

# False Negatives: Earnings Underreporting, Tax Overreporting in Surveys Worldwide

Vladimir Hlasny

**FALSE NEGATIVES:  
EARNINGS UNDERREPORTING, TAX OVERREPORTING  
IN SURVEYS WORLDWIDE**

Vladimir Hlasny<sup>1</sup>

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**Send correspondence to:**

Vladimir Hlasny  
UN Economic and Social Commission for Western Asia  
[hlasny@un.org](mailto:hlasny@un.org)

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## Abstract

Household survey incomes are subject to misreporting and measurement issues biasing the static and dynamic assessment of inequality and poverty. Non-positive incomes are particularly problematic as they represent extreme statistics in income distributions, are incompatible with sustainable consumption streams, and cannot be squared with households' observed behaviors and other socio-economic outcomes. We find that, in high income countries, the main source of extremely low disposable incomes is unduly high reported tax and social security withholdings. In transitional economies between the upper-middle- and high-income status, the main sources are negative self-employment income, followed by negative capital income and high tax liabilities. Lower down, among middle- and low-income countries, negative self-employment incomes play a leading role. Meanwhile, households with negative incomes appear to be typically as well off as, or better off than other households in terms of material wellbeing, both according to the short-term and long-term indicators. By contrast, zero-income households appear to be materially poor. We surmise that zero or small negative incomes correspond predominantly to chronically deprived households who temporarily fall into material poverty, while large negatives correspond to chronically well-off households under-reporting earnings, or writing off capital losses or tax assessments from surrounding years. Hence, 'tax overreporting' may explain low incomes – especially the zeros – in high income countries, while 'earnings underreporting' plays a greater role in upper-middle- and lower-income countries. Underestimation of rental values among homeowners is one specific challenge.

**Keywords:** negative incomes, income misreporting, tax avoidance

**JEL Classifications:** D31, I32, N30, H26

## ملخص

تخضع مداخل الدراسات الاستقصائية للأسر المعيشية لقضايا تتعلق بالإبلاغ والقياس الخاطئين، مما يؤدي إلى تحيز التقييم الثابت والدينامي لعدم المساواة والفقير. الدخل غير الإيجابي يمثل إشكالية بشكل خاص لأنها تمثل إحصاءات متطرفة في توزيع الدخل، وتتعارض مع تدفقات الاستهلاك المستدام، ولا يمكن تربيعها مع سلوكيات الأسر "الملاحظة والنتائج الاجتماعية والاقتصادية الأخرى. نجد أن المصدر الرئيسي – للدخل المنخفض للغاية المتاح في البلدان ذات الدخل المرتفع هو الاقتطاع الضريبي والضمان الاجتماعي المرتفع بلا داع. وفي الاقتصادات التي تمر بمرحلة انتقالية بين مركز الدخل المتوسط الأعلى والمرتفع، تتمثل المصادر الرئيسية في الدخل السلبي للعمل الحر، يليه الدخل الرأسمالي السلبي والالتزامات الضريبية المرتفعة. وفي البلدان المتوسطة والمنخفضة الدخل، تؤدي الدخول السلبية للعمل الحر دوراً قيادياً. وفي الوقت نفسه، يبدو أن الأسر ذات الدخل السلبي تكون عادةً في وضع جيد، أو أفضل حالاً من الأسر الأخرى من حيث الرفاهية المادية، وفقاً للمؤشرات قصيرة الأجل وطويلة الأجل. على النقيض من ذلك، يبدو أن الأسر المعيشية ذات الدخل الصفري فقيرة مادياً. نعتقد أن الدخل السلبي الصفري أو الصغير يتوافق في الغالب مع الأسر المحرومة بشكل مزمن والتي تقع مؤقتاً في فقر مادي، في حين أن السلبيات الكبيرة تتوافق مع الأسر الميسورة بشكل مزمن التي لا تبلغ عن أرباحها، أو تشطب خسائر رأس المال أو التقييمات الضريبية من السنوات المحيطة. وبالتالي، فإن «الإفراط في الإبلاغ الضريبي» قد يفسر انخفاض الدخل - وخاصة الأصفار - في البلدان ذات الدخل المرتفع، بينما يلعب «نقص الإبلاغ عن الأرباح» دوراً أكبر في البلدان ذات الدخل المرتفع والمنخفض. يعد التقليل من قيم الإيجار بين مالكي المنازل أحد التحديات المحددة.

## 1. Introduction

Incomes in household surveys worldwide suffer from various misreporting and measurement issues, such as under/over-reporting earnings or liabilities, omission from sampling frame, unit and item nonresponse, top and bottom coding by statistical agencies or survey aggregators, and other problems. That is not to say that surveys are inferior sources of information on the poor. The measurement problems have their analogies in tax registries, where taxpayers may conceal earnings, expedite or delay the realization of certain gains or losses, choose alternative tax jurisdictions, or fail to file taxes altogether.

In surveys and registries alike, the lower tail of income distributions typically includes unsustainably low-income values that fall short of deprivation thresholds according to any definition, such as the international \$1.9/day poverty line or the ‘wolf point’ necessary for bare survival (Davis 1941:405) or even zero. Misreporting of earnings and tax liabilities, and shifting of their reporting across the years for strategic tax-liability considerations, are thought to be the primary sources of extreme income observations reported by households, particularly those at the lower tail (Paulus 2015). In contrast to tax registries, household surveys may not be suspected to suffer from misreporting, given that households have little to gain from lying or making themselves look poor in front of enumerators. Nevertheless, tallying all earnings and losses over the span of a survey period can be a daunting task, and reporting public assistance such as food stamps may be embarrassing. Since incomes reported on surveys cannot be ascertained, legally or otherwise, and there is no cost to lying, misreporting (and typically underreporting) may be more rampant in surveys than in tax records (Higgins et al. 2018). Selective underreporting, both of the extensive and the intensive kind, means that the income ranking of households in surveys may differ from the ranking of true unobserved incomes, and households at the bottom of surveyed distributions may come from higher quantiles in the distributions of true or tax-registry incomes.

Suggestive evidence of the rampant underreporting in surveys comes from the mass of extremely low reported incomes. Negative and zero incomes are quite common in terms of the proportion of household surveys afflicted by them, and the share of sampled households reporting such values (Table 1). Negative incomes reported in surveys, or the individual income components, are also often large in magnitude.

At the same time, methodological approaches for addressing the measurement problems associated with lower-tail incomes, including diagnostics for identifying mismeasured values and correcting them, and adjusting distributional statistics for the nature of the suspected mismeasurement, have not been agreed and, really, are in their infancy (Bellù and Liberati 2006; Eurostat 2006; Hao and Naiman 2010; Cowell 2011; OECD 2016; Raffinetti et al. 2017; Ceriani et al 2022; Hlasny et al. 2022). Hence, the issue of non-positive and other implausibly low incomes is relevant from multiple vantage points, and addressing it entails making normative choices and crossing multiple technical hurdles.

Understanding the lower tail is important empirically, from the fiscal perspective as well as in welfare and capabilities assessments. Particularly little is known about the redistributive impacts of measurement issues in specific income components such as self-employment and capital income (Ooms 2021). The emerging literature on multidimensional welfare, poverty and deprivation has also stressed the need to link carefully the densities of income, wealth, health and other dimensions

to overall welfare. At the same time, the United Nations' work on the Human Development and Human Poverty Indexes has focused on mapping the interaction among capabilities and functionings. The United Nations has worked on identifying a finite set of indicators and isolating the minimum set of capabilities for a decent life. In this respect, proper measurement of bottom incomes is crucial for understanding the association among multiple indicators of socio-economic outcomes, setting poverty thresholds, identifying vulnerable populations, and producing accurate proxy means test indices for assistance targeting and tailoring.

This study focuses on the prevalence and magnitude of non-positive incomes, their incidence, composition and sources, and evidence whether they reflect true incomes, household capabilities or welfare. We rely on a wide spectrum of 356 harmonized national income surveys from the Luxembourg Income Study database. We then review selected empirical methods promulgated for addressing them, and draw implications for inequality and poverty measurement.

The rest of the study is structured as follows. Section II reviews the theoretical and measurement problems posed by negative and zero incomes, and the main established methods for correcting them and assessing their distributional impacts. Section III introduces the conceptual analytical framework, and the available data with the definition of main aggregates. Section IV presents the key results. Section V discusses implications for scholarly and policy work in light of the recent lines of research.

## **2. Literature review**

Lower-tail incomes are problematic conceptually, as they may not reflect the underlying levels of households' earnings, capabilities or welfare. They are problematic empirically, as they generate biases for the assessments of income distribution and its evolution over time. The measurement biases are problematic statically for understanding income distribution within as well as across countries, but also dynamically for understanding the evolution of inequality and poverty – as well as within-country growth incidence and individuals' mobility – over time. Understanding the scale and incidence of households' graduation from poverty-targeting programs is crucial for program evaluation and re-deployment. The high prevalence of non-positive incomes in particular presents a problem for the accurate derivation of distributional statistics, significantly for some measures of poverty, inequality and mobility. Non-positive incomes are traditionally either bottom-coded or truncated, and may thus be entirely excluded from measurement. Even when they are kept intact, the chosen inequality and poverty statistics may simply not account for them. The traditionally computed Gini index of inequality – accounting for the dispersion of non-negative incomes only – is a case in point. The approach to dealing with the non-positive observations can tangibly affect the estimated growth in inequality, poverty, or individuals' transitions in/out of poverty.

Negative incomes are problematic not only because they cannot be squared with households' long-term consumption requirements and they may be excluded from inequality and poverty assessments, but they may be artifacts of tax evasion tactics and accounting rules, or of data-entry errors on selected income components. For instance, evidence from Latin America comparing the distribution of survey incomes and tax records showed that self-employment incomes were underreported even at the lowest survey quantiles. Beside the prime suspect of tax evasion, it may be that gains from self-employment may not have been captured in the survey snapshot partly because of accounting norms and practices. Households may have reported them in other time

periods or legal jurisdictions. Finally, limited recall of gains from sales or of the annualized investment in self-employment activities may be responsible for accidental – yet still systematic and substantial – omission.

Evidence from linked survey and tax-registry data reveals that employment incomes at the bottom of the distribution are particularly affected by tax evasion, resulting in underreporting of true earnings by 17% of the surveyed population (Paulus 2015). Linking the survey and tax-records income data in the US also suggests substantial underreporting in the survey (Higgins et al. 2018). Linking income-survey and food-stamp administrative data shows that social assistance failed to be reported in the survey by over one-third of housing-assistance recipients, 40% of food-stamp recipients and 60% of general-assistance recipients, resulting in sharply underestimated bottom incomes (Meyer and Mittag 2019). Another problematic income source is imputed rent among house owners where, as evidenced in Peru, particularly the poorer among house owners in rural areas tend to underestimate their rental value by 20–25% (Ceriani et al. 2019). Negative incomes may also be introduced by the special treatment of selected income components such as windfall incomes, alimonies, and tax refunds by statistical agencies or survey aggregators including LIS and ERF.

Using experimental design, Fochmann and Wolf (2019) found that individuals' underreporting of earnings and over-deducting of liabilities such as debt repayments are asymmetric between positive and negative incomes which calls for the separate assessment of negative, zero and higher incomes.

Zero incomes are arguably as problematic as negative incomes or even more problematic. Actual zero incomes are quite unlikely in the population, as most households receive some earnings, private or public transfers, or imputed rent from their housing or other assets – or, regardless of earnings, may still be liable for tax withholding. In surveys, zero incomes are often caused by problems with the survey instrument, including bottom coding, or replacing missings with zeros, where missings may be caused by item or unit nonresponse, data-entry errors or censoring at zero (Neugschwender 2020). Zero incomes may thus be associated with a wider scale of survey problems that are harder to offset meaningfully.

Survey documentation provided by statistical agencies typically fails to clarify the origins of the negative and zero incomes. The standardization process undertaken by survey aggregators such as LIS or ERF also plays a role in introducing non-positive incomes without adequate documentation.<sup>2</sup> To what extent they are artifacts of accounting practices or income and tax misreporting – or reflect meaningfully if not accurately on households' current fiscal position and welfare – must thus be investigated. The availability of individual income components and alternative measures of households' economic status can be used in this respect.

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<sup>2</sup> As a case in point, when LIS transformed its standardization procedures in 2018–2019, the statistics related to non-positive incomes were affected significantly. Take for instance Colombia 2007, 2010 and 2013, for which we have two versions of LIS-standardized datasets (internally labeled as CO, and transformed TCO). In 2007, while mean income was barely affected by the transformed standardization, the lowest survey income changed from representing barely -8.2% to a whopping -75.8% of the mean income (-1,005,237 to -9,839,707 pesos). Negative incomes also came to represent 0.522% of the sample compared to 0.435% pre-transformation – and zero incomes came to represent 2.03% compared to 1.88% pre-transformation.

### 3. Conceptual framework and data

Before delving into the measurement and assessment of income distributions, it is important to settle on the unit of analysis and the income concept relevant from both welfare and capabilities perspectives. We choose to adopt a well-established post-fiscal adjustment income concept, standard simple equivalence scales, and standard household sampling weights constructed by national statistical agencies and facilitating representativeness for the underlying population. Disposable household income (*DHI*) is used as our approximation for households' capabilities or welfare, representing the total monetary and non-monetary current income included selected implied earnings for the household net of income taxes and social security contributions.<sup>3</sup> *DHI* excludes the contentious in-kind transfers. *DHI* has a number of desirable properties compared to pre-fiscal (gross) or other post-fiscal (e.g., net income plus in-kind transfers) concepts, and compared to alternative income normalizations. For example, *DHI* is regarded as closely associated with households' revealed welfare; it does not require one to take a position on the adult-equivalence or scale economies; and it requires limited imputation of unearned or implicit receipts and liabilities. *DHI* is equivalised and made available across all LIS surveys, unlike other income concepts (Atkinson *et al.* 1995).

Household is taken to be the preferred unit of analysis, compared to families, adult-equivalents or individuals, because of conventions regarding how income items are aggregated. The household-level income allows us to see the raw size of negative incomes as reported in the survey, without diluting them by equivalence scales. Household income – beside household income adjusted for household size (per capita) or composition (per adult equivalent) – is a well-established welfare aggregate in its own right, under standard assumptions on the nature of consumption and welfare.<sup>4</sup> Finally, the post-fiscal income concept allows us to identify more monetary sources – both income and liabilities components – of low levels of welfare and capabilities reported by households.

Most LIS surveys applied stratified, population-representative sampling, but some surveys, notably in Sweden, do not apply stratification explicitly. We take advantage of harmonization among the LIS surveys to comment on worldwide inequality and biases to it.

Given our skepticism regarding the meaning of non-positive incomes, we apply alternative methods for treating them, and assess the distributional impacts of the alternative approaches. If we find that households with non-positive incomes do not have a profile of deprived units (Brewer *et al.* 2017), we may wish to truncate the reported non-positive values of individual income sources, or replace them with values that better represent households' observed capabilities or functionings. These alternative approaches may be thought of as examples of reweighting (say,

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<sup>3</sup> *DHI* is of course not a perfect welfare aggregate due to the omission of some private transfers, public goods and other in-kind transfers, and the insurance component of social security contributions.

<sup>4</sup> Using household income carries the implicit assumption that income is spent entirely on public goods (each household member disposes equally of the full household income). This is of course not true. Some goods such as housing and utilities are clearly a shared public good across household members but others such as personal services, clothing, food or mobile phones are not. It also assumes that each household member has the same consumption capacity, which is also not true. Adults eat more than small children, and men and women have different consumption patterns. Adjusting for household composition has also its own drawbacks. Consumption patterns and family structures change across time, regions and countries. If one is really concerned about comparing household wellbeing across time and space, the scales used to account for household composition should be adjusted across these two dimensions. This, of course, becomes very cumbersome and increases the degree of normative choices that the analyst must make. On the other hand, using one equivalence scale for all would be very controversial and would favor some countries at some point in time at the expenses of other countries or points in time (different organizations such as the OECD or the FAO have proposed different scales but there is no international agreement on the most appropriate scale).



assigning zero weights to non-positive incomes in the extreme) versus replacing (say, replacing negatives with zeros) of incomes suspected of being misreported or non-representative of households' true earnings, capabilities or welfare. Information on the accuracy of households' income values and on the appropriate weights or values to use for them may come from within survey (such as here, or in Hlasny et al. 2022) or from out of survey (such as from linked tax registries or other surveys, or from national accounts, as in Dang et al. 2019). This taxonomy is analogous to that for addressing suspected top incomes (Bourguignon 2018; Hlasny and Verme 2018; Lustig 2019).

The correction undertaken may involve a single step, or a multi-step process when a variety of issues are suspected such as the case of underrepresentation of capital income (Ooms 2021; Hlasny and Verme 2022). Here we adopt two alternative approaches: single-step imputation of DHI, and multi-step imputation of multiple income components.

### 3.1 Data

Our study relies on 356 household surveys in the Luxembourg Income Study (LIS 2019) database, which can be viewed as covering most of the spectrum of national household surveys encountered around the world in terms of the level of economic development, inequality and poverty, sample size (ranging from 1,813 to 235,732), and definitions of incomes (net, mixed, gross<sup>5</sup>). The surveys hail from 31 high income and 15 upper-middle income countries (upper-middle: Brazil, China, Colombia, Dominican Republic, Georgia, Guatemala, Iraq, Mexico, Panama, Paraguay, Peru, Romania, Serbia, Russia, South Africa), four lower-middle income countries (Côte d'Ivoire, Egypt, India, Vietnam), and one low income country (Sudan) on six continents for years 1969–2016. In light of this heterogeneity, the LIS database is an ideal testing ground for income-dispersion analyses such as the one applied in this study. The surveys were all harmonized using a consistent approach and made available by LIS.<sup>6</sup>

Among LIS surveys, 317 surveys or 89% contain negative or zero income observations (46 with negatives; 87 with zeros; 184 with both) and are analyzed further. Among these 317 surveys, zero incomes make up 0.47% of overall samples (32,569 out of 6,940,581 records), and negative incomes make up 0.21% (14,394 records). Refer to Table 1 and its notes.

For illustration, in the French 2005 survey there were no zeros and three negative incomes, while in 2010 there were 117 zeros and 25 negatives (together nearly 1% of the sample). The negative values were typically 32% as high (in absolute value) as the survey's positive incomes.

Based on the LIS definition of *DHI*, negative and zero incomes could come in the form of low labor, capital or transfer income ( $HIL + HIC + HIT = HI$ ), or high income tax liability and social security contributions ( $HXITI + HXITS = HXIT$ ). The income components could be further subdivided into paid employment income and self-employment income ( $HILE + HILS = HIL$ ), interest and dividends, voluntary individual pensions, rental income and royalties ( $HICID +$

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<sup>5</sup> The nature of accounting for taxes and contributions either by direct observation or imputation in all income specifications (gross), in total incomes but not in income components (mixed), or not at all (net).

<sup>6</sup> Available via the secure remote-execution Lissy tool ([www.lisdatacenter.org/data-access/lissy](http://www.lisdatacenter.org/data-access/lissy)). LIS also offers direct data access to pre-approved visitors via a secure computer on site at LIS (Esch-sur-Alzette, Luxembourg). This offers users greater functionalities such as the ability to list and tabulate values, and generate advanced graphs.

$HICVIP + HICREN + HICROY = HIC$ ), and social security transfers and private transfers ( $HITS + HITP = HIT$ ). Liability components could be subdivided into income tax withholdings and adjustments ( $HXITIW + HXITIA = HXITI$ ), and social security contributions paid by self and paid on behalf of others ( $HXITSS + HXITSB = HXITS$ ). In sum:

$$\begin{aligned} DHI &= HI - HXIT = (HIL + HIC + HIT) - (HXITI + HXITS) \\ &= [(paid\ empl. + self\ empl.) + (int.\ \&divid.\ + vol.\ ind.\ pens.\ + rent + royal.) \\ &\quad + (soc.\ sec.\ + priv.\ transfers)] \\ &- [inc.\ tax\ withhold.\ + adjust.\ + soc.\ sec.\ contrib.\ self\ paid + paid\ on\ behalf] \end{aligned}$$

In the following analysis, we review the frequency and size of non-positive incomes, their composition and sources, and their association with households' other socio-economic outcomes. This evidence taken jointly verifies whether the reported incomes are representative of economic outcomes of deprived units. To the extent that their presence in the survey may bias our static and dynamic assessment of aggregate inequality, poverty, and individuals' mobility, we will re-estimate the statistics using a treatment method for non-positive values proposed by Hlasny et al. (2022). We will then comment on the sensitivity of alternative inequality and poverty measures to the treatment method.

## 4. Results

### 4.1 The nature and sources of non-positive incomes

Among the 354 household surveys in the LIS database, 229 surveys (65%) contain negative disposable household incomes. In 12 surveys, negative incomes account for over one percent of nonzero incomes – numbering 2–191 observations across those surveys.<sup>7</sup> (In descending order, the countries are: ch92, fr84, nl87, pe04, pl95, uk86, kr08, pe10, pe13, fr89, rs06, ie87.) Negative incomes are not trivial in size. Mean negative income is as large in absolute value as 754% of mean nationwide income, and exceeds 200% of mean nationwide income in 15 surveys. (In descending order, the countries are: nl93, be85, no10, de12, ch82, de01, cz92, no13, co10, de98, gt06, de95, se81, de00, de84.) In another 28 surveys, mean negative income is as high as 100–200% of mean nationwide income.

Among the 354 LIS surveys, 270 surveys (76%) also contain zeros for incomes. In 22 surveys, zeros account for over one percent of non-negative incomes, and number up to 1,213 observations in the survey sample.<sup>8</sup> (In descending order, the countries are: se67, ci02, ca71, ch82, co04, za08, co07, eg12, it14, at95, ru00, ci15, cl94, cl15, co13, be92, cl09, ca75, hu91, gr95, ru10, cl90.)

To understand the source of negative income values, we assess the components of these incomes. In each survey, among households with negative disposable incomes, we calculate the share of households that have negative capital income, negative self-employment income, or tax withholdings/adjustments higher than other income (i.e., labor income + transfers + voluntary pensions + rental income + royalties). We also calculate mean negative capital income, mean negative self-employment income, and mean excess of taxes over other income. The ratios of these

<sup>7</sup> In larger-sample surveys, negative incomes number as many as 584 observations (in no04), but this may represent a smaller problem when it involves a smaller *share* of the sample. Worth noting, observations with zero incomes are omitted from these counts because zero incomes are a separate problem with an unclear source.

<sup>8</sup> Observations with negative incomes are omitted from these counts for clarity.

means to the mean negative disposable income indicate how important capital income, self-employment income, or undue tax outlays are in bringing about negative disposable incomes in each survey.

Table 1 shows that the main source of negative disposable incomes, in one-half of all surveys, is negative self-employment income. Additionally, unduly high tax and social security withholdings are the main source in one-third of surveys. In the remaining one-sixth of surveys, negative capital income and high self-paid social-security contributions account for the bulk of negative incomes.

These results are not surprising, since self-employment income is particularly prone to mismeasurement and misreporting. First, empirical evidence from comparing the distribution of self-employment income in survey and tax data in Latin America suggests that this income tends to be underreported in surveys across all distribution quantiles.<sup>9</sup> Hence, negative self-employment incomes may arise from underreporting. Second, household surveys provide information over a short sampling period when the self-employed may have been mostly expending resources on self-employment related activities, whereas gains from self-employment may have materialized only later without being captured in the survey snapshot. Third, self-employment income might be more difficult to report accurately in surveys compared to other income components, because the respondents need to recall not only how much they gained from their sales or services but also their annualized investment in self-employment activities.

Interestingly, when surveys are sorted by frequency of negative disposable incomes, negative self-employment income shows up as the main source in surveys with the highest frequency of negative disposable incomes. When surveys are sorted by the magnitude of negative incomes, tax burden and negative capital income dominate as sources among surveys with the highest magnitude of negative incomes. This suggests that negative self-employment incomes are more frequent and more problematic at the extensive margin, but lower in magnitude and less problematic at the intensive margin, than windfall tax liabilities or realized capital losses.

#### *4.2 Socioeconomic status of households with non-positive incomes*

Using households' consumption, food consumption, employment status, health, education, home-ownership and urban/rural residence,<sup>10</sup> we now assess how households with non-positive incomes fare compared to population at large. Refer to Table 2.

We find that mean household consumption of negative-disposable-income households is 24–454% of nationwide mean disposable income (mean 96% across the 43 surveys), never less than that. This suggests that households with negative disposable incomes have relatively high consumption by national standards. In the 73 surveys where food consumption is available, mean food consumption of households with negative disposable incomes is as high as 73% of nationwide

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<sup>9</sup> The authors are grateful to Holguer Xavier Jara Tamayo for a helpful correspondence on these points.

<sup>10</sup> These are available for a smaller set of surveys, for instance 43 surveys out of 354 in the case of consumption, 73 surveys in the case of food consumption.

mean disposable income (mean 23% across the 73 surveys, and over 40% in 12 surveys), also suggesting that these households are not food-poor.<sup>11</sup>

We conclude that households with negative incomes are typically as well off as, or even better off than other households in terms of material wellbeing, and are as economically active as them. By contrast, zero-income households are materially deprived and are less economically active, even though their human capital is not clearly lower than their peers', hinting at other unexplained factors responsible for the observed income shortfall. For households with negative incomes, we report on the magnitude and the nature of their 'overconsumption' as the excess of total monetary consumption (HC) over their final disposable monetary income, and confirm that durables and non-essential services (food and essentials for zero-income households) account for a large share of their overconsumption.

From the analysis of this overconsumption between households with negative, zero, and positive DHI, we assess the quality of the respective observed DHIs as measures of households' capabilities and welfare. Figure 1 illustrates households' overconsumption as a share of their final disposable monetary income in selected LIS surveys. Households in the lowest income quantiles of the population – earning non-positive incomes in these surveys – are seen to have the highest relative consumption in excess of their final disposable income. Given the systematic and large-scale nature of this tendency, and in light of the evidence in Table 2, we conclude that the households' incomes are underreported, or their liability overreported, relative to their observed consumption patterns and socio-economic status.

To compute inequality and poverty measures in the presence of unreliable non-positive values in the income distributions, we implement several alternative classical methods: leaving the non-positives intact, replacing through censoring/bottom-coding (i.e., resetting to zero), and extreme reweighting by truncation (i.e., removing negatives or even zeros). Refer to Table 3. We find that the traditional censoring and truncation approaches produce non-trivial corrections to the uncorrected statistics, of up to 2.3 points of the Gini, and 1.5 points of the poverty headcount ratio. However, they fail to produce a complete, continuous and meaningful income distribution. More advanced methods should thus be explored (De Battisti et al. 2019; Hlasny et al. 2022). For comparison, Table 4 reports on indexes considered more sensitive to the distribution of bottom incomes, Theil's general entropy index  $GE(2)$  and the IGR. (By contrast,  $GE(\alpha \leq 1)$  indexes cannot be used with non-positive incomes.) These are confirmed to be affected more gravely by bottom-coding at zero, removing negative incomes, or removing all non-positives. In sum, these estimations suggest that the issue of non-positive incomes is important for the proper measurement of inequality and poverty, and of their evolution over time, and deserves proper attention and modeling by practitioners.

#### *4.3 Alternative sets of income surveys: Luxembourg Wealth Surveys*

The frequencies of negative and zero incomes in surveys, their sources and their associations with other household outcomes, are contingent to some degree on the process of data preparation and harmonization by the disseminating data centers. For instance, Luxembourg Income Study and the

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<sup>11</sup> This excludes 3 surveys where the few negative-disposable-income households report zero food consumption, likely the case of misreporting or censoring.

Economic Research Forum (ERF) use different routines in harmonizing surveys and constructing variables, particularly when the data diverge in their main purpose, such as with income versus wealth surveys.<sup>12</sup>

Among a set of 40 Luxembourg Wealth Surveys (LWS) harmonized by the LIS, for selected OECD countries 1995–2016, only 33 surveys have information on disposable household income. All these surveys contain some non-positive income observations. In particular, 17 surveys have both negatives and zeros for incomes, 14 surveys contain negatives but have no zeros, while two surveys have zeros without having any negatives. (Refer to Table 5.)

Among the set of LWS surveys, mean negative disposable income is as large in magnitude as 690% of mean nationwide disposable income (us01), and exceeds 200% of mean nationwide disposable income in 6 other surveys. (in descending order: no10, us98, de02, no13, us04, us07). It also approaches 200% of mean nationwide disposable income in us95 and de12.

As in the case of the LIS surveys, evaluating the mean negative capital income, mean negative self-employment income, and mean excess of taxes over other income among households with negative incomes, and comparing them to the mean negative disposable income gauges how important capital income, self-employment income, or undue taxes are in causing negative disposable incomes in each survey.

In the LWS surveys, like in the LIS database, there are three major sources of negative incomes, both at the extensive and the intensive margin: unduly high tax withholdings or adjustments (i.e., higher than the sum of paid labor income, transfers, voluntary pensions, rental income and royalties), negative self-employment income, and negative capital income. Windfall tax liability is the main source of negative disposable incomes in one-half of surveys (16 out of 31 surveys), negative self-employment income is the main source in one-third of surveys (11 surveys), and negative capital income is the main source in the remaining 4 surveys.

High taxes are the main source of negative disposable incomes in surveys with the highest frequency of negative disposable incomes as well as in surveys with the highest magnitude of negative incomes. This is in contrast to the pattern found in the more heterogeneous set of LIS income surveys. This suggests that in high-income countries, windfall tax liabilities are the most frequent as well as the largest-magnitude source of negative disposable incomes in surveys. By analogy, the main source of negative survey incomes in upper-middle income countries is negative self-employment and capital incomes, only then followed by high tax assessments.

Among households with negative disposable incomes, mean outlays on income taxes amount to as much as 338% of the mean negative disposable income in Canada '16 (mean 117% across the surveys where this can be evaluated). Outlays on other taxes amount to 405% of the mean negative disposable income in Sweden '05, but only 0–14% in other surveys.

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<sup>12</sup> Under a LIS–ERF partnership, ERF datasets were prepared and partially harmonized with LIS datasets following a LIS Database template, using the same variable definitions and standards. Refer to [www.lisdatacenter.org/our-data/erf-lis-database](http://www.lisdatacenter.org/our-data/erf-lis-database). Among the 16 LIS–ERF surveys for Arab countries 1999–2015, only two surveys include negative or zero incomes. Moreover, the frequencies of negative or zero incomes are low. The Iraqi (upper-middle income) 2007 and 2012 surveys include 28 and 0 negatives, respectively, and 12 zeros each, among 17,792–25,146 household observations, while the Sudanese (low-income) 2009 survey includes 28 zeros among 7,913 households.

Finally, we compare mean interest paid (available in 9 surveys out of 31), mean consumption (7 surveys), and mean food consumption (13 surveys) among households with negative disposable incomes, against mean national disposable income, to gauge their true socio-economic status. Interest paid among negative disposable-income households amounts to 0–34%, mean 11%, of the mean nationwide disposable income (largest in no13, no10 and au14). Mortgage interest paid makes up the largest bulk of this. For households with ostensibly ultra-low incomes, these appear to be high financing liabilities endured on account of real-estate ownership. This would confirm the conjecture that households often underestimate the true rental value of their properties even as they bear the full burden of mortgage payments.

For completeness, mean consumption of households with negative disposable income is 60–116%, mean 85%, of nationwide mean disposable income (highest in au10, it04). This suggests that households with negative disposable income have relatively high consumption. Mean food consumption of households with negative disposable income is up to 31%, mean 12%, of nationwide mean disposable income (highest in it95, it04), also suggesting that these households are not food-deprived.

## **5. Conclusions**

This study was concerned about the widespread occurrence of unreliable non-positive incomes in household surveys, which suggests that earnings underreporting or tax overreporting – or both – is prevalent. The premise adopted in this study is that non-positive incomes are not sustainable in the longer term, and do not reflect households’ capabilities or welfare (even if the households temporarily experience losses). Not only are such incomes difficult to square with the households’ observed socio-economic outcomes, and the non-negative nature of consumption needed for survival, they also present challenges for the static and dynamic measurement of inequality, poverty, and their trends. At the micro level, they bias our assessment of growth incidence, and of individuals’ mobility and transitions in/out of poverty. The study therefore aimed to impute incomes consistent with the households’ profile and behavior.

We found that non-positive incomes are quite common and are often large in absolute value. Moreover, they are just the tip of the iceberg, as the presence of additional small positive incomes – or misreported values throughout the income distribution – may pose a greater problem still. Across a large database of surveys from upper-middle- and high-income countries, the most prevalent source of negative disposable incomes, in one-half of all surveys from countries rich and poor, is negative self-employment income. Unduly high tax and social security withholdings are the main source in one-third of surveys, predominantly from high-income countries. In the rest of surveys, negative capital income and high self-paid social-security contributions also help to account for negative incomes. This suggests that capital income presents a measurement challenge not only at the top of income distributions, as previously claimed.

Zooming in on high income countries, windfall tax liabilities are the most frequent as well as the largest-magnitude source of negative incomes. Negative capital income is an important source of negative incomes only in selected countries, with a lower monetary magnitude than the tax liabilities. Hence, ‘tax overreporting’ may be the leading source of extremely low incomes in high income countries. Meanwhile, ‘earnings underreporting’ plays a more important role in upper-middle income countries. Underestimation of the rental value among homeowners – in

combination with reporting the full burden of mortgage payments – is one specific issue responsible for low reported capital incomes.

Having reviewed households' (short term) food and total consumption, and (longer-term) health, education, home-ownership and urban/rural residence, we conclude that households with negative incomes are typically as well off as, or even better off than other households in terms of material wellbeing. On the contrary, zero-income households appear materially deprived in the short term, even though their health and education are not clearly lower than their peers'.

We conclude that the issue of implausibly low incomes is clearly not trivial, and deserves attention and careful modeling by practitioners. In light of our findings, we conjecture that zero or small negative incomes are prevalent among chronically fiscally deprived people who fall into material poverty, while large negative incomes correspond to chronically rich people under-reporting, or writing off capital losses or tax assessments from surrounding years. Meanwhile, the gap between households' incomes and their other socio-economic outcomes may be subject to an attenuating 'confirmation bias,' whereby households reporting low incomes may report different values for income or their other outcomes to avoid distrust by the enumerator.

In sum, understanding the sources of extreme incomes, imputing their true values, and disentangling the truly-nonpoor from truly-poor groups is essential for deriving relevant measures of household needs, which is instrumental for accurate targeting of social protection programs.

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**Table 1: LIS surveys with non-positive incomes: frequencies of zeros and negatives, components in negative incomes, and consumption of negative-income households**

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
at00	2340	7	4	1.1%	0%		100%	228.6%	0%			
at04	5147	0	2	161.3%	0%		0%		100%	100.2%		
at07	5707	2	0									
at10	6187	4	1	9.2%	0%		0%		100%	105.5%		
at13	5909	3	0									
at94	2869	10	6	2.4%	0%		100%	114.3%	0%			
at95	19512	264	0									
at97	2685	9	2	2.6%	0%		100%	102.6%	0%			
au01	6786	47	42	52.1%	24%	28.5%	81%	167.1%	0%			
au03	10210	79	45	43.9%	24%	69.6%	80%	183.2%	0%			
au04	11361	37	25	55.4%	20%	7.4%	84%	189.2%	0%	83%	11%	
au08	9345	38	17	51.0%	18%	110.9%	88%	155.5%	0%			
au10	18008	40	48	31.0%	35%	85.1%	75%	185.3%	0%	116%	12%	
au14	14115	34	40	28.5%	38%	129.2%	75%	152.0%	0%			
au81	14755	46	0									
au85	7563	29	0									
au89	14450	43	0									
au95	6819	42	38	99.2%	11%	24.9%	89%	129.3%	0%			
be00	2085	5	0									
be85	6471	24	1	733.7%	100%	114.4%	0%		0%			
be88	3779	28	0									
be92	3821	42	0									
be95	2639	12	0									
be97	4632	13	4	3.7%	0%		0%		100%	239.8%		
br06	1E+05	891	0									
ca00	28970	0	68	28.8%	4%	59.8%	54%	120.6%	51%	291.0%		
ca04	27820	1	45	13.6%	7%	215.4%	93%	230.4%	4%	1.1%		
ca07	26745	0	26	11.2%	4%	85.8%	92%	232.6%	8%	7.1%		
ca10	25019	0	23	17.5%	9%	225.6%	87%	253.4%	9%	5.1%		
ca13	23014	0	17	25.9%	6%	23.5%	88%	216.9%	12%	13.6%		
ca71	25927	557	52	33.3%	6%	195.2%	94%	142.0%	0%			
ca75	26569	276	46	48.0%	0%		80%	187.9%	22%	26.5%		
ca81	15136	65	26	55.8%	4%	17.8%	100%	116.4%	0%			
ca87	10999	12	12	49.9%	0%		75%	128.1%	25%	200.5%		
ca91	20035	32	29	22.2%	3%	47.6%	97%	196.7%	7%	95.5%		
ca94	37475	43	44	36.4%	5%	242.2%	93%	173.3%	2%	191.8%		
ca97	33843	7	48	40.1%	4%	1474.5%	71%	121.4%	27%	84.4%		
ca98	31218	1	60	97.0%	10%	25.6%	80%	150.6%	18%	179.7%		
ci02 <sup>b</sup>	10746	410	0									

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
ci08 <sup>b</sup>	12301	21	0									
ci15 <sup>b</sup>	12128	145	0									
ch00	3642	0	12	8.3%	0%		0%		100%	337.3%		6%
ch02	3726	0	16	25.2%	0%		0%		100%	269.8%		8%
ch04	3270	0	25	30.7%	0%		4%	67.0%	100%	162.9%		9%
ch07	6778	0	40	37.5%	0%		0%		100%	133.2%		
ch10	7502	0	15	18.6%	0%		0%		100%	128.2%		
ch13	6792	0	10	3.8%	0%		0%		100%	128.8%		
ch82	7036	151	8	377.3%	0%		0%		100%	101.5%		
ch92	6301	24	167	40.0%	0%		5%	768.7%	96%	51.0%		
cl00	65036	489	0									
cl03	68153	470	0									
cl06	73720	403	0									
cl09	71460	758	0									
cl11	59084	352	0									
cl13	66725	317	0									
cl15	83887	967	0									
cl90	25793	259	0									
cl92	35948	304	0									
cl94	45379	531	0									
cl96	33636	174	0									
cl98	48107	307	0									
cn02	17113	1	9	10.2%	0%		89%	134.4%	67%	29.3%		13%
cn13	17887	3	81	32.1%	7%	278.6%	62%	165.7%	0%		61%	21%
co04	8994	188	0									
co07	15847	298	69	8.2%	0%		0%		100%	109.6%		
co10	16125	122	44	5.4%	0%		0%		100%	115.4%		
co13	14050	159	52	4.6%	0%		0%		100%	140.1%		
co07 <sup>b</sup>	19784	401										
	2	6	1032	75.8%	0%		0%		100%	101.7%		
	19957	174										
co10 <sup>b</sup>	4	1	473	282.9%	0%		0%		100%	101.8%		
	19606	215										
co13 <sup>b</sup>	3	2	483	16.3%	0%		0%		100%	107.0%		
	18715	178										
co16 <sup>b</sup>	0	6	465	8.9%	0%		0%		100%	107.4%		
cz02	7973	3	0									
cz07	11294	2	0									
cz10	8866	2	0									
cz92	16234	0	1	314.0%	0%		0%		100%	100.0%		
cz96	28148	12	2	74.6%	0%		0%		100%	112.9%		
de00	11796	3	6	232.5%	67%	184.1%	0%		50%	77.7%		
de01	12320	5	11	321.9%	55%	158.5%	0%		45%	127.3%		
de02	11909	5	12	93.6%	67%	111.0%	0%		50%	261.3%		

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
de03	11644	3	10	110.7%	70%	205.7%	0%		40%	46.5%		
de04	11294	4	8	58.6%	75%	237.4%	0%		25%	154.5%		
de05	12361	6	9	70.8%	78%	204.4%	0%		22%	298.7%		
de06	11552	5	14	53.2%	71%	113.4%	0%		43%	277.7%		
de07	10921	2	13	35.3%	77%	311.2%	0%		31%	85.0%		
de08	10270	4	3	31.7%	33%	325.1%	0%		67%	86.4%		
de09	13888	4	10	78.4%	60%	178.3%	0%		40%	273.6%		
de10	16703	3	27	122.3%	41%	163.4%	0%		67%	131.2%		
de11	16397	5	19	162.4%	74%	95.9%	0%		37%	257.1%		
de12	17992	8	16	426.5%	69%	132.9%	0%		50%	95.8%		
de13	15946	5	16	125.3%	50%	222.0%	0%		69%	66.1%		
de14	15908	7	25	126.3%	72%	180.5%	0%		32%	111.4%		
de15	14426	7	18	100.4%	50%	239.1%	0%		56%	60.7%		
de73	46770	40	19	11.2%	0%		0%		100%	150.2%		15%
de78	46068	6	16	11.0%	0%		0%		100%	266.7%		9%
de83	42752	1	5	37.0%	0%		0%		100%	180.5%		16%
de84	5322	7	9	216.4%	100%	136.4%	0%		11%	7.8%		
de87	4814	2	8	47.9%	100%	261.4%	0%		0%			
de89	4640	4	4	67.0%	100%	302.2%	0%		0%			
de91	6665	2	9	109.9%	100%	175.7%	0%		0%			
de94	6768	5	7	79.8%	100%	234.1%	0%		14%	23.7%		
de95	6699	5	10	235.5%	90%	163.4%	0%		10%	22.8%		
de98	7220	0	5	254.9%	80%	159.0%	0%		40%	68.7%		
dk00	82062	68	90	149.3%	2%	1.6%	93%	150.7%	16%	19.1%		
dk04	83349	105	126	148.5%	2%	10.5%	73%	191.5%	34%	28.2%		
dk07	84669	218	197	166.8%	4%	50.1%	78%	187.6%	31%	1.5%		
dk10	85645	0	241	179.1%	7%	52.9%	78%	169.0%	30%	1.7%		
dk13	87517	0	127	122.6%	4%	101.0%	72%	174.1%	36%	2.6%		
dk87	12462	79	35	89.1%	0%		91%	196.2%	6%	5.9%		
dk92	12895	66	31	124.1%	0%		81%	202.2%	26%	53.2%		
dk95	80071	71	78	189.0%	28%	283.6%	78%	94.3%	13%	6.4%		
do07	8356	40	2	58.1%	0%		0%		100%	100.0%		
ee00	6068	6	28	93.7%	0%		100%	143.0%	0%		71%	22%
ee04	4155	10	7	63.5%	0%		86%	156.5%	43%	3.2%	131%	53%
ee07	4744	5	1	5.9%	0%		100%	20.8%	100%	79.2%		
ee10	4993	8	1	3.5%	0%		0%		100%	293.0%		
ee13	5772	22	9	115.3%	0%		89%	146.5%	33%	25.2%		
eg12	12040	191	10	14.3%	0%		100%	123.6%	0%			
es00	4776	4	11	4.4%	0%		82%	66.3%	0%			
es04	12996	112	3	4.6%	0%		0%		100%	371.4%		
es07	13014	30	44	67.7%	0%		68%	207.2%	41%	19.3%		
es10	13109	93	107	32.1%	0%		97%	116.7%	62%	29.7%		
es13	11965	45	53	23.7%	0%		74%	166.4%	49%	57.2%		
es80	23939	18	0									

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
es90	21153	45	2	1.5%	100%	100.0%	0%		0%		122%	49%
es95	5928	29	38	3.1%	5%	12.0%	100%	123.0%	0%			
fi00	10423	2	2	6.4%	0%		50%	15.5%	100%	99.6%		
fi04	11228	2	6	15.6%	0%		100%	9.1%	100%	97.2%		
fi07	10472	1	2	0.7%	0%		0%		100%	103.3%		
fi10	9351	3	3	0.3%	0%		0%		100%	143.5%		
fi13	11030	4	1	0.3%	0%		0%		100%	100.0%		
fi87	11863	0	5	2.4%	0%		40%	71.9%	100%	313.2%		
fi91	11749	1	8	85.0%	0%		0%		100%	133.1%		
fi95	9262	1	4	2.9%	0%		75%	195.6%	25%	39.9%		
fr00	10305	4	14	47.4%	0%		0%		100%	145.0%	160%	19%
fr05	10240	0	3	53.2%	33%	288.0%	0%		67%	200.9%	128%	21%
fr10	15797	117	25	32.1%	0%		64%	202.0%	40%	134.3%	112%	18%
fr78	10490	22	39	11.3%	0%		0%		100%	215.1%		22%
fr84	11575	112	208	20.6%	0%		0%		100%	112.7%		26%
fr89	8678	75	88	17.2%	0%		0%		100%	127.6%		26%
fr94	11294	5	3	107.3%	0%		0%		100%	279.5%		45%
ge10	5546	14	0									
ge13	2760	2	0									
ge16	2696	2	0									
gr00	3895	18	4	1.8%	0%		75%	11.4%	0%			
gr04	5568	21	18	32.0%	0%		83%	145.9%	0%			
gr07	6503	26	29	86.5%	0%		59%	82.2%	90%	72.4%		
gr10	6024	30	23	4.4%	0%		4%	55.8%	100%	214.4%		
gr13	8616	6	8	7.0%	0%		0%		100%	112.2%		
gr95	4842	50	17	0.3%	0%		100%	100.0%	0%			
gt06	13664	3	7	236.0%	0%		0%		100%	123.4%	454%	73%
gt11	13368	111	1	51.3%	0%		100%	100.0%	0%		38%	
gt14	11517	5	0									
hu12	2019	1	0									
hu91	2019	21	0									
hu94	1936	4	0									
ie00	2420	3	4	13.8%	0%		25%	3.0%	0%			
ie04	6080	2	0									
ie07	5241	13	0									
ie10	4322	19	1	86.1%	0%		0%		100%	100.8%		
ie87	3294	2	33	49.6%	0%		100%	163.2%	6%	39.0%		
ie94	3192	8	2	0.6%	0%		100%	104.2%	0%			
ie95	2830	5	1	0.5%	0%		100%	100.0%	0%			
ie96	2642	5	0									
il01	5787	0	19	28.2%	0%		32%	359.0%	74%	4.4%	81%	10%
il05	6272	0	17	20.0%	0%		41%	372.8%	71%	7.7%	80%	12%
il07	6172	0	18	2.0%	0%		6%	386.6%	94%	86.2%	77%	10%
il10	6168	0	10	1.2%	0%		0%		100%	106.4%	56%	8%

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
il12	8742	0	45	17.3%	0%		7%	2054.8%	93%	6.3%	63%	6%
il14	8465	0	35	87.3%	0%		17%	45.1%	89%	126.0%	148%	13%
il16	8903	0	31	16.3%	0%		13%	843.8%	87%	49.2%	63%	8%
il86	5000	3	0									
in04	41467	112	276	19.1%	0%		100%	129.2%	0%			40%
in11	42119	72	305	25.7%	0%		100%	128.4%	0%			35%
iq07	17792	0	17	65.6%	0%		100%	124.9%	0%		184%	66%
is04	2924	0	3	19.5%	0%		0%		100%	198.5%		
is07	2886	0	3	10.2%	0%		0%		100%	374.5%		
is10	3016	1	0									
it00	8000	75	2	12.6%	0%		100%	114.9%	0%		74%	20%
it04	8012	16	4	89.4%	0%		100%	126.1%	50%	10.1%	104%	29%
it08	7977	39	0									
it10	7941	47	1	3.7%	0%		100%	100.3%	100%	289.6%	60%	20%
it14	8151	122	2	9.2%	0%		100%	406.2%	50%	148.1%	66%	15%
it86	8022	2	0									
it87	8027	18	0									
it89	8274	2	8	61.4%	0%		100%	144.8%	0%			44%
it91	8188	13	0									
it93	8089	36	0									
it95	8134	16	14	52.7%	0%		100%	124.6%	0%		92%	31%
it98	7147	61	7	116.1%	0%		100%	167.9%	0%		98%	33%
kr06	15532	27	147	20.1%	0%		37%	285.5%	71%	23.5%		8%
kr08	13655	11	152	23.4%	0%		53%	217.6%	57%	19.1%		9%
kr10	13317	28	93	3.3%	0%		0%		100%	110.7%		8%
kr12	13075	15	87	3.5%	0%		0%		100%	138.8%		8%
lt10	5113	17	0									
lt13	5167	9	0									
lu04	3622	0	3	49.0%	0%		0%		100%	279.4%		
lu07	3755	0	5	14.2%	0%		0%		100%	198.1%		
lu10	5452	0	13	77.1%	0%		46%	99.2%	54%	266.0%		
lu13	3873	0	27	40.3%	0%		48%	159.3%	78%	72.0%		
lu85	2012	2	0									
lu97	2515	1	0									
mx00	10108	34	0									
mx02	17167	41	0									
mx04	22595	55	0									
mx08	29468	33	113	71.7%	0%		100%	146.4%	0%		91%	22%
mx10	27655	51	165	91.6%	0%		100%	121.0%	0%		96%	24%
mx12	9002	4	84	86.9%	0%		100%	136.6%	0%		90%	25%
mx84	4735	15	0									
mx89	11531	38	0									
mx92	10530	33	0									
mx94	12815	39	0									

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
mx96	14042	44	0									
mx98	10952	59	0									
nl04	9356	0	21	62.7%	0%		57%	185.2%	62%	74.0%		
nl07	10337	0	13	45.6%	0%		85%	204.3%	38%	26.9%		
nl10	10492	0	18	82.4%	0%		61%	89.8%	44%	147.9%		
nl13	10174	0	15	31.3%	0%		73%	160.9%	47%	76.8%		
nl83	4833	12	9	3.4%	0%		0%		100%	100.0%		
nl87	4190	20	67	2.9%	0%		0%		100%	177.8%		
nl90	4378	30	22	57.9%	0%		0%		100%	106.3%		
nl93	5187	41	12	753.8%	0%		25%	7.7%	75%	134.0%		
nl99	4344	11	2	57.3%	0%		100%	167.8%	0%			
no00	12919	15	34	72.0%	0%		53%	138.1%	59%	151.9%		
no04	13131	8	11	41.9%	0%		45%	317.0%	55%	120.1%		
no07	2E+05	722	185	44.4%	0%		55%	220.6%	56%	97.9%		
		101										
no10	2E+05	0	584	502.6%	0%		32%	79.8%	81%	129.0%		
		121										
no13	2E+05	3	550	310.8%	0%		28%	31.3%	88%	157.0%		
no79	10414	19	87	184.0%	0%		22%	282.0%	84%	112.1%		
no86	4975	6	2	32.3%	0%		0%		100%	117.9%		
no91	8073	14	0									
no95	10127	13	13	68.8%	8%	335.9%	54%	115.7%	46%	113.7%		
pa07	12993	9	0									
pa10	13347	27	0									
pa13	11812	22	0									
pe04	18904	107	261	17.0%	0%		100%	123.7%	0%		59%	25%
pe07	21973	115	158	39.2%	0%		100%	119.1%	1%	3.8%	61%	23%
pe10	21228	121	232	100.3%	0%		100%	109.1%	1%	0.3%	68%	25%
pe13	30161	191	323	53.5%	0%		100%	110.2%	0%	0.8%	56%	23%
pl04	32214	51	118	168.0%	0%		98%	118.1%	9%	3.6%		37%
pl07	37366	50	211	81.4%	0%		97%	133.6%	26%	22.5%		32%
pl10	37412	47	201	82.6%	0%		92%	139.8%	25%	17.4%		28%
pl13	37181	95	225	137.6%	0%		90%	125.9%	28%	12.9%		27%
pl16	36886	83	226	139.6%	0%		95%	125.6%	20%	13.6%		25%
pl86	10646	1	0									
pl92	6602	1	0									
pl95	32009	24	422	100.9%	0%		100%	133.9%	0%	7.6%		52%
pl99	31428	24	145	105.1%	0%		98%	125.7%	9%	6.6%		41%
py00	8126	48	0									
py04	7817	55	2	8.4%	0%		0%		100%	100.0%		
py07	4802	12	0									
py10	4999	25	0									
py13	5397	33	0									
ro95	31571	1	1	14.5%	0%		0%		100%	294.0%		16%

	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
rs06	4560	33	46	53.6%	0%		100%	143.8%	0%		163%	48%
rs10	4581	17	26	72.5%	0%		100%	119.5%	0%		141%	44%
rs13	4506	35	44	88.3%	0%		100%	122.2%	0%		155%	52%
rs16	6448	48	38	95.9%	0%		100%	122.8%	0%		151%	46%
ru00	3112	39	6	10.3%	0%		100%	182.7%	0%			7%
ru04	3061	26	1	27.1%	0%		100%	131.2%	0%			26%
ru07	3335	29	1	1.1%	0%		100%	100.0%	0%			19%
ru10	5658	58	0									
sdn09	7913	28	0									
se00	14491	0	21	77.7%	0%		100%	199.5%	0%			
se05	16268	0	16	56.7%	0%		94%	170.0%	25%	22.8%		
se67	5921	544	0									
se75	10306	9	29	122.6%	0%		45%	67.6%	72%	299.6%		
se81	9625	33	28	233.8%	61%	165.2%	0%		64%	85.6%		
se87	9530	1	36	82.6%	0%		67%	192.5%	36%	183.4%		
se92	12484	1	48	111.7%	0%		92%	146.6%	25%	25.8%		
se95	16260	4	35	142.9%	0%		86%	152.9%	29%	44.3%		
si04	3725	1	0									
si10	3924	1	0									
sk04	5147	0	8	86.3%	0%		100%	142.7%	0%			
sk07	5449	2	2	66.7%	0%		50%	235.5%	50%	155.4%		
sk13	5490	5	0									
sk92	15990	2	0									
tw00	13801	0	1	1.3%	0%		0%		100%	199.1%	53%	17%
tw05	13681	0	2	0.9%	0%		0%		100%	124.7%	51%	10%
tw07	13776	0	2	0.8%	0%		0%		100%	201.2%	65%	3%
tw10	14853	0	10	3.7%	0%		0%		100%	144.5%	48%	10%
tw13	15858	0	20	3.9%	0%		0%		100%	373.4%	49%	8%
tw16	16528	0	17	3.2%	0%		0%		100%	162.1%	57%	7%
tw81	15286	1	0									
tw95	14706	29	0									
tw97	13701	0	1	0.2%	0%		0%		100%	100.0%	24%	
uk04	27753	22	158	29.9%	1%	81.9%	11%	506.9%	95%	64.7%		
uk07	24977	38	71	57.7%	4%	135.6%	28%	135.4%	76%	136.0%		
uk10	25350	54	82	41.7%	0%		15%	260.1%	91%	110.7%		
uk13	20135	40	52	88.4%	2%	16.5%	21%	112.7%	83%	109.1%		
uk16	19380	56	107	89.8%	0%		11%	304.3%	93%	101.1%		
uk69	7005	3	1	58.7%	0%		0%		100%	161.1%		
uk74	6695	1	3	10.2%	0%		0%		100%	164.5%		
uk79	6777	1	17	10.4%	0%		12%	379.4%	94%	193.3%		
uk86	7178	4	82	31.4%	0%		13%	437.1%	90%	63.0%	112%	24%
uk91	7056	0	26	14.2%	0%		50%	270.5%	81%	74.7%	98%	17%
uk94	26399	11	118	45.7%	0%		0%		100%	127.1%		
uk95	6797	3	44	25.2%	0%		0%		100%	112.6%		16%



	Hhds	Zer o DHI (#)	Neg. DHI (#)	[Mean neg. DHI / Mean natl. DHI] (%)	Neg. capital incomes among neg. DHI (% of counts)	Mean neg. capital income / Mean neg. DHI (%)	Neg. self- emp. incomes among neg. DHI (% of counts)	Mean neg. self- emp income / Mean neg. DHI (%)	Neg. net non- capital incomes among neg. DHI (% of counts) <sup>a</sup>	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean consumption among neg. DHI (% of mean natl. DHI)	Mean food consumption among neg. DHI (% of mean natl. DHI)
uk99	24988	11	146	84.5%	0%		12%	216.0%	92%	106.0%		
us00	78054	365	92	12.3%	8%	70.9%	91%	149.2%	2%	866.5%		
us04	76447	538	97	10.3%	11%	73.9%	86%	157.3%	8%	199.5%		
us07	75872	563	367	64.5%	3%	16.5%	8%	18.9%	91%	116.9%		
us10	75188	624	57	24.8%	11%	44.8%	72%	58.0%	19%	361.5%		
us13	51498	393	24	9.5%	8%	129.5%	83%	147.2%	13%	4.1%		
us16	69957	595	40	7.3%	15%	108.3%	88%	129.3%	0%			
us74	11475	46	52	32.1%	0%		73%	177.6%	31%	43.7%		
us79	65238	183	148	30.7%	14%	41.0%	91%	147.2%	5%	218.5%		
us86	58258	209	155	19.3%	12%	100.2%	86%	162.9%	12%	909.6%		
us91	59219	175	96	17.7%	10%	131.7%	90%	153.8%	6%	17.5%		
us94	56941	207	99	18.7%	7%	61.7%	93%	136.2%	4%	657.9%		
us97	50348	239	62	18.2%	6%	57.6%	87%	126.6%	10%	217.6%		
uy07	47906	36	0									
uy10	45305	29	0									
uy13	45592	35	0									
uy16	44428	36	0									
za08	7162	141	0									
za10	6758	7	0									
za15	9594	48	0									

Notes: Surveys without non-positive incomes are excluded: at87, br09-13, cz04, cz13, de81, es85, hu99, hu05-09, hu15, il79, il92, il97, jp08, lu91, lu94, lu00, py16, ro97, ru11-16, si97, si99, si07, si12, sk96, sk10, tw86, tw91, uy04, vn11<sup>b</sup>, vn13<sup>b</sup>, za12. Empty cells indicate missing values of a variable in a survey.

<sup>a</sup> Net non-capital income is computed as the sum of paid employment income, social security transfers, voluntary individual pensions, rental income and royalties, less income taxes and social contributions:  $hile + hits + hicvip + hicren + hicroy - hxit$ .

<sup>b</sup> These surveys were harmonized according to a transformed LIS method.

**Table 2: Characteristics of households with negative or zero incomes, selected LIS surveys**

Attributes of hhds with neg. DHI as % of nationwide mean <sup>b</sup>								Attributes of hhds with zero DHI as % of nationwide mean <sup>b</sup>						
	Cons-ump.	Food expend.	Outflow from mortg., loans & repaymts.	Home-ownership	Good health	Upper secondary education	Urban	Cons-ump.	Food expend.	Outflow from mortg., loans & repaymts.	Home-ownership	Good health	Upper secondary education	Urban
EG12	--	--	--	136.8	112.2	61.7	18.1	--	--	--	101.0	104.5	105.6	76.5
FR00	177.1	127.4	72.5	138.7	--	119.8	102.8	49.8	43.8	0.0	49.3	--	48.8	133.9
FR05	159.0	150.8	171.9	45.7	--	174.0	97.0	--	--	--	--	--	--	--
FR10	103.8	122.8	162.4	98.8	--	123.7	106.1	58.8	36.6	32.5	75.4	--	56.4	127.8
GR95	--	--	--	95.1	--	24.7	--	--	--	--	81.1	--	127.9	--
GR00	--	--	0.0	118.2	--	193.3	72.4	--	--	14.3	60.9	--	161.2	80.8
GR04	--	--	--	96.8	--	97.4	118.7	--	--	--	113.1	--	138.1	131.3
GR07	--	--	--	77.2	96.4	108.3	108.6	--	--	--	43.6	108.8	130.4	144.8
GR10	--	--	84.0	107.9	110.4	147.1	103.4	--	--	67.5	81.2	118.3	42.4	127.5
GR13	--	--	--	106.7	120.1	114.8	117.1	--	--	--	66.9	101.6	119.2	159.5
IL97	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IL01	75.4	62.5	43.1	92.3	--	94.2	95.6	--	--	--	--	--	--	--
IL05	64.3	78.3	47.8	127.2	--	101.8	--	--	--	--	--	--	--	--
IL07	61.9	60.2	15.1	83.6	--	63.9	97.3	--	--	--	--	--	--	--
IL10	55.1	57.8	73.8	78.2	--	117.6	101.2	--	--	--	--	--	--	--
IL12	65.6	52.6	--	49.4	--	109.2	96.8	--	--	--	--	--	--	--
IL14	158.2	94.1	--	80.5	--	109.6	96.2	--	--	--	--	--	--	--
IL16	48.2	40.3	--	75.5	--	117.5	98.1	--	--	--	--	--	--	--
IT95	105.0	115.3	--	139.8	124.1	152.7	120.5	58.0	59.1	--	53.1	61.7	60.5	79.8
IT98	94.6	107.1	27.4	145.9	--	222.7	99.3	55.5	60.4	47.4	47.3	--	16.0	117.2
IT00	111.8	88.3	1,505.9	80.9	--	0.0	123.6	57.8	62.3	12.8	74.6	--	22.7	110.7
IT04	128.9	115.4	0.0	82.6	--	0.0	130.1	81.6	97.4	0.0	128.8	--	85.0	123.0
IT08	--	--	--	--	--	--	--	54.7	74.7	5.5	65.9	98.8	39.7	113.1
IT10	--	87.3	0.0	0.0	133.4	0.0	126.6	54.2	61.8	13.3	75.5	110.5	93.6	106.9
IT14	67.6	71.2	--	146.5	--	251.5	125.1	53.2	56.9	--	47.5	--	58.1	106.5
RS06	128.1	105.4	--	102.7	--	31.0	33.3	67.7	65.6	--	88.1	--	124.6	132.2
RS10	131.7	108.4	--	105.6	--	33.2	22.5	63.2	62.6	--	68.2	--	136.2	138.6
RS13	126.6	120.3	--	102.3	--	8.8	11.0	55.3	60.9	--	91.5	--	119.0	119.9
RS16	129.1	124.4	--	114.0	--	51.0	19.3	61.4	63.5	--	77.4	--	101.6	118.3
SI97	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SI99	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SI04	--	--	--	--	--	--	--	27.6	73.2	--	0.0	--	137.1	--
SI07	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SI10	--	--	--	--	--	--	--	27.1	62.1	--	130.7	0.0	128.5	--
SI12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ES95	--	--	--	81.6	--	107.8	--	--	--	--	80.0	--	81.1	--
ES00	--	--	0.0	106.8	--	76.8	--	--	--	0.0	0.0	--	0.0	--
ES04	--	--	--	95.7	--	0.0	25.6	--	--	--	76.7	--	83.6	102.8
ES07	--	--	--	106.2	100.4	132.1	93.1	--	--	--	70.7	82.2	100.7	110.1
ES10	--	--	--	111.7	100.1	70.7	84.3	--	--	--	68.9	91.4	99.3	109.3
ES13	--	--	--	91.3	115.1	89.4	95.5	--	--	--	49.0	100.8	68.0	113.0

Notes: Years refer to income-reference years. Surveys were harmonized by LIS and ERF. Observation counts are those with disposable household income non-missing. Samples weighted using household weights.

**Table 3: Gini coefficients and poverty headcount ratios, selected LIS surveys**

	$DHI < DHI = 0$		Gini		Gini	Gini	Poverty HCR (%)	HCR	HCR	HCR ( $DHI > 0$ )
	(#)	(#)	( $DHI \geq 0$ , bottom-code at 0)	( $DHI \geq 0$ , truncate $DHI < 0$ )	( $DHI > 0$ )	( $DHI \geq 0$ , bottom-code at 0)		( $DHI \geq 0$ , truncate $DHI < 0$ )		
EG12	28	173	53.17 (1.17)	53.12 (1.18)	53.00 (1.18)	52.32 (1.19)	18.59 (0.35)	18.59 (0.35)	18.40 (0.35)	17.37 (0.35)
FR00	14	4	33.07 (.28)	32.97 (.27)	32.89 (.27)	32.86 (.27)	9.01 (.28)	9.01 (.28)	8.93 (.28)	8.90 (.28)
FR05	3	0	33.04 (.29)	33.01 (.29)	32.99 (.29)	--	9.68 (.29)	9.68 (.29)	9.65 (.29)	--
FR10	25	117	34.32 (.38)	34.24 (.38)	34.10 (.38)	34.04 (.38)	9.99 (.24)	9.99 (.24)	9.80 (.24)	9.72 (.24)
GR95	17	50	40.42 (.54)	40.42 (.54)	40.23 (.54)	39.61 (.53)	18.56 (.56)	18.56 (.56)	18.36 (.56)	17.70 (.55)
GR00	4	18	39.13 (.55)	39.13 (.55)	39.03 (.55)	38.71 (.54)	17.59 (.61)	17.59 (.61)	17.61 (.61)	17.34 (.61)
GR04	18	21	37.67 (.48)	37.55 (.47)	37.34 (.47)	37.07 (.47)	14.09 (.47)	14.09 (.47)	13.93 (.46)	13.72 (.46)
GR07	29	26	37.21 (.65)	36.44 (.51)	36.08 (.50)	35.81 (.50)	12.83 (.41)	12.83 (.41)	12.36 (.41)	12.09 (.41)
GR10	23	30	36.76 (.54)	36.74 (.54)	36.51 (.54)	36.20 (.54)	14.34 (.45)	14.34 (.45)	14.07 (.45)	13.80 (.45)
GR13	8	6	36.86 (.54)	36.86 (.54)	36.81 (.54)	36.76 (.54)	14.13 (.38)	14.13 (.38)	14.07 (.37)	14.01 (.37)
IL97	0	0	37.99 (.51)	--	--	--	16.32 (.51)	--	--	--
IL01	19	0	38.79 (.51)	38.61 (.50)	38.38 (.49)	--	16.81 (.49)	16.81 (.49)	16.51 (.49)	--
IL05	17	0	39.63 (.63)	39.56 (.63)	39.38 (.63)	--	18.46 (.49)	18.46 (.49)	18.24 (.49)	--
IL07	18	0	39.34 (.38)	39.33 (.38)	39.13 (.37)	--	17.94 (.49)	17.94 (.49)	17.75 (.49)	--
IL10	10	0	41.04 (.69)	41.03 (.69)	40.91 (.69)	--	19.31 (.50)	19.31 (.50)	19.14 (.50)	--
IL12	45	0	39.41 (.38)	39.28 (.36)	38.95 (.36)	--	17.63 (.41)	17.63 (.41)	17.28 (.41)	--
IL14	35	0	39.50 (.42)	38.89 (.33)	38.63 (.33)	--	18.86 (.43)	18.86 (.43)	18.65 (.42)	--
IL16	31	0	37.76 (.33)	37.58 (.30)	37.27 (.29)	--	18.22 (.41)	18.22 (.41)	17.90 (.41)	--
IT95	14	16	37.43 (.48)	37.30 (.47)	37.18 (.47)	37.06 (.47)	14.86 (.39)	14.86 (.39)	14.72 (.39)	14.62 (.39)
IT98	7	61	38.71 (.62)	38.60 (.62)	38.53 (.61)	38.12 (.62)	15.39 (.43)	15.39 (.43)	15.30 (.43)	14.97 (.42)
IT00	2	75	37.08 (.47)	37.08 (.47)	37.07 (.47)	36.57 (.47)	13.35 (.38)	13.35 (.38)	13.34 (.38)	12.72 (.37)
IT04	4	16	36.67 (.58)	36.64 (.58)	36.62 (.58)	36.50 (.58)	11.35 (.35)	11.35 (.35)	11.39 (.35)	11.24 (.35)
IT08	0	39	36.14 (.54)	--	--	35.78 (.54)	11.70 (.36)	--	--	11.33 (.36)
IT10	1	47	35.43 (.46)	35.43 (.46)	35.41 (.46)	35.04 (.46)	11.37 (.36)	11.37 (.36)	11.34 (.36)	11.05 (.35)
IT14	2	122	36.44 (.48)	36.43 (.48)	36.41 (.48)	35.27 (.47)	12.82 (.37)	12.82 (.37)	12.79 (.37)	11.35 (.35)
RS06	46	33	40.26 (.51)	39.52 (.45)	38.90 (.44)	38.46 (.44)	18.08 (.57)	18.08 (.57)	17.42 (.56)	17.19 (.56)
RS10	26	19	38.53 (.50)	37.97 (.45)	37.59 (.45)	37.29 (.44)	15.60 (.54)	15.60 (.54)	15.13 (.53)	14.78 (.53)
RS13	47	35	40.71 (.76)	39.48 (.61)	38.88 (.61)	38.37 (.61)	15.89 (.54)	15.89 (.54)	15.59 (.54)	14.99 (.54)
RS16	38	48	39.65 (.46)	39.09 (.40)	38.78 (.39)	38.32 (.39)	16.70 (.46)	16.70 (.46)	16.45 (.46)	16.07 (.46)
SI97	0	0	30.40 (.49)	--	--	--	10.07 (.59)	--	--	--
SI99	0	0	30.86 (.43)	--	--	--	11.26 (.51)	--	--	--
SI04	0	1	31.74 (.43)	--	--	31.70 (.43)	12.01 (.53)	--	--	11.98 (.53)
SI07	0	0	31.87 (.41)	--	--	--	12.53 (.54)	--	--	--
SI10	0	1	34.37 (.45)	--	--	34.31 (.45)	14.99 (.57)	--	--	14.92 (.57)
SI12	0	0	35.65 (.48)	--	--	--	13.91 (.57)	--	--	--
ES95	38	29	39.50 (.46)	39.47 (.46)	39.06 (.46)	38.73 (.46)	14.33 (.46)	14.33 (.46)	13.83 (.45)	13.48 (.45)
ES00	11	4	38.84 (.54)	38.83 (.54)	38.70 (.54)	38.64 (.54)	17.66 (.55)	17.66 (.55)	17.50 (.55)	17.41 (.55)
ES04	3	112	36.42 (.29)	36.42 (.29)	36.41 (.29)	35.91 (.28)	16.60 (.33)	16.60 (.33)	16.58 (.33)	16.15 (.32)
ES07	44	30	35.34 (.32)	34.95 (.29)	34.72 (.29)	34.60 (.28)	15.63 (.32)	15.63 (.32)	15.44 (.32)	15.30 (.32)
ES10	107	93	37.53 (.29)	37.18 (.28)	36.65 (.27)	36.13 (.27)	15.72 (.32)	15.72 (.32)	15.24 (.32)	14.64 (.31)
ES13	53	44	38.03 (.32)	37.87 (.32)	37.53 (.31)	37.21 (.31)	15.20 (.33)	15.20 (.33)	14.84 (.33)	14.44 (.32)

Notes: Years refer to income-reference years. Surveys were harmonized by LIS and ERF. Standard errors in parentheses. '--' For clarity of presentation: Because of the absence of zero/negative incomes, the statistics are same as in the preceding column, and are thus omitted.

**Table 4: Theil's entropy GE(2) indexes and income gap ratios, selected LIS surveys**

	$DHI < DHI = 0$		Theil's entropy	GE(2) ( $DHI \geq 0$ , bottom-code at 0)	GE(2) ( $DHI \geq 0$ , truncate $DHI < 0$ )	GE(2) ( $DHI > 0$ )	Poverty IGR (%)	IGR ( $DHI \geq 0$ , truncate $DHI < 0$ )	IGR ( $DHI \geq 0$ , bottom-code at 0)	IGR ( $DHI > 0$ )
	0 (#)	0 (#)	GE(2)							
EG12	28	173	25.49 (.485)	25.47 (.427)	25.39 (.401)	24.96 (.386)	45.19 (.66)	44.60 (.61)	43.89 (.60)	39.28 (.54)
FR00	14	4	2.23 (.10)	2.21 (.12)	2.21 (.10)	2.20 (.10)	26.25 (1.39)	24.32 (.79)	23.26 (.74)	22.86 (.71)
FR05	3	0	2.41 (.19)	2.40 (.16)	2.40 (.18)	--	27.10 (.84)	26.67 (.75)	26.45 (.74)	--
FR10	25	117	3.44 (.95)	3.42 (.88)	3.41 (.90)	3.40 (.85)	31.83 (.60)	30.34 (.46)	28.96 (.43)	28.33 (.42)
GR95	17	50	3.52 (.22)	3.52 (.21)	3.49 (.23)	3.41 (.19)	41.57 (.94)	41.56 (.94)	40.46 (.92)	37.04 (.83)
GR00	4	18	3.07 (.16)	3.07 (.15)	3.06 (.15)	3.02 (.15)	35.14 (.91)	35.12 (.91)	34.45 (.88)	32.28 (.80)
GR04	18	21	3.03 (.18)	3.02 (.20)	2.99 (.17)	2.96 (.17)	33.91 (1.06)	32.53 (.86)	30.82 (.81)	28.33 (.71)
GR07	29	26	3.32 (.23)	3.12 (.21)	3.07 (.20)	3.04 (.22)	42.37 (3.20)	32.71 (.92)	29.75 (.82)	27.22 (.72)
GR10	23	30	2.95 (.19)	2.95 (.16)	2.92 (.17)	2.88 (.16)	33.51 (.93)	33.29 (.92)	31.62 (.87)	29.22 (.78)
GR13	8	6	3.36 (.21)	3.35 (.18)	3.35 (.19)	3.34 (.16)	30.66 (.72)	30.58 (.71)	30.22 (.70)	29.87 (.69)
IL97	0	0	3.19 (.21)	--	--	--	29.74 (.69)	--	--	--
IL01	19	0	4.00 (.88)	3.96 (.77)	3.93 (.91)	--	29.13 (1.16)	27.67 (.74)	26.06 (.65)	--
IL05	17	0	4.70 (.82)	4.69 (.77)	4.66 (.63)	--	31.33 (.89)	30.50 (.67)	29.53 (.62)	--
IL07	18	0	3.08 (.11)	3.08 (.11)	3.06 (.12)	--	30.63 (.68)	30.53 (.67)	29.31 (.61)	--
IL10	10	0	6.70 (1.87)	6.70 (2.19)	6.68 (2.05)	--	29.43 (.66)	29.38 (.65)	28.64 (.62)	--
IL12	45	0	3.39 (.17)	3.36 (.19)	3.31 (.20)	--	34.46 (1.01)	33.17 (.60)	30.98 (.54)	--
IL14	35	0	3.09 (.11)	2.94 (.11)	2.90 (.11)	--	37.43 (1.80)	32.37 (.57)	30.87 (.52)	--
IL16	31	0	2.58 (.06)	2.55 (.05)	2.51 (.05)	--	35.20 (1.32)	32.61 (.57)	30.70 (.51)	--
IT95	14	16	3.37 (.32)	3.35 (.34)	3.33 (.31)	3.31 (.31)	31.91 (.99)	30.62 (.76)	29.83 (.73)	28.90 (.70)
IT98	7	61	3.96 (.45)	3.94 (.48)	3.93 (.43)	3.87 (.39)	36.96 (1.20)	35.79 (.94)	35.39 (.93)	32.40 (.86)
IT00	2	75	3.29 (.29)	3.29 (.32)	3.29 (.27)	3.22 (.29)	34.23 (.88)	34.21 (.88)	34.19 (.88)	30.30 (.76)
IT04	4	16	4.52 (1.06)	4.51 (1.12)	4.51 (.98)	4.49 (1.08)	29.60 (.96)	29.23 (.88)	29.07 (.87)	27.95 (.82)
IT08	0	39	3.40 (.29)	--	--	3.35 (.32)	29.53 (.98)	--	--	25.96 (.85)
IT10	1	47	2.70 (.23)	2.70 (.28)	2.70 (.27)	2.65 (.27)	36.88 (1.06)	36.85 (1.05)	36.65 (1.05)	32.80 (.97)
IT14	2	122	3.03 (.18)	3.03 (.17)	3.03 (.18)	2.89 (.20)	43.54 (1.17)	43.46 (1.17)	43.30 (1.17)	34.58 (1.02)
RS06	46	33	3.21 (.13)	3.08 (.14)	3.00 (.13)	2.94 (.12)	47.09 (2.03)	40.98 (1.06)	37.58 (.98)	34.45 (.90)
RS10	26	19	3.16 (.23)	3.06 (.26)	3.01 (.22)	2.97 (.24)	42.85 (2.13)	37.58 (1.11)	35.21 (1.04)	33.09 (.96)
RS13	44	35	4.64 (.69)	4.34 (.61)	4.25 (.61)	4.18 (.61)	52.74 (3.20)	41.90 (1.12)	37.12 (1.04)	33.68 (.92)
RS16	38	48	3.32 (.21)	3.15 (.16)	3.11 (.16)	3.05 (.18)	41.39 (1.89)	37.36 (.85)	35.57 (.80)	32.28 (.71)
SI97	0	0	1.56 (.04)	--	--	--	25.62 (1.52)	--	--	--
SI99	0	0	1.66 (.04)	--	--	--	24.71 (1.19)	--	--	--
SI04	0	1	1.72 (.04)	--	--	1.71 (.05)	24.25 (1.23)	--	--	23.82 (1.19)
SI07	0	0	1.72 (.05)	--	--	--	22.96 (1.09)	--	--	--
SI10	0	1	2.05 (.06)	--	--	2.04 (.07)	34.06 (1.38)	--	--	33.71 (1.37)
SI12	0	0	2.46 (.18)	--	--	--	28.89 (1.20)	--	--	--
ES95	38	29	3.52 (.24)	3.51 (.24)	3.46 (.23)	3.41 (.26)	35.83 (1.11)	35.43 (1.08)	32.35 (1.00)	29.65 (.90)
ES00	11	4	3.45 (.22)	3.45 (.21)	3.43 (.22)	3.42 (.25)	25.85 (.84)	25.73 (.83)	24.93 (.79)	24.49 (.76)
ES04	3	112	2.60 (.13)	2.60 (.15)	2.59 (.13)	2.54 (.13)	30.69 (.56)	30.69 (.56)	30.62 (.56)	27.27 (.48)
ES07	44	30	2.31 (.04)	2.24 (.05)	2.22 (.04)	2.21 (.04)	32.01 (1.05)	28.42 (.56)	26.87 (.52)	26.01 (.49)
ES10	107	93	2.58 (.04)	2.54 (.05)	2.47 (.04)	2.41 (.04)	43.96 (.96)	40.35 (.70)	36.85 (.66)	33.33 (.59)
ES13	53	44	2.87 (.08)	2.85 (.08)	2.81 (.08)	2.77 (.07)	43.16 (.93)	40.98 (.73)	38.76 (.70)	36.63 (.66)

Notes: Years refer to income-reference years. Surveys were harmonized by LIS and ERF. Standard errors in parentheses. '--' For clarity of presentation: Because of the absence of zero/negative incomes, the statistics are same as in the preceding column, and are thus omitted. Standard errors on Theil's index are bootstrap estimates. Theil's index and standard errors multiplied by 10 for clarity of presentation.

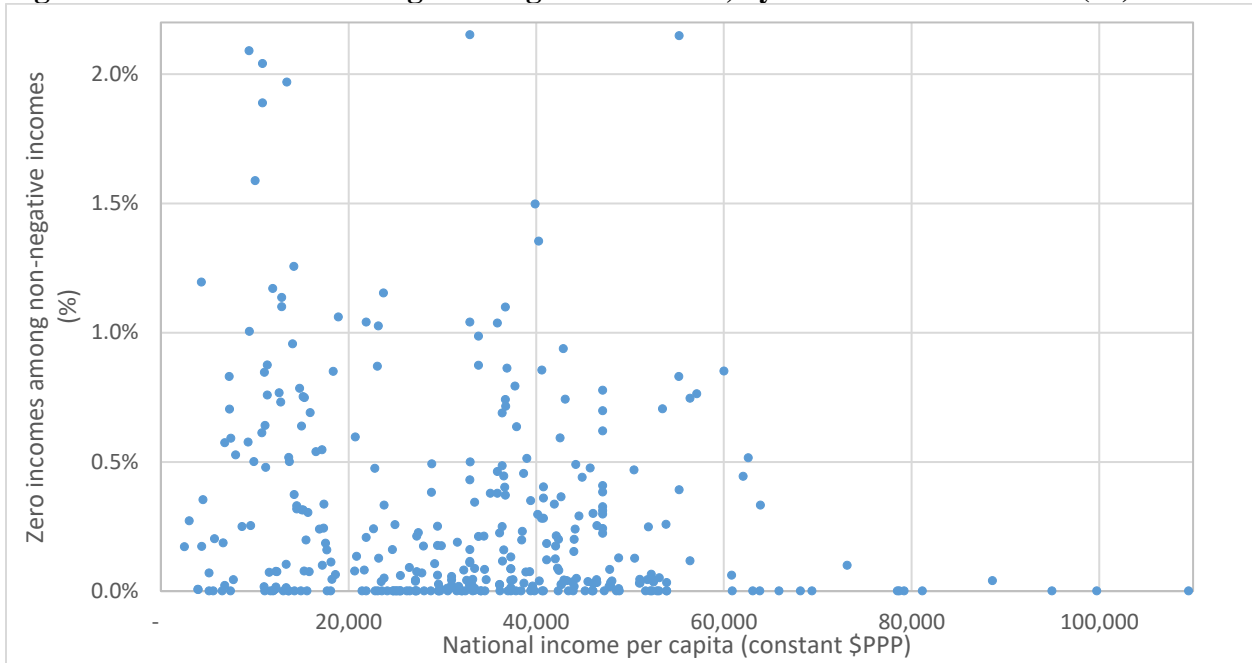
**Table 5. High-income country LWS surveys with non-positive incomes: frequencies of zeros and negatives, components in negative incomes, and consumption of negative-income households**

	Hhds	Zer o DHI (#)	Neg. DHI (#)	Mean neg. DHI / Mean natl. DHI  (%)	Mean neg. capital income / Mean neg. DHI (%)	Mean neg. self- empl. income / Mean neg. DHI (%)	Mean neg. net non-capital income / Mean neg. DHI (%) <sup>a</sup>	Mean income tax outlay / Mean neg. DHI (%)	Mean other tax outlay / Mean neg. DHI (%)	Mean interest paid among neg. DHI (% of mean natl. DHI)	Mean consump. among neg. DHI (% of mean natl. DHI)	Mean food consump. among neg. DHI (% of mean natl. DHI)
au04	11361	37	25	55%	7%	189%	0%			5%	83%	11%
au10	18008	40	48	31%	85%	185%	0%			6%	116%	12%
au14	14115	34	40	28%	129%	152%	0%			11%		
ca05	5267	0	12	98%			281%	122%				
ca12	12003	0	18	34%			179%	104%				
ca16	12429	0	22	49%			524%	338%				
ca99	15930	5	35	38%	41%		227%	83%				
de02	61600	25	55	322%	158%	0%	137%	79%				
de07	57760	25	70	53%	103%	0%	163%	193%				
de12	81985	25	95	163%	96%	0%	141%	155%				
fi09	10825	0	1	0%			100%					
fi13	11030	4	1	0%			100%					3%
it00	8000	75	2	13%		115%				3%	74%	20%
it04	8012	16	4	89%		126%	10%				104%	29%
it08	7977	39	0	0%								
it10	7941	47	1	4%		100%	290%				60%	20%
it14	8151	122	2	9%		406%	148%				66%	15%
it95	8134	16	14	53%		125%				0%	92%	31%
no10	228200	0	584	503%		80%	129%		9%	31%		
no13	235732	3	550	311%		31%	157%		2%	34%		
se02	17954	0	46	41%		139%	88%	85%	0%	6%		
se05	16268	0	16	57%		170%	23%	17%	405%	7%		
uk07	30199	456	6	23%		160%						
uk09	19913	0	254	0%			165%					
uk11	21242	115	0	0%								
us01	22205	0	194	690%	26%	18%	185%	163%	1%			
us04	22560	0	118	237%	37%	9%	190%	184%	1%			3%
us07	21970	1	249	218%	23%	44%	156%	174%	1%			2%
us10	32135	0	57	72%	221%	114%	31%	22%	8%			3%
us13	29945	0	90	24%	386%	32%	93%	96%	14%			2%
us16	30991	0	144	27%	263%	425%	75%	98%	13%			2%
us95	21495	0	168	189%	91%	66%	265%	178%	2%			
us98	21525	0	188	453%		24%	184%	132%	1%			

Notes: Surveys without non-positive incomes are excluded: at11, at14, gr09, gr14, si14, sk10, sk14. Empty cells indicate missing values of a variable in a survey.

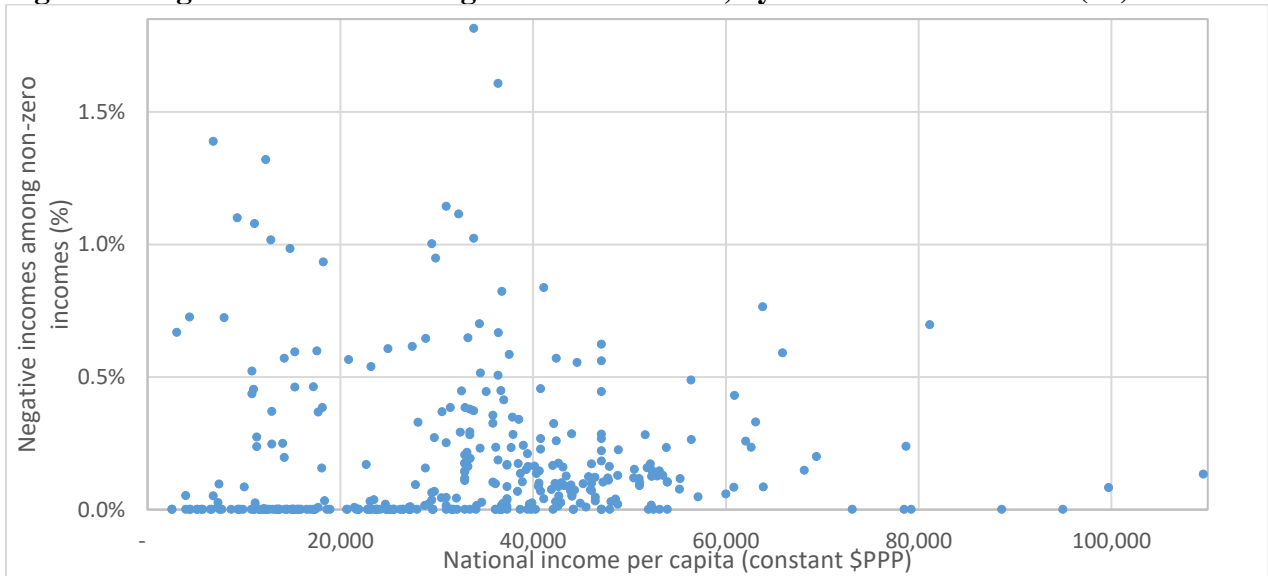
<sup>a</sup> Net non-capital income is computed as the sum of paid employment income, social security transfers, voluntary individual pensions, rental income and royalties, less income taxes and social contributions:  $hile + hits + hicvip + hicren + hicroy - hxit$ .

**Figure 1: Zero incomes among non-negative incomes, by national income level (%)**



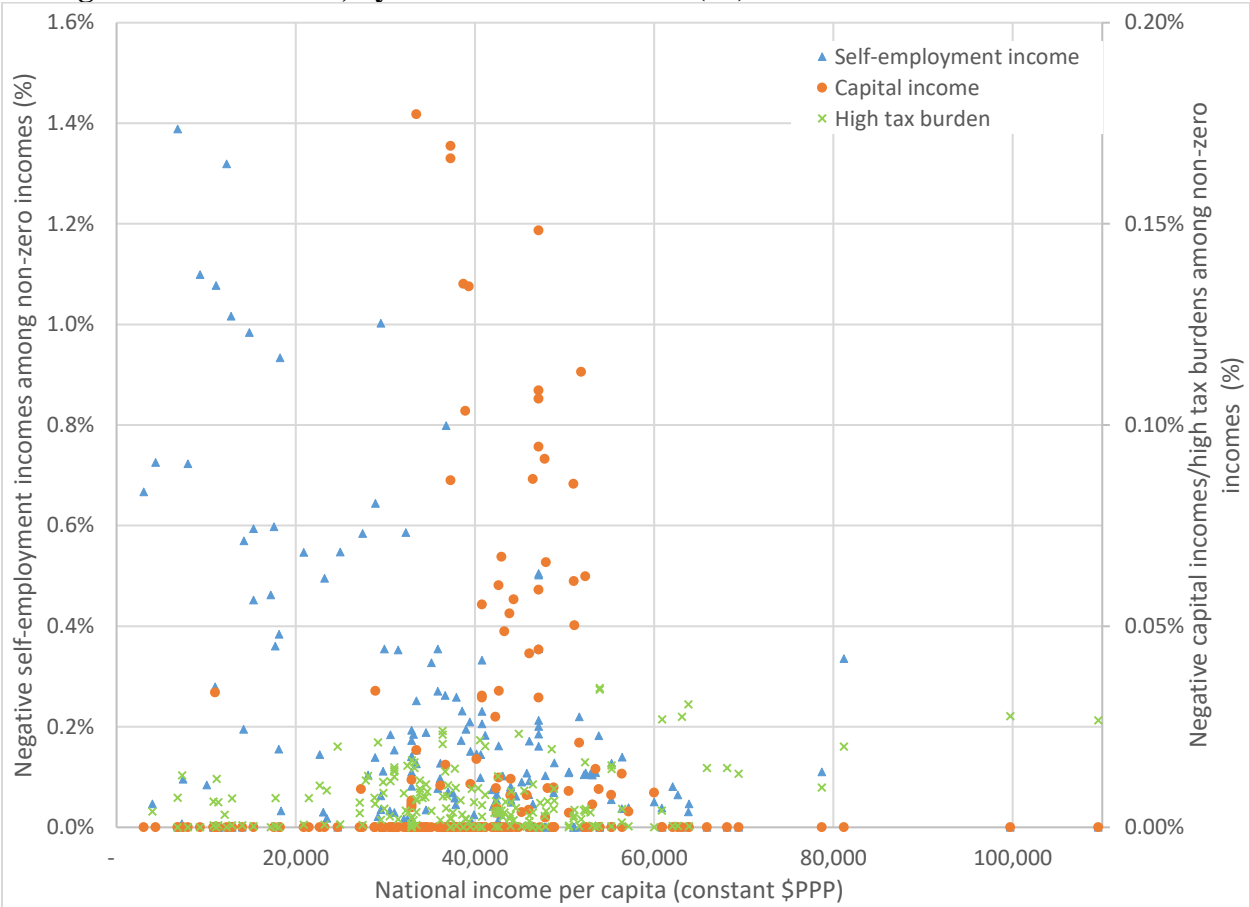
Note: Two observations (\$2,532; 3.8% and \$33,454; 9.2%) omitted for clarity of presentation.

**Figure 2: Negative incomes among non-zero incomes, by national income level (%)**



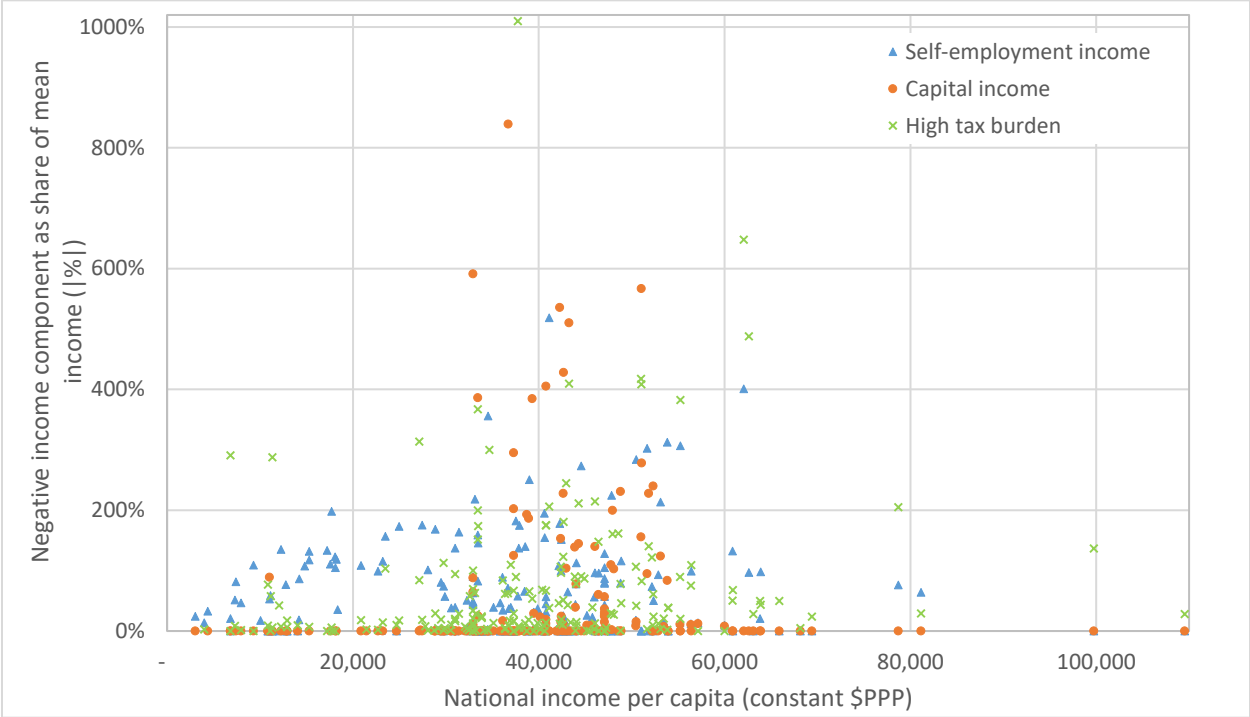
Note: One observations (\$55,254; 2.7%) omitted for clarity of presentation.

**Figure 3: Negative self-employment incomes, negative capital incomes and high tax burden among non-zero incomes, by national income level (%)**



Note: Samples restricted to surveys with the income component non-missing. Sample shares with negative self-employment income shown on left axis; Sample shares with negative capital income or high tax burden shown on right axis.

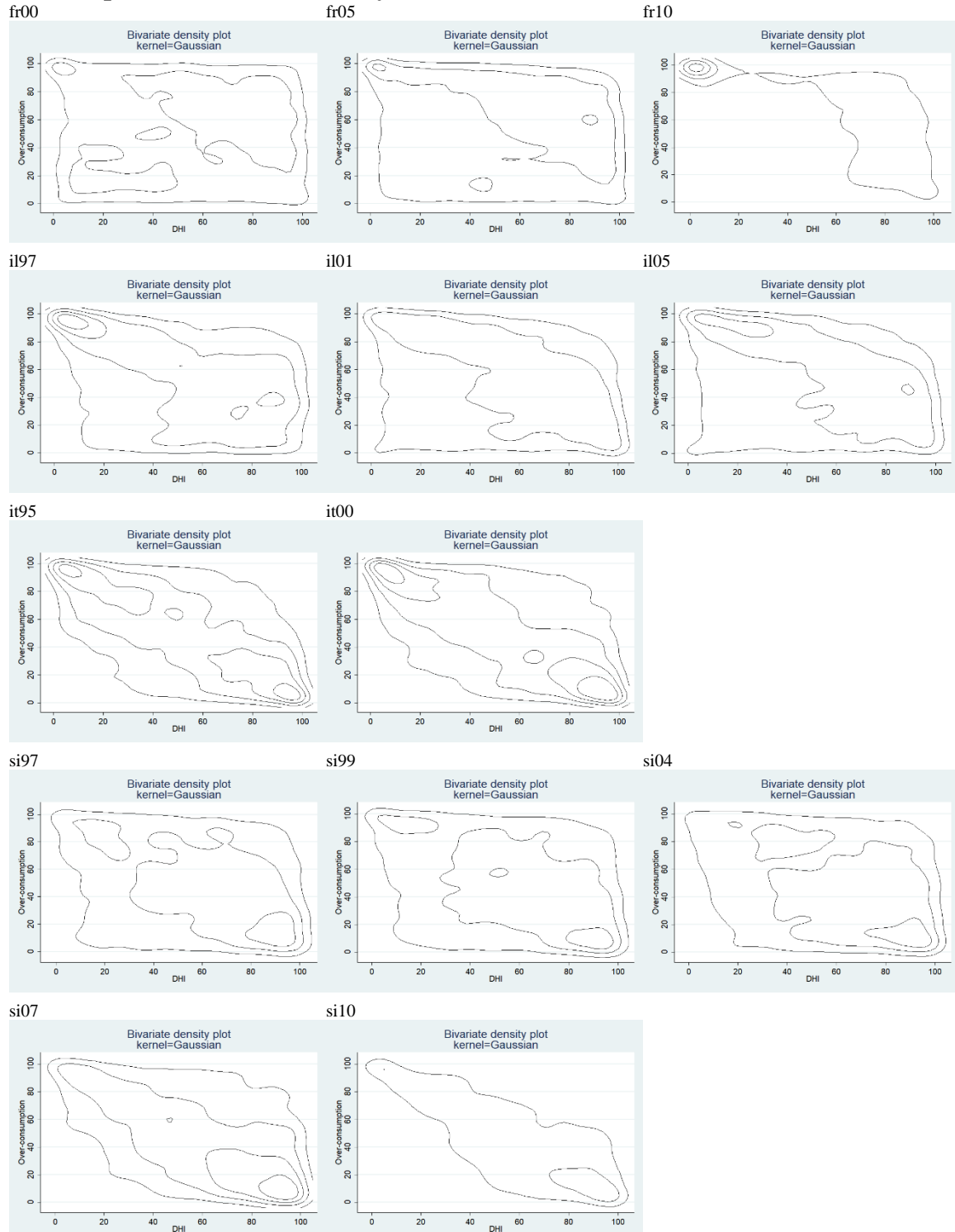
**Figure 4. Negative self-employment incomes, negative capital incomes and high tax burden as share of mean income, by national income level (%)**



Note: Samples restricted to surveys with the income component non-missing.



**Figure 5: Overconsumption as percent of final post-fiscal monetary income, kernel density contour plots, selected LIS surveys**



Note: The horizontal axis shows percentiles of households' *DHI* distribution, while the vertical axis shows the percentiles of households' overconsumption over their final post-fiscal monetary income (*FMI*),  $(HC - FMI)/FMI$ , where  $FMI = (dhi + hwl + hwc + hwt + hiatold + hiatdis + hiatsur + hiatsic + hiatfam + hiatedu + hiatune + hiathou + hiatcsp + hiatwic + hiatcar + hiatvet) - (hxot + hxvc + hxih + hxch + hxint)$ .