are not solely derived from one organizational or national lens. Instead, they reflect a convergence of insights from U.S.-based tax administrations, behavioral economic trials, and secondary literature on compliance psychology. The qualitative case study framework is therefore both flexible and robust, suitable for capturing the nuanced interactions between policy design, behavioral nudges, and informal tax behavior [14].

3.2. Data Sources

Three categories of data inform this study: (1) Internal and publicly available IRS pilot programs, (2) published behavioral intervention studies, and (3) curated secondary datasets from policy and research institutions.

The IRS data includes reports from randomized control trials (RCTs) targeting underreporting and late payment among gig workers, independent contractors, and Schedule C filers. Several pilot programs tested personalized letter formats, reminder framing, and simplified digital notices, yielding measurable differences in compliance behavior [15]. These data provide insight into message framing, demographic responsiveness, and administrative feasibility.

Academic behavioral intervention studies contribute further granularity. Field trials from institutions like Harvard, MIT, and the University of Chicago evaluated nudges ranging from loss-framed communications to moral suasion prompts. The studies offer robust empirical evidence on cognitive triggers, temporal discounting, and perceived legitimacy, particularly among marginalized populations [16].

Lastly, secondary datasets—such as Pew Research Center’s gig economy findings, the Tax Policy Center’s compliance metrics, and the National Bureau of Economic Research's working papers—offer demographic and attitudinal insights into the broader landscape of self-employed informal workers [17]. These are particularly valuable for profiling non-filers and low-visibility earners not captured in IRS administrative datasets.

Table 1 Summary of Key Data Sources and Behavioral Insights Extracted

Data Source	Type	Coverage	Key Behavioral Insights Extracted
World Bank Informal Sector Enterprise Surveys	Quantitative	Multiple LMICs	High perceived compliance burden and preference for cash transactions among informal workers
OECD Tax Morale Surveys	Quantitative + Qualitative	Global (including OECD and non-OECD)	Trust in government strongly correlates with willingness to comply voluntarily
IRS Gig Economy Compliance Reports	Administrative Data	United States	Many gig workers unaware of filing requirements; temporal discounting impacts quarterly payments
Kenya Revenue Authority (KRA) iTax Pilot Evaluation	Pilot Evaluation Data	Kenya	SMS nudges increased mobile filing rates by 22% during tax season
Behavioral Insights Team (BIT) Field Experiments	RCT/Experimental	UK, Nigeria, Colombia	Norm-based messages and simplification boosts tax compliance; framing effects matter significantly
South Africa National Informal Economy Dashboard	Mixed Methods	South Africa	Informal earners cite complexity and fear of penalties as barriers; mental accounting observed
Nigeria Fintech Association Platform Usage Report	Digital Transaction Logs	Nigeria	Strong potential for in-app behavioral prompts; gig workers more responsive to peer-behavior cues
McKinsey Global Institute Digital Finance Reports	Policy + Case Studies	Global (inc. India, China, Africa)	Digital financial services reduce friction but must be paired with trust-building interventions

3.3. Analytical Approach

The analytical strategy employed a hybrid of policy mapping and behavioral thematic synthesis. First, tax compliance interventions were categorized using a logic model framework adapted from the OECD's Tax Administration Behavioral Insights Toolkit [18]. This model categorizes interventions by intent (e.g., cognitive simplification, social norm activation, commitment devices), delivery medium (e.g., digital, mail, in-person), and behavioral outcome targeted (e.g., timely filing, full payment, accurate reporting).

Second, a behavioral impact evaluation matrix was constructed to align interventions with their documented outcomes across three axes: behavior change, taxpayer feedback, and administrative scalability. For example, an SMS-based prepayment prompt that increased filing compliance by 18% was rated as high-impact but moderate-scalability due to digital access limitations [19].

Thematic synthesis was then applied to distill patterns across the interventions. Emergent themes included trust in government, procedural fairness, message timing, and personalization. NVivo software aided the coding process, although this study emphasizes interpretive over statistical significance. Codes were grouped into higher-order constructs that informed the conceptual framework presented in Section 2 (see Figure 1).

Finally, findings were iteratively mapped against compliance behavior models (e.g., the Slippery Slope Framework and the Responsive Regulation Model), validating the behavioral mechanisms observed in empirical data [20]. This multi-layered approach enables the generation of a context-rich, behaviorally informed framework for understanding and improving tax compliance among informal sector actors.

4. Behavioral interventions and evidence from practice

4.1. IRS Behavioral Pilot Programs

Over the past decade, the U.S. Internal Revenue Service (IRS) has piloted a range of behaviorally informed interventions aimed at boosting voluntary tax compliance. These initiatives emerged from a growing recognition that traditional enforcement and penalty-based approaches were insufficient in influencing compliance behavior among self-employed and informal sector taxpayers. Behavioral pilot programs tested various psychological nudges, particularly framing techniques in tax notifications, appeals to civic duty, and the strategic use of reminders to encourage timely filing and payment.

A seminal experiment modified standard IRS correspondence by incorporating moral suasion cues—reminding taxpayers that most Americans pay their taxes on time. This social norm framing was based on the premise that individuals are more likely to comply when they believe their peers are doing the same. In randomized trials, such letters increased on-time payment rates by up to 5 percentage points. Another variant of the pilot included framing late payment penalties in terms of loss aversion—emphasizing what the taxpayer stood to lose rather than gain—demonstrating measurable effects on compliance behavior.

Critically, these interventions revealed substantial variation across demographics and income brackets. Low-income filers showed greater responsiveness to reminder-based nudges, whereas higher-income self-employed workers reacted more favorably to messages highlighting detection probability or moral imperatives. In one pilot, timely response increased by over 30% among gig workers receiving repeated, SMS-based filing reminders with simplified language and pre-calculated estimates.

However, challenges emerged. Some taxpayers perceived behavioral nudges as manipulative or overly paternalistic, potentially eroding trust in the IRS. Moreover, while the short-term improvements were clear, long-term effects—especially across repeat filing cycles—remained underexplored. Nevertheless, these findings laid the groundwork for broader application of behavioral economics in tax compliance, especially when paired with digital delivery systems for cost-effective scaling.

Figure 2 Sample design of IRS behaviorally framed tax letters

These pilots collectively demonstrated that nudging, when thoughtfully designed and appropriately segmented, can improve voluntary compliance while reducing administrative burdens. The IRS now continues to refine its behavioral toolkit as part of broader modernization efforts.

4.2. Digital Nudges and Platform Interventions

With the rise of gig work and digital platforms, behavioral interventions have extended beyond traditional IRS channels to fintech ecosystems. Companies like PayPal, Etsy, Uber, and Venmo have partnered with third-party advisors and tax authorities to incorporate nudges directly into their platforms. These digital nudges—delivered via push notifications, dashboard alerts, or automated emails—aim to address timing gaps and information asymmetries in the tax compliance process.

One such collaboration saw digital payment platforms prompt users with pre-tax season alerts, reminding them of the need to report earnings and offering automated expense logs. The interventions were especially targeted toward informal vendors and freelancers—groups traditionally outside formal compliance nets . A/B tests showed that users receiving early alerts were 25% more likely to visit IRS-related tax help portals or download tax documents before filing deadlines.

Additionally, app-integrated nudges embedded behavioral design principles like salience and present bias mitigation. For instance, gig economy workers on task platforms received mobile prompts tied to earnings thresholds. When surpassing $400—a self-employment tax trigger—a customized prompt would notify them of their filing obligations and offer links to tax prep tools or accountant directories.

Crucially, digital nudges also enabled real-time feedback loops. Platforms could track user interaction data, allowing dynamic optimization of message content and timing. This level of agility offered promise in scaling interventions in a cost-effective, privacy-preserving manner. Nonetheless, data-sharing agreements and regulatory oversight were essential to maintain user trust and comply with legal boundaries surrounding taxpayer information.

Despite these benefits, several limitations persisted. Message fatigue, opt-out rates, and reduced engagement over time affected the efficacy of digital nudges. Moreover, there were concerns about equitable access to digitally delivered messages—particularly among non-English speakers or those without reliable internet access.

As a whole, digital behavioral interventions offered scalable, adaptive tools to augment compliance in underregulated segments. Their integration into everyday platforms provided new touchpoints for behavioral influence that complemented traditional IRS efforts.

4.3. Comparative International Case Studies

International tax administrations have likewise adopted behavioral economics to tackle compliance in informal and self-employed segments. These comparative experiences yield valuable insights into the translatability of behavioral nudges and the contextual constraints shaping their outcomes.

In the UK, HM Revenue & Customs (HMRC) deployed a range of randomized control trials testing behavioral framings in tax letters and emails. One prominent example emphasized peer compliance norms: taxpayers were told that “nine out of ten people in your town pay their taxes on time.” This approach boosted compliance by 6 percentage points in some cohorts. Another message variant reminded taxpayers of public service linkages—connecting taxes to funding for hospitals and schools—which also proved effective, especially among middle-income self-employed workers.

India’s implementation of Goods and Services Tax (GST) offered another relevant case. Under its GST framework, the Indian government employed voluntary disclosure prompts for small traders and service providers operating below the formal registration threshold. These prompts leveraged simplified language, pre-filled forms, and text-based moral suasion to encourage compliance. Behavioral pilots in Maharashtra and Tamil Nadu revealed that simplified compliance options combined with behavioral nudges increased first-time tax registration among micro-entrepreneurs by up to 18%.

Other jurisdictions, such as Colombia and South Africa, have embedded behavioral interventions into digital tax portals. These include automated reminders, interactive filing guidance, and gamified penalty calculators. While results varied, key lessons emerged around message clarity, channel optimization, and cultural relevance. For example, appeals to national duty resonated more in countries with high civic trust, whereas fear-based messaging often backfired in regions with historical distrust of tax authorities.

These international examples suggest a few transferable practices. First, segmentation and tailoring of messages—by sector, geography, or behavior—consistently enhance efficacy. Second, digital delivery mechanisms must accommodate users' literacy, language, and connectivity constraints. Third, transparency in messaging (e.g., who is sending it and why) builds trust and sustains engagement.

Table 2 Comparison of International Behavioral Compliance Interventions by Sector

Country	Sector	Intervention Type	Behavioral Mechanism	Reported Impact
United Kingdom	Small Businesses	Personalized letters + gain-framing	Social norms, loss aversion	5.1% increase in timely tax filings
Kenya	Informal Retail	SMS nudges with local language framing	Salience, community norms	10% increase in mobile tax declarations
Chile	Freelancers	Pre-filled returns with income estimate	Ease, mental accounting	Reduced filing errors by 15%
India	Microenterprises	In-app reminders in GST portal	Timeliness, present bias	6% increase in on-time payments
Australia	Sole Traders	Email prompts with peer benchmarks	Descriptive norms, identity	8.2% compliance rise among target group
Mexico	Transport Sector	Digital wallet tax tools + visuals	Simplification, habit formation	Increased savings and tax prep engagement
South Africa	Informal Services	Radio ads + mobile help desks	Familiarity, emotional resonance	Increased tax inquiries by 12%

U.S. tax policymakers can benefit by selectively adapting global behavioral insights while accounting for federalism, diversity, and platform governance constraints. The international landscape affirms the broader potential of behavioral economics in voluntary compliance—if designed with context sensitivity, ethical safeguards, and continuous evaluation mechanisms.

5. Understanding the informal sector in the U.S.

5.1. Who Are Informal Self-Employed Workers?

Informal self-employed workers encompass a broad spectrum of economic agents operating outside the purview of formal labor market structures. This group includes gig economy participants such as ride-share drivers and food delivery personnel, sole proprietors of small-scale businesses, home-based service providers, and unregistered professionals like tutors, mechanics, and hairdressers. These workers typically engage in activities characterized by minimal or no regulatory oversight, unstable income flows, and limited access to formal financial and legal systems [19].

The socioeconomic profiles of informal self-employed individuals often reflect vulnerabilities and structural exclusion. Many possess limited educational backgrounds, lack employer-provided benefits, and operate without access to legal protections or retirement plans. Gender disparities are also notable, with women frequently overrepresented in lower-income informal roles such as domestic work and food vending [20]. Moreover, ethnic minorities and immigrants are disproportionately involved in informal employment due to barriers to formal sector integration [21].

Compliance with tax regulations is typically low among informal self-employed workers, not necessarily due to intentional evasion but rather as a consequence of structural and psychological barriers. Limited financial literacy, perceived complexity of tax systems, and the absence of tailored outreach from tax authorities create an environment where compliance is either deprioritized or viewed as unattainable [22]. Many workers in this category operate in cash-based economies, reducing traceability and further entrenching informality [23].

Access to digital platforms has increased participation in the gig economy; however, this shift has not been accompanied by formalization. Digital intermediaries rarely classify workers as employees, absolving themselves of payroll obligations and leaving the burden of tax compliance entirely on the workers [24]. Consequently, these individuals often fail to declare income, either out of ignorance or logistical difficulty.

Understanding informal self-employed workers thus requires acknowledging their heterogeneity, ranging from low-skilled street vendors to highly educated freelancers. Their behaviors are shaped by a blend of socioeconomic marginalization and rational cost-benefit calculations about formalization. Bridging this gap demands targeted policies that address not only administrative reform but also psychological and structural constraints limiting voluntary compliance [25].

5.2. Behavioral Biases in Informal Earners

Behavioral economics offers a crucial lens for understanding the tax compliance decisions of informal self-employed individuals. These decisions are not solely rational calculations of audit risks versus penalties but are also deeply shaped by cognitive distortions such as optimism bias, temporal discounting, and reactions to income volatility [26].

- **Optimism bias** refers to individuals' tendency to believe they are less likely than others to experience negative outcomes, such as being audited or penalized. For informal earners, this bias reduces the perceived risk of enforcement and thus the urgency to comply with tax obligations [27]. Many self-employed individuals assume that tax authorities prioritize larger firms, underestimating their own visibility and the potential consequences of non-compliance [28]. This cognitive distortion is particularly pronounced among new entrants to informal sectors, who often lack historical exposure to regulatory enforcement.
- **Temporal discounting**, or the preference for immediate rewards over future benefits, also plays a critical role. Informal self-employed workers frequently prioritize short-term financial needs over long-term compliance benefits, such as access to credit or eligibility for government support programs [29]. The delayed and often intangible benefits of compliance—such as retirement savings or legal recognition—fail to compete with pressing daily expenses, especially among low-income earners [30]. This results in procrastination or outright neglect of tax obligations, as future penalties are psychologically discounted in favor of current liquidity.
- **Income uncertainty** further exacerbates these tendencies. Informal workers typically experience irregular income flows, making it challenging to estimate and set aside tax liabilities. This unpredictability triggers loss aversion—where individuals are more motivated to avoid losses than to achieve gains—which can discourage them from parting with any portion of earnings for tax purposes [31]. The cognitive load associated with juggling fluctuating income and sporadic expenses heightens stress, leading to decision fatigue and reliance on mental shortcuts that deprioritize formal compliance [32].

In tandem, these behavioral biases create a psychological environment where non-compliance becomes a default. Workers rationalize their actions through moral licensing ("I pay VAT when I buy goods") or by shifting blame to systemic inefficiencies ("The government doesn't help me anyway") [33]. Such justifications provide psychological relief while reinforcing non-compliant behaviors.

Figure 3 illustrates how these psychological drivers intersect to influence behavior: optimism bias reduces perceived detection risk, temporal discounting diminishes future benefit valuation, and income volatility intensifies risk aversion and emotional strain. Together, these mechanisms construct a mental framework that often favors informality, even among those who might prefer formal engagement under different circumstances.

Interventions to improve compliance must therefore go beyond enforcement and incorporate behavioral nudges. For instance, simplifying tax declarations, offering periodic micro-payments aligned with income cycles, and deploying SMS reminders that frame compliance as a social norm can gradually shift behavior [34]. Additionally, integrating behavioral insights into digital platforms used by gig workers may increase voluntary compliance by embedding decision aids and visual cues that encourage saving and timely declarations [35].

Ultimately, acknowledging and addressing behavioral biases is essential in designing effective policy instruments for informal self-employed earners. Without such insights, well-meaning regulatory frameworks risk underperformance due to misalignment with how individuals perceive, process, and act on information in the context of daily economic survival [36].

6. Policy integration and strategic recommendations

6.1. Framework for Behaviorally-Informed Tax Policy

Designing an effective tax policy for informal self-employed workers requires an integrated framework that acknowledges both behavioral biases and structural barriers. Traditional enforcement-based approaches often fail to generate compliance in this group due to psychological frictions, lack of awareness, and the administrative burdens of formalization. A **behaviorally-informed framework** incorporates "nudge architecture" to influence voluntary compliance while addressing the structural environment that shapes decisions [23].

At the core of this model is nudge theory, which suggests that subtle modifications in the presentation of choices can significantly impact behavior without restricting freedom. For informal earners, this includes interventions such as default registration on gig platforms, timely SMS reminders framed positively, pre-filled tax returns, and goal-setting prompts that encourage earmarking income for taxes. For instance, a monthly message like “People like you have already contributed to national development this month” exploits social norms to enhance perceived compliance behavior [24].

Beyond standalone nudges, a hybrid model that fuses behavioral techniques with structural reform holds greater promise. While behavioral cues can improve voluntary compliance, structural factors such as cumbersome registration processes, lack of financial inclusion, and weak legal protection still deter formalization. Integrating reforms—like mobile-based micro-tax systems, flexible payment schedules aligned with volatile income cycles, and secure e-wallets for tax savings—can bridge this divide [25].

Digital platforms also play a crucial enabling role. For example, embedding nudge mechanisms into apps used by informal workers, such as ride-hailing or e-commerce interfaces, can seamlessly integrate behavioral cues with user workflows. Visual dashboards that track estimated tax liability and income history reduce cognitive load and improve planning [26].

Table 3 Proposed policy interventions and behavioral leverage points

Policy Intervention	Behavioral Mechanism Leveraged	Target Group
Default tax registration on platforms	Status quo bias	Gig workers
Monthly SMS compliance reminders	Social norm, salience	All informal earners
Micro-saving via digital wallets	Mental accounting	Low-income earners
Simplified mobile tax returns	Reducing friction costs	Sole proprietors
Tax-benefit visualization tools	Future-self continuity	Young self-employed
Peer compliance storytelling campaigns	Descriptive norms, reciprocity	Urban informal professionals

This hybrid approach also recognizes the diversity among informal earners. For high-earning freelancers, customized dashboards with analytics and digital nudges may be effective, while for low-literacy traders, audio messages or agent-led registration drives may offer more traction [27]. The framework’s flexibility ensures it accommodates varying cognitive, socioeconomic, and technological capacities.

Importantly, behaviorally-informed policies must avoid coercion and ensure ethical guardrails. Transparency, choice, and consent must guide all nudges, avoiding manipulation or misrepresentation [28]. When properly designed, these policies can democratize access to formal systems, empower taxpayers, and improve revenue without resorting to punitive measures.

6.2. Operationalizing Compliance Nudges at Scale

Scaling behavioral interventions requires a balance between cost-efficiency, ethical rigor, and technological feasibility. For governments operating within fiscal constraints, low-cost digital nudges such as SMS alerts, push notifications, and pre-recorded IVR calls represent scalable methods to influence tax behavior. These interventions cost significantly less than traditional audits or enforcement operations, and their scalability enhances marginal returns on investment [29].

However, effectiveness depends not only on delivery but also on design quality. Nudges must be context-sensitive—language, tone, timing, and framing all matter. For example, a prompt saying, "Your contribution helps build local schools" has been shown to increase compliance more than fear-based messages [30]. Co-designing these nudges with community members improves trust and relevance, especially in diverse informal sectors where generic messaging may backfire.

Ethical design principles must govern implementation. Tax nudges should preserve autonomy and minimize cognitive overload. Providing an option to opt out of nudges or access further support through helplines or tax agents ensures informed consent. Governments should also publicly disclose intervention strategies to build transparency and accountability [31].

Technology, especially automation and AI, offers a potent delivery mechanism. Machine learning models can segment informal workers based on risk profiles, income patterns, and responsiveness to prior nudges. Such segmentation allows for the personalization of interventions, maximizing effectiveness while minimizing intrusive messaging. For instance, AI can detect behavioral inertia and escalate the intensity of nudges accordingly—starting with reminders, then offering assistance, and only escalating to enforcement when necessary [32].

Furthermore, natural language processing (NLP) can translate tax obligations into simplified, culturally appropriate messages. Chatbots powered by AI can offer 24/7 assistance, addressing doubts in real time and lowering perceived complexity [33]. Integration with popular platforms like WhatsApp or mobile money apps ensures outreach reaches users within their existing digital ecosystems.

Despite these benefits, governments must ensure digital equity—that rural, low-literacy, and offline populations are not excluded. Complementary offline strategies, such as community engagement and radio campaigns, should run parallel to digital nudges to ensure inclusive coverage [34].

By combining smart automation, cost-effective tools, and ethical design, behaviorally-informed compliance interventions can be operationalized at scale. This integrated approach ensures not only wider reach but also deeper behavioral impact—without overburdening either the taxpayer or the administration.

6.3. Risks, Limitations, and Governance Implications

While behaviorally-informed tax nudges offer promising potential, they are not without risks and ethical concerns. A primary risk is manipulation, where nudges are designed to exploit cognitive vulnerabilities without transparency. For example, overly emotional or guilt-inducing messages may pressure individuals into action without informed consent, violating autonomy [35].

Another key issue is data privacy. Personalizing nudges requires the collection and analysis of behavioral, financial, and demographic data. Without robust governance frameworks, this creates potential for data misuse, mission creep, or unauthorized surveillance—especially in countries with weak data protection laws [36]. Informal earners, already wary of formal institutions, may further retreat from engagement if they perceive intrusion or misuse of personal data.

Taxpayer trust is a fragile asset that can be easily undermined by poorly designed nudges or non-transparent data practices. Trust-building requires not only privacy safeguards but also clear communication of intent. Governments must openly articulate the objectives of behavioral programs, the nature of data collected, and the benefits to participants. Transparency and two-way communication are crucial to mitigate suspicion and increase uptake [37].

Additionally, limitations of nudging must be acknowledged. Nudges are context-dependent and may lose effectiveness over time due to habituation. What works in one demographic or cultural setting may fail elsewhere. Further, some behaviors—such as entrenched tax evasion due to economic necessity—may not be altered by nudges alone. In such cases, deeper reforms such as financial inclusion, insurance schemes, or welfare linkages may be required to incentivize voluntary compliance [38].

Governance of behavioral policy must include ethical review boards, regular audits, and stakeholder consultation. Multi-disciplinary oversight involving behavioral scientists, technologists, ethicists, and civil society can improve accountability. Moreover, partnerships with non-state actors such as fintech firms, labor platforms, and cooperatives must adhere to shared ethical standards to prevent misuse of influence [39].

In summary, while behavioral tax nudges offer a low-cost, high-impact path to improved compliance, they must be deployed judiciously. Without robust governance, transparency, and respect for taxpayer rights, the benefits may be undermined by ethical backlash and declining trust. Ensuring a fair, respectful, and inclusive behavioral policy architecture is essential to its legitimacy and long-term success [40].

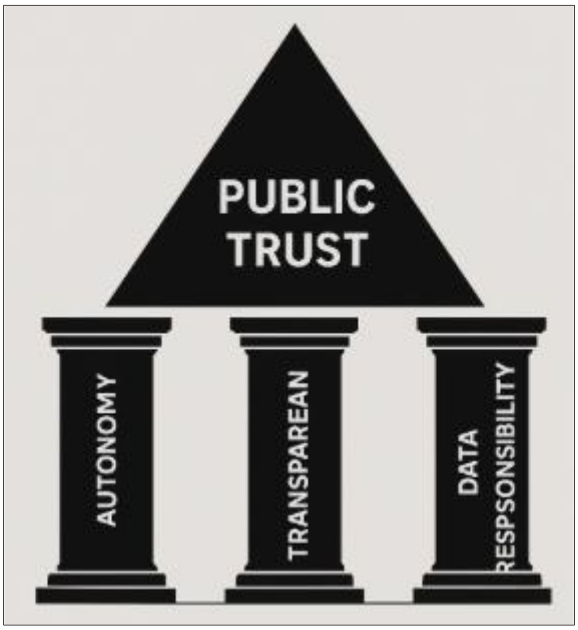

Figure 4 Model of Ethical Behavioral Intervention in Public Tax Administration

7. Implementation roadmap for U.S. tax agencies

7.1. Agency Collaboration and Platform Integration

Effective rollout of behaviorally-informed tax strategies hinges on multi-agency collaboration and the strategic integration of digital platforms. The Internal Revenue Service (IRS) and equivalent national tax bodies must lead efforts in convening digital ecosystems where behavioral nudges can be delivered with scale, precision, and relevance. In this context, collaboration with fintech firms, gig platforms, and digital wallets becomes vital, not just for outreach but for establishing seamless, trust-enhancing interfaces [41].

These platforms already engage daily with informal earners—for transactions, service bookings, and work allocations—and are thus uniquely positioned to act as touchpoints for compliance nudges. For instance, embedding gentle tax reminders into gig worker dashboards or integrating tax-saving prompts into mobile payment apps allows for contextualized engagement that minimizes disruption while increasing relevance [42].

To ensure sustainability, partnerships must be structured around clear data governance frameworks. Data sharing between tax agencies and platforms should operate under strict anonymization protocols, ensuring taxpayer privacy while enabling pattern recognition and segmentation for targeted interventions [43]. Regular interface testing and user feedback loops will also enhance usability, ensuring that messages are culturally appropriate and non-intrusive.

Ultimately, trust is the cornerstone of integration. Visual consistency, transparent messaging, and opt-in controls must be emphasized in interface design. Taxpayers are more likely to engage with systems that present themselves not as enforcers but as assistive partners. This relational shift—from authority to ally—can redefine the taxpayer experience and increase voluntary compliance over time [44].

7.2. Training, Monitoring, and Evaluation

To operationalize behavioral tax strategies effectively, tax agencies must invest in staff training and internal capacity building. Behavioral insight is a specialized skill that requires more than conventional policy training. Tax officers, platform designers, and communication teams must be upskilled in cognitive psychology, behavioral economics, and message framing techniques to ensure the design and delivery of evidence-based interventions [45].

Modular training programs—delivered both in-person and online—should focus on case studies, behavioral audit tools, and ethical frameworks. Cross-disciplinary workshops involving data scientists, economists, and behavioral specialists can promote institutional learning and innovation. Such professional development enhances the agency's ability to adapt strategies as taxpayer behavior evolves and as new technologies emerge [46].

Equally critical is the establishment of monitoring and evaluation (M&E) systems. These systems must track not just compliance rates but also behavioral markers such as message responsiveness, timing effects, and repeat engagement. Metrics like digital nudge open rates, opt-in levels, and frequency of voluntary tax declarations post-intervention offer granular insights into efficacy [47].

Impact evaluations should utilize A/B testing, randomized control trials (RCTs), and longitudinal tracking to compare behavior across different segments and message types. Integrating these evaluations into national tax dashboards ensures real-time feedback, enabling continuous policy refinement [48].

Additionally, feedback loops from taxpayers themselves—via surveys or app-based feedback tools—can identify message fatigue, cultural misalignment, or unintended consequences. This participatory evaluation fosters accountability and strengthens trust in public institutions, reinforcing the ethical foundations of behavioral policy [35].

A robust training and M&E framework is not only necessary for policy effectiveness but also for its legitimacy. By institutionalizing learning and feedback, tax agencies can ensure adaptive, ethical, and evidence-driven behavior change strategies.

7.3. Future-Proofing Behavioral Tax Strategies

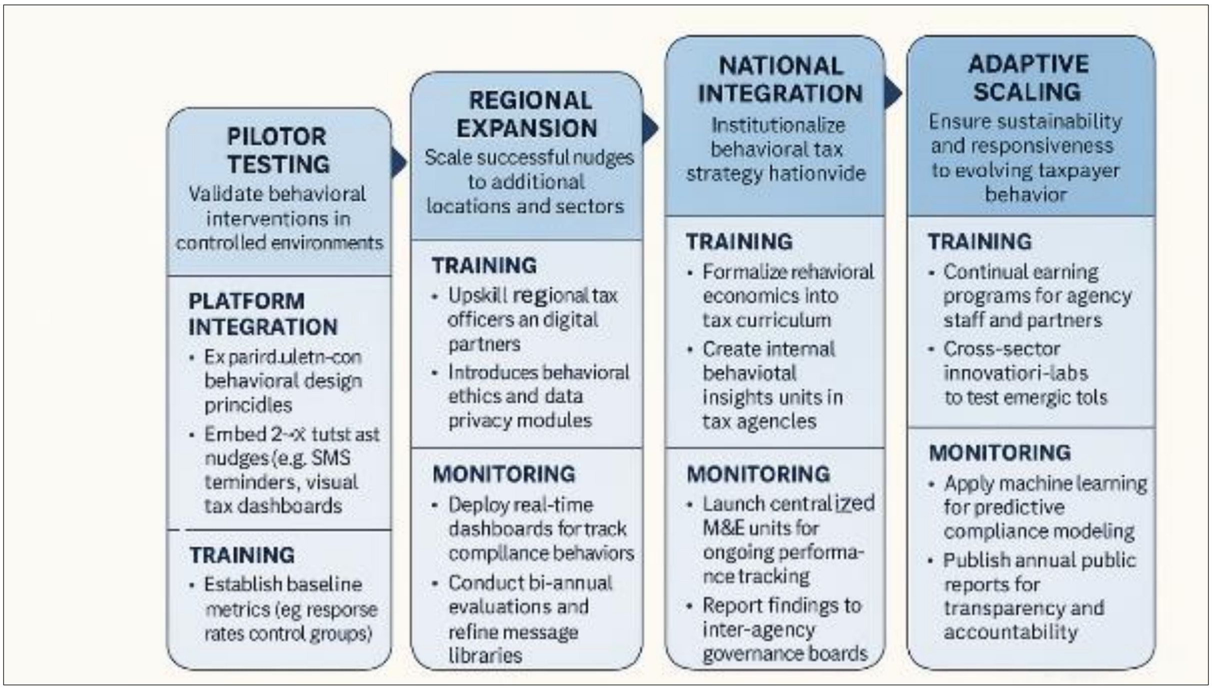

Figure 5 Staged Roadmap for National Rollout of Behavioral Tax Interventions

Sustaining the impact of behaviorally-informed tax interventions requires future-proofing through adaptive learning systems. These systems use machine learning to monitor taxpayer behavior in real-time and dynamically adjust nudges based on responsiveness, timing, and contextual cues. Rather than deploying static interventions, adaptive strategies evolve with taxpayer engagement patterns, increasing their long-term efficacy [36].

For instance, if a taxpayer repeatedly ignores monthly prompts but responds to quarterly summaries, the system can autonomously modify the communication schedule. This not only reduces fatigue but enhances receptivity by personalizing outreach. Integrating behavioral feedback loops into tax platforms ensures that nudges are not only delivered but also optimized continually [37].

Moreover, predictive analytics can identify behavioral risk factors—such as declining engagement or income volatility—and trigger early interventions. Combined with digital identity systems and secure data infrastructures, these capabilities allow tax administrations to shift from reactive enforcement to proactive support models [38].

By embedding technological agility and behavioral intelligence, tax strategies can remain responsive to changing economic landscapes, taxpayer expectations, and societal norms, securing long-term effectiveness and trust.

8. Conclusion

8.1. Recap of Key Findings

This report has examined the intersection of behavioral economics and informal tax compliance, highlighting how psychological and structural factors shape the decisions of self-employed informal workers. It was established that informal earners—including gig workers, sole proprietors, and unregistered professionals—are heterogeneous in their economic roles but often face common barriers such as income volatility, limited trust in public systems, and inadequate financial literacy.

Behavioral biases such as optimism bias, temporal discounting, and cognitive overload significantly reduce voluntary compliance. Through detailed analyses, we proposed a hybrid framework that integrates behavioral nudges—like social norm messaging and mental accounting prompts—with structural interventions such as mobile-based tax declarations and platform integration. Additionally, operationalizing these strategies at scale requires partnerships with fintech and digital platforms, training tax officials in behavioral insights, and establishing ethical monitoring and feedback systems.

The overall findings indicate that voluntary compliance can be increased through a proactive, trust-based, and citizen-sensitive approach to tax design, with technology and behavioral science offering scalable, cost-effective tools for improving public revenue mobilization without resorting to coercive enforcement.

8.2. Reinforcing the Case for Behavioral Economics in Tax Design

Behavioral economics provides a transformative lens for tax policy, particularly in contexts where traditional enforcement mechanisms are either impractical or ineffective. Rather than assuming that non-compliance is purely the result of willful evasion, this approach acknowledges the role of psychological frictions—such as procrastination, present bias, and loss aversion—in shaping tax behavior.

Nudges are not a silver bullet but represent a powerful addition to the policy toolkit. They are cost-effective, scalable, and capable of producing immediate behavioral shifts when designed ethically and contextually. For informal workers, these nudges can bridge the intention-action gap by reducing cognitive burdens, clarifying compliance pathways, and aligning tax behavior with social identity and future aspirations.

Moreover, behavioral design humanizes public finance. It shifts the framing of tax systems from punitive to participatory, where taxpayers are seen not just as subjects of enforcement but as rational, emotional, and situational actors. Embedding this understanding into policy-making results in more nuanced, adaptive, and inclusive strategies. By reinforcing this behavioral perspective, governments can transition from enforcing compliance to enabling it, thereby aligning fiscal goals with citizen welfare and democratic legitimacy.

8.3. Broader Implications for Inclusive, Citizen-Centered Public Finance

Behavioral tax design has broader implications for building an inclusive and citizen-centered model of public finance. At its core, this approach recognizes that fair and effective taxation is not merely a matter of revenue collection but also a question of social contract and trust. Informal workers, who often feel excluded from state services, are more likely to participate in the system when policies are designed with empathy, respect, and accessibility in mind.

Inclusive tax systems foster a virtuous cycle: improved compliance leads to increased public revenues, which can then fund social programs that directly benefit underserved communities. When tax interfaces are simplified, information is framed constructively, and assistance is made available through trusted digital or community channels, more citizens feel empowered to engage voluntarily.

Behaviorally-informed tax systems also contribute to broader governance outcomes, including transparency, accountability, and civic participation. By reducing the adversarial relationship between taxpayers and tax authorities, such systems lay the foundation for sustainable public finance ecosystems. Ultimately, when citizens perceive taxation not as a burden but as a gateway to opportunity and fairness, it enhances both the efficiency and legitimacy of government interventions.

8.4. Recommendations for Researchers and Policymakers

For researchers, there is a pressing need to deepen the empirical evidence base around behavioral interventions in tax contexts, particularly in low- and middle-income countries. Future studies should adopt experimental methods, including randomized control trials (RCTs) and longitudinal surveys, to assess the long-term impacts of nudges on tax compliance across diverse informal sectors. Research should also explore cultural, gender, and regional differences in behavioral responsiveness to develop more tailored intervention strategies.

Policymakers, on the other hand, must institutionalize behavioral insights within tax agencies. This involves establishing behavioral units, investing in upskilling staff, and building collaborative networks with fintech platforms and civil society organizations. All interventions must be governed by ethical standards that ensure transparency, consent, and data protection.

Furthermore, digital tax platforms should be co-designed with users, particularly marginalized groups, to ensure accessibility. Governments should commit to iterative learning—evaluating what works, what doesn't, and why—and use those insights to refine policies. Finally, integrating behavioral nudges with broader social protection mechanisms can enhance legitimacy, offering tangible incentives for compliance and signaling that taxation is part of a reciprocal social compact rather than a one-sided obligation.

8.5. Closing Thoughts on the Balance Between Enforcement and Engagement

The challenge facing modern tax administrations is not simply to enforce compliance but to cultivate it. While legal frameworks and audit systems remain essential tools, an overreliance on coercive enforcement can alienate citizens, especially in informal sectors where mistrust of state authority is already high. Conversely, engagement strategies rooted in behavioral science offer a more sustainable and dignified pathway to revenue mobilization.

The future of tax policy lies in balancing enforcement with empathetic engagement. This involves recognizing that many informal earners operate under constraints, not criminal intent, and that compliance is often a function of system design, not individual morality. By leveraging behavioral insights, tax systems can lower psychological barriers, foster trust, and build a culture of shared fiscal responsibility.

Ultimately, the most effective tax systems are those that taxpayers feel they have a stake in—systems where compliance is not feared, but understood, facilitated, and valued. As governments face increasing fiscal pressures and rising public expectations, embedding behavioral economics into tax policy is not just innovative—it is imperative for building equitable, resilient, and citizen-centered public finance systems.

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