The Hebrew University of Jerusalem

The Bogen Family Department of Economics

Consumption Smoothing May Help Account for Part of the Income - Consumption Gap among the Poor

Tal Asif

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in the Faculty of Social Sciences

Advisor: Professor Ori Heffetz

September 3, 2025

Acknowledgements

I would like to thank Professor Ori Heffetz, Professor Moses Shayo, and my fellow students at the grad student seminar, who offered valuable advice and helped improve my work.

Note on AI Assistance

In the absence of clear institutional guidelines, I find it important to be explicit about my use of generative AI tools in this paper. In this work, I used AI, specifically ChatGPT models 3.5 and 4, as well as Gemini Pro, to assist with code development and with language editing. All ideas, logic, fact-checking, and conclusions are my own.

Contents

1 Introduction

A central empirical puzzle in poverty research is that many low-income households report expenditures above reported income. This *"income - consumption gap"* appears in multiple countries and is large in magnitude in the lower tail of the income distribution (Headey, 2008; Meyer and Sullivan, 2011b,a, 2012; Gibson, 2016). A substantial body of literature shows that survey error, especially underreporting of transfers and program participation, explains an important share of this discrepancy (Meyer and Mittag, 2019; Mittag, 2019; Meyer et al., 2015; Meyer and Mittag, 2021; Celhay et al., 2024).Yet the gap rarely vanishes. Existing work has not established whether intertemporal behavior contributes meaningfully to this gap, or for whom it is most salient. I document systematic patterns that are consistent with this mechanism and identify the population groups and life-cycle stages where it is most likely to operate. This objective motivates the present study.

- **Research question:** Can consumption smoothing account for a meaningful share of the observed gap between income and expenditure among poor households?
- **Sub-questions** If the answer to the research question is yes:

  (i) For whom is this mechanism most salient across the life-cycle and household types?

  (ii) Under which macroeconomic environments is the gap most consistent with smoothing behavior?

Hypothesis: Forward looking households with temporarily low-income but higher expected permanent income sustain consumption using saving, credit, and private support. If so, the income - consumption gap should vary systematically with life-cycle stage and demographics: it should be larger among the youngest and, to some extent, the oldest households; it should be pronounced for groups with stronger smoothing motives or access to private transfers (for example, students); and it should be visible when we look at expenditure minus income. I do not attempt to quantify the fraction of the gap due to smoothing; instead, I test whether the cross group and cross age patterns are consistent with this mechanism and document the macro conditions under which it appears stronger.

I exploit the Luxembourg Income Study (LIS) microdata (LIS Cross-National Data Center in Luxembourg, 2023), which harmonize nationally representative household and person surveys. This setting provides three advantages for the question at hand. First, cross-country comparability of core variables allows me to document whether the patterns are general rather than country-specific. Second, for a subset of countries LIS contains both disposable income and total expenditure, which enables direct measurement of the gap and identification of *poor spenders* (households below the poverty line whose expenditures exceed disposable income). Third, the household-person linkage and uniform coding of head characteristics permit a consistent analysis of life-cycle and demographic heterogeneity. To avoid Covid-19 pandemic confounders, the baseline cross-section uses each country's most recent pre-2019 wave; for the expenditure analyses I use all available waves with both income and consumption (1995-2023) for the 11 countries that report expenditure.

I complement the micro analysis with country-year indicators from the World Development Indicators (WDI) (World Bank, 2025). By relating the estimated curvature of age profiles to contemporaneous macro conditions with country and year fixed effects, I assess whether the strength of the U shape moves with fundamentals such as fertility, energy use, and external balance. These correlations are descriptive but informative about the contexts in which the gap tends to widen.

Main findings: (i) In 27 of 31 countries, poverty rates are markedly higher at the youngest ages and, in many cases, at the oldest ages as well; a quadratic age specification captures this U shape robustly. (ii) In 10 out of 11 countries with expenditure, the U shape persists when focusing on *poor spenders*; part of the curvature weakens relative to all poor, but a clear U shape remains in most cases. (iii) Student-headed and non-family households are over-represented among the poor and specifically among young ages; where budget shares are observed, the student non-family group shows the lowest income and the highest spending, with a tilt toward discretionary categories such as leisure, clothing, communications, and education. (iv) Across all historical waves available for the 11 expenditure countries (107 surveys), the squared-age coefficient is positive and statistically significant in 89 surveys for poverty, 88 for poor-spender rates, and 98 for the expenditure minus income measure. (v) At the macro level, few indicators are systematically related to curvature. For poverty and poor-spender rates, fertility

is positively associated with curvature while energy intensity is negatively associated. For the expenditure minus income gap, only four indicators are robustly associated with curvature and all are markers of external imbalance or external financing (total debt service of GNI, external debt stocks, net official development assistance per capita, and net foreign direct investment).

Finally, the paper provides extensive sensitivity and robustness checks in the Appendix: alternative poverty thresholds, alternative poverty measures, multi-wave persistence, and exercises that adjust reported income for underreporting in the spirit of the linked-data literature.

2 Literature Review

2.1 Poverty and the Income Consumption Gap

A consistent empirical puzzle in poverty research is that many low-income households report expenditures that exceed reported income, sometimes by large margins. Early evidence from Australia showed that almost half of income poor households reported spending above disposable income, with gaps that could reach a multiple of reported resources (Headey, 2008). Related work for the United States and Europe documents the same pattern, with expenditure in the bottom of the income distribution frequently well above reported income (Meyer and Sullivan, 2011b,a; Meyer and Mittag, 2019; Gibson, 2016). This gap matters for inference about well being and policy choices, since income based poverty can classify as poor households that maintain non poor levels of consumption by drawing on other resources (Meyer and Sullivan, 2012; Gibson, 2016).

A large strand of the literature attributes an important share of the gap to survey error. Linked survey-administrative data reveal extensive under reporting of transfer income and program participation at the bottom of the income distribution (Meyer and Mittag, 2019). Decompositions of total survey error highlight item non-response, coverage, and measurement components that are especially acute for low-income samples (Meyer et al., 2015; Meyer and Mittag, 2021). Recent work diagnoses mechanisms that generate misreporting, including recall problems, timing error, and stigma, and proposes design changes that improve reporting (Celhay et al., 2024). Correcting misreporting reduces measured poverty and narrows the income consumption gap (Meyer and Mit-

tag, 2019; Mittag, 2019). At the same time, the literature also warns that income based metrics can be misleading when resources are transitorily low or when non cash benefits, wealth draw downs, and informal support are important but unobserved (Meyer and Sullivan, 2012; Gibson, 2016). Evidence from Italy shows that income and consumption based poverty identify different populations, particularly around recessions when families smooth spending through temporary shocks to income (Cutillo et al., 2022). Together, these findings motivate an interpretation in which measurement error explains much, but not all, of the observed gap.

2.2 Consumption Smoothing

Theory predicts that forward looking households base spending on expected lifetime resources rather than current income, using saving, credit, and private transfers to stabilize consumption. The permanent income and life-cycle perspectives formalize this idea and imply that consumption can diverge from current income when shocks are temporary or when credit constraints relax. Empirically, consumption inequality tends to be lower and less cyclically sensitive than income inequality, which is consistent with intertemporal reallocation (Attanasio and Pistaferri, 2016; Krueger and Perri, 2006).

For low-income households, smoothing is real but incomplete. Disadvantaged groups face higher consumption variability, especially for necessities, which signals tight liquidity and limited insurance (Fisher and Hardy, 2023). In the United States, consumption volatility rose more for households with less education and wealth than for others, even when income volatility did not, pointing to binding constraints on smoothing (Gorbachev, 2011). Long horizon cohort evidence also suggests a prioritization of essentials: the gap in necessary spending narrowed while the gap in leisure and culture widened, consistent with smoothing of core needs and compression of discretionary outlays among lower income groups (Karonen and Niemelä, 2022). Overall, the record indicates that low-income households try to smooth consumption, often successfully for necessities, yet frictions in credit and insurance markets limit the extent of smoothing.

A complementary channel is *intergenerational* consumption smoothing within families. Recent evidence shows that private support to young adults and later life assistance to parents help stabilize living standards when formal credit is scarce, allowing spending to diverge from current income in predictable life-cycle ways. In practice, parents

provide cash support, residence, and help in child care during schooling and early career, while adult children later supply time and financial assistance to aging parents. These flows act as implicit loans and insurance that relax liquidity constraints, consistent with the observed profiles in which young non-family and student headed households can appear income poor yet sustain higher spending, and some older households maintain consumption from family resources and wealth (Fisher and Hardy, 2023; Karonen and Niemelä, 2022; Headey, 2008; Creedy and Tan, 2007). Cross-country evidence using LIS data shows that household structure and private support are important determinants of material well-being (Gornick and Jäntti, 2012; LIS Cross-National Data Center in Luxembourg, 2023). This interpretation aligns with the permanent income and life-cycle perspectives and with classic tests showing substantial, though incomplete, within family risk sharing (Hayashi et al., 1996), while the dynastic view provides a concise rationale for resource reallocation across generations (Altonji et al., 1992; Hayashi et al., 1996). Together, these insights motivate treating inter-generational transfers as another mechanism behind spending above reported income at young ages and sustained consumption later in life.

2.3 Consumption Smoothing and the Income Consumption Gap

The two strands of literature meet at a central point. If poor households sometimes sustain consumption above current income by borrowing, drawing down assets, or receiving private transfers, then the observed income consumption gap is not necessarily an anomaly or solely due to measurement error. Several studies explicitly argue that consumption is a more reliable indicator of material well being for the poor than current income, precisely because it embeds these intertemporal and non cash resources (Meyer and Sullivan, 2012; Gibson, 2016). Evidence that income and consumption based poverty identify different households reinforces this view (Cutillo et al., 2022). At the same time, the measurement literature shows that under reported transfers and other survey errors are sizable and must be corrected (Meyer and Mittag, 2019; Mittag, 2019; Meyer and Mittag, 2021; Celhay et al., 2024).

What remains insufficiently answered is the quantitative link between smoothing and the gap: how much of the systematic gap can be traced to intertemporal behavior rather than to measurement error, and for whom. Prior work does not decompose the gap

into components attributable to smoothing versus survey error. It also provides limited evidence on the population segments and life-cycle phases where smoothing is most likely to generate spending above income. A growing set of facts suggests where to look. Young adults and students often expect higher permanent income and may use credit or family support to raise current consumption relative to earnings. Older households can spend from accumulated wealth. Household structure can shape access to insurance and credit. Yet the literature has not mapped these patterns to the documented gap in a unified framework using microdata (Gornick and Jäntti, 2012; LIS Cross-National Data Center in Luxembourg, 2023). This unresolved link—quantifying the contribution of consumption smoothing to the income - consumption gap and identifying for whom it matters, motivates the analysis that follows.

3 Data

3.1 Microdata: Luxembourg Income Study (LIS)

The primary source of data for this research comes from the Luxembourg Income Study (LIS) Database, which harmonizes nationally representative household and person surveys into a consistent cross-country framework (LIS Cross-National Data Center in Luxembourg, 2023). I use one pre-2019 wave per country in the baseline cross-section to avoid Covid-19 pandemic policy shocks, and for countries with expenditure data I employ all available waves (1995-2023) in the multi-wave exercises.[1] The LIS household file and person file are linked at the household identifier; the resulting file contains household resources and composition alongside head characteristics. The cross-country comparability of core income and demographic constructs is a central strength for this study (see Gornick and Jäntti, 2012).

3.2 Country-Level Macroeconomic Data: WDI

Country-year covariates are drawn from the World Bank's World Development Indicators (WDI) (World Bank, 2025). I extract the indicators used in Section 4.3 (e.g., fertility, energy use, official development assistance, debt and external-balance measures etc'), matched to LIS survey year and country. Where noted in the Results, indicators enter

[1] Survey codes and the full wave list appear in the Appendix.

in logs. Because coverage differs by series, estimation samples vary across specifications; exact N and series are reported in the Appendix.

3.3 Sample Construction

The analytical sample follows three principles. First, I restrict to the most recent pre-2019 survey for each country in the baseline. Second, for expenditure analyses, I use every wave with both disposable income and total household consumption reported; in the current pull this encompasses 11 countries (Australia, Estonia, India, Israel, Italy, Ivory Coast, Mexico, Japan, Peru, Poland, and Taiwan) composing 107 unique surveys. Third, all summary statistics and age profiles are computed at the *household-head* level, with the head defined per LIS conventions i.e. Household is the co-resident unit regardless of family ties; head is the highest-income member in LIS unless otherwise specified. Observations missing income (and consumption where relevant) are excluded from the analysis (about 0.1%). Household classified as headed by teenagers (less than 0.3% of observations) are excluded from the analysis too.

Equivalization and units. Income and expenditure are equivalized using the square-root scale: household totals are divided by $\sqrt{\text{household size}}$. Throughout, "income" refers to LIS disposable household income Where used (after direct taxes and cash transfers; non-cash benefits are not included). total consumption refers to the LIS household expenditure aggregate. I keep amounts in local currency. Since the analysis uses within-survey relative measures and the outcome is the U-shape curvature, currency levels are irrelevant.

Age profiles. To study life-cycle patterns, I compute outcomes by single years of age (heads aged 18+) and, for presentation, in some cases I aggregate to fixed bands (e.g., 18–21, 22–24, 25–29, ..., 70–74, 75+). The quadratic age curvature reported in the tables is estimated on these series and summarized by the coefficient on Age^2.

3.4 Key Variables

- Equivalized income per capita = disposable household income/$\sqrt{\text{hh size}}$.
- Equivalized consumption per capita = household consumption/$\sqrt{\text{hh size}}$.

- Poverty line is set at 50% of the within-country median of equivalized income per capita (main text), with a sensitivity check at 60% reported in the Appendix.
- Poor is an indicator for income below the country-specific poverty line.
- Poor spender indicates households that are poor *and* whose consumption levels exceeds income levels (available where consumption is observed).
- Expenditure - income gap equals equivalized consumption minus equivalized income; for interpretation, throwout the paper I use expenditure - income so that positive values indicate spending above reported income.
- Student status flags household heads recorded as students in LIS; family status distinguishes family from non-family households based on relationship to head codes.[2]

Core figures and tables, unless otherwise specified, use the standard LIS analysis sample. The main cross-country patterns are based on within-survey relative measures and are therefore robust to currency units. Sensitivity checks include: (i) the 60% poverty threshold; and (ii) multi-wave persistence (where available). (iii) The measurement-error discussion and adjustments referenced in the Results follow the linked-survey literature (e.g., Meyer and Mittag, 2019; Mittag, 2019; Meyer and Mittag, 2021; Celhay et al., 2024) and are reported as robustness rather than as inputs to the main sample construction.

The net effect is a transparent, replicable pipeline: a harmonized LIS micro sample with clearly defined poverty and "poor spender" outcomes, paired with WDI covariates at the survey-year level. This structure aligns with common practice in the poverty and measurement literatures while keeping the focus on within-country life-cycle patterns central to the paper's contribution (Meyer and Sullivan, 2012; Gornick and Jäntti, 2012).

4 Results

To address the research question, I conduct a series of analyses designed to test whether consumption smoothing can account for a portion of the income - expenditure gap among the poor. I proceed in three steps. First, I examine how this gap varies across household

[2]The main analysis classifies couples without children as non-family for reasons that will be explained in section 4.2. Reclassifying them as family modestly affects the results

age groups and document that the poor, and specifically *poor spenders*, are overrepresented among both the youngest and the oldest households. Second, to identify which population segments drive these patterns, I separate households headed by students from those headed by employees or the self-employed, and I further distinguish non-family households (singles, flatmates, or couples without children) from family households. I find that student-headed households and, especially among the young, non-family households exhibit substantially higher poverty rates relative to comparison groups. This is consistent with the hypothesis that individuals with higher expected permanent income allow themselves to consume above their current income. I deepen this analysis by comparing the budget shares of spending categories: poor students allocate larger shares to leisure and entertainment, clothing, and other non-essential items. In most expenditure categories the family vs. non-family differences are not statistically significant. Third, I study macroeconomic correlates of the observed U-shape by relating the curvature of the age profile to country-level indicators. Most macro variables are not robustly associated with the U-shape, although fertility rates is positively correlated with curvature, whereas debt, foreign aid, and energy use is negatively correlated.

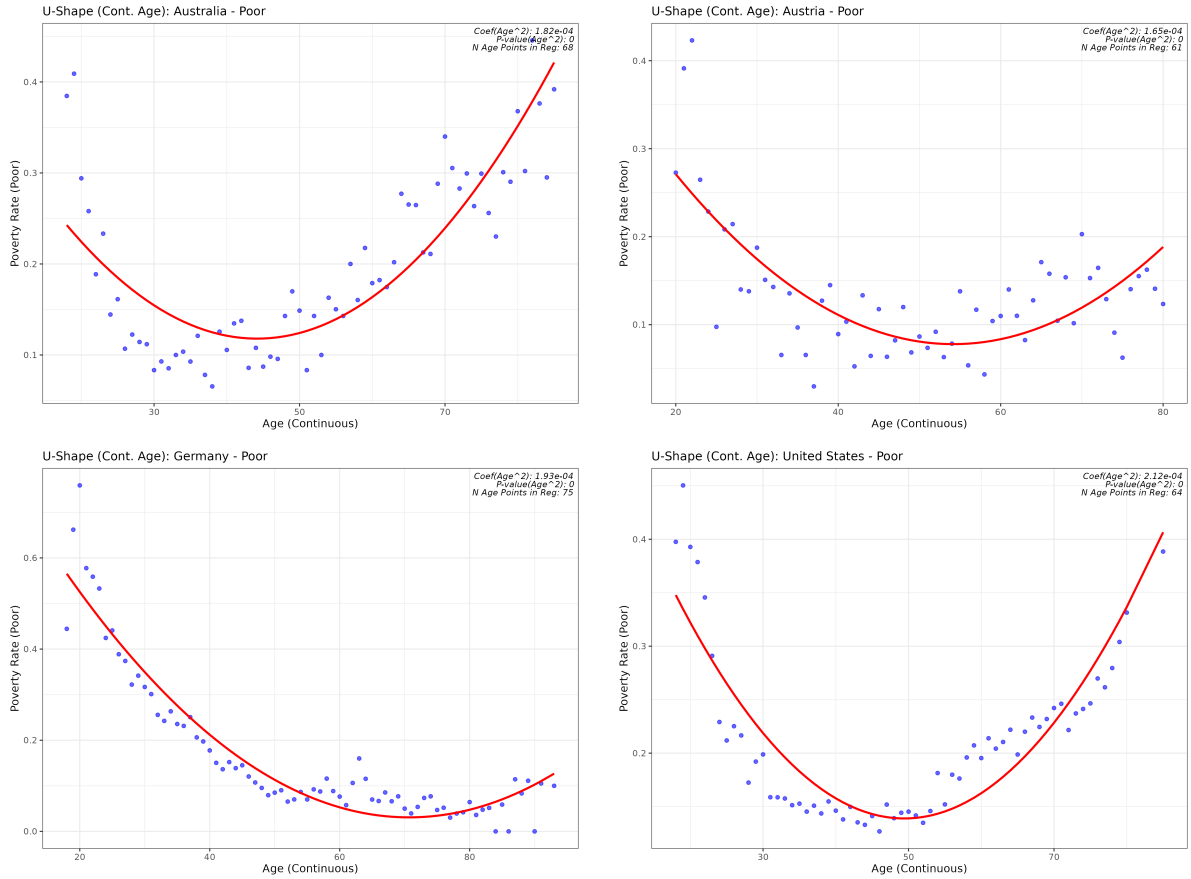
4.1 Poverty Rates Across the Life-Cycle

The initial set of analyses relies on income surveys from 31 countries. For each country I use the most recent survey available up to 2019. At the time of analysis, many countries had not released data for 2023 onward; restricting to pre-2020 waves keeps the analysis insulated from COVID-19 policies and extraordinary transfers. This choice improves cross-country comparability [3].

I first compute the poverty rate by age group. In the large majority of countries (27 out of 31), the youngest age group, and in some countries also the oldest, exhibits a poverty rate more than twice the overall average.

[3] see the Appendix for full survey details

Figure 1: Poverty Rates by Age Groups



This figure presents the poverty rate as a function of the household head's age for Australia (2018), Austria (2019), Germany (2019), and the United States (2019). The horizontal axis represents age and the vertical axis indicates the poverty rate. An inset box in each panel reports the coefficient for the squared age term (β_{age^2}) and its p-value from a quadratic regression, which serves as a statistical measure of the curve's U-shape.

Figure 1 illustrates this for a subset of countries; country-specific β_{age^2} coefficients appear in the Appendix. The U-shape manifests differently across countries: for example, Australia and the United States show both "arms" of the curve, whereas Austria and Germany display an over-representation primarily among young households, resembling more of an "L-shape." Importantly for what follows, a quadratic specification still captures the systematic difference between the youngest groups and the rest; one may think of it as observing only the left "arm" of the U. From here onward, I will use the term *U-shape* for both cases.

As mentioned in the literature review, a known concern in the literature is under-reporting of income among the poor. Mittag (2019) estimate the magnitude of such under-reporting in the United States. To assess whether misreporting could account for the observed U-shape, I "inflate" the reported incomes of poor households using the

Mittag (2019) adjustment. As expected, this reduces the measured poverty rate, yet the U-shape of the age profiles remains (detailed results in the Appendix).

For 11 countries, the LIS surveys also include expenditure data, allowing me to examine the gap between income and spending directly.

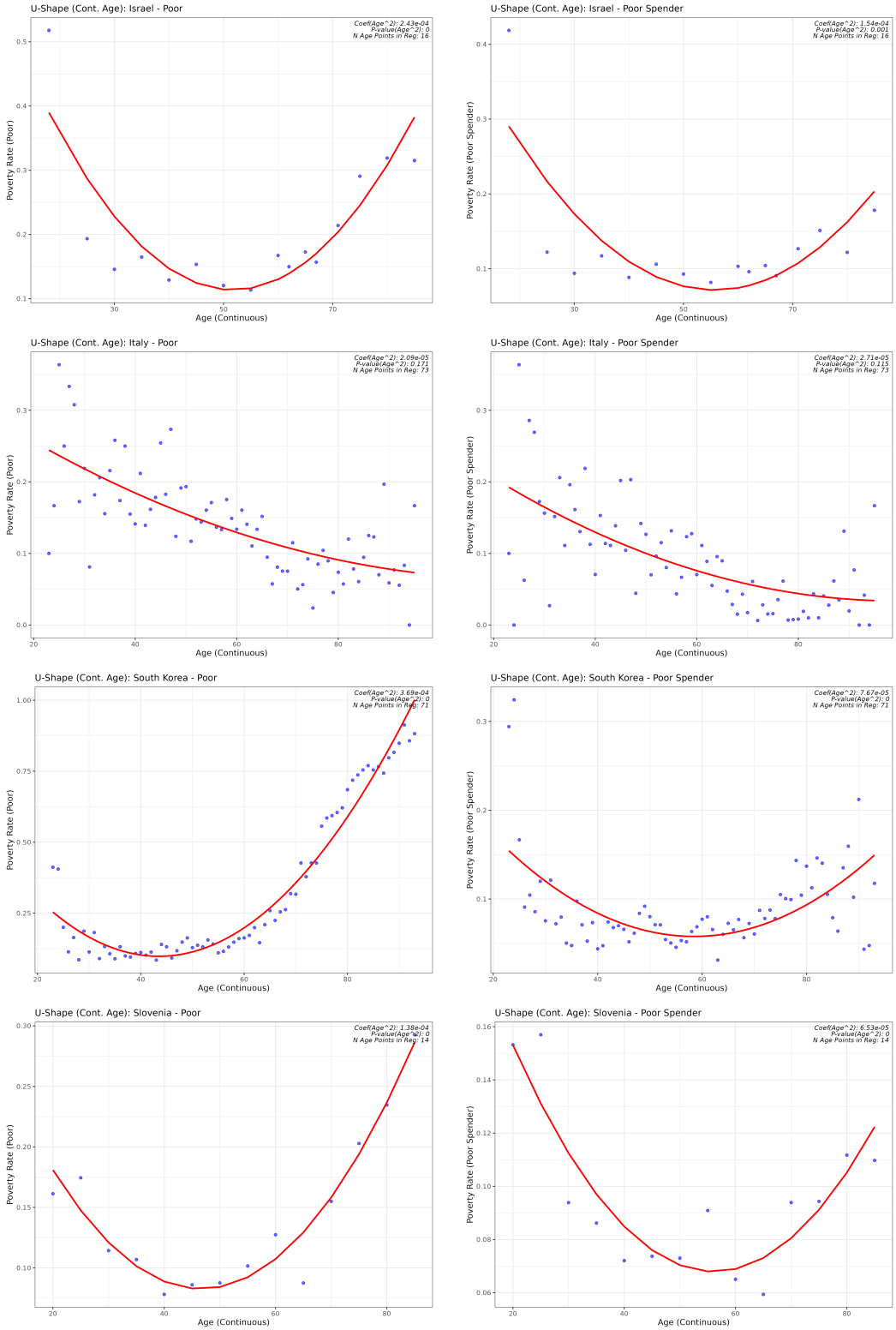
Figure 2 shows representative example. The left panels replicate the age-poverty patterns; the right panels plot the age profile of *poor spenders*, defined as households below the poverty line whose annual expenditures exceed disposable income. By construction, the poor-spender rate is weakly lower than the poverty rate in each age group. Figure 2 demonstrates that part of the U-shape "flattens" when focusing on poor spenders rather than on all poor. This indicates that consumption smoothing cannot fully explain the income - expenditure gap among the poor. Some of the residual discrepancy is consistent with income under-reporting (Mittag, 2019), and additional mechanisms may also be at play. Nevertheless, a pronounced U-shape remains visible in most countries.

To quantify curvature, I estimate, for each country, the following quadratic regression:

$$outcome_i \;=\; \beta_1 \;+\; \beta_2\, age\_group_i \;+\; \beta_3\, age\_group_i^2 \;+\; \varepsilon_i,$$

where $outcome \in \{\text{poverty rate},\ \text{poor-spender rate},\ \text{mean(expenditure} - \text{income)}\}$.
Data availability varies across LIS surveys: in most countries the exact age of each individual is recorded, but in some (e.g., Israel) only age groups are available, which reduces statistical power. I fit the specification for each country's data. Table 1 reports the estimates.

Figure 2: Poor & Poor Spender Rates by Age Group



This figure compares the age profiles of two distinct populations for Israel (2019), Italy (2016), South Korea (2019), and Slovenia (2015). The horizontal axis is age. The left column displays the poverty rate by age. The right column displays the rate of 'poor spenders': households classified as poor whose total expenditure exceeds their total disposable income. An inset box in each panel reports the coefficient for the squared age term (β_{age^2}) and its p-value from a quadratic regression, which serves as a statistical measure of the curve's U-shape. The comparison illustrates how the age profile of poverty changes when restricting the sample to households spending beyond their current income.

Table 1: Quadratic Age Term (Age^2): Coefficient and Standard Error by Survey and Outcome

Survey	Country-Year (Survey)	Outcome	Age^2 Beta (SE)	p-value	N age points
AU16	Australia 2016 (AU16)	Poverty rate	0.0000402 (0.0000188)	0.018	67
AU16	Australia 2016 (AU16)	Poverty rate (spender)	0.0000120 (0.0000139)	0.196	67
AU16	Australia 2016 (AU16)	Consumption - Income	10.5690576 (1.5102854)	0.000	67
EE00	Estonia 2000 (EE00)	Poverty rate	0.0000632 (0.0000182)	0.000	69
EE00	Estonia 2000 (EE00)	Poverty rate (spender)	0.0000191 (0.0000129)	0.071	69
EE00	Estonia 2000 (EE00)	Consumption - Income	-0.0372429 (0.0522612)	0.239	69
IN11	India 2011 (IN11)	Poverty rate	0.0000948 (0.0000165)	0.000	72
IN11	India 2011 (IN11)	Poverty rate (spender)	0.0000742 (0.0000146)	0.000	72
IN11	India 2011 (IN11)	Consumption - Income	7.2695535 (3.9268601)	0.034	72
IL19	Israel 2019 (IL19)	Poverty rate	0.0002430 (0.0000391)	0.000	16
IL19	Israel 2019 (IL19)	Poverty rate (spender)	0.0001538 (0.0000371)	0.000	16
IL19	Israel 2019 (IL19)	Consumption - Income	25.4094747 (2.5583052)	0.000	16
IT16	Italy 2016 (IT16)	Poverty rate	0.0000209 (0.0000151)	0.086	73
IT16	Italy 2016 (IT16)	Poverty rate (spender)	0.0000271 (0.0000170)	0.058	73
IT16	Italy 2016 (IT16)	Consumption - Income	3.3416204 (0.5328373)	0.000	73
CI15	Ivory Coast 2015 (CI15)	Poverty rate	0.0001179 (0.0000199)	0.000	67
CI15	Ivory Coast 2015 (CI15)	Poverty rate (spender)	0.0001167 (0.0000190)	0.000	67
CI15	Ivory Coast 2015 (CI15)	Consumption - Income	181.9758573 (54.6733497)	0.000	67
JP19	Japan 2019 (JP19)	Poverty rate	0.0001435 (0.0000182)	0.000	65
JP19	Japan 2019 (JP19)	Poverty rate (spender)	0.0001057 (0.0000158)	0.000	65
JP19	Japan 2019 (JP19)	Consumption - Income	1049.6786210 (143.3395130)	0.000	65
MX18	Mexico 2018 (MX18)	Poverty rate	0.0000319 (0.0000088)	0.000	82
MX18	Mexico 2018 (MX18)	Poverty rate (spender)	0.0000165 (0.0000070)	0.010	82
MX18	Mexico 2018 (MX18)	Consumption - Income	13.6931098 (1.1243780)	0.000	82
PE19	Peru 2019 (PE19)	Poverty rate	0.0000944 (0.0000139)	0.000	80
PE19	Peru 2019 (PE19)	Poverty rate (spender)	0.0000840 (0.0000148)	0.000	80
PE19	Peru 2019 (PE19)	Consumption - Income	2.4773326 (0.2715009)	0.000	80
PL19	Poland 2019 (PL19)	Poverty rate	0.0000111 (0.0000116)	0.171	77
PL19	Poland 2019 (PL19)	Poverty rate (spender)	-0.0000075 (0.0000071)	0.147	77
PL19	Poland 2019 (PL19)	Consumption - Income	2.9654793 (0.7152131)	0.000	77
TW05	Taiwan 2005 (TW05)	Poverty rate	0.0001946 (0.0000290)	0.000	68
TW05	Taiwan 2005 (TW05)	Poverty rate (spender)	0.0000179 (0.0000106)	0.048	68
TW05	Taiwan 2005 (TW05)	Consumption - Income	123.3852814 (17.7835771)	0.000	68

This table presents the estimated coefficients for the squared age term from separate quadratic regressions for each country and outcome. The analysis uses the most recent pre-2020 survey for 11 countries with expenditure data. The columns report the survey, outcome, the Age^2 coefficient (SE), p-value, and the number of age groups. A positive, significant coefficient indicates a convex, U-shaped relationship between age and the outcome.

Although the poor and poor spender coefficients appear small in absolute terms, the curvature is clear when considering the full age range (18-75+), as seen in Figure 2. The squared-age coefficient β_3 is positive and statistically significant for all countries except Italy ($p = 0.086$) and Poland ($p = 0.171$). When using the poor-spender rate, significance is also lost in Australia and Estonia, leaving 7 of 11 countries with a statistically significant U-shape; note, however, that these regressions involve few age groups in some countries and therefore have limited power. Because the core question concerns the income -

expenditure gap, I also analyze (expenditure − income) directly. The third row for each country in Table 1 presents the age-profile curvature for this gap among the poor; an analogous analysis for the full population yields qualitatively similar results. On this gap measure, all countries except Estonia ($p = 0.239$) show a positive and significant β_3.

To verify that these patterns are persistent rather than artifacts of a single wave, I extend Table 1 to all available LIS waves for the 11 countries with consumption data, spanning 1995-2023 (107 surveys in total). Across these, β_3 is positive and significant in 89 surveys for poverty, 88 for poor-spender rates, and 98 for the expenditure-income gap. [4]. While none of these results is causal evidence of consumption smoothing, they provide coherent suggestive evidence that consumption smoothing may indeed play a part in the known income - expenditure puzzle among the poor as it is robust across country and year.

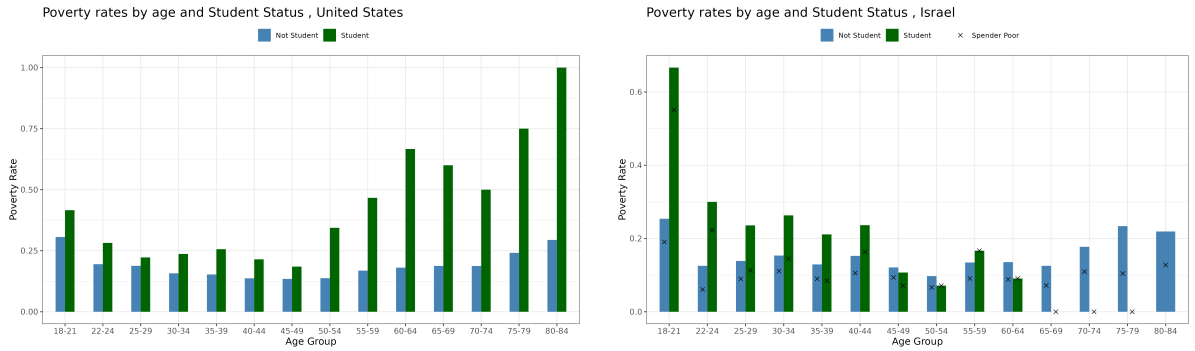
4.2 Household Characteristics Effect Poverty Rates

I next examine whether demographic characteristics are associated with higher poverty and with distinct spending baskets. Given data constraints, I focus on two variables: whether the household head is recorded as a student, and whether the household is a family or a non-family unit (single, flatmates, or couple without children). Under the permanent-income hypothesis, students should have low current income but higher expected permanent income, potentially enabling consumption above current resources. Analogously, young non-family, of a couple without children households may allow themselves higher spending if they expect future earnings growth as their skills in the labor market improve.

LIS records student status for 25 of the 31 countries. In 17 of these 25, student headed households—especially among the young, have substantially higher poverty rates than non student headed households.

[4]The full panel of estimates appears in the Appendix

Figure 3: Poverty Rate by Student Status



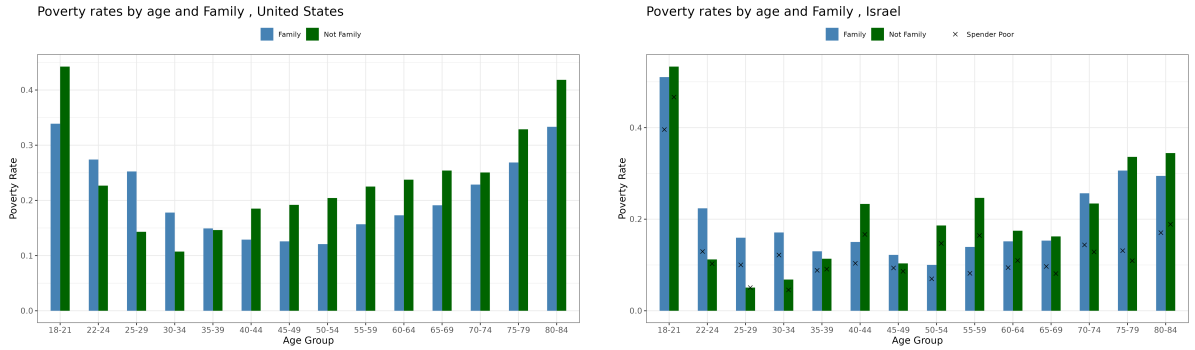
This figure illustrates the poverty rate by age group, disaggregated by the student status of the household head, for the United States and Israel. In each panel, the horizontal axis represents age groups and the vertical axis shows the poverty rate. The two lines distinguish between households headed by a student and those headed by a non-student, allowing for a visual assessment of how the age poverty profile differs between these two groups. In the Israel panel "X" on each bar represent the "poor spender" rate

Figure 3 displays the United States and Israel as two cases with especially pronounced gaps. Across all age groups, student poverty shares are markedly higher, and the U-shape is more pronounced among students and often attenuates in the non-student population. Countries without this pattern are: Germany, Greece, Poland, the United Kingdom, Slovenia, Chile, Colombia, and Mexico. In most cases, there is no clear difference; in Mexico and Poland the pattern reverses, with student-headed households appearing *less* poor. Despite attempts to investigate these counterexamples, the available data do not reveal a clear explanation. Note also that student counts are sparse at older ages (40+), so results for older student groups should be interpreted with caution.

To run the analogous split by family status, precise family structure coding is required; unfortunately, LIS provides such coding for only six countries, so the evidence in this subsection should be interpreted with caution. Figure 4 suggests a common pattern: non-family households tend to have higher poverty at the youngest and oldest ages, whereas in the late twenties and thirties, the rates for family households often exceed those for non-family households. One possible interpretation is life-cycle consumption smoothing only for non-family households: young non-family households may expect higher permanent incomes and therefore sustain higher spending while investing in skills. In the late twenties and thirties, the arrival of children raises needs and measured poverty among families. At older ages, non-family status may coincide with households headed by single individuals and tighter resources. Alternative explanations, including measurement

of family status, selection into non-family living arrangements (including students), and housing cost differences, are also plausible. Although these findings cannot be regarded as conclusive evidence, they are at a minimum consistent with the research hypothesis; country by country figures and sample sizes are reported in the Appendix.

Figure 4: Poverty Rate by Family Status



This figure presents the poverty rate by age group, disaggregated by the family status of the household, for the United States and Israel. The horizontal axis denotes age groups and the vertical axis indicates the poverty rate. The plots differentiate between households classified as 'Family' (e.g., with children) and 'Not Family' (singles, unrelated individuals, or childless couples) to examine the relationship between life-cycle stage, family structure, and poverty. In the Israel panel "X" on each bar represent the "poor spender" rate

To go further, I exploit the countries that report expenditure composition, student status, and family structure: Israel and to some extent: India Mexico and Peru. I partition households into four groups defined by student status (student vs. non-student) and family structure (family vs. non-family). Table 2 presents the Israeli results; Other countries shows a similar picture. For each group, I report the ratio of category expenditures to total income (annual income and expenditures are in USD). Because many households spend more than their income, the category shares can sum to more than one.

As shown in Table 2, student non-family households have the lowest mean income (about 31,000 ILS per capita) yet the highest expenditures (about 60,000, versus roughly 50,000 ILS per capita in the other groups). This group devotes larger shares of income to food, clothing, communications, culture, leisure and entertainment, and education. Relative to non-student households, students also spend more on alcohol and tobacco, clothing, rent, transport, communications, restaurants and hotels, and education. With the exception of housing, these are largely non-essential or discretionary categories, consistent with intertemporal smoothing by agents who expect higher future income. Housing is essential, but the higher rent among students is plausibly a quality or location choice

Table 2: Israel consumption bundle by HH type

	Not student & family	Not student & not family	Student & family	Student & not family
Mean Income per capita	36302.887 (462.564)	37277.579 (353.013)	36908.706 (276.324)	31494.780 (1488.551)
Mean Consumption per capita	52525.358 (832.005)	52317.093 (1004.281)	50670.617 (642.046)	60419.190 (2773.220)
Average Age	39.226 (0.639)	52.653 (0.600)	9.629 (0.183)	25.248 (0.968)
Household Size	3.828 (0.083)	1.373 (0.033)	4.984 (0.272)	1.571 (0.125)
Mean Age of Head	52.644 (0.583)	68.767 (0.722)	29.040 (0.871)	25.514 (1.986)
Budget shares (of income)				
Food and Non-Alcoholic Beverages	0.519 (0.039)	0.406 (0.024)	0.759 (0.472)	1.161 (0.858)
Alcohol and Tobacco	0.047 (0.005)	0.031 (0.006)	0.151 (0.140)	0.016 (0.007)
Clothing and Footwear	0.072 (0.005)	0.036 (0.005)	0.508 (0.416)	0.109 (0.047)
Actual Rent and Utilities	0.312 (0.028)	0.276 (0.023)	0.808 (0.477)	0.830 (0.362)
Housing Equipment	0.133 (0.014)	0.115 (0.016)	0.459 (0.368)	0.056 (0.021)
Health	0.117 (0.017)	0.147 (0.027)	0.065 (0.016)	0.064 (0.023)
Transport	0.175 (0.013)	0.096 (0.020)	0.515 (0.379)	0.496 (0.259)
Communication	0.052 (0.004)	0.037 (0.002)	0.238 (0.204)	0.303 (0.199)
Recreation and Culture	0.115 (0.012)	0.064 (0.007)	0.118 (0.040)	0.194 (0.089)
Education	0.077 (0.010)	0.007 (0.004)	0.942 (0.694)	1.643 (1.164)
Restaurants and Hotels	0.067 (0.008)	0.042 (0.007)	0.124 (0.035)	0.283 (0.072)
Miscellaneous Goods and Services	0.156 (0.012)	0.152 (0.021)	0.427 (0.246)	0.355 (0.202)
N households	902	287	126	72

This table provides a comparison of household characteristics and consumption patterns in Israel, segmented into four groups based on the head's student and family status. The upper panel reports summary statistics (mean income, consumption, age, size), with standard errors in parentheses. The lower panel details the budget composition, presenting mean expenditure by category as a share of total income for each group. The final row reports the number of households in each category.

aligned with the same logic. As anticipated from the graphs, differences between family and non-family households are comparatively small.

4.3 U Shape and Macroeconomic Factors

Finally, I explore the macroeconomic conditions under which consumption smoothing, and more generally the U-shaped age profile of poverty, tends to be stronger. For each LIS survey in the ten countries with expenditure data (Taiwan is excluded because it is not classified as a country in the World Bank data), I estimate the quadratic effect of age and retain the squared age coefficient as a survey level measure of curvature. I then relate this curvature to existing macro indicators from the World Bank by estimating

$$\beta_{age^2,i} \;=\; \gamma_1 \;+\; \gamma_2\, X_i \;+\; \text{FE(country)} \;+\; \text{FE(year)} \;+\; u_i,$$

where X_i is the macro indicator for survey i. I repeat this exercise for three outcomes: the poverty rate, the poor spender rate, and the expenditure minus income gap, using all available waves from 1995 to 2023 (107 surveys in total). Because macro data are incomplete for some country-year combinations, the estimating samples differ across

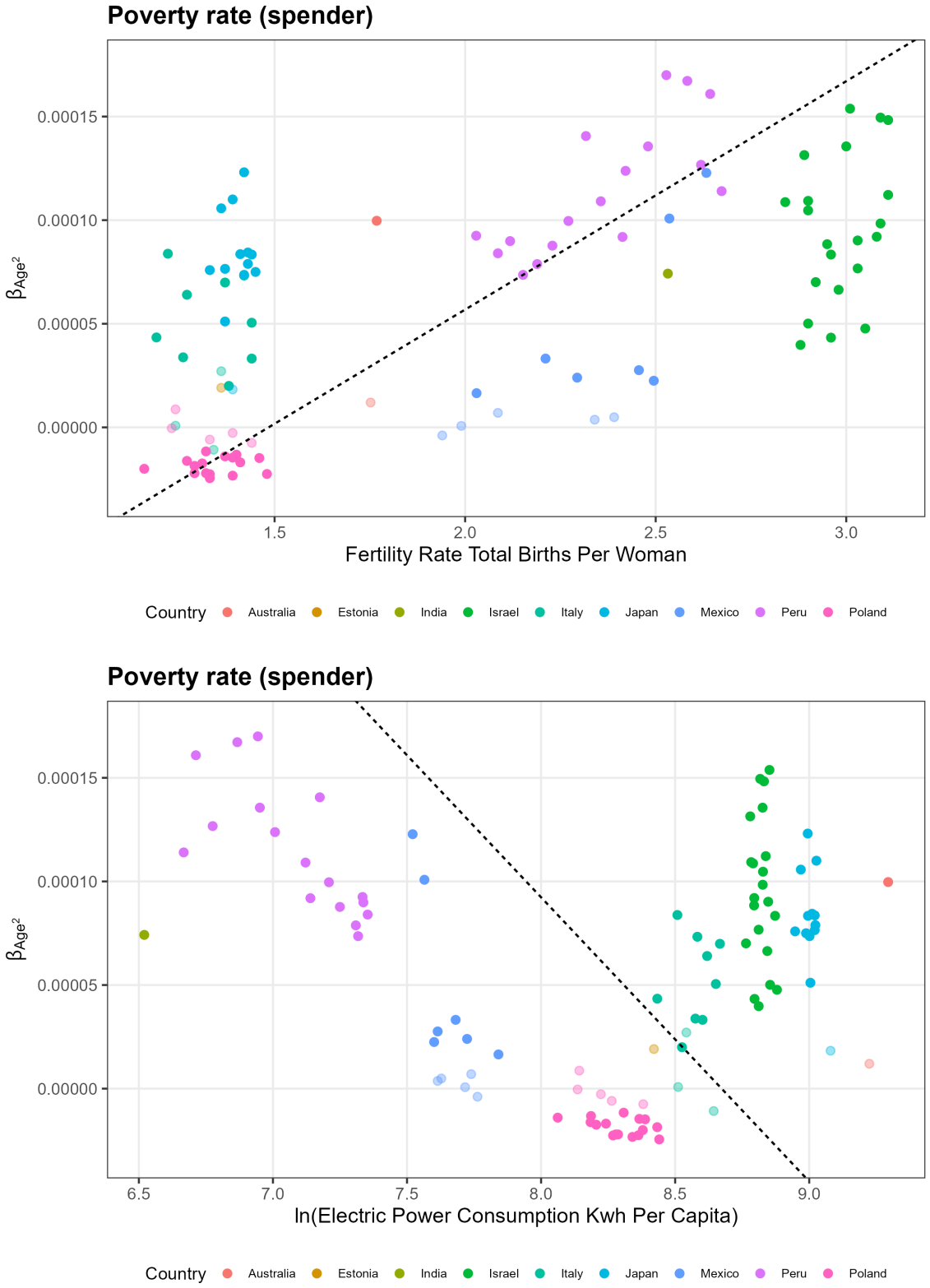
specifications. Full details appear in the Appendix.

Out of forty nine macro indicators, fifteen are statistically associated with curvature when the outcome is the poverty rate, sixteen when the outcome is the poor spender rate, and four when the outcome is the expenditure minus income gap. For many indicators, the estimated slopes, although statistically different from zero, are economically insignificant. Figure 5 and Table 3 summarize the most informative relationships.

Several patterns stand out, and they are informative for interpretation. Fertility is positively related to curvature. A one unit increase in the total fertility rate is associated with a rise in curvature of about 0.000124 for poverty and 0.000110 for the poor spender rate ($p = 0.0066$ and $p = 0.0030$, respectively). Adolescent fertility shows a similar but smaller association of about 0.000005 for poverty and 0.000004 for the poor spender rate ($p = 0.0022$ and $p = 0.015$). Energy intensity moves in the opposite direction. A one percent increase in electricity use per capita is associated with a reduction of about 0.000129 in poverty curvature and 0.000137 in poor spender curvature ($p = 0.040$ and $p = 0.0027$). A one percent increase in energy use per capita measured in kilograms of oil equivalent is associated with a reduction of about 0.000126 for poverty and 0.000141 for poor spenders ($p = 0.026$ and $p = 0.0037$). Official development assistance and national debt are also relevant. Log net ODA per capita is positively associated with curvature in all three outcomes, and military expenditures are negatively associated with curvature for poverty and for poor spenders ($p = 0.0026$ and $p = 0.0010$).

The most policy relevant and novel result in this section concerns the expenditure minus income gap, which is the outcome most directly tied to the research question. Only four of forty nine macro indicators are robustly associated with curvature of this gap, yet all four are markers of external imbalance. The slope on total debt service as a share of GNI is about 0.246 (N= 30, the slope on log external debt stocks is about 2.74 (N= 30), the slope on log net ODA per capita is about 0.00037 (N= 28), and the slope on log net foreign direct investment measured on a balance of payments basis is about 49.4 (N= 26, $p = 0.021$). This cross-country regularity points to a systematic connection between external balance conditions and the extent to which households, especially poor households, finance consumption in excess of reported income. In other words, the macro environment that features heavier external borrowing or external financing coincides with a stronger U shape in the consumption income gap.

Figure 5: Curvature and macro indicators: examples



These scatter plots show the relationship between the curvature of the 'poor spender' age profile (vertical axis) and two macroeconomic indicators across country-year observations. The vertical axis represents the estimated coefficient on the squared age term (β_{age^2}), which quantifies the U-shape. The horizontal axis is the total fertility rate (top panel) and the log of electric power consumption per capita (bottom panel). A linear regression line is fitted to visualize the trend.

Scope and limitations are clear and do not diminish the value of these patterns. Across all forty nine indicators, most are statistically insignificant. Coefficients for many indicators are small in economic terms, and samples differ across specifications because macro data are missing in some country and year combinations. The regressions include country and year fixed effects, which absorb many confounders but do not identify causal channels. Multiple comparisons and cross-country measurement differences may add noise, and some of the gap level associations can reflect simultaneity. Another potential concern with this analysis is the family-wise error rate. After applying corrections for multiple testing, many results lost statistical significance, but the findings seem to hold qualitatively.

Taken together, the macro results are hypothesis generating rather than causal. They help locate contexts where curvature is stronger or weaker and they suggest mechanisms that merit targeted tests. Most importantly, the external imbalance link for the expenditure minus income gap is new in this literature; it is internally consistent across distinct indicators, and it reinforces the central contribution of this paper, which is to document and interpret systematic variation in the consumption income gap over the life-cycle. Detailed variable definitions, estimation choices, and the exact country by country samples appear in the Appendix.

Table 3: Fixed-effects regressions of β_{Age^2} on macro variables

	(1) TDS/GNI	(2) ln Ext Debt	(3) ln Net ODA pc	(4) ln FDI (BoP)
Coefficient	0.246***	2.738***	0.00037***	49.395**
(SE)	(0.000)	(0.000)	(0.000)	(10.999)
Observations	30	30	28	26
R^2	0.090	0.017	0.000	0.061
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: Each column is a separate regression of β_{Age^2} on the
listed variable with country and year fixed effects; cluster-robust SE by country in parentheses.
Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
(1) Total debt service / GNI; (2) ln External debt stocks (US$); (3) ln Net ODA per capita (US$);
(4) ln Foreign direct investment, net (BoP, US$).

4.4 Robustness and Sensitivity Checks

To verify that the core life-cycle patterns are not the result of arbitrary modeling choices, I conduct a series of robustness and sensitivity analyses detailed in the Appendix. First,

to ensure the results are not driven by the choice of poverty threshold, I re estimate the main specifications using survey-specific relative lines at 50% and 60% of median income; the level and shape of the age poverty profiles remain qualitatively and quantitatively stable across thresholds, as confirmed by parallel shifts in the FGT $FGT_{0,50}$ & $FGT_{0,60}$ (see Foster et al. (1984)) indices at both lines (Appendix F Table 8). Second, to assess functional-form sensitivity and the location of the life-cycle turning point, I report curvature and turning points from quadratic age profiles with delta method standard errors; across most surveys the quadratic term is positive and significant and the implied turning point lies in mid-life, reinforcing the U-shaped patterns emphasized in the main results (Appendix F Table 9). I also employ some alternative poverty and curvature measures as specified in the Appendix. Taken together, the alternative poverty thresholds, shape diagnostics with delta-method inference, and benchmark-level comparisons consistently confirm the stability of the principal findings on the U-shaped age profile of poverty, and the convexity of the consumption-income gap.

5 Discussion

This paper asks whether consumption smoothing can plausibly explain part of the well documented gap between reported income and expenditure among the poor, a gap that the literature has mostly attributed to survey error. The evidence assembled here indicates that measurement problems, while important, do not fully account for the discrepancy. I document that the youngest and the oldest households are consistently overrepresented among the poor and that the income - expenditure gap is largest at those ages. In the paper I summarize this life-cycle pattern by a U-shape. The contribution is to add a complementary interpretation alongside the measurement error account: consumption smoothing. To enrich that interpretation, I examine which population segments are disproportionately represented in the arms of the U and show that households headed by students are classified as income poor in surveys even though their spending baskets do not resemble those of chronically poor households. Finally, I present cross-country evidence suggestive of macroeconomic environments in which the U-shape is more pronounced, highlighting links with fertility, energy use, indebtedness, and external balance. This macro lens offers a new perspective on an old puzzle: country level development and balance-of-payments conditions appear correlated with micro-level income expenditure

gaps.

The results also matter for policy. Beyond the critical agenda of improving survey instruments and correcting under reporting of transfers and income, policymakers should recognize that some of the observed gap is real and reflects intertemporal choices. The findings therefore connect to and extend the literature on poverty measurement: in settings where short run resources are temporarily low, consumption can be a more stable indicator of material well being than current income. In such contexts, complementing income based poverty with consumption based measures can be informative for targeting and for distinguishing transitory shortfalls from persistent deprivation (e.g., Meyer and Sullivan, 2012; Gibson, 2016; Cutillo et al., 2022.

Limitations. Despite extensive robustness and sensitivity checks, several constraints mean results should be interpreted with caution. First, data coverage is incomplete and uneven. Not all LIS countries and waves collect total expenditure, and several WDI series are missing or discontinuous for particular country - year; as a result, the multi wave macro exercises are estimated on a small subset of countries and cannot, for example, include the United States in the macro regressions even though the U.S. is central to related work. Second, cross-country comparability, though greatly improved by LIS harmonization, remains imperfect. National surveys differ in questionnaire design, recall periods, treatment of in-kind items (e.g., imputed rent for owner-occupied housing), and the construction of disposable income; harmonization cannot fully eliminate source specific heterogeneity (LIS Cross-National Data Center in Luxembourg, 2023; Gornick and Jäntti, 2012). Third, consumption measurement error, and not just income measurement error is a known concern. Differences between diary and recall instruments, recall windows, and category coverage can affect the level and composition of reported spending in systematic ways, especially at the lower tail of the distribution (Gibson, 2016). Fourth, the empirical design is descriptive and correlational. The age-profile results recover systematic curvature, and the macro patterns identify covariation with country - year conditions, but neither design is causal; endogeneity (e.g., reverse causality and omitted variables) cannot be ruled out. Fifth, multiple-testing and small-N considerations apply in the macro section. Many indicators were screened and several specifications rely on modest samples, so statistically significant associations—while in-

ternally consistent across related indicators, should be viewed as exploratory rather than confirmatory. Finally, non-response and survey-error heterogeneity vary across national statistical systems. The literature documents substantial non-response, item misreporting, and coverage problems concentrated in low-income samples, with implications for both income and program participation reports (Meyer et al., 2015; Meyer and Mittag, 2021; Celhay et al., 2024; Heffetz et al., 2024). These caveats do not overturn the patterns documented here but clarify the scope of the claims: the paper establishes robust empirical regularities that are consistent with consumption smoothing; it does not identify causal mechanisms.

Future research. Follow up work can take two paths. First, it can quantify more precisely what fraction of the observed income - expenditure gap among the poor is attributable to intertemporal behavior versus survey error, ideally by combining LIS-style microdata with administrative records on transfers and credit and by leveraging designs that move beyond correlations (e.g., policy shocks to student finance, credit supply, or transfer timing). Second, it can develop causal tests of the macro link by leveraging instruments or natural experiments that shift external financing conditions or debt service, and then track differential changes in age profile curvature across countries, thereby tightening the bridge between macro environments and household smoothing behavior.

6 Bibliography

References

Altonji, J. G., Hayashi, F., and Kotlikoff, L. J. (1992). Is the extended family altruistically linked? direct tests using micro data. *American Economic Review*, 82(5):1177–1198.

Attanasio, O. P. and Pistaferri, L. (2016). Consumption inequality. *Journal of Economic Perspectives*, 30(2):3–28.

Celhay, P., Meyer, B. D., and Mittag, N. (2024). What leads to measurement errors? evidence from reports of program participation in three surveys. *Journal of Econometrics*, 238(2):105581.

Creedy, J. and Tan, L. (2007). The relationship between personal income and net worth in australia. *Australian Economic Review*, 40(2):165–181.

Cutillo, A., Raitano, M., and Siciliani, I. (2022). Income-based and consumption-based measurement of absolute poverty: insights from italy. *Social Indicators Research*, 161(2):689–710.

Fisher, J. D. and Hardy, B. (2023). Money matters: Consumption variability across the income distribution. *Journal of Economic Inequality*, 21:45–67.

Foster, J., Greer, J., and Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica: journal of the econometric society*, pages 761–766.

Gibson, J. (2016). Poverty measurement: we know less than policy makers realize. *Asia & the Pacific Policy Studies*, 3(3):430–442.

Gorbachev, O. (2011). Did household consumption become more volatile? *American Economic Review*, 101(5):2248–2270.

Gornick, J. C. and Jäntti, M. (2012). Child poverty in cross-national perspective: Lessons from the luxembourg income study. In *The Oxford Handbook of the Social Science of Poverty*, pages 119–140. Oxford University Press.

Hayashi, F., Altonji, J. G., and Kotlikoff, L. J. (1996). Risk-sharing between and within families. *Econometrica*, 64(2):261–294.

Headey, B. (2008). Poverty is low consumption and low wealth, not just low income. *Social Indicators Research*, 89:23–39.

Heffetz, O., Lichtinger, G., and Reeves, D. B. (2024). Assessing nonresponse bias in macro indicators by combining para-, administrative, and survey data. Technical report, National Bureau of Economic Research.

Karonen, E. and Niemelä, M. (2022). Necessity-rich, leisure-poor: The long-term relationship between income cohorts and consumption through age-period-cohort analysis. *Journal of Family and Economic Issues*, 43(3):599–620.

Krueger, D. and Perri, F. (2006). Does income inequality lead to consumption inequality? evidence and theory. *The Review of Economic Studies*, 73(1):163–193.

LIS Cross-National Data Center in Luxembourg (1995 - 2023). Luxembourg income study (lis) database. `https://www.lisdatacenter.org`. Multiple countries; microdata runs completed: 1995–2023.

Meyer, B. D. and Mittag, N. (2019). Using linked survey and administrative data to better measure income: Implications for poverty, program effectiveness, and holes in the safety net. *American Economic Journal: Applied Economics*, 11(2):176–204.

Meyer, B. D. and Mittag, N. (2021). An empirical total survey error decomposition using data combination. *Journal of Econometrics*, 224(2):286–305.

Meyer, B. D., Mok, W. K., and Sullivan, J. X. (2015). Household surveys in crisis. *Journal of Economic Perspectives*, 29(4):199–226.

Meyer, B. D. and Sullivan, J. X. (2011a). Consumption and income poverty over the business cycle. In *Who Loses in the Downturn? Economic Crisis, Employment and Income Distribution*, pages 51–82. Emerald Group Publishing Limited.

Meyer, B. D. and Sullivan, J. X. (2011b). Further results on measuring the well-being of the poor using income and consumption. *Canadian Journal of Economics/Revue canadienne d'économique*, 44(1):52–87.

Meyer, B. D. and Sullivan, J. X. (2012). Identifying the disadvantaged: Official poverty, consumption poverty, and the new supplemental poverty measure. *Journal of Economic Perspectives*, 26(3):111–136.

Mittag, N. (2019). Correcting for misreporting of government benefits. *American Economic Journal: Economic Policy*, 11(2):142–164.

World Bank (2025). World development indicators. `https://databank.worldbank.org/source/world-development-indicators`. Database; updated July 1, 2025.