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Economic Shocks and Household Consumption Smoothing Strategies

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Abstract

This paper examines the ability of Peruvian households to smooth consumption in the face of job loss and family business failure shocks, using the weak form of the permanent income hypothesis. The analysis distinguishes between ex ante mechanisms—such as insurance coverage and access to formal credit markets—and ex post responses adopted after a shock occurs. The results show that: (i) on average, households are able to smooth consumption; (ii) this ability is concentrated among those with access to the formal financial system, although some smoothing was also observed during the pandemic among households with informal savings; (iii) households tend to smooth spending on essential categories, such as food and health, but not on non-essential items including clothing, education, and leisure; in the case of health, smoothing is observed only when households have insurance coverage; and (iv) eight types of ex post coping strategies are evaluated, most of which help mitigate consumption losses-particularly multiple jobholding and government transfers. The findings also reveal substantial heterogeneity: higher-income households benefit from broader access to financial instruments, including severance savings, while lower-income households face more limited options and display weaker smoothing capacity.

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1. Introduction

Households routinely face adverse events that disrupt income flows and compel them to adjust their consumption decisions. Economists refer to this behavior as consumption smoothing—the effort to maintain stable consumption in the face of income volatility. These shocks can take many forms, including illness, natural disasters, or job loss. Their impact depends on the severity and type of shock, as well as households' socioeconomic conditions. To cope, households rely on a range of strategies. Preventive tools—such as health or financial insurance and access to formal financial services—are arranged in advance and activated when needed. Reactive measures—such as informal loans, government transfers, family support, or taking on additional work—are deployed in response to a shock.

Peru lacks a well-developed social safety net and faces substantial barriers to credit access. According to the Superintendency of Banking, Insurance Companies, and Pension Funds (Superintendencia de Banca, Seguros y AFP, SBS), as of December 2022 only 42 % of the labor force had access to formal credit. Low insurance coverage and widespread informality further constrain households' ability to prepare for shocks. As a result, preventive mechanisms remain limited, and coping strategies tend to rely heavily on immediate, reactive measures. These hypotheses, however, require empirical testing. This study examines how effectively Peruvian households can smooth their consumption in the face of economic shocks. Given the scope and reliability of available data, the analysis focuses on two key events: job loss and household business failure. Its contribution lies in estimating marginal propensities to consume (MPCs) using nationally representative microdata and in analyzing consumption patterns across essential and non-essential categories, as well as the role of both preventive mechanisms and post-shock coping strategies.

A robust body of theoretical and empirical literature has examined how households smooth consumption in response to shocks. Much of this work is grounded in intertemporal consumption models, where the ability to shift resources over time—particularly through access to credit—plays a central role. In these frameworks, credit markets serve as a key preventive mechanism, allowing households to borrow during downturns and repay when income rebounds. Most empirical studies are based on microdata from advanced economies with relatively complete financial markets. In contrast, research on emerging markets—where financial constraints are more severe—tends to rely on natural experiments (such as weather shocks) or randomized controlled trials. These studies are often geographically limited or focus on specific population segments, depending on the type of shock being analyzed.

Our approach differs in several respects. We use nationally representative household survey data that directly capture the occurrence of economic shocks, households' coping strategies, and detailed components of income and consumption, all reported annually by respondents. Our empirical analysis tests the weak form of the permanent income hypothesis (PIH), which posits that households able to smooth consumption exhibit a stronger MPC of permanent income than of transitory income (Hun, 1975)[1]. This pattern suggests that transitory shocks are absorbed

[1]The weak form of the PIH is a relaxed version of the original formulation by Friedman (1957). The standard PIH posits that household consumption depends solely on permanent income, with any fluctuations in transitory income being fully smoothed through complete insurance mechanisms—particularly access to perfect credit

without major consumption adjustments, consistent with smoothing behavior. If, by contrast, consumption responds more to transitory income, it indicates that households are unable to buffer shocks effectively and consumption mirrors short-term income volatility. While several studies have found empirical support for the weak form of the PIH in developing countries (Paxson, 1992; Meng, 2003; Mamedli and Sinyakov, 2018), no such evidence has yet been documented for Peru.

The analysis draws on panel data from Peru's National Household Survey (*Encuesta Nacional de Hogares*, ENAHO) covering the 2007–2022 period. Economic shocks are widespread: nearly 30 % of households report being affected, and among those, up to 89 % experience income losses. To assess consumption smoothing, we begin by estimating each household's permanent income using a weighted average of income over the past three years, combined with the average income of shock-affected households, adjusted by the likelihood of experiencing a shock. Transitory income is defined as the gap between total reported income and this measure of permanent income. We then model household consumption as a function of permanent income, transitory income, socioeconomic characteristics, and income volatility.

The results show that, on average, Peruvian households do smooth consumption in response to shocks. The estimated MPC of permanent income exceeds that of transitory income—0.523 vs. 0.176 in non-shock periods, and 0.541 vs. 0.248 during shock periods. Disaggregating by income quintiles reveals substantial heterogeneity: smoothing is weaker among lower-income households, a pattern consistent with prior findings that low-income, heavily indebted, or asset-poor households tend to exhibit lower smoothing capacity. Similar dynamics have been documented by Mamedli and Sinyakov (2018) for the 2014 Russian crisis and by Fisher et al. (2020) for U.S. households from 1999 to 2013.

Understanding how households adjust consumption when income sources are disrupted is central to modern dynamic macroeconomic models. These models—rooted in the neoclassical tradition—rely on intertemporal substitution as the key mechanism linking current income with future consumption. They are widely used in contemporary macroeconomic analysis.

However, most such models overlook the institutional features and constraints typical of developing economies. In these settings, consumption smoothing is shaped by structural factors—including labor informality, incomplete financial markets, and limited access to formal insurance or credit. Comparisons with other contexts highlight this divergence. For instance, the MPCs of permanent income is substantially higher in emerging markets like China (Meng, 2003) than in developed economies like the United States (Fisher et al., 2020). This gap reflects higher

markets that allow households to transfer resources seamlessly across time. Empirically, if the PIH holds, the MPC of permanent income should equal one, while the MPC of transitory income should be statistically indistinguishable from zero. As consumption smoothing is a central theme in economic theory, this hypothesis has been widely tested. Some studies, such as Kim (1996) and Dejuan et al. (2004) for the United States, and Dejuan and Seater (1997) for a group of industrialized economies, find empirical support. Others, such as Paxson (1992) for Thailand and Pistaferri (2001) for Italy, report limited smoothing—often due to credit constraints that restrict households' access to formal financial markets. In this context, the weak form offers a more appropriate framework for economies like Peru, where limited access to formal credit means that households are unlikely to achieve full consumption smoothing. It allows for partial smoothing, whereby the MPC of permanent income exceeds that of transitory income

income risk in emerging markets—driven by labor market instability and informality—as well as the greater reliance on precautionary savings.

The Peruvian case offers insight into economies with similar institutional structures, where informality is pervasive and formal risk-sharing mechanisms are scarce. In such contexts, households rely primarily on ex post coping strategies rather than preventive tools, underscoring the limits of consumption smoothing under conditions of financial exclusion.

Our findings suggest that consumption smoothing is significantly stronger among households with access to formal risk-management tools—such as health insurance and participation in the formal financial system. These mechanisms, available prior to the occurrence of shocks, are typically limited to higher-income segments in the formal economy. Given these constraints, we also examine a range of ex post coping strategies adopted after shocks occur. These prove essential for smoothing consumption. In fact, households that do not employ such responses show no evidence of smoothing, implying that economic shocks can have lasting negative effects on well-being for a considerable share of the population.

Despite their relevance, the use and effectiveness of alternative, non-formal coping mechanisms remain underexplored in the literature. These include family loans, government transfers, dissaving or asset liquidation, taking on additional work, and cutting food or other essential consumption.

For Peru, no prior studies have analyzed consumption smoothing using a model that incorporates periods of heightened unemployment and business failure, such as during 2020–2021. Existing research has instead focused on the impact of individual instruments on outcomes like poverty or household spending. These studies also find evidence of heterogeneity: smoothing capacity varies by income or poverty status. For example, Castro (2006) finds that government transfers help poor households smooth consumption to some extent, but their capacity remains far below that of non-poor households, particularly in maintaining spending levels following income shocks, as measured by the deviation from average income.

Martinez and Montalva (2008), using panel data from ENAHO for 2002–2006, show that job or business failure reduces non-durable consumption by 5.8 % on average—but by as much as 18 % among poor households. Similarly, Montero and Yamada (2008) analyze ENAHO data from 1998 to 2005 and find that the loss of a household member's job results in a 27 % decline in family income, a 7 % drop in real household spending, and a 44 % increase in the likelihood of falling into poverty. However, these studies do not directly evaluate consumption smoothing.

This paper contributes to the literature by distinguishing between preventive mechanisms and ex post coping strategies used to manage income shocks. It also addresses a notable gap in the literature, as consumption smoothing in Latin America remains largely unexplored. To our knowledge, this is the first study to empirically assess how Peruvian households have adjusted consumption in response to economic shocks over the past two decades.

The remainder of the paper is organized as follows. Section 2 presents the theoretical framework. Section 3 describes the data and empirical approach. Section 4 describes the main results. Section 5 discusses the robustness checks and alternative specifications. Section 6 concludes.

2. Theoretical Model

Consumption smoothing in the face of adverse household shocks is formalized using an intertemporal consumption model. We assume an infinite-horizon framework in which households experience income shocks and derive utility from consumption in each period. Preferences follow a constant relative risk aversion (CRRA) utility function, with σ denoting the coefficient of relative risk aversion. The household's optimization problem is defined as follows:

$$\max \sum_{t=1}^{\infty} \beta^{t-1} \frac{c_t^{1-\sigma}}{1-\sigma}$$

subject to:

$$c_t + a_{t+1} = (1+r)a_t + y_t, \quad \forall\, t = 1, 2, \ldots$$

Here, r is the interest rate, β is the subjective discount factor, and y_t denotes household income in period t. Income is broadly defined to encompass multiple sources: it may include labor earnings, unemployment benefits, home production, income from multiple jobs, or transfers from family, other households, or the government. This flexible representation allows income to be modeled as a function of shocks and the strategies households use to manage them:

$$y_t = \bar{y}_t + s_t(\text{shocks, strategies, etc.})$$

Assuming CRRA preferences, the utility function takes the form:

$$u(c_t) = \frac{c_t^{1-\sigma}}{1-\sigma},$$

where σ is the inverse of the intertemporal elasticity of substitution.

The solution to the optimization problem yields a consumption and savings path from $t = 1$ to ∞. If we assume perfect consumption smoothing—i.e., consumption equals permanent income in each period ($c_t = \bar{y}_t$)—permanent income can be derived from the intertemporal budget constraint:

$$\bar{y}_t = \theta \sum_{s=t}^{\infty} \beta^{s-t} \bar{y}_s,$$

where $\theta = [1/(1+r)] / \sum_{s=t}^{\infty} \beta^{s-t} [1/(1+r)]^{s-t}$.

This expression represents permanent income as a weighted average of current income, where $\bar{y}_t$ is the weight assigned to income in period t. Consequently, consumption in each period can be expressed as:

$$c_t = \bar{y}_t = [\sum_{s=t}^{\infty} \beta^{s-t} \bar{y}_s] / [(1+r)^{s-t-1} \sigma \bar{y}_{s+t}] / [\sum_{s=t}^{\infty} \beta^{s-t} (1+r)^{s-t-1} \sigma]$$

or more generally:

$$c_t = \frac{1}{[(1+r)]^{s-t-1} \sigma} \sum_{s=t}^{\infty} \bar{y}_s,$$

for all $t \geq 2$.

This solution arises from the specific structure of the utility function. Consumption depends on both current and permanent income, as well as on intertemporal preference parameters—namely, the interest rate and the subjective discount factor. The predicted effects of changes in these parameters on consumption and saving behavior follow the standard logic of intertemporal choice models. A key feature of this framework is that it links consumption not only to income but also to the underlying drivers of income. These include sources of household income, the shocks households face, and the strategies they adopt in response. When shocks reduce income or wealth—i.e., $\partial \bar{y}_t / \partial \text{shock}_t < 0$—the model predicts a corresponding drop in consumption, $\partial c_t / \partial \text{shock}_t < 0$. The same logic applies to household strategies: if they mitigate income losses, they can soften the impact on consumption.

To test these relationships, we turn to the weak form of the PIH as a practical extension of the original formulation by Friedman (1957). Under the strict PIH, the MPC of permanent income ($Y_{it}^{(P)}$), denoted β, should be equal to 1, while the MPC of transitory income ($Y_{it}^{(T)}$), denoted γ, should be statistically zero:

$$c_{it} = \beta Y_{it}^{P} + \gamma Y_{it}^{T} + e_{it}$$

However, empirical studies—such as Paxson (1992) for Thailand and Pistaferri (2001) for Italy—have shown that the strict form does not always hold. A key reason is limited access to risk-sharing mechanisms, due either to credit constraints on the supply side or households' inability to borrow on the demand side. The weak form of the PIH offers a more realistic test: it allows for partial smoothing, with consumption depending on both permanent and transitory income. Deaton (1992) highlights the role of assets as a buffer that helps households smooth consumption in the face of income losses. In this view, precautionary saving interacts with borrowing constraints, creating an incentive to hold assets even in the absence of full insurance.

If the estimated MPC of permanent income exceeds that of transitory income—and the latter is positive—this indicates some degree of consumption smoothing (Hun, 1975). That is, consumption is more responsive to permanent than to transitory income shocks. In contrast, if consumption reacts more strongly to transitory income, it inherits the volatility of these shocks, and smoothing is absent. When households lack sufficient assets, they often resort to ex post coping strategies, such as support from family or taking on additional work.

The model yields clear empirical predictions about the effect of income shocks and coping strategies on household consumption. The next section introduces the empirical specification used to test these predictions and to assess the role of different smoothing mechanisms.

3. Empirical Methodology

To evaluate the hypothesis of consumption smoothing, we estimate a consumption equation that relates household consumption to both permanent and transitory income. The model follows the specification proposed by Meng (2003) and Paxson (1992), and takes the following form:

$$c_{it} = \alpha + \beta Y_{it}^{P} + \gamma Y_{it}^{T} + \mu V_{it} + X_{it}\delta + e_{it}$$

where c_{it} is per capita household consumption; Y_{it}^{P} and Y_{it}^{T} represent permanent and transitory income, respectively; V_{it} captures income volatility; X_{it} is a vector of household characteristics; and e_{it} is the error term.

Under the weak form of the PIH, consumption smoothing is present when the MPC of permanent income exceeds that of transitory income—i.e., when $\beta > \gamma$. This condition indicates that households' consumption decisions are primarily influenced by long-term income expectations rather than short-term fluctuations.

Since neither permanent nor transitory income is directly observable, both must be estimated. Following standard practice, we assume that observed income is the sum of its permanent and transitory components:

$$Y_{it} = Y_{it}^{P} + Y_{it}^{T}$$

Once permanent income is estimated, transitory income is obtained as the residual. Income volatility, v_{it}, is computed as the variance of household income across periods, and the parameter is estimated from the same regression model.

A key challenge in this approach is the availability and quality of data to estimate permanent income. Several estimation strategies have been proposed in the literature, conditional on data quality. In this study, we follow Bird (1995) and Meng (2003) in constructing permanent income as a weighted average of past income, adjusted for the likelihood of experiencing economic shocks:

$$Y_{st}^{P} = \sum_{t=-\infty}^{s} \omega_{st} \left[Y_{st}(1 - P_{s,t}) + P_{s,t} + Y_{st}^{U} \right]$$

where $P_{s,t}$ denotes the probability of experiencing an economic shock in period t, Y_{st}^{U} is the average income of households that experienced such a shock, and ω_{st} is the weight assigned to income period t, defined as:

$$\omega_{st} = \delta[1 + g(s+t)]/[1 + \delta(s+t)], \quad t = 0, -1, \ldots, -\infty$$

where g is the income growth rate and δ is the discounting parameter, assumed to vary between 0.1 and 0.9.

Shock probabilities $P_{s,t}$ are estimated using a probit model of the form:

$$P_{s,t} = \text{Prob}(\text{shock} = 1) = f(\text{age}_{s,t}, \text{edu}_{s,t}, \text{gender}_{s,t}, \text{sector}_{s,t}, \text{income\_quintile}_{s,t}, \text{region}_{s,t})$$

where covariates include the household head's age, years of education, gender (female = 1), economic sector of activity, income quintile classification, and geographic region.

4. Data

This study uses data from ENAHO for the period 2007–2022. Specifically, we use the three-year household panel module, which is essential for constructing permanent income, as it relies on income information from three consecutive years. The final panel sample represents approximately 20.7 % of the full ENAHO dataset for the period. Monetary variables such as household per capita income and consumption are deflated across time and regions using price indices provided by Peru's national statistics agency (*Instituto Nacional de Estadística e Informática*, INEI).

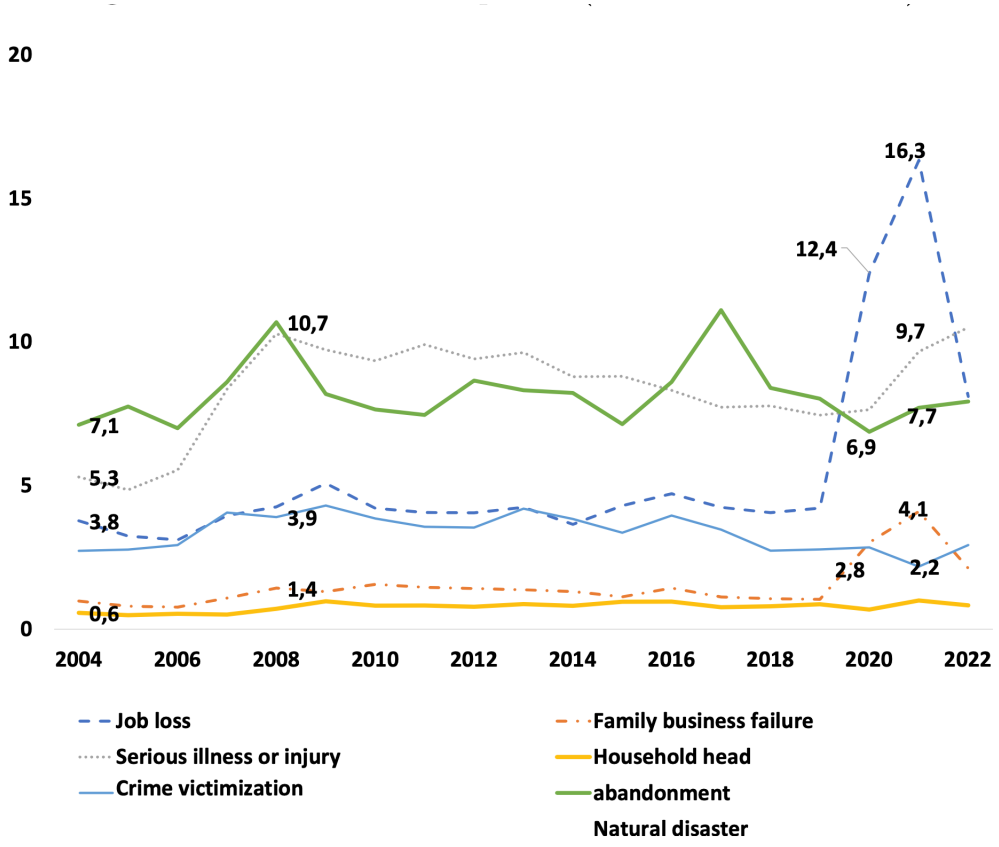
We also draw on household head characteristics and shock exposure, both captured through ENAHO. In particular, the Governance, Democracy, and Transparency module asks whether the household has experienced any adverse events in the past 12 months and whether those events led to income loss, asset depletion, both, or neither. Reported shocks include: (i) job loss by a household member; (ii) business failure; (iii) serious illness or accident; (iv) abandonment of the household head, crime (e.g., robbery, assault); (v) natural disasters (e.g., droughts, storms, floods, pests); and (vi) other events.

Shock incidence varies over time (Figure 1). Historically, natural disasters and illness have affected the largest share of households. However, in 2021, job loss became the most prevalent shock, affecting 16.3 % of households nationwide. In contrast, 2020 saw a notable decline in crime-related and climate-related shocks. The least common event over the full sample period was abandonment of the household head. For analytical consistency, we focus exclusively on economic shocks—namely, job loss and business failure—due to the limited availability of panel data for other types of events.

During the COVID-19 pandemic in 2020, economic shocks became more widespread, with 12.4 % of households reporting job loss and 3.0 % reporting business failure—well above the 2007–2019 averages of 3.8 % and 1.2 %, respectively. The health crisis triggered strict policies including lockdowns, social distancing, and widespread business closures, which in turn fueled unemployment and prolonged income disruptions. Survey responses reveal a marked rise in perceived uncertainty. This shift in perception is captured by responses to a question in the same ENAHO module: "How long do you think it will take for the situation to improve?" In the year before the pandemic, 49.8 % of households that had not yet recovered from a prior economic shock expected to recover within 12 months, 23.8 % anticipated it would take more than a year, 18.5 % were unsure, and 7.9 % believed the situation had no solution. By 2020, those shares had shifted: only 34.9 % still expected to recover within 12 months, 32.5 % anticipated a longer timeline, 25.4 % were unsure, and 7.2 % believed there was no solution.

[1] According to Meng (2003), when only cross-sectional data are available, the standard approach is to use at least one instrumental variable that is correlated with permanent income but orthogonal to consumption. Suitable instruments may include assets and education, lagged income, or long-term averages of rainfall. An alternative approach is to identify an instrument that captures transitory income shocks. For instance, Paxson (1992) uses regional rainfall data to estimate transitory income among agricultural households in Thailand. When panel data are available, permanent income is typically proxied using weighted averages of income from previous years. Bhalla (1980) proposes two such measures: the first calculates a three-year weighted average, based on the horizon justified in Bhalla (1979); the second is derived from an income equation that incorporates individual characteristics and financial assets. These methods help address the endogeneity of income in consumption regressions.

Figure 1. Adverse Events Reported (Percent of Households)



Note: Percentages of households reporting each event. Non-responses are excluded. Data from the full ENAHO sample.
Source: INEI, ENAHO 2004 - 2022.

According to the PIH, full consumption smoothing in response to shocks is only possible when households have access to mechanisms that allow them to shift income across time—from periods of abundance to periods of loss. The theory rests on a key assumption: that individuals are not subject to financial constraints. This assumption, however, is difficult to justify in contexts like Peru, where limited access to financial services can heighten perceived uncertainty and cause income shocks to transmit more directly into consumption changes.

In this setting, it is reasonable to expect that economic shocks first affect household income, and then consumption. A useful way to explore this relationship is by comparing the consumption patterns of households exposed to shocks with those that were not, to assess the potential for smoothing. ENAHO data show that households experiencing economic shocks—such as job loss or business failure—report the lowest income growth. A basic signal of smoothing emerges from comparing consumption dynamics relative to income: in general, consumption exhibits a more muted response than income. When both income and consumption increase (with or without a shock), the growth in consumption is smaller than that of income; similarly, when both decline, the drop in consumption is less severe than the fall in income.

Table 1

Strategies to Cope with Income Loss or Asset Depletion, by Income Quintile, 2008-2019
(Percent of households experiencing income loss or asset depletion in each group)

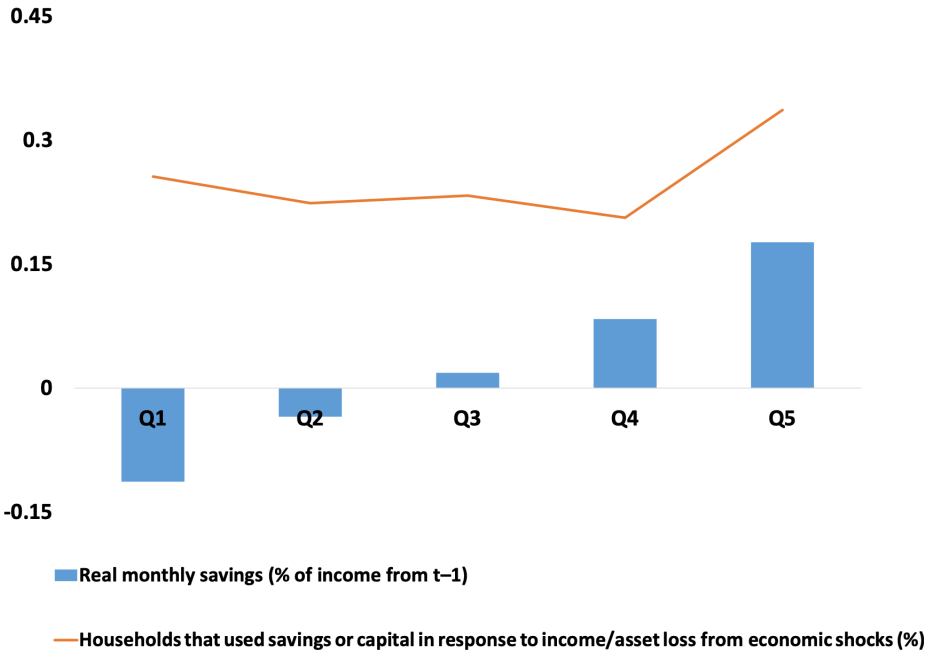
	Quintiles					
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Total**
Took on additional jobs	26.2	28.6	31.1	29.1	26.4	28.5
Drew down savings or household capital	25.3	22.7	23.2	24.0	29.5	25.0
Took out loans	17.9	20.3	21.4	22.5	23.8	21.5
Reduced food and other consumption	18.0	18.7	17.5	16.2	15.7	17.1
Received support from relatives	16.5	14.8	13.2	13.8	12.4	13.9
Took no action	12.6	10.4	10.6	11.2	9.5	10.7
Other	6.2	7.2	6.4	6.6	5.4	6.4
Pawned or sold assets	5.3	5.2	4.8	4.2	4.6	4.8
Received government assistance	1.3	0.6	0.3	0.4	0.2	0.5

Source: INEI, ENAHO 2008-2019
Note: Households may report more than one strategy. As a result, totals may exceed 100 %.

In terms of ex post responses to shocks, households in the top income quintile (Q5) are more likely to draw on savings or take loans to offset the impact. Conversely, the strategy of cutting back on food or general consumption shows an inverse relationship with income level: in Q1, 18 % of households reduce food consumption, compared to 15.7 % in Q5 (Table 1). This pattern is consistent with the hypothesis that the impact of shocks varies across the income distribution.

Interestingly, Q1 households (the lowest-income group) report significantly greater use of savings or productive assets compared to households in quintiles 2 through 4. This finding aligns with results from Peru's 2016 National Survey on Financial Services Demand and Financial Literacy (*Encuesta Nacional de Demanda de Servicios Financieros y Nivel de Cultura Financiera*) (SBS, 2016), which notes that 76 % of savings among Q1 households are held in the form of livestock or seeds. However, the value of savings used to absorb shocks likely differs substantially by income level. Prior to the shock, households in the bottom two income quintiles held negative average monetary savings—that is, their total expenditures exceeded total income (Figure 2).

Figure 2. Real Monthly Per Capita Savings Among Households Experiencing Income or Asset Loss and Reporting Use of Savings or Capital to Cope with a Shock, by Income Quintile (Average 2008-2019)



Note: Savings are defined as income minus consumption, both measured at the household level using ENAHO data and expressed in real terms. Savings are expressed as a percentage of income from the year prior to the shock. Financial savings are not separately identified.
Source: INEI, ENAHO 2007 - 2019.

5. Results

The results are presented following the sequence of the empirical methodology. We begin with the estimation of permanent and transitory income. We then test the PIH, with results disaggregated by income quintile and consumption category. Finally, we examine the smoothing strategies used by households, distinguishing between ex ante mechanisms (available prior to the shock) and ex post responses (deployed after the shock occurs).

5.1 Income Decomposition

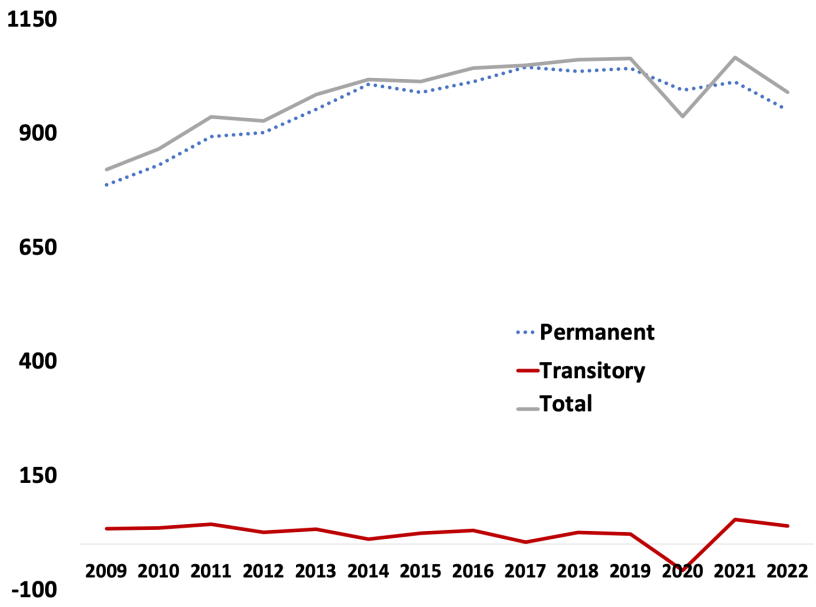
We start by estimating a bivariate model for economic shocks. Specifically, the probability of experiencing an economic shock—such as job loss or business failure—is modeled as a function of the household head's age, education, region of residence, and household income quintile. Older individuals face a lower risk of shocks, while younger workers—who typically experience higher job turnover—are more vulnerable. Employment sector also plays a significant role: household heads working in construction are more likely to experience income losses during adverse events, reflecting the sector's high employment volatility. Table 12 in the Appendix reports the full

estimation results.

Permanent income is then estimated using Equation 2 (Section 3), incorporating these shock probabilities. Transitory income is calculated as the difference between observed income and estimated permanent income. Figures 3 and 4 show that permanent income closely aligns with total income, while transitory income displays much greater volatility. This volatility amplifies with household income: higher-income households register larger transitory fluctuations.

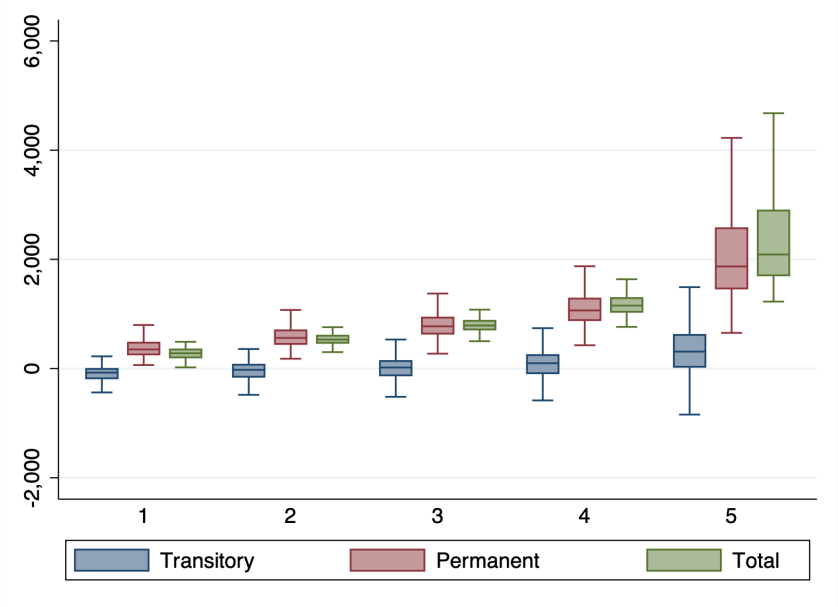
Among lower-income households, average transitory income is negative—indicating limited savings capacity and a higher likelihood of income-depleting shocks (Figure 4). In 2020, permanent income fell below observed income, reflecting the pandemic-driven spike in shock incidence. This pattern aligns with the theory of consumption smoothing: in the face of severe shocks, permanent income remains relatively stable while transitory income absorbs the adjustment—enabling households to maintain more stable consumption patterns.

Figure 3. Permanent, Transitory, and Total Income per Capita (2022 Soles, Lima Prices)



Note: Includes only observations with identified permanent income. Outliers are excluded.
Source: INEI, ENAHO 2009 - 2022.

Figure 4. Permanent, Transitory, and Total Income per Capita by Income Quintile (2022 soles)



Note: Includes only observations with identified permanent income. Outliers are excluded. The horizontal axis represents income quintiles, with 1 being the lowest-income quintile.
Source: INEI, ENAHO 2009 - 2022.

5.2 Consumption Smoothing

We estimate Equation 1 for the period 2009–2022, incorporating year fixed effects to account for macro shocks that could impact households. This is especially important for 2020–2021, when the pandemic affected the population broadly. However, results remain nearly identical if we restrict the sample to 2009–2019 (Table 10 in the Appendix), indicating that year fixed effects stabilize our consumption equation estimates.

A key finding is that, for the full sample, the MPC of permanent income (0.52) exceeds that of transitory income (0.18), confirming that, on average, Peruvian households smooth consumption (Table 2). This result is highly statistically significant: an F-test of the null hypothesis ($\beta = \gamma$) is rejected at the 1 % level.[2] Moreover, the conclusion holds across subsamples—both households with and without economic shocks—and is robust in median quantile regressions (Table 11 in the Appendix).[3]

[2]Throughout the analysis, statistical significance of consumption smoothing is assessed using an F-test of the null hypothesis that the coefficients on permanent and transitory income are equal. The alternative hypothesis is that the MPC of permanent income exceeds that of transitory income.

[3]Quantile regression is employed as a robustness check to assess the sensitivity of the estimates to potential violations of the assumptions underlying ordinary least squares (OLS). The analysis focuses on the median quantile, which offers greater robustness to outliers that could bias the OLS estimates. The results obtained from quantile regression are broadly consistent with those from OLS, both in terms of the estimated MPCs and the overall support for the consumption smoothing hypothesis. These findings suggest that the study's conclusions are robust to the presence of outliers.

Regarding other explanatory variables, the coefficient on income variance is negative, indicating that households facing greater income uncertainty tend to consume less—consistent with risk aversion influencing consumption and saving decisions. Our regressions also control for geographic domain, employment status, region, and other covariates (Table 2). Notably, the consumption smoothing result is robust even when these controls are excluded.

Table 2

Consumption Equation Estimates (2009-2022)

	With Controls			No Controls		
	Total	With Economic Shock	Without Economic Shock	Total	With Economic Shock	Without Economic Shock
Permanent income	0.523***	0.541***	0.522***	0.618***	0.618***	0.618***
	(43.57)	(19.35)	(41.73)	(62.69)	(29.56)	(60.06)
Transitory income	0.176***	0.248***	0.173***	0.179***	0.249***	0.176***
	(12.03)	(7.29)	(11.33)	(11.84)	(7.25)	(11.15)
Income variance	-4.257***	-5.895***	-4.197***	-5.608***	-7.080***	-5.559***
	(-7.85)	(-6.10)	(-7.61)	(-9.87)	(-7.13)	(-9.61)
Age	Yes	Yes	Yes	No	No	No
Region	Yes	Yes	Yes	No	No	No
Occupation	Yes	Yes	Yes	No	No	No
Education	Yes	Yes	Yes	No	No	No
Gender	Yes	Yes	Yes	No	No	No
Household size	Yes	Yes	Yes	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	50,841	2,282	48,559	50,841	2,282	48,559
Prob >F	0	0	0	0	0	0
R-squared	0.688	0.69	0.688	0.688	0.69	0.688
Consumption smoothing test (prob >F)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

Source: INEI, ENAHO 2007-2022

Note: * Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Only economic shocks (job loss and family business failure) are considered.

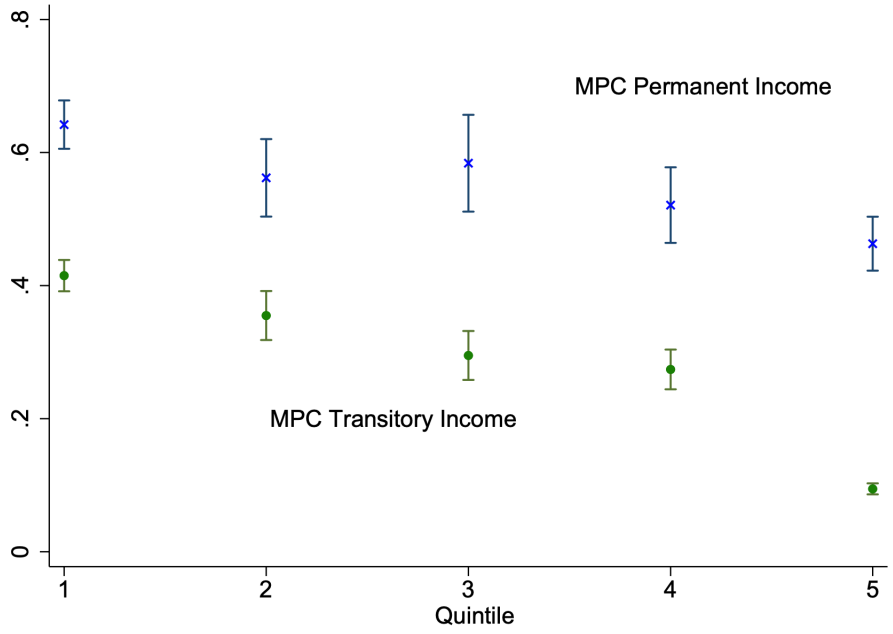
Consumption Smoothing Across Income Quintiles

A household's position within the income distribution can significantly influence its ability to smooth consumption. International evidence suggests that smoothing behavior varies across different income levels. When we estimate the consumption model by income quintiles (using data from 2007–2021), we find evidence of smoothing in every income group (Figure 5, Table 3).

In all quintiles, the MPC of permanent income significantly exceeds that from transitory income. This finding holds even when restricting the sample to 2007–2019 (Table 13 in the Appendix). The result also holds under median quantile regressions within each income quintile, indicating that the weak form of the PIH remains robust to outliers.

One notable insight is that the negative impact of income variance on consumption is strongest in the lowest quintiles and generally diminishes as income rises—except in the top quintile (Q5). This pattern suggests concave risk aversion with respect to income. Examining MPCs by quintile therefore reveals important heterogeneity in smoothing capacity across the income distribution. To assess this, we test whether the permanent (and transitory) income MPCs differ significantly between quintiles, using hypothesis tests similar to those applied by Meng (2003).[4]

Figure 5. Marginal Propensity to Consume by Income Quintile (2009-2022)



Source: INEI, ENAHO 2009 - 2022.

Results show that MPCs of permanent income vary significantly across almost all quintile comparisons. The only exceptions, where we cannot reject equality at the 95 % confidence level, are between Q2 and Q3, and between Q3 and Q4 (Table 4). Regarding transitory income, the MPCs are statistically higher in Q1 (0.42) and Q2 (0.35) than in Q3 (0.29), Q4 (0.27), and Q5

[4]It is worth noting that this is the standard approach used in the consumption equation literature to examine differences across income quintiles (Fisher et al., 2020). However, alternative statistical techniques are also available for similar purposes, such as quantile regression (Koenker and Halock, 2001), which offers several potential advantages: greater robustness in modeling extreme values of the dependent variable, no assumption of a specific distribution, and increased flexibility when working with highly variable data (Rodriguez and Yao, 2017). Unlike OLS, which estimates the conditional mean, quantile regression estimates different points of the conditional distribution, such as the median or other quantiles—requiring a larger dataset. In this study, the quintile-based analysis is intended to examine how income rank interacts with other covariates.

Table 3

Consumption Equation Estimates by Income Quintile (2009–2022)

	Income Quintiles				
	Q1	**Q2**	**Q3**	**Q4**	**Q5**
Permanent income	0.642***	0.562***	0.584***	0.521***	0.463***
	(34.57)	(18.90)	(15.72)	(17.97)	(22.38)
Transitory income	0.415***	0.355***	0.295***	0.274***	0.0945***
	(19.74)	(11.54)	(7.80)	(8.94)	(3.96)
Income variance	-2.968***	-2.030***	-2.132**	-3.079***	-3.289***
	(-3.59)	(-5.47)	(-2.80)	(-3.93)	(-5.40)
No. observations	12,019	10,298	9,253	9,111	10,160
Prob >F	0	0	0	0	0
R-squared	0.373	0.281	0.264	0.26	0.466
Consumption smoothing test (prob >F)	0.000***	0.000***	0.000***	0.000***	0.000***

Source: INEI, ENAHO 2009-2022

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. t-statistics in parentheses. Controls include age, region, occupation, education, gender, number of dependents, and year fixed effects. Estimates are from the first column of Table 2, disaggregated by income quintile. Only economic shocks (job loss and family business failure) are considered.

(0.09), indicating lower saving rates among the poorest two quintiles. These results imply weaker consumption smoothing at the bottom of the income distribution—a conclusion consistent with literature such as Mamedli and Sinyakov (2018), who document significantly lower smoothing among low-income households.

Table 4

Tests of Differences in MPC of Permanent and Transitory Income Across Quintiles

(a) Differences in MPC of Permanent Income

	Q1	Q2	Q3	Q4
Q2	0.02**			
Q3	0.00***	0.33		
Q4	0.00***	0.02**	0.25	
Q5	0.00***	0.00***	0.00***	0.00***

(b) Differences in MPC of Transitory Income

	Q1	Q2	Q3	Q4
Q2	0.77			
Q3	0.00***	0.01***		
Q4	0.00***	0.01**	0.76	
Q5	0.00***	0.00***	0.00***	0.00***

Source: INEI, ENAHO 2009-2022

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Figures are p-values from F-tests of differences in MPC across income quintiles.

Consumption Smoothing Across Spending Categories

While the analysis so far has focused on total consumption, it is important to understand whether smoothing behavior varies across different spending categories. In other words, some expenditures—such as essential food—are less likely to be reduced even when households face significant shocks, whereas others—such as leisure-related goods and services—may be more discretionary and subject to cutbacks.

Analyzing this heterogeneous behavior requires identifying the most relevant spending categories. Due to data limitations, this section focuses on four groups: two essentials—food and healthcare—and two non-essentials—clothing and a combined category of education and leisure. For example, food expenditure accounts for nearly half of total consumption, a common pattern in developing economies (Albisu and Laajimi, 1997). As Peru has developed economically, the share of food in household expenditure has declined—mirroring the trend observed in Spain between 1958 and 1993. Another notable category is housing and transport-related spending, which has increased in recent years due to lifestyle changes (such as children leaving home and smaller household sizes) and greater spending on internet and vehicle use. Healthcare spending peaked in 2020 due to the COVID-19 pandemic, while education and leisure declined, reflecting temporary school closures, increased dropout rates, and a shift from private to public schooling. Based on this grouping, the analysis focuses on the four categories noted above: food, healthcare, clothing, and education and leisure.

Table 5 reports that the MPC of permanent income exceeds that of transitory income across all four categories. However, an F-test confirms that this difference is statistically significant only in the essential categories of food and healthcare. In the non-essentials—clothing, education and leisure—the MPCs are statistically indistinguishable. This suggests that households smooth consumption in essential categories when faced with economic shocks but are more likely to adjust non-essential expenditures depending on the nature of the shock. These findings are consistent with those of Meng (2003), who documents smoothing in food expenditures but not in education or leisure among urban Chinese households.

Table 5

Consumption Equation Estimates by Spending Category, 2009–2022 (Households Experiencing Economic Shocks Only)

Variables	Food	Health	Clothing	Education and Leisure
Permanent income	0.143***	0.0585***	0.0205***	0.0316***
	(9.8)	(3.0)	(7.66)	(4.78)
Transitory income	0.0949***	0.0283**	0.0140***	0.0317
	(7.32)	(2.67)	(4.61)	(1.34)
Income variance	-1.360*	-0.94	-0.187**	-0.157
	(-2.12)	(-1.85)	(-2.82)	(-0.63)
No. observations	2,282	2,282	2,282	2,282
Prob >F	0	0	0	0
R squared	0.368	0.206	0.212	0.136
Consumption smoothing test (prob >F)	0.086*	0.04**	0.11	0.98

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Controls include age, region, occupation, education, gender, number of dependents, and year fixed effects. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.
Source: ENAHO 2014-2022.

5.3 Consumption Smoothing Strategies

This section evaluates the role of various smoothing mechanisms used by households. We differentiate between ex ante strategies—such as insurance and formal financial access—that are in place before shocks and may help mitigate their impact; and ex post strategies—actions taken in response to shocks, like informal loans or government transfers. Considering Peru's institutional context—high informality and poverty—ex post strategies are likely more prevalent among the population.

Ex Ante Smoothing Strategies

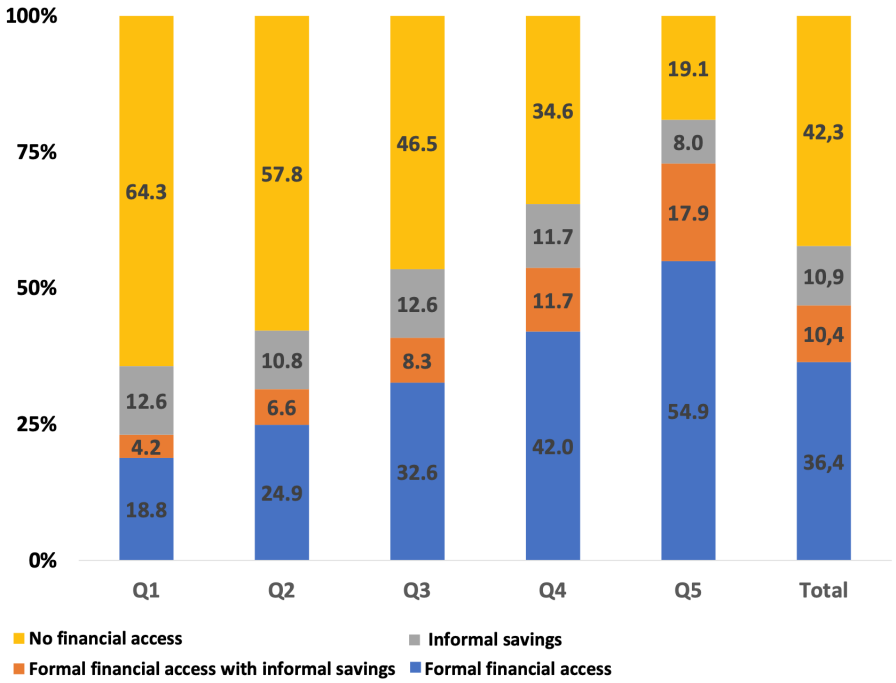
A. Financial Access

Barriers to formal financial access are a primary reason households cannot shift income across time, which undermines consumption smoothing. Such barriers are especially salient in developing

countries with underdeveloped financial systems, like Peru.

We define a household as having formal financial access if the household head reports holding any of the following: a savings account, a time deposit, a checking account, a credit card, a debit card, interest-bearing deposits, a housing loan, or retirement severance savings (*Compensación por Tiempo de Servicios*, CTS). This definition draws on ENAHO's financial inclusion module.[5] A strong positive correlation emerges between income level and financial access: only 23 % of households in the bottom income quintile have formal financial access, compared to 72.8 % in the top quintile (Figure 6).

Figure 6. Peruvian Households by Type of Financial Access, by Income Quintile (Percentage, 2019)



Note: A household is considered to have access to the formal financial system if the household head reports holding a savings account, term deposit, checking account, credit card, or debit card; receiving income from bank deposits; receiving CTS; or holding a mortgage loan. Informal saving refers to saving through a rotating savings group (*junta*), keeping money at home, or saving with family or acquaintances, without using the formal financial system. Formal financial access with informal saving includes cases where households report both formal access and at least one form of informal saving.
Source: INEI, ENAHO 2019.

Table 6 presents consumption equation estimates for households experiencing economic shocks, stratified by financial access type: formal access, informal savings access, and no access. While the MPC from permanent income exceeds that from transitory income in all three groups, the smoothing hypothesis (validated by an F-test) holds statistically only for households with formal

[5]This definition follows the standard used in Peru's financial inclusion surveys and reflects the range of formal instruments available to households.

financial access. Households lacking formal access fail to smooth consumption in response to economic shocks. These findings provide empirical evidence that financial constraints—lack of formal credit or savings—significantly hinder consumption smoothing.

Notably, the severity of a shock influences the relevance of financial instruments: between 2014 and 2019, only formal financial access significantly supported smoothing. However, when including 2020–2021 in the estimation period, informal credit access becomes statistically significant at the 5 % level (Table 6, bottom row). This suggests prolonged, large-scale shocks—such as the pandemic—made informal credit a meaningful consumption-smoothing mechanism. [6]

Table 6

Consumption Equation Estimates by Type of Financial Access, 2009–2019 (Households Experiencing Economic Shocks Only)

	Formal Access	Informal Savings Only	No Access
Permanent income	0.545***	0.540***	0.454***
	(8.58)	(11.07)	(8.20)
Transitory income	0.216*	0.330*	0.359***
	(2.47)	(2.23)	(5.19)
Income variance	-5.948***	-7.193	-2.385
	(-4.10)	(-1.23)	(-1.13)
No. observations	357	158	287
Prob >F	0	0	0
R squared	0.687	0.810	0.699
Consumption smoothing test (prob >F) 2014–2019	0.003***	0.24	0.31
Consumption smoothing test (prob >F) 2019–2021	0.0006***	0.043*	0.02*

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Estimates include controls for age, region, occupation, education, gender, number of dependents, and year fixed effects. Only economic shocks (job loss and family business failure) are considered. The smoothing test for the 2019–2021 period is based on the model estimated for that same period.
Source: INEI, ENAHO 2014–2021.

B. Health Insurance

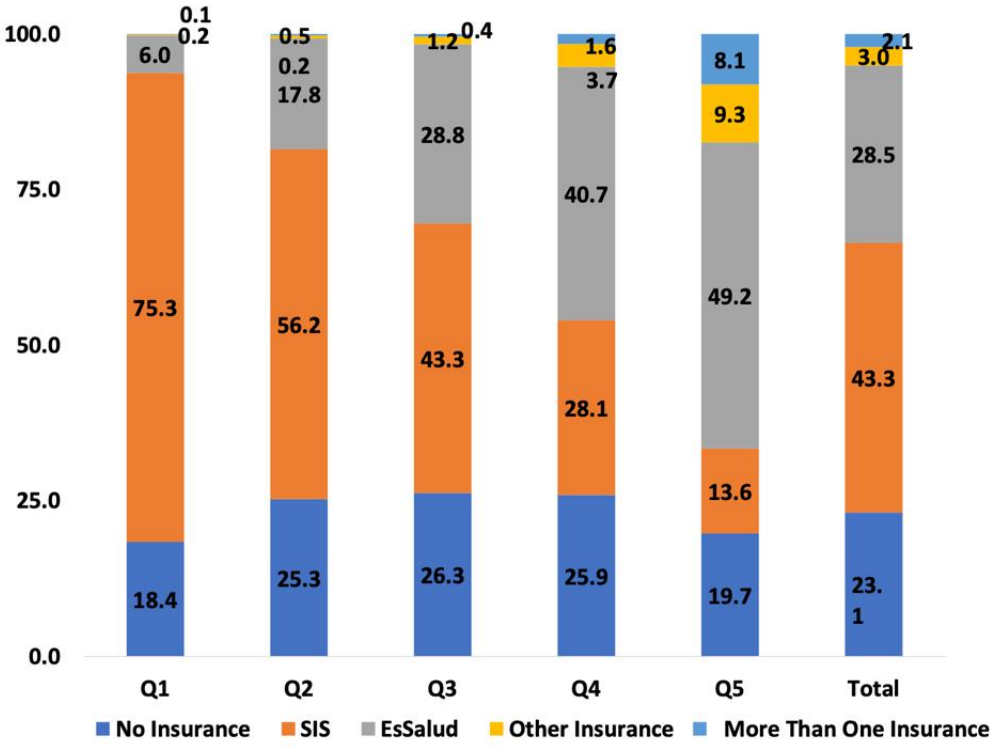
A key question is whether health insurance enables households to smooth medical spending in the face of income shocks. ENAHO identifies the following insurance types for the household head: the Comprehensive Health Insurance program (*Seguro Integral de Salud*, SIS), private

[6] Since 2015, ENAHO has included a financial inclusion module that gathers data on whether individuals have access to formal financial products, such as savings accounts, time deposits, checking accounts, or credit and debit cards. It also captures the use of informal saving practices, including rotating savings groups, saving through relatives or friends, or keeping cash at home. This allows for a more accurate assessment of both formal financial access and informal saving behaviors across the population.

insurance, the public social security health provider (*Seguro Social de Salud*, EsSalud), as well as military/police, university, and private school insurance. Figure 7 displays the 2019 distribution of Peruvian households by income quintile and insurance type. SIS is the most prevalent coverage, insuring 43.3 % of the population nationwide, followed by EsSalud at 28.5 %. The remaining categories account for only a small share of coverage, underscoring the limited reach of private health insurance in Peru.

Coverage varies significantly by income quintile. Middle-income groups (Q2–Q4) have the lowest coverage rates—25.3 %, 26.3 %, and 25.9 %, respectively. This reflects SIS's mission to serve vulnerable households, especially those classified as poor or extremely poor under the national household registry (*Padrón General de Hogares*). By contrast, EsSalud targets formally employed workers, as the cost of coverage is paid by their employer—hence its dominance in higher-income quintiles.

Figure 7. Health Insurance Coverage by Income Quintile, 2019 (Percent of Households)



Source: ENAHO (2019), INEI.

The smoothing effect is particularly evident among EsSalud affiliates, who retain coverage not only while employed but also during periods of unemployment under the Special Unemployment Coverage Right (*Derecho Especial de Cobertura por Desempleo*), a form of continued coverage after job loss (*latencia*). This provision allows the insured and their dependents to access EsSalud services for up to 12 months following job termination—provided the employer made required contributions during the three years prior to termination.

The estimation of the health consumption equation allows us to test the smoothing hypothesis for this specific spending category. On average, the MPC of permanent income exceeds that of transitory income—this holds both for households with health insurance and for those without. However, the consumption smoothing hypothesis (i.e., that the coefficient on permanent income exceeds that on transitory income) is statistically significant only for households that experienced an economic shock and were covered by health insurance. In contrast, households without any form of health insurance show no evidence of smoothing, underscoring the importance of being insured—especially in the face of economic shocks (Table 7). Finally, to assess the impact of the COVID-19 pandemic, the model is estimated for the 2020–2021 period among households that experienced economic shocks. The results indicate that these households were unable to smooth health consumption, as the null hypothesis of coefficient equality could not be rejected.

Table 7

Consumption Equation Estimates for Health, by Health Insurance Coverage, 2009–2019 (Households Experiencing Economic Shocks Only)

Variables	Full Sample	With Insurance	Without Insurance	2020–21
Permanent income	0.0693**	0.0839**	0.0252**	0.0284*
	(2.59)	(2.67)	(2.93)	(2.09)
Transitory income	0.0294*	0.0232	0.0176*	0.0253
	(2.05)	(1.13)	(2.12)	(1.93)
Income variance	-1.143	-1.322	-0.18	0.361
	(-1.70)	(-1.85)	(-0.31)	(0.47)
No. observations	1,338	845	493	723
Prob >F	0	0		
R squared	0.255	0.329	0.124	0.136

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Estimates include controls for age, region, occupation, education, gender, number of dependents, and year fixed effects. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.
Source: INEI, ENAHO 2014–2021.

Ex Post Smoothing Strategies

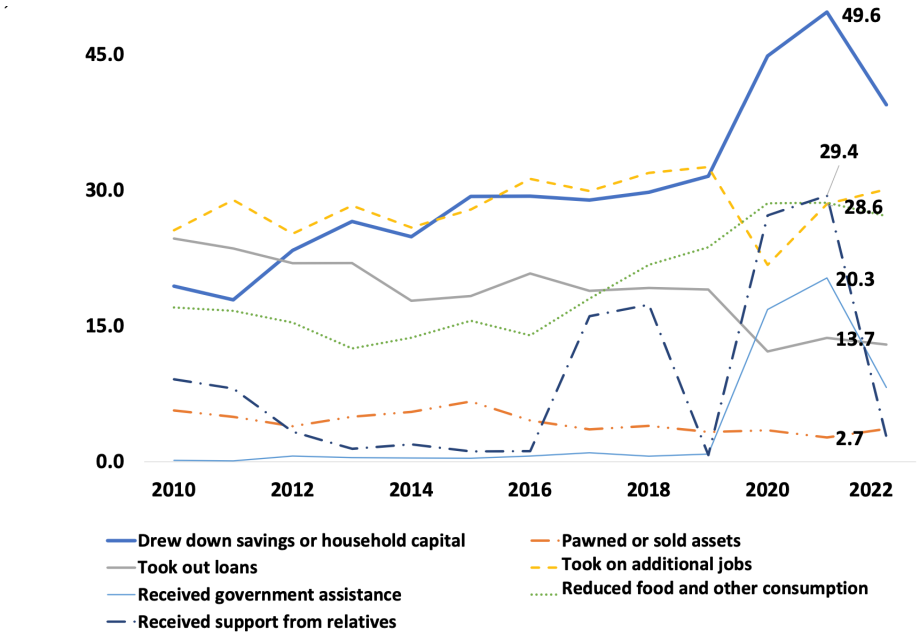
This section assesses households' ability to smooth consumption using ex post strategies—those applied after shocks occur. These responses may complement ex ante tools (such as insurance or formal financial access) for some households or serve as their primary buffer in the absence of such preventive instruments.

ENAHO tracks the following strategies for households that experience income and/or asset loss due to shocks: (i) using family savings or capital, (ii) pawning or selling assets, (iii) taking out loans, (iv) taking on additional jobs, (v) receiving government assistance, (vi) reducing food or other consumption, (vii) receiving support from relatives, and (viii) taking no action. The key question is whether these strategies help mitigate the negative impact of shocks on consumption

and, by extension, on household welfare. Moreover, they illuminate how adverse shocks transmit through different coping channels (Figure 8).

In 2021, using family savings or capital was the most common response, reported by 49.6 % of households that experienced shocks and incurred income or asset losses. This behavior has risen steadily over the sample period, peaking during 2020–2021. Cutting back on food consumption was used by 29.9 % of such households in 2021. Taking on additional work is also significant, particularly during the pandemic—consistent with findings in (Céspedes, 2017) on income augmentation strategies. Notably, receiving family support and government aid also spiked during the pandemic; the former reached 28.6 %, reflecting policy measures and social networks activated in 2020–2021.

Figure 8. Coping Strategies in Response to Income/Asset Loss from Economic Shocks (Percent)



Note: Percentages of households experiencing income and/or asset losses from economic shocks.
Source: INEI, ENAHO 2010-2022.

The consumption smoothing significance of each strategy is tested individually, focusing on households that both experienced economic shocks and suffered income or asset losses.[7] This approach limits the sample, as smoothing analysis relies on three-period panel data and excludes households without full panel coverage.

The role of household-level strategies in consumption smoothing following economic shocks is examined in table 14le 8. On average, these strategies appear effective: households that adopted any of the eight identified coping mechanisms were more likely to maintain stable consumption levels (Column 9). However, when examining each strategy individually, results are mixed.

[7] Among households affected by economic shocks between 2007 and 2021, 97 % experienced a loss of income and/or assets.

One notably effective strategy is taking on additional employment. This mechanism is widely used in the Peruvian economy as a means of boosting household income. According to Céspedes (2017), individuals with multiple jobs earn, on average, 38 % more than those with only one. Results reported in Column 4 suggest that holding multiple jobs not only increases income but also serves as an efficient tool for smoothing consumption during economic disruptions.

Drawing down savings, pawning or selling assets, and taking loans (Columns 1–3) also contribute significantly to smoothing, even though they do not involve formal financial institutions. Their effectiveness aligns with the smoothing benefits associated with access to formal finance discussed in the previous section.

By contrast, support from family members proves insufficient for mitigating the consumption impact of shocks. While intrafamily transfers play a meaningful role in supplementing household income (Céspedes, 2017), they appear less effective as a shock-response mechanism. One possible explanation is that such transfers are regular and institutionalized, limiting their responsiveness and scalability during periods of heightened vulnerability.

Government transfers, typically targeted at lower-income households and linked to poverty status, became significantly more widespread during the pandemic (2020–2021). Given the nature and magnitude of the COVID-19 shock, these transfers proved sufficient to support consumption smoothing. Column 5 of Table 8 confirms that households receiving government assistance during an economic shock were able to stabilize consumption.

In stark contrast, households that did not adopt any coping strategy (Column 8) were unable to smooth consumption. This group effectively serves as a counterfactual, highlighting the importance of proactive income-compensating measures following a shock.

An important question is whether the effectiveness of these ex post strategies varies across income levels. While access to preventive instruments—such as insurance or formal finance—is concentrated in higher-income quintiles, the use of reactive coping strategies shows less variation by income.

Table 9 shows that consumption smoothing is statistically significant among households in Q2 through Q5, but not in Q1, where the poorest households are concentrated. This suggests that a large share of the population can successfully use ex post strategies to buffer against shocks. Unfortunately, small sample sizes within each income quintile limit more granular analysis by strategy.

Table 8

Consumption Equation Estimates by Coping Strategy for Economic Shocks, 2009–2021

Variables	Drew Down Savings or Household Capital	Pawned or Sold Assets	Took Out Loans	Took on Additional Jobs	Received Government Assistance	Reduced Food and Other Consumption	Received Support from Relatives	Took no Action	Used Any Strategy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Permanent income	0,549***	0,688***	0,531***	0,617***	0,525***	0,658***	0,349***	0,560***	0,522***
	(12,42)	(4,23)	(9,34)	(14,24)	(4,31)	(10,40)	(4,95)	(12,83)	(15,11)
Transitory income	0,257***	0,0881	0,354***	0,309***	0,273	0,346***	0,327***	0,509**	0,252***
	(3,70)	(0,54)	(4,72)	(4,89)	(1,49)	(4,84)	(4,61)	(3,03)	(6,90)
Income variance	-5,487***	-23,00*	-4,154	-16,96***	10,54	-3,942	-4,487	13,26	-5,320***
	(-3,34)	(-2,64)	(-1,01)	(-3,75)	(0,35)	(-1,84)	(-1,12)	(0,87)	(-4,22)
No. observations	562	66	350	564	108	317	231	383	1836
Prob >F	0	0	0	0	0	0	0	0	0
R squared	0,718	0,842	0,791	0,761	0,631	0,72	0,726	0,659	0,669
Consumption smoothing test (prob>F)	0,001***	0,0224**	0,0528*	0,0004***	0,0004***	0,0003***	0,8293	0,7698	0,0000***

Nota: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Only households experiencing income and/or asset losses from economic shocks are considered. Controls include age, region, occupation, education, gender, number of dependents, and year fixed effects. Column 9 reports estimates for households that used any of the eight coping strategies. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.

Fuente: INEI, ENAHO 2009-2021.

5.4 Policy Implications

This study contributes to the broader discussion on how Peruvian households respond to economic shocks, highlighting both preventive and ex post coping mechanisms. Although the analysis does not directly evaluate specific government programs aimed at protecting household income or consumption, the strategies examined are relevant to a range of broader public policies. Accordingly, the policy implications outlined here may offer useful guidance.

First, the results underscore the importance of the formal credit market as a mechanism for consumption smoothing. This finding directly supports the rationale behind financial inclusion policies, which have been a focus of Peruvian government efforts in recent decades. Yet international comparisons show that financial inclusion in Peru remains among the lowest in the region—limiting households' ability to use credit markets as a form of insurance. The immediate implication is that shocks are more likely to translate into welfare losses for a large share of the population with little or no access to formal credit. Expanding financial inclusion should therefore remain a key policy priority.

A second area for policy attention concerns access to health insurance. In Peru, the public health system—primarily composed of the Ministry of Health (MINSA) and EsSalud—serves the

Table 9

Consumption Equation Estimates by Income Quintile for Households Using at Least One Coping Strategy (2009–2021)

	Income Quintiles					Used at Least One Strategy
Variables	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	(6)
	(1)	(2)	(3)	(4)	(5)	
Permanent income	0.348	0.378*	0.514***	0.594***	0.437***	0.522***
	(1.56)	(2.48)	(3.33)	(3.67)	(7.94)	(15.11)
Transitory income	0.204	0.189	0.203	0.307*	0.268***	0.252***
	(0.91)	(1.19)	(1.34)	(1.98)	(3.76)	(6.90)
Income variance	-1.224	-6.697	-4.744	-1.149	-5.668***	-5.320***
	(-0.14)	(-0.89)	(-1.81)	(-0.51)	(-4.17)	(-4.22)
No. observations	223	390	403	411	409	1,836
Prob >F	0	0	0	0	0	
R squared	0.387	0.319	0.369	0.411	0.555	0.669
Consumption smoothing test (prob >F)	0.16	0.01**	0.0002***	0.0001***	0.06*	0.0000***

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Controls include age, region, occupation, education, gender, number of dependents, and year fixed effects. Only households experiencing income and/or asset losses from economic shocks are considered. Results refer to households using any of the eight coping strategies listed. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.
Source: INEI, ENAHO 2009–2021.

majority of the population. The evidence presented here indicates that access to health coverage plays a critical role in household efforts to smooth consumption.

Third, the analysis highlights the relevance of government transfers as ex post coping mechanisms. These transfers were widely deployed during 2020 and 2021, and the model confirms their effectiveness in mitigating the impact of the COVID-19 economic shock. Prior studies emphasize the role of public transfers as a vital income source for poor and vulnerable households. This study adds to that literature by showing that such transfers also serve as effective instruments for consumption smoothing in times of adverse events.

Finally, because consumption smoothing enables households to offset income shocks, the functioning of credit markets can have broader general equilibrium implications—particularly for interest rates. This connection is especially relevant when considering policies aimed at expanding financial inclusion, which may in turn affect conditions in the loanable funds market. The general equilibrium effects of household smoothing behavior and financial inclusion thus merit further research and should remain on the policy agenda.

6. Conclusions

This study provides empirical evidence on the extent to which Peruvian households are able to smooth consumption in the face of economic shocks. From a policy perspective, understanding households' smoothing capacity is key to tracing how shocks are transmitted to household welfare. It also offers insight into the potential effectiveness of various policy tools. For instance,

if consumption is highly sensitive to permanent income, then policies targeting transitory income—such as short-term government transfers—may have limited effects on household welfare.

Conceptually, households can shield themselves from income shocks if they have access to adequate financial instruments such as insurance, savings, or credit that allow them to maintain consumption temporarily. In practice, however, these instruments are often not available—particularly among lower-income households. In such cases, financial constraints hinder full smoothing, and income shocks are likely to translate into welfare losses.

This paper assesses consumption smoothing capacity by comparing the MPC of permanent income with that of transitory income—a test of the weak form of the PIH. The results, based on ENAHO panel data from 2009 to 2022, show that MPC of permanent income is significantly higher than that of transitory income. This finding offers robust evidence that, on average, Peruvian households do engage in consumption smoothing when faced with income shocks.

The analysis also distinguishes between two types of smoothing strategies: ex ante mechanisms such as insurance and access to formal credit, and ex post mechanisms such as family transfers or government assistance. Importantly, the capacity to smooth consumption is not uniform across the income distribution. Higher-income households are more likely to rely on formal instruments such as CTS or financial assets. In contrast, low-income households have fewer such resources and display a more limited ability to smooth consumption—suggesting that shocks have more damaging welfare effects in this group. Expanding financial inclusion would help enhance smoothing and mitigate welfare losses during periods of economic stress.

Ex post strategies—used by a large share of the population—also contribute to smoothing on average. The most common include drawing down savings or assets, which are shown to be effective in stabilizing consumption among households that suffered income and asset losses due to shocks.

An especially notable mechanism, often overlooked in the literature, is secondary employment. Holding multiple jobs is a widespread income-generation strategy in Peru. This study finds that it also serves as an effective way to smooth consumption following income losses.

Both public and private transfers are commonly used to cope with shocks. Private transfers—typically between households—play a substantial role in supporting vulnerable groups, but their effectiveness as smoothing mechanisms appears limited.

Finally, the results show significant heterogeneity in the effectiveness of ex post strategies across the income distribution. For households in Q1, the poorest quintile, the instruments analyzed do not appear sufficient to stabilize consumption. By contrast, higher-income households more successfully use ex post mechanisms to mitigate the effects of income losses.

While the findings do not evaluate specific government programs, they clearly align with several areas of policy interest. Measures to expand access to formal credit remain essential for helping households manage income shocks. Likewise, ensuring access to health insurance contributes meaningfully to resilience. As for ex post responses, the model confirms that public transfers deployed in 2020–2021 served as effective smoothing tools during the pandemic—underscoring their role in future policy design.

1. Appendix

Table 10

Consumption Equation Estimates (2009–2019)

	With Controls			No Controls		
	Total	With Economic Shock	Without Economic Shock	Total	With Economic Shock	Without Economic Shock
Permanent income	0.523***	0.555***	0.521***	0.622***	0.625***	0.621***
	(38.06)	(15.30)	(36.68)	(54.43)	(25.43)	(52.44)
Transitory income	0.166***	0.254***	0.162***	0.171***	0.260***	0.168***
	(9.73)	(5.66)	(9.21)	(9.68)	(5.70)	(9.19)
Income variance	-4.288***	-6.550***	-4.200***	-5.816***	-7.497***	-5.747***
	(-6.23)	(-6.37)	(-5.98)	(-8.07)	(-7.75)	(-7.80)
Age	Yes	Yes	Yes	No	No	No
Region	Yes	Yes	Yes	No	No	No
Occupation	Yes	Yes	Yes	No	No	No
Education	Yes	Yes	Yes	No	No	No
Gender	Yes	Yes	Yes	No	No	No
Household size	Yes	Yes	Yes	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	39,472	1,337	38,135	39,472	1,337	38,135
Prob >F	0	0	0	0	0	0
R squared	0.693	0.711	0.693	0.663	0.685	0.662
Consumption smoothing test (prob >F)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. t-statistics in parentheses. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2022 soles.

Source: INEI, ENAHO 2009–2019.

Table 11

Consumption Equation Estimates Using Quantile Regression, 2009–2022

	With Controls			No Controls		
	Total	With Economic Shock	No Economic Shock	Total	With Economic Shock	No Economic Shock
Permanent income	0.534***	0.549***	0.533***	0.650***	0.643***	0.650***
	(87.73)	(18.00)	(83.35)	(135.82)	(25.30)	(132.64)
Transitory income	0.244***	0.291***	0.239***	0.253***	0.309***	0.250***
	(31.72)	(10.77)	(28.81)	(30.85)	(10.00)	(29.25)
Income variance	-5.584***	-6.087***	-5.549***	-8.090***	-7.353**	-8.034***
	(-14.76)	(-7.76)	(-11.15)	(-26.98)	(-2.76)	(-18.81)
Age	Yes	Yes	Yes	No	No	No
Region	Yes	Yes	Yes	No	No	No
Occupation	Yes	Yes	Yes	No	No	No
Education	Yes	Yes	Yes	No	No	No
Gender	Yes	Yes	Yes	No	No	No
Household size	Yes	Yes	Yes	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	50,841	2,282	48,559	50,841	2,282	48,559
Prob >F	0	0	0	0	0	0
Pseudo R-squared	0.4807	0.4467	0.4827	0.4539	0.4135	0.4559
Consumption smoothing test (prob >F)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. t-statistics in parentheses. Quantile regression estimates are based on the median quantile. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.

Source: INEI, ENAHO 2009–2022.

Table 12

Probit Model of the Likelihood of Experiencing an Economic Shock (Pooled Data, 2009–2022)

Variables	**Coefficients**	**z-statistic**
Age	-0.0237***	(-5.16)
Education	0.0249***	(8.44)
Female	0.135***	(4.62)
Sector		
Mining	0.239**	(2.74)
Manufacturing (consumption)	0.199***	(3.58)
Manufacturing (intermediate & capital goods)	0.256***	(3.51)
Construction	0.413***	(9.61)
Trade	0.252***	(6.37)
Non-personal services	0.208***	(5.77)
Personal services	0.357***	(7.53)
Domestic service	0.338***	(3.35)
Income Quintile		
2	0.126**	(3.25)
3	0.100*	(2.43)
4	0.00781	(0.18)
5	-0.0810	(-1.78)
Region		
Central Coast	-0.190***	(-4.46)
Southern Coast	0.00955	(0.21)
Northern Sierra	-0.349***	(-6.32)
Central Sierra	-0.282***	(-8.24)
Southern Sierra	-0.0635	(-1.80)
Amazon Region	-0.261***	(-7.76)
Lima	0.0825*	(2.34)
Constant	-1.760***	(-33.66)
Pseudo R2	0.049	
Prob >chi2	0	
No. of observations	89,432	

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Only economic shocks (job loss and family business failure) are considered.
Source: INEI, ENAHO 2007–2021.

Table 13

Consumption Equation Estimates by Spending Category, 2009–2019 (Households Experiencing Economic Shocks Only)

Variables	Food	Health	Clothing	Education & Entertainment
Permanent income	0.118***	0.0693**	0.0272***	0.0393***
	(6.74)	(2.59)	(6.82)	(3.37)
Transitory income	0.0810***	0.0294*	0.0141**	0.0534
	(5.29)	(2.05)	(2.89)	(1.20)
Income variance	-1.230*	-1.143	-0.187	0.285
	(-2.03)	(-1.70)	(-1.63)	(0.55)
No. observations	1,338	1,338	1,338	1,338
Prob >F	0	0	0	0
R squared	0.431	0.255	0.250	0.142
Consumption smoothing test (prob >F)	0.027	0.085	0.11	0.98

Note: *Statistically significant at the 10 % level, ** at the 5 % level, *** at the 1 % level. Controls include age, region, occupation, education, gender, number of dependents, and year fixed effects. Only economic shocks (job loss and family business failure) are considered. Income and consumption in 2021 soles.
Source: INEI, ENAHO 2014–2019.

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