

Housing and Household Leverage under the Microscope

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Housing is the largest asset in household portfolios¹. It is therefore a fundamental driver of the accumulation and distribution of assets and wealth across the lifecycle and across generations. Housing debt also constitutes the largest liability of household portfolios. One of the reasons why housing is a major vehicle of wealth accumulation is because it can be acquired with leverage. Mortgage debt allows households with low income and few assets, including young households, to accumulate wealth. The benefits of leverage need to be balanced against its risks, and that is a major lesson from the 2008 global financial crisis (GFC). Assessing housing assets and liabilities from households' perspective requires looking at their distribution, with a particular emphasis on the bottom.

This article draws on recent OECD research (Causa, Woloszko and Leite, 2019) on housing, wealth accumulation and wealth distribution, based on an in-depth analysis of households' balance sheets from three major data sources: the Luxembourg Wealth Study (LWS) Database, <http://www.lisdatacenter.org>², the OECD Wealth Distribution Database (WDD) (oe.cd/wealth), and the Household Finance and Consumption Survey (HFCS). Informed by new evidence and stylised facts about the distribution of housing-related debt across various socio-economic groups, the article discusses potential policy trade-offs between risks and opportunities associated with the regulation of mortgage markets.

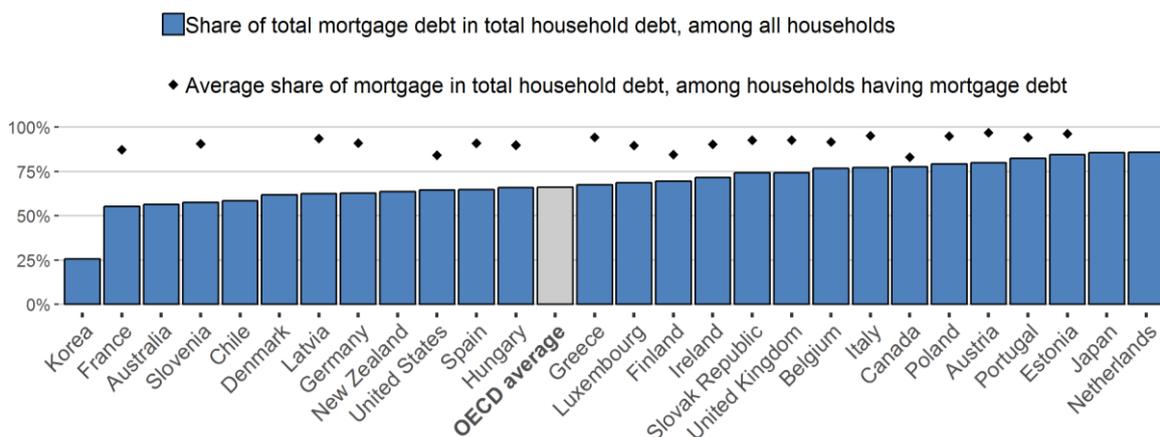
Mortgage debt is the biggest liability in household portfolios

Mortgage debt is the most important component of household debt (Figure 1). At the macroeconomic level, that is, considering all households in the population whether indebted or not, mortgage debt represents more than half of total household debt in almost all OECD countries. At the household level, that is, among households that hold mortgage debt, mortgage debt represents more than 80% of their total debt. From a policy perspective, this makes it clear that monitoring household debt and housing market developments require a careful focus on mortgage debt.

The proportion of households that hold a mortgage varies significantly across OECD countries (Figure 2, Panel A). On average across the OECD, around 25% of households have mortgage debt, ranging from around 10% in Slovenia and Italy to between 40 and 50% in the United States and the Netherlands. One key stylised fact is that the participation in mortgage debt increases broadly monotonically with household income (Figure 2, Panel B). This is not surprising as mortgage markets are regulated and bank lending is conditional on household repayment capacity, measured primarily by their level of income. Yet the link between household income and mortgage debt is somewhat steeper in some countries than in others. This may be indicative of differences in the prudential regulation of mortgage markets for both the borrower and the lender, in addition to housing affordability.

Access to mortgage debt for young households is likely to be one key driver of homeownership for this group, given their relatively low levels of wealth and income. Across OECD countries, the higher the participation in mortgage markets among young households, the lower the difference in homeownership between young households and the rest of the population (labelled "homeownership age spread") (Figure 3). The literature shows that younger households are relatively more sensitive than other groups to policy settings affecting homeownership, in particular mortgage market regulations (Andrews, Caldera Sánchez and Johansson, 2011.³ Cross-country differences in homeownership age spreads are also likely to reflect differences in the dynamics of housing affordability. This has been emphasised recently in countries with large house price increases, such as the United Kingdom, where a so-called "broken housing market" is driving a generational divide in homeownership whereby young households have been priced out of the market (IFS, 2018).

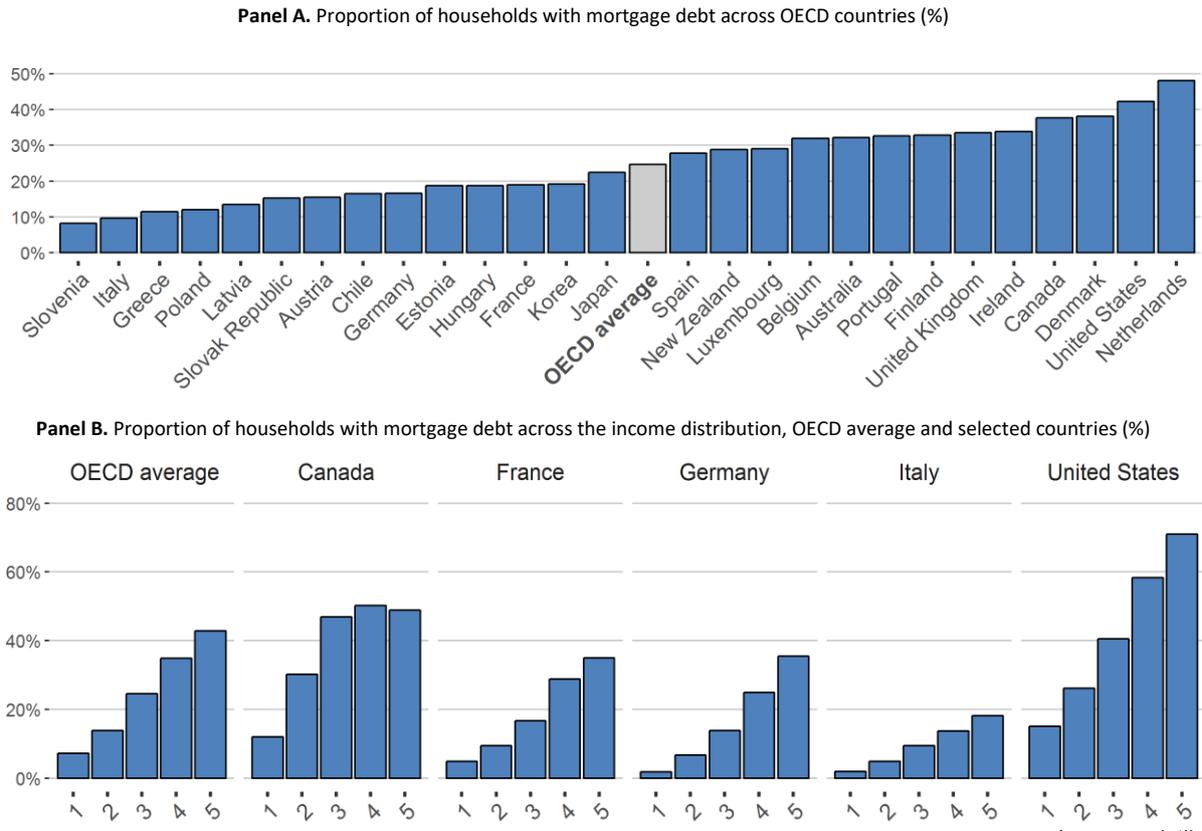
Figure 1. At the macro and household level, mortgage debt is the largest part of household debt



Note: In France, at the macro level, that is, summing among all households whether indebted or not, mortgage debt represents 55% of total household debt; at the micro level, that is, among households having mortgage debt, mortgage debt represents on average 87% of their total debt. The numbers refer to principal residence debt only.

Source: OECD Wealth Distribution Database (oe.cd/wealth), HFCS database, LWS database.

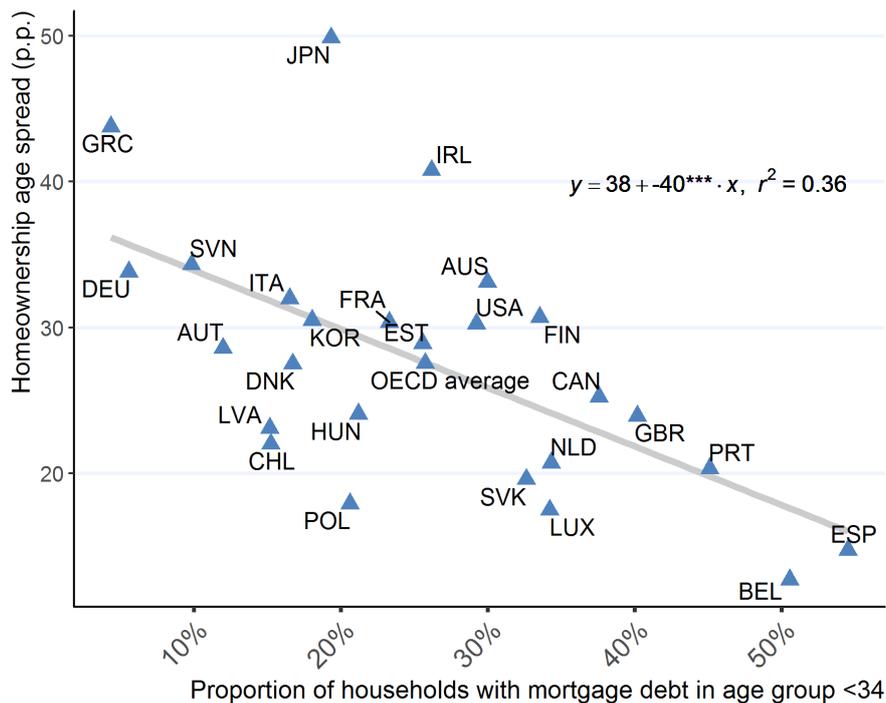
Figure 2. OECD countries exhibit great variation in households' participation in the mortgage market, and participation increases with the level of household income



Note: The numbers refer to principal residence debt only.

Source: OECD Wealth Distribution Database (oe.cd/wealth).

Figure 3. Participation in the mortgage market by young households tends to narrow the difference between homeownership among the young and the rest of the population



Note: Homeownership age group spread refers to the difference in homeownership rates between young households and all households. The numbers refer to principal residence debt only.

Source: OECD Wealth Distribution Database (oe.cd/wealth).

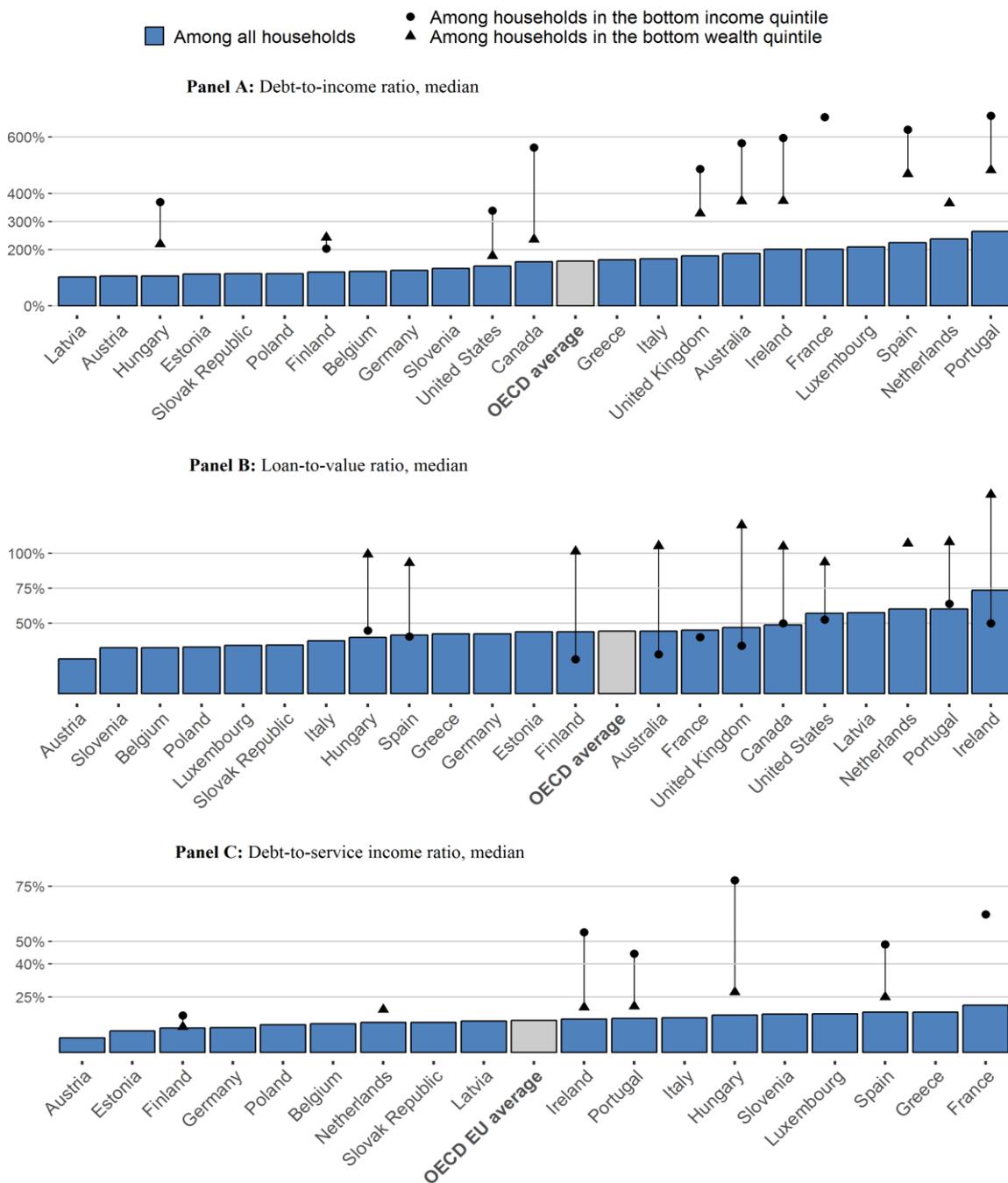
Mortgage debt is both an opportunity and a risk

Information on the distribution of mortgage debt across socioeconomic groups is important for determining vulnerabilities associated with the sensitivity of households to income losses, declines in house prices and increases in interest rates. Figure 3 analyses financial vulnerability associated with mortgage debt by focusing on three complementary prudential indicators (ECB, 2009): the debt-to-income ratio, the loan-to-value ratio and the debt-to-service income ratio. These indicators are based on micro data, which allows for a focus on bottom income and wealth households as relevant at-risk population groups. The numbers should be taken with

caution, given that samples are sometimes relatively small and may not be fully representative of the whole population.⁴ Still, these indicators provide a broad picture of financial vulnerability associated with mortgage debt.

Over the last decades, and in particular prior to the financial crisis, the strong expansion in mortgages led to an increase in the debt-to-income ratios for households with mortgage debt. This ratio is well above 100% in most OECD countries and it exceeds 200% in some of them such as Portugal, Spain and the Netherlands (Figure 4, Panel A). This is likely to partly reflect, at least for the Netherlands, the prevalence of interest-only and contractual savings mortgages which

Figure 4. Mortgage debt exposes households to financial vulnerability



Note: The numbers refer to principal residence debt only. These ratios are calculated only for households with principal residence mortgages. The calculation is done only in cases where the number of observations exceeds 50, which is why some data is not shown for bottom income and wealth households. The debt service-to-income ratio calculation can only be calculated for European countries on the basis of HFCS data.

Source: HFCS database, LWS database.

delay repayment of the principal (ECB, 2009). Households at the bottom of the income distribution are particularly vulnerable, with debt-to-income ratios exceeding the conventional at-risk threshold value of 300%. Associated risks seem to be particularly significant in some Anglo-Saxon countries (e.g. Canada and Australia). This may reflect the strong increase in house prices over the last decade, especially in Canada, triggering an increase in mortgage debt.

The loan-to-value ratio can be considered as a solvency risk indicator. It tracks households' ability to pay back their mortgages, assuming that their house can be sold at the prevailing market price if the household faces serious difficulties in repaying its debt. The highest values of this ratio, more than 50%, are in Ireland, Portugal and the Netherlands (Figure 4, Panel B), potentially reflecting recent declines in house prices in these countries. The loan-to-value ratio is highest at the bottom of the net wealth distribution, especially in countries characterised by widespread participation in mortgage debt. For indebted households in the bottom quintile of the net wealth distribution, loan-to-value ratios exceed the conventional at-risk threshold value of 75%. While this is somewhat definitional as households at the bottom of the net wealth distribution are often the most indebted and/or those that experienced asset price depreciation, the conclusion is still that excessive leverage can expose vulnerable households to solvency risk in case of house price busts.

The debt service-to-income ratio can be considered as a liquidity risk indicator. It measures the amount of income that households pay for interest and to repay the principal. This indicator can be used for evaluating the vulnerability of households to changes in their capacity to reimburse mortgage debt in cases of various shocks to their income. Overall, the debt service-to-income ratio is well below the conventional at-risk threshold value of 40% (Figure 4, Panel C). Hungary, Ireland, France, Portugal and Spain are countries where households at the bottom of the income distribution devote more than 40% of their income to servicing their mortgages. This could signal particular vulnerability to sudden drops in incomes and increases in interest rates when mortgages are taken out at variable rates. According to HFCS data, variable rates are prevalent in Portugal and Ireland (93.9% and 86.0% respectively), slightly less so in Hungary (54.4%), and relatively infrequent in France (9.8%).⁵

From a household perspective, mortgage debt is both an opportunity and a risk. On the one hand, it allows households, especially young households and those with few initial assets to accumulate wealth. On the other hand, it can expose households, especially those at the bottom of the distribution, to financial risks in the event of income losses, of house price declines as well as interest rate increases. The implication is that mortgage-related policies need to strike the right balance between allowing access to mortgage debt as an opportunity to accumulate wealth, and preventing the building up of excessive leverage with potential large economic and social risks. Macroprudential policies are the core of this trade-off.

Reducing household-level vulnerabilities through macroprudential regulation

The implementation of borrower-based prudential regulation may raise distributional concerns⁶. As discussed above, borrowers with high loan-to-value ratios are concentrated at the bottom of the wealth distribution and borrowers with high loan-to-income ratios at the bottom of the income distribution. Subsequently, caps on loan-to-value and debt-to-income may exclude low-income and low-wealth

households from the mortgage market. The down-payment constraint resulting from more restrictive caps will be particularly binding for first-time buyers and liquidity-constrained households, e.g. younger and low-income households (see e.g. Ortalo-Magne and Rady, 2006)). Recent analysis by (Kelly, Le Blanc and Lydon, 2018) on the effect of tightening credit standards on the distribution of borrowers shows that European countries that experienced a boom-and-bust in the housing market saw the composition of buyers shifting from young and low-income to old and high-income households after 2010.

However, distributional concerns associated with the implementation of borrower-based macroprudential policies are likely to fade out over a longer-term horizon. Excessive expansions of mortgage credit can trigger higher house price increases, which reduce housing affordability, and thus price out low-income households from the market. By curbing the joint increase of credit volume and house prices during leverage cycle booms, macroprudential caps may enhance housing affordability (see (Mian and Sufi, 2008), (Glick and Lansing, 2010) (Kohl, 2018)).

As a result, macroprudential policies can enhance microeconomic resilience, especially for those households most vulnerable to price and income shocks. Even though related credit constraints may prevent young households from accumulating wealth through homeownership, long-term positive gains are likely to outweigh short-term costs and therefore such instruments can be welfare improving by: i) preventing young households from prematurely investing in housing hence reducing vulnerability to price and income shocks, ultimately allowing better consumption smoothing (Xiong and Mavropoulos, 2018); and ii) more generally, contributing to housing affordability by curbing leverage-induced increases in house prices. The effectiveness of such instruments will ultimately depend on specific policy design: research progress is still needed to properly evaluate the distributional effects of various macroprudential instruments.

¹ *In line with the definition of housing as household main residence, mortgage debt refers to principal residence debt throughout the paper unless otherwise stated.*

² *Luxembourg Wealth Study (LWS) Database, <http://www.lisdatacenter.org> (Austria, Canada, Greece, Norway, United Kingdom, United States, June 2018 to December 2018). Luxembourg: LIS.*

³ *The literature is largely consensual in finding that young households are overly sensitive to mortgage market design and regulation in terms of e.g. loan-to-value and loan-to-income ratios. See e.g. (Chiuri and Jappelli, 2003) (Xiong and Mavropoulos, 2018) (Andrews and Caldera Sánchez, 2011). Young households are also overly sensitive to access to stable jobs, which largely condition access to (mortgage) credit.*

⁴ *The calculation is not performed for income and wealth groups in countries where underlying sub-samples are considered as too small. This happens mostly in countries where a relatively low share of households hold mortgage debt (because the calculation is conditional on having mortgage debt).*

⁵ *Not shown for space-saving reasons are calculations based on HFCS.*

⁶ *See (Alam et al., 2019) for recent evidence on the effects of loan-targeted instruments on aggregate household credit and consumption.*

References

Alam, Z. et al. (2019), Digging Deeper-Evidence on the Effects of Macroprudential Policies from a New Database IMF Working Paper Monetary and Capital Markets Department Digging Deeper-Evidence on the Effects of Macroprudential Policies from a New Database.

Andrews, D., A. Caldera Sánchez and Å. Johansson (2011), "Housing Markets and Structural Policies in OECD Countries", OECD Economics Department Working Papers, No. 836, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5kgk8t2k9vf3-en>.

Causa, O., N. Woloszko and D. Leite (2019), "Housing, wealth accumulation and wealth distribution: Evidence and stylized facts", OECD Economics Department Working Papers, No. 1588, OECD Publishing, Paris, <https://dx.doi.org/10.1787/86954c10-en>.

ECB (2009), Housing Finance in the euro area, European Central bank, <http://www.ecb.europa.eu>.

FCAC (2017), Home Equity Lines of Credit: Market Trends and Consumer Issues: Public Research Report, Financial Consumer Agency of Canada (FCAC).

Glick, R. and K. Lansing (2010), "Global household leverage, house prices, and consumption", FRBSF Economic Letter, <http://homepage.ntu.edu.tw/~nankuang/Global%20Household%20Leverage,%20House%20Prices,%20and%20Consumption-1.pdf> (accessed on 4 December 2018).

IFS (2018), The IFS Green Budget: October 2018 The Institute for Fiscal Studies.

Kelly, J., J. Le Blanc and R. Lydon (2018), "Pockets of risk in European Housing Markets: then and now", Research Technical Papers, <https://ideas.repec.org/p/cbi/wpaper/12-rt-18.html> (accessed on 28 November 2018).

Kohl, S. (2018), "More Mortgages, More Homes? The Effect of Housing Financialization on Homeownership in Historical Perspective", *Politics & Society*, Vol. 46/2, pp. 177-203, <http://dx.doi.org/10.1177/0032329218755750>.

Makoto, N. (2012), Everything You Always Wanted to Know About Reverse Mortgages but Were Afraid to Ask, Federal Reserve of Philadelphia Business Review, <http://www.philadelphiafed.org>.

Mian, A. and A. Sufi (2011), "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis", *American Economic Review*, Vol. 101/5, pp. 2132-2156, <http://dx.doi.org/10.1257/aer.101.5.2132>.

Mian, A. and A. Sufi (2008), "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis", SSRN Electronic Journal, <http://dx.doi.org/10.2139/ssrn.1072304>.

OECD (2018), A Broken Social Elevator? How to Promote Social Mobility, <https://doi.org/10.1787/9789264301085-en>.

OECD (2018), Taxation of Household Savings, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264289536-en>.

Ortalo-Magne, F. and S. Rady (2006), "Housing Market Dynamics: On the Contribution of Income Shocks and Credit Constraints", *Review of Economic Studies*, Vol. 73/2, pp. 459-485, http://dx.doi.org/10.1111/j.1467-937X.2006.383_1.x.

Xiong, Q. and A. Mavropoulos (2018), Housing Consumption and Macroprudential Policies in Europe: An Ex Ante Evaluation, <http://www.iwh-halle.de>.

Gender: The Hidden Dimension in the Measurement of Economic Inequality

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Since the publication of Piketty’s book “Capital” in 2014, the distribution of income and wealth seems to have gained renewed relevance in economics (Sandmo 2015), and economic inequality has taken over an important part of the policy agendas of international institutions and national governments alike. However, the dimension of gender has largely remained hidden in the current debate about, and analysis of, economic inequality. First, the gender dimension is underexplored as regards the explanation of income inequality trends across countries as well as its consequences. As Bateman (2019) notes, economists often focus on how globalization and technological change have contributed to rising income inequality; or, like Tony Atkinson and Joseph Stiglitz, on the reduction in governments’ redistributive capacity via taxation and social spending. Moreover, accounting for gender in analyzing inequality trends is greatly impeded by data constraints: the gender dimension is also hidden as regards the measurement of income and wealth inequality. We therefore still do not know *how serious the neglect of intra-household inequality is* (Haddad and Kanbur 1990).

When it comes to measuring personal income inequality, intra-household inequality is often omitted, since the standard approach is to compute inequality measures based on household disposable income, assuming that resources are pooled and equally shared within the household. Yet, the evidence that there are substantial inequalities which are linked to gendered power relations within the household is ample. In a forthcoming chapter of the Handbook for Labour, Human Resources and Population Economics, we document the sources of the resulting bias in income inequality measurement. We thus review and link two strands of the literature: First, the literature on decision-making within the household provides

theoretical and empirical insights showing that different pooling and sharing patterns exist across households, and that gender is a relevant category in shaping intra-household inequality. Second, the literature which aims to capture the gender-specific distribution of wealth enables to gain insights into the gender-specific distribution of capital income and to make inferences about aspects of bargaining power. Combining the available theoretical and empirical evidence, we provide some indications in which areas better data is required to obtain reliable measures of gender as well as overall income inequality. Such information is even more relevant since the outbreak of COVID-19 as it enables us to gauge the gendered impact of the pandemic (Malghan and Swaminathan 2020), and to design data-based policy accordingly.

Conceptual Issues: Income Statistics and Measurement

The degree of income inequality within countries is typically measured by statistical information on disposable household income obtained from surveys, which are designed to capture the living conditions and economic well-being of individuals and households. Disposable household income is defined as the sum of each household member’s income net of direct taxes and social security contributions. Ideally, information on different income components would be available at the level of the household as well as the individual. But this is not always the case, either because income is received jointly or because it is recorded at the household level for practical reasons.

Table 1 shows the composition of household disposable income and provides information on the level at which it accrues (i.e. the income unit, reported in parentheses), and the level at which it is typically recorded in household surveys (indicated by separate columns). The

Table 1: Income components, income units & income statistics

| | <i>INDIVIDUAL</i> | <i>HOUSEHOLD</i> |
|----------------------------------|--|---|
| <i>MARKET INCOME</i> | 1. Income from employment a) Employee income (I) b) Income from self-employment | 2. Property income a) Income from financial or non-financial assets (I/H) b) Royalties (I/H) |
| | 3. Current transfers received | |
| <i>STATE TRANSFERS</i> | a) Social security pensions/schemes (I) b) Other insurance benefits (I) e.g. unemployment or sickness benefits | c) Family and housing benefits (H) d) Other social benefits (I/H) (universal or means-tested) |
| | | e) Current transfers from other households (e.g. alimonies) and non-profit institutions (I/H) |
| 4. Current transfers paid | | |
| <i>TAXES & CONTRIBUTIONS</i> | a) Social insurance contributions (I) | b) Direct taxes (I/H) c) Current inter-household transfers paid (I/H) |
| | 1 + 2 + 3 - 4 = Disposable household income | |

Source: Adapted version based on Canberra Group (2011) and Ponthieux and Meurs (2015).

Columns indicate the level at which statistical information is available, labels in parenthesis indicate whether the income unit is the individual (I) or household (H).

only component which is consistently received and reported at the individual level is income obtained from work-related activities. The recipient of property income is the asset owner; income can thus accrue to household members individually or jointly. But independent of the income unit, micro datasets mostly report aggregated figures at the household level.

Household-level transfer income can be paid to individually or jointly managed accounts. Individual level information on state transfers, direct taxes and social insurance contributions is available if they are related to individual employment status. Even if other types of transfers are paid to the individual, they are often merged with other social benefits which accrue to the household. Moreover, tax systems often provide exemptions and deductions at the household level, thereby altering the income unit. Thus, the European Statistics on Income and Living Conditions (EU-SILC), which is the most important source for harmonized income data in Europe, reports direct taxes and social security contributions only as an aggregate at the household level (Ponthieux and Meurs 2015).

In order to measure the degree of inequality in the *personal* distribution of income, disposable household income has to be allocated among household members. This is typically done on a per-capita basis adjusted by applying equivalence scales to account for different household sizes and economies of scale. Yet, two strong assumptions underlie this computation and interpretation: first, that all income is pooled and second, that pooled income is equally shared among household members. This implies that no differences in living standards within the household exist. From this it follows that although the standard approach views the individual as the relevant

unit to evaluate income as the major determinant of economic well-being (Ponthieux and Meurs 2015), it is unable to provide an accurate assessment of individual conditions, particularly as it ignores the actual relations of individuals within the household.

Intra-household resource allocation and decision-making

Data availability is even more limited when it comes to individual preferences, resources, power and decision-making processes. These are typically not available in high-quality quantitative data but are required to open the “black box” of the household.

Issues of data availability may have been compounded by theoretical approaches which did not emphasize decision-making and resource allocation at the intra-household level. Textbook models in family economics do not allow for intra-household differences in resources; they either ignore differences in preferences (Samuelson 1956) or aggregate preferences through an altruistic household head (Becker 1981). Either way, they presume fully pooled income. More recent game-theoretical approaches deviate from this assumption and show that inequality within the household can stem from the outcomes of cooperative (Lundberg and Pollak 2008) or non-cooperative (Chen and Woolley 2001) bargaining processes. Feminist (economic), sociological and psychological accounts, on the other hand, explore the role of social norms in explaining “how changing norms affect microeconomic resource allocation and how intra-household resource allocation itself – and the strategic interaction that determines it – reinforces and challenges prevailing social norms” (Katz 1997: 38).

Empirically, control over resources and responsibility for tasks is studied most extensively for the Global South (Doss 2013), e.g. on intra-household decision-making and poverty (Findlay and Wright 1996, Vijaya *et al.* 2014), farming (Anderson *et al.* 2017), health (Dito 2015), and children and their health (Richards *et al.* 2013). For Europe, the empirical evidence of intra-household dynamics and the distribution of decision-making power within households is more limited. Mader and Schneebaum (2013) and Ponthieux and Meurs (2015) use the 2010 special module of the European Union Statistics on Income and Living Conditions (EU-SILC) survey to study the management of financial resources within the household.

These (cross-)country studies show that financial decisions within the household do not result from actual and distinct bargaining but are rather the result of established daily practice or of conforming to social norms. In particular, gender is the most important factor in determining which household decisions a person will make on their own, which are left to their partner, and which are made jointly. Whereas traditional gender roles prevail in Europe with women responsible for everyday and child-related decisions and men handling major financial decisions, couples with smaller differences in education, income and employment status are more likely to make decisions jointly.

Gender Wealth Inequality

As a key determinant of capabilities, wealth matters for social and economic inequality within households: the level of asset holdings affects each partner's bargaining power, and it determines the amount of capital income which accrues to each household member. However, even more blind spots regarding the gendered distribution of wealth exist than for the distribution of income. Whereas advances in data availability and quality have enabled some insights the main issue is that wealth itself is mostly recorded at the household level. This not only underestimates inequality (Frémeaux and Leturcq 2019), but also misses the gender dimension of wealth inequality if equivalence scales are applied without supporting data on the demographic characteristics of individual wealth ownership.

Data issues might be part of the reason why the literature is far from unanimous in answering the question whether there is a gender wealth gap – as opposed to the well-researched gender pay gap. Although the theoretical and qualitative literature emphasizes that household resources (both income and wealth) cannot be assumed to be pooled, most studies are restricted to investigating the gender wealth gap at the household level. The strategies typically applied are: (1) Divide wealth equally among all (eligible, typically adult) household members; (2) limit the sample to single-adult households; or (3) “assign” households a gender by using a reference person in the household.

Several studies use household-level data on the U.S., including the Panel Study of Income Dynamics (Schmidt and Sevak 2006), the National Longitudinal Survey of Youth (Yamokoski and Keister 2006), and the Wisconsin Longitudinal Survey (Ruel and Hauser 2013). For eight European countries, Schneebaum *et al.* (2018) use the Household Finance and Consumption Survey. Deere and Doss (2006) review the available evidence for fifteen countries in Latin America, Africa, and Asia, which often uses asset information in household surveys. This literature shows not only that a wealth gap exists between single-adult households headed by females as opposed to males, but also between men and women within couple households.

The gap is particularly salient at the top of the distribution, that is, where the majority of wealth is owned due to the right-skewed distribution of household wealth. Furthermore, this literature documents compelling evidence for a marriage wealth premium.

The important exceptions to the literature's reliance on household-level data for net wealth focus on Europe. They are based on the wealth module of the German Socio-economic Panel (Sierminska *et al.* 2010) and the French non-core data of the Household Finance and Consumption Survey and its national precursor, the Life History and Wealth Survey (Frémeaux and Leturcq 2019). These studies also show a gender wealth gap, which can be partly explained by differences in men and women's demographic and especially in labour market characteristics. Sierminska *et al.* (2018) find that the rising importance of labour market characteristics lead to a falling gender wealth gap over time. Individual-level studies also confirm the marriage wealth premium (Lersch 2017). Important caveats and exceptions apply first and foremost to the severe data limitations that wealth researchers face, but issues surrounding selection bias and reporting errors remain. In particular, the available evidence suggests that the gender wealth gap is right-skewed – yet survey and item non-response of the richest households lead to under-reporting at the top of the distribution. The paucity of data sources compounds these problems, since cross-checking with other data sets is all but impossible regarding the gender wealth gap.

Measuring Overall Income Inequality: The Way Forward

The (feminist economic) literature on decision-making within the household opens the black box and helps us to understand the complex gendered nature of within-household dynamics. It shows that we cannot expect all individually received income to be pooled, nor pooled income to be necessarily shared equally among household members. Moreover, evidence on the financial organization of the household indicates that the allocation of responsibility for financial means follows traditional gender norms and feeds back into gender inequality. Although empirical endeavours to capture the gender wealth gap are at least as constrained by data-availability at the individual level as income-inequality measurement, the available evidence indicates that the intra-household distribution of asset ownership is not equal, especially at the top of the wealth distribution. Wealth ownership then plays a role in the distribution of property income and bargaining power within the household. Taken together, these insights indicate that estimates of overall income inequality which disregard intra-household inequality are likely to be biased. But how large is this bias, and what can be done to improve income inequality measurement?

In one of the first accounts to investigate “*How Serious is the Neglect of Intra-household Inequality?*”, Haddad and Kanbur (1990) present evidence that the error in nutritional-status inequality in the Philippines amounts to 30% or more. They thus conclude that “[t]he neglect of intra-household inequality is likely to lead to a considerable understatement of the levels of inequality and poverty.” More recent research provides evidence that the underestimation of inequality is equally severe with regards to wealth. Malghan and Swaminathan (2017) show that 32% of total wealth inequality in Karnataka, India, is due to inequality within coupled households. In a comparative study of 37 countries based on LIS data, Malghan and Swaminathan (2016) show that earnings inequality within heterosexual couple households amounts to 30% in South and Central American countries, but in high-

income countries such as Germany, Iceland, Luxembourg, the Netherlands, Norway, Switzerland and the United States the intra-household contribution share can even be larger than 50%.

Although scarce, the empirical evidence suggests that a substantial share of overall income inequality is due to inequality within the household. Thus, improving the quality of income inequality and gender inequality estimates requires household surveys to be adapted so as to enable to consistently and comprehensively account for the intra-household distribution of economic resources. One step forward is to exploit existing information to produce income inequality estimates adjusted for inequality within the household, with a special focus on its gendered nature. The second step is to make it possible to make income and wealth data available at the individual level in household surveys by identifying the lowest receiving (owning) unit. A third step forward concerns the integration of insights from the decision-making literature and the need to intensify the exchanges between methodological approaches. Qualitative research from the feminist and socio-economic literature provides valuable insights into intra-household dynamics regarding the financial management of economic resources, which should act as a complement to quantitative inequality research. Besides being of interest in its own right, qualitative findings are important inputs to the generation of survey questions which enable researchers to obtain quantitative information on the share of pooled income, different sharing patterns, and how this varies according to individual and household characteristics. Such information can be used to produce estimates of intra-household inequality which are theoretically grounded and based on empirical evidence, rather than being derived from ad-hoc rules. It is thus crucial to grasp *how serious the neglect of intra-household inequality is*, and to account for gender-specific effects in designing policies to combat rising income inequality and the social and economic hardships produced by the COVID-19 pandemic.

References

Anderson, L, Reynolds, T, Gugerty, M (2017). Husband and Wife Perspectives on Farm Household Decision-making Authority and Evidence on Intra-household Accord in Rural Tanzania. *World Development* 90: 169-183.

Bateman, V (2019). *The Sex Factor. How Women Made the West Rich*. Polity Press, Cambridge.

Becker, G (1981). *A Treatise on the Family*. Harvard University Press, Cambridge, MA.

Canberra Group (2011). *Handbook on Household and Income Statistics*, second ed. United Nations Economic Commission for Europe, Geneva.

Chen, Z, Woolley, F (2001). A Cournot-Nash Model of Family Decision Making. *The Economic Journal* 111(474): 722-748.

Deere, C, Doss, C (2006). The gender asset gap: What do we know and why does it matter? *Feminist Economics* 12(1-2): 1-50.

Dito, B.B (2015). Women's Intra-household Decision-Making Power and Their Health Status: Evidence from Rural Ethiopia. *Feminist Economics* 21(3): 168-190.

Doss, C (2013). Intra-household Bargaining and Resource Allocation in Developing Countries. *The World Bank Research Observer* 28(1): 52-78.

Findlay J, Wright R.E (1996). Gender, poverty and the intra-household distribution of resources. *Review of Income & Wealth* 42(3): 335-351.

Frémeaux, N, Leturcq, M (2019). The individualisation of wealth within couples: The implications for taxation. *Revue de l'OFCE* 161(1): 145-175.

Haddad, L, Kanbur, R (1990). How Serious is the Neglect of Intra-Household Inequality? *The Economic Journal* 11(402): 866-881.

Katz, Elizabeth. (1997). The Intra-Household Economics of Voice and Exit. *Feminist Economics* 3(3): 25-46.

Lersch, P.M (2017). The Marriage Wealth Premium Revisited: Gender Disparities and Within-Individual Changes in Personal Wealth in Germany. *Demography* 54(3).

Lundberg, S, Pollak, R (2008). Family Decision-Making. In: *The New Palgrave Dictionary of Economics, 2nd Edition*, Palgrave Macmillan, London.

Mader, K, Schneebaum, A (2013). The gendered nature of intra-household decision making in and across Europe. Department of Economics Working Paper Series 157, WU Vienna University of Economics and Business, Vienna.

Malghan, D, Swaminathan, H (2016). What is the Contribution of Intra-household Inequality to Overall Income Inequality? Evidence From Global Data, 1973-2013. LIS Working Paper Series No. 679.

Malghan, D, Swaminathan, H (2017). Intra-household Wealth Inequality and Economic Development: Evidence from Karnataka, India. IIM Bangalore Research Paper No. 487.

Malghan, D, Swaminathan, H (2020). Inside the Black Box: Intra-household Inequality and a Gendered Pandemic. LIS Working Paper Series No. 797.

Piketty, T (2014). *Capital in the 21st Century*, Harvard University Press.

Ponthieux, S, Meurs, D (2015). Gender Inequality. In: Atkinson, A.B., Bourguignon, F (eds) *Handbook of Income Distribution*, Volume 2A. Elsevier, Oxford/Amsterdam, p 981-1146.

Richards, E, Theobald S, George, A, et al (2013). Going beyond the surface: Gendered intra-household bargaining as a social determinant of child health and nutrition in low and middle income countries. *Social Science & Medicine* 95: 24-33.

Ruel, E, Hauser R. M (2013). Explaining the gender wealth gap. *Demography* 50(4): 1155-1176.

Samuelson, P (1956). Social Indifference Curves. *Quarterly Journal of Economics* 70(1): 1-22.

Sandmo, A (2015). The Principal Problem in Political Economy: Income Distribution in the History of Economic Thought. In: Atkinson, A.B., Bourguignon, F (eds) *Handbook of Income Distribution*, Volume 2A. Elsevier, Oxford/Amsterdam, p 3-65.

Schmidt, L, Sevak, P (2006). Gender, Marriage, and Asset Accumulation in the United States. *Feminist Economics* 12(1-2): 139-166.

Schneebaum, A, Rehm, M, Mader, K, Hollan, K (2018). The gender wealth gap across European countries. *Review of Income and Wealth* 64(2): 295-331.

Sierminska, E, Frick J. M, Grabka M.M (2010). Examining the Gender Wealth Gap. *Oxford Economic Papers* 62: 669-900.

Sierminska, E, Frick J. M, Grabka M.M, Piazzalunga D (2015). Wealth Gender Differences: The Changing Role of Explanatory Factors over Time. Available via www.ecineq.org/ecineq_lux15/FILESx2015/CR2/p168.pdf.

Vijaya, R.M, Lahoti, R, Swaminathan, H (2014). Moving from the Household to the Individual: Multidimensional Poverty Analysis, *World Development* 59: 70-81.

Yamokoski, A, Keister, L (2006). The wealth of single women: Martial status and parenthood in the asset accumulation of young baby boomers in the United States. *Feminist Economics* 12(1-2): 167-194.

Top and Bottom Coding at LIS

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Since its foundation in the 1980s, LIS has acknowledged that even after harmonisation comparability concerns between household surveys from different countries could remain. Such differences arise mainly from national methodological procedures, when implementing representative surveys. In the beginning, this concerned mostly varying sample sizes and income units (Smeeding *et al.*, 1985; O’Higgins *et al.*, 1985, Atkinson *et al.*, 1994). Later, differences in top coding practices by data providers and representativeness of the upper end of the income distribution (Gottschalk and Smeeding, 2000; Cowell and Flachaire, 2007) were discussed.

In order to keep *true* country rankings unbiased by nationally applied top coding procedures, the use of bottom and top coding techniques was proposed and disseminated. Besides others, Gottschalk and Smeeding (1997) and Smeeding (1997) implemented a top code of 10 times the median of disposable income, which equally served as a benchmark applied to the LIS Key Figures. Similarly, Fritzell (1992) applied a top coding value of 15 times the median in order to reduce the influence of extreme values at the top. At that time, Gottschalk and Smeeding (2000) reassured that LIS top coding had no influence on rank order and in general had a very limited influence on the Gini Index of advanced countries. Whereas this statement seemed a proper one for the advanced countries, Székely and Hilgert’s (1999) cross-national study of 18 national surveys from the LAC countries showcases well how underestimation of top incomes varies across countries in the region. Moreover, top coding practices are hardly found in LAC countries.

As the LIS Database has gradually grown to include more and more emerging economies, additional sensitivity analyses have become necessary. A main motivation of this paper is to reassess the influence of the previously applied top and bottom coding practices on the emerging economies. We acknowledge that the general idea of top and bottom coding is not unproblematic, as cutting the data at the extreme of maximum values could reduce inequality (when there is no measurement error in the data). On the other hand, when there is measurement error, it could turn out to be a plausible strategy to reduce variability in the tail distributions and to enforce a common practice to preserve ‘smoothened’ trends and country rankings between data sets with varying degrees of measurement error. We

therefore aim to clarify whether the necessity to use top and bottom coding practices with the data at hand remains.

The following empirical section will show a sensitivity analysis for top coded and bottom coded incomes separately. Using the Gini Index we compare the previous top coding procedure (10 times the median of equalised disposable income) with alternative measures, such as 20 times the median of equalised disposable income and the detection of extreme values via the interquartile range (IQR). Likewise, we perform a sensitivity analysis for bottom coding techniques. The previous method (bottom coding at 1 % of the mean of equalised disposable household income) is compared against bottom coding at value 0 and detection of extreme values via the interquartile range (IQR). In the final section, we will discuss why we adopted the practice of top and bottom coding at the lower and upper boundary for extreme values for the LIS Key-Figures and other indicators in LIS’ Data Access Research Tool (DART). Last, we briefly present more advanced statistical measures which are specifically intended for modelling the tails of the distribution.

Sensitivity Analysis of Bottom and Top Coding

First, we investigated the impact of different top coding procedures on the Gini Index for disposable household income (and likewise for wages). We computed three alternative measures in comparison to non-top-coded income.² The first one is the threshold that for many years has been put in place by LIS and which has been adopted by many LIS users, the top code at 10 times the median of disposable income. A second one simply raises the threshold to 20 times the median, to accommodate more unequal income distributions in the recently added emerging countries. And a third one, the interquartile range (IQR), is a common procedure that is applied to detect extreme values in distributions. The IQR is, for example, applied by the European Commission – Eurostat (2018) for the detection of outliers in the wage distribution; by reporting back to national agencies, data providers are asked to possibly confirm or correct for these values. A log transformation before defining the interquartile range takes into account that income is skewed to the right. Thus the upper boundary is defined as $Q3 * (Q3/Q1)^3$,³ which is then used as a top code (Figure 1). We therefore basically tested the impact of this technique as a strict top code.

Figure 1: Interquartile Range at the upper boundary

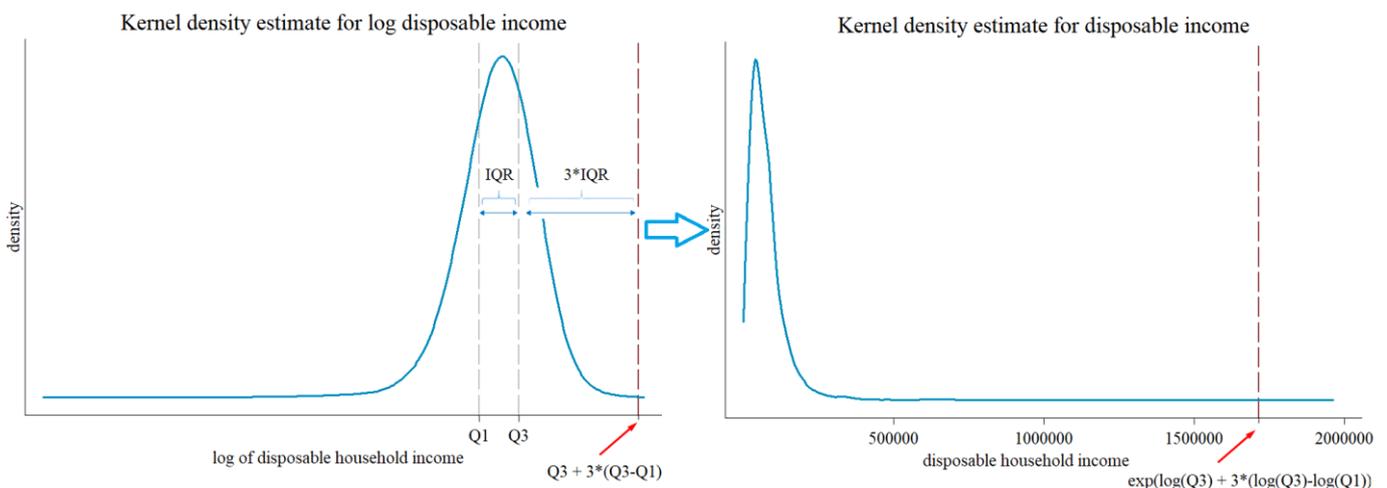


Figure 2 shows findings for the Gini Index on disposable household income (equivalised by the square root of household members) for selected countries. Equally, Figure 3 shows findings for wages. Many countries show that the IQR is much closer to the reference scenario of non-top-coded values. Particularly striking are the considerably lower Gini values in emerging economies when applying the 10 times the median threshold. Even top coding by 20 times the median keeps inequality in various countries far below the IQR (e.g. Chile, Guatemala, India, Ivory Coast, Paraguay, and South Africa).

A second set of analyses concerns the bottom coding of values. The bottom coding of negative values has been a pragmatic decision in the past. As various data providers do not specifically collect losses in self-employment income or capital income, the LIS data was considered more comparable when negative values were set to non-negative values throughout the database. It is worth mentioning that this procedure is directly applied to disposable income and not at the level of the source income (more specifically, this means that when a loss in a household is offset by other income then no bottom coding is applied for this household). In order to keep the low values in the distributions for various income measures (and hence to distinguish them clearly from values 0), these values have previously been set to 1% of the mean of equivalised disposable household income.

The previous method of setting negative values to 1% of the mean is here contrasted with two measures: bottom coding at value 0 and bottom coding at the lower boundary for extreme values by the interquartile range, where the lower boundary is defined as $Q1/(Q3/Q1)^3$.

In a first step, we calculated the Gini Index for bottom coded distributions at value 0 and bottom coded values at the lower boundary of extreme values. These results are not shown here, as the Gini Index proved to be very insensitive to bottom coding procedures and in only

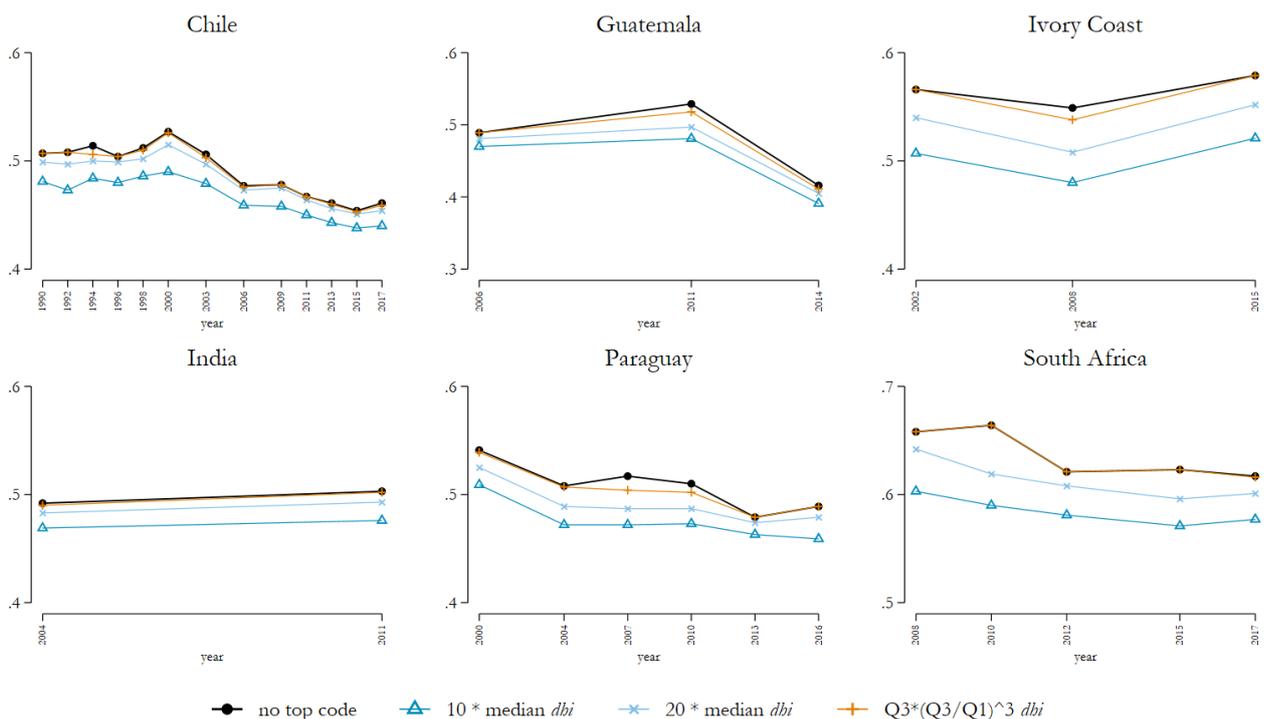
a few cases changed by 0.1% (e.g. 33.2% instead of 33.3%), and very rarely by 0.2%.

Thus, in a second step, we tested the influence on a more critical measure towards low values, the Atkinson Index (Atkinson 1970), combined with a risk aversion parameter epsilon (ϵ) equal to 1.5. Note, however, that these three measures are not directly comparable as the computation of the Atkinson Index bottom coded at value 0 excludes negative and 0 values from the distribution. We perform this comparison at this stage to show that with a strict bottom code at value 0, very low reported values remain unmodified in the income distribution (after looking at the raw data these refer typically to very low capital incomes as the only income source collected). We therefore report the sensitivity of the Atkinson Index with epsilon (ϵ) equal to 1.5 with respect to these very low values and then contrast it to a more general approach, where we keep all observations in the sample but where we apply a positive lower bound on both negative and 0 values.

Figure 4 illustrates the sensitivity in the various bottom coding techniques for selected countries. First of all, due to the actual existence of very low values in the raw data, the calculations of the Atkinson Index became quite sensitive in some datasets, as can be seen, for example, in the extreme jumps in Italy and Norway. The alternative bottom coding techniques, applying 1% of the mean or the lower boundary for extreme values, yield more stable patterns. Bottom coding at the boundary for extreme values strongly reduces the jumpy pattern of the Atkinson calculation, as compared to the 1% of the mean. An additional line for the Gini Index allows for a direct comparison of the country-specific trends.

Particularly in emerging economies (see Ivory Coast, Peru, and South Africa) that have very unequal income distributions, the threshold for extreme values at the bottom is even lower than the threshold of 1% of mean equivalised income. Hence fewer cases are treated in the extreme

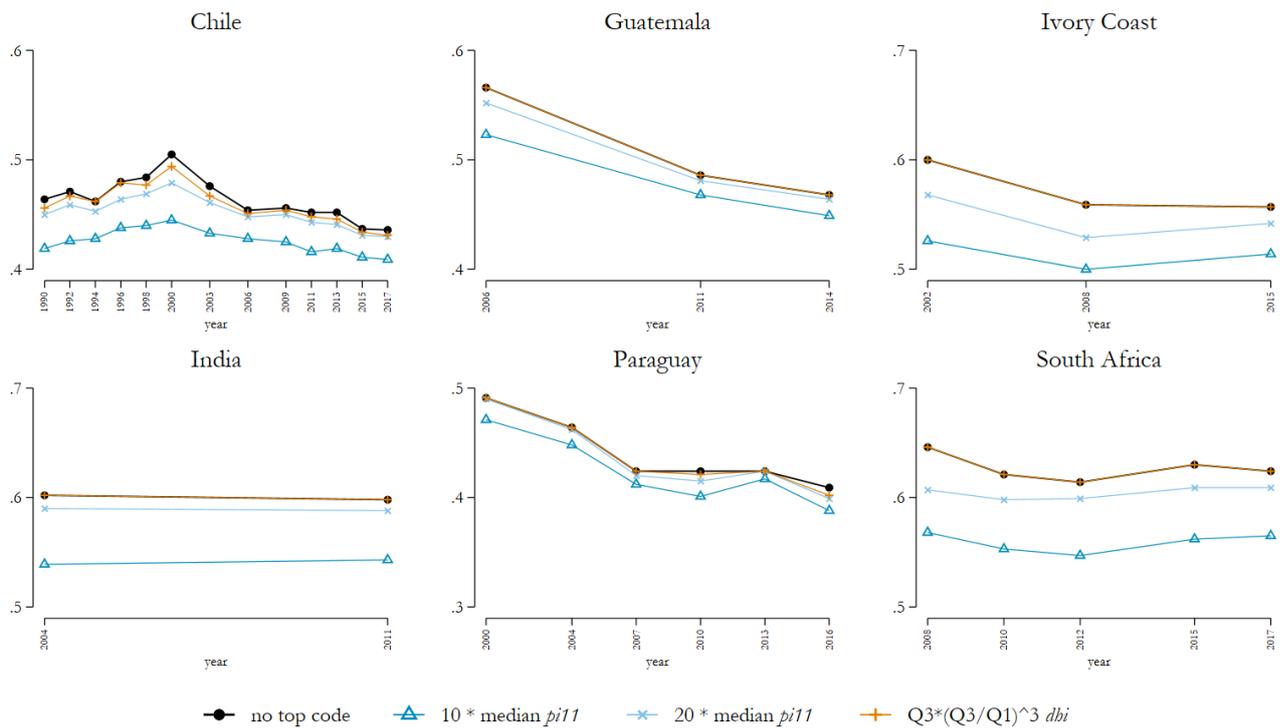
Figure 2: Alternative top coding procedures – Gini Index disposable household income (selected countries)



Note: See for all LIS datasets Figure 2 in the Appendix of LIS Technical Working Paper No. 9.

Source: Luxembourg Income Study (LIS) Database, accessed August 2020.

Figure 3: Alternative top coding procedures – Gini Index wages (selected countries)



Note: See for all LIS datasets Figure 3 in the Appendix of LIS Technical Working Paper No. 9.

Source: Luxembourg Income Study (LIS) Database, accessed August 2020.

values approach and more inequality is kept in the data. The lower boundary for extreme values refers in 50 % of the datasets to a range between 2.8 to 5.8 % of mean equivalised dhi; 90 % are in a range between 1.3 to 8.5 % of mean equivalised dhi.

For further reference, we recommend to consult Neugschwender (2020), LIS Technical Working Paper No. 9, including a Table appendix with detailed dataset-specific statistics when applying different top and bottom coding procedures. Relatively large percentage shares at the bottom are in many cases due to 0 values in the raw data, which are also raised to the bottom coded value. This affects the 1 % of the median and the extreme values approach equally. After disregarding 0 values, only 15 datasets out of the 407 datasets in the LIS Database show percentage shares larger than 1 % when treated with the extreme values approach; 10 of these datasets show more than 1 % sample cases when treated with the 1 % of the mean bottom coding. At the top, treatment to top coding at the extreme values exceeds 0.1 % of sample cases in only 7 datasets, whereas the 10 times the median approach exceeds 1 % of the sample in 20 datasets.

Conclusion

After looking in depth at these figures we reinstated the necessity for applying top and bottom coding procedures for the LIS Key Figures and DART.⁴ This decision is motivated mostly in the context of cross-national comparisons, where we aim to preserve a ranked order of inequality between countries. Among the tested approaches we concluded that it is best to adopt the interquartile range as the new technique to first detect extreme values and then to apply the lower and upper boundary as a bottom and top code. The new measure affects inequality measures much less, as compared to the previous approach, but still smoothens inequality trends within and between countries by consistently reducing the influence of extreme values in the income distributions for inequality measures.

In line with LIS' tradition of keeping the micro data as 'original' as possible we decided against implementing a technique to correct for these values in the micro data at this stage. At the same time, LIS cannot ask its data providers to systematically check these values. We therefore take a consistent approach to set these values to the lower and upper limit of the boundary. We emphasise at the same time that LIS keeps the reported values in the microdata and, as has always been its custom, leaves it up to the users to treat extreme values in the data.

LIS encourages its users to apply alternative procedures to better treat measurement error in the tails of the distributions with survey data. Such measures are, for example, re-weighting observations (e.g. Hlasny and Verme, 2018), semi-parametric approaches (e.g. Pareto distribution modelling for parametric tail (Cowell and Flachaire, 2007; Van Kerm, 2007)), or linking tax data to survey data as proposed by Blanchet *et al.* (2018).

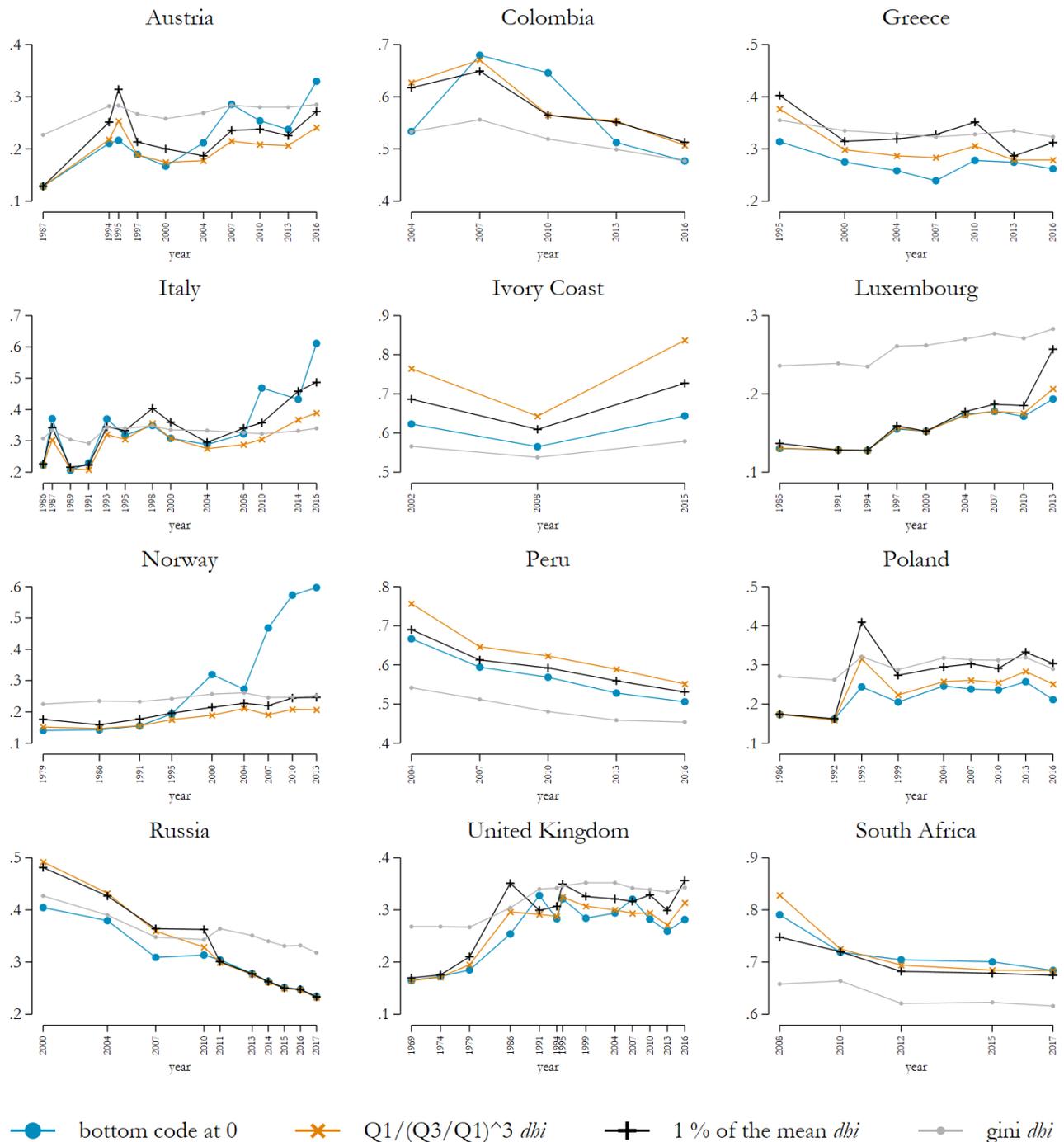
¹ The author is grateful for various valuable comments and ideas received from Philippe Van Kerm, Piotr Paradowski, Teresa Munzi, and Daniele Checchi in completing this exercise of reassessing top and bottom coding practices at LIS. This article including an appendix can be downloaded as LIS Technical Working Paper No. 9.

² Another technique, trimming the upper end, was disregarded, as this technique would impact datasets where a top code has been applied. Thus by trimming the top end of the distribution we would further reduce inequality.

³ This formula is equal to, first, defining a new log transformed variable disposable household income, second, calculating the log values for the interquartile range, and finally using the exponential of the log values in the original income distribution before log transformation, $EXP[\log Q1 - 3*(\log Q3 - \log Q1)]$ for the lower boundary and $EXP[\log Q3 + 3*(\log Q3 - \log Q1)]$ for the upper boundary.

⁴ At this stage the method is limited to income measures. A similar practice cannot be applied for net worth as this latter contains a large share of negative values which affects the calculation of a robust interquartile range.

Figure 4: Alternative bottom coding procedures – Atkinson Index ($\epsilon=1.5$) disposable household income (selected countries)



Note: See for all LIS datasets Figure 4 in the Appendix of LIS Technical Working Paper No. 9.

Source: Luxembourg Income Study (LIS) Database, accessed August 2020.

References

Atkinson, A.B. (1970), On the measurement of inequality, *Journal of Economic Theory*, Vol. 2, No. 3, pp. 244-263, [https://doi.org/10.1016/0022-0531\(70\)90039-6](https://doi.org/10.1016/0022-0531(70)90039-6).

Atkinson, A. B., Lee Rainwater, L. and Smeeding, T. M. (1994), Income Distribution in European Countries, LIS working papers series, No. 121, available at <http://www.lisdatacenter.org/wps/liswps/121.pdf>, accessed: 3/2/2020.

Blanchet, T.; Flores I.; Morgan M. (2018), "The Weight of the Rich: Improving Surveys Using Tax Data", WID.world Working Paper 2018/12, available at <https://wid.world/document/the-weight-of-the-rich-improving-surveys-using-tax-data-wid-world-working-paper-2018-12/>, accessed: 4/2/2020.

Cowell, F. A. and Flachaire, E. (2007), Income distribution and inequality measurement: The problem of extreme values, *Journal of Econometrics*, Volume 141, Issue 2, December 2007, pp. 1044-1072. <https://doi.org/10.1016/j.jeconom.2007.01.001>

European Commission – Eurostat (2018), Working Group Labour Market Statistics, TF2: Income from main job (variable INCGROSS): Imputation bands, outlier detection, and dissemination plan, Luxembourg, June 13-14, available at [https://circabc.europa.eu/webdav/CircaBC/ESTAT/labmarstatwg/Library/statistics_working/2018/1.%202013-14June%20\(Section%20A_%20LFS\)/2.%20Documents/Doc%2009%20Item%202.8%20Income%20from%20main%20job_INCGROSS.pdf](https://circabc.europa.eu/webdav/CircaBC/ESTAT/labmarstatwg/Library/statistics_working/2018/1.%202013-14June%20(Section%20A_%20LFS)/2.%20Documents/Doc%2009%20Item%202.8%20Income%20from%20main%20job_INCGROSS.pdf), accessed: 2/2/2020.

Fritzell, J. (1992), Income Inequality Trends in the 1980's: A Five Country Comparison?, LIS working papers series, No. 73, available at <http://www.lisdatacenter.org/wps/liswps/73.pdf>, accessed: 3/2/2020.

Gottschalk, P. and Smeeding, T. M. (1996), The International Evidence on Income Distribution in Modern Economies: Where Do We Stand? LIS working papers series, No. 137, available at <http://www.lisdatacenter.org/wps/liswps/137.pdf>, accessed: 3/2/2020.

Gottschalk, P. and Smeeding, T. M. (1997), Cross National Comparisons of Levels and Trends in Inequality, LIS working papers series, No. 126, available at <http://www.lisdatacenter.org/wps/liswps/126.pdf>, accessed: 3/2/2020.

Gottschalk, P. and Smeeding, T. M. (2000), *Empirical evidence on income inequality in industrialised countries*, in Atkinson, A.B. and Bourguignon, F. (eds.), *Handbook of Income Distribution*, vol. 1, Elsevier, pp. 261-307.

Hlasny, V.; Verme, P. (2018), Top Incomes and Inequality Measurement: A Comparative Analysis of Correction Methods Using the EU SILC Data, *Econometrics*, 6, 30.

Luxembourg Income Study (LIS) Database, <http://www.lisdatacenter.org> (multiple countries; July 15, 2020). Luxembourg: LIS.

Michael O'Higgins, M.; Schmaus, G. and Stephenson, G. (1985), Income Distribution and Redistribution, LIS working papers series, No. 3, available at <http://www.lisdatacenter.org/wps/liswps/3.pdf>, accessed: 3/2/2020.

Smeeding, T. M. (1997), American Income Inequality in a Cross-National Perspective: Why Are We So Different?, LIS working papers series, No. 157, available at <http://www.lisdatacenter.org/wps/liswps/157.pdf>, accessed: 3/2/2020.

Van Kerm, P., (2007), "Extreme incomes and the estimation of poverty and inequality indicators from EU-SILC," IRIS Working Paper Series 2007-01, IRIS at CEPS/INSTEAD, available at: <https://ideas.repec.org/p/irs/iriswp/2007-01.html>, accessed: 4/2/2020.

Székely, M. and Hilgert, M. (1999), What's Behind the Inequality We Measure? An Investigation Using Latin American Data, LIS working papers series, No. 234, available at <http://www.lisdatacenter.org/wps/liswps/234.pdf>, accessed: 3/2/2020.

Smeeding, T. M.; Schmaus, G. and Allegrezza, S. (1985), An Introduction to LIS – The Luxembourg Income Study, LIS working papers series, No. 1, available at <http://www.lisdatacenter.org/wps/liswps/1.pdf>, accessed: 3/2/2020.

Some Changes in the LIS PPPs: A brief Look at the Methodology and Income Rankings for Selected Regions in the LIS Database

Gintare Mazeikaite , (LIS)

In an increasingly globalised world, there is a growing demand for cross-national studies comparing living standards and well-being. One such effort is the UN's 2030 Agenda for Sustainable Development, which has set a target to end extreme poverty by 2030. While more and more detailed data is available globally, initiatives like these are faced with significant comparability issues. For example, to measure progress in poverty reduction, monetary values not only need to be expressed in a common currency but also reflect different prices faced by individuals in each country over time. Cross-country price differences and various distortions in the international currency market make the currency exchange rates unsuitable for such an exercise because they are likely to underestimate the standard of living in developing countries.

One common solution is to use purchasing power parity (PPP) rates. These convert a local currency into an amount of foreign currency that would buy the same bundle of goods and services in all countries in a given year. By far the largest international database of PPP rates is provided by the [International Comparison Program \(ICP\)](#), which is an initiative led by the World Bank that aims to improve the cross-country comparability of income data. The most recent PPP deflators are published in the [World Development Indicators \(WDI\)](#). In May 2020, WDI released PPP rates that convert local currency units into 2017 US PPP dollars, which were calculated using updated data on expenditures, regional composition, population and market exchange rates. In addition to this, the previously used 2011 PPPs were revised due to National Accounts rebasing, a common practice used to obtain more accurate estimates of the size and structure of an economy.

Currently, LIS provides the most recent [PPP estimates](#) on household final consumption expenditure¹ for the benchmark years 2011 and 2017. In addition to this, users can access information on the domestic consumer price index (CPI) deflators with both reference years 2011 and 2017, as well as LIS PPPs that combine changes in price levels within countries over time with spatial PPP deflators, making it easy to express local currency values in 2011 and 2017 USD PPP. While income and wealth measures published in the [LIS visualisation tool DART](#) since July 2020 use the 2017 PPPs, the updated 2011 PPPs are also available for LIS users. 2011 PPPs can be used with LIS data to produce estimates of absolute poverty comparable to those calculated by the World Bank, which will keep using the revised 2011 purchasing power parities rather than the 2017 PPPs until further notice (see [World Bank blog post](#) for details). A recent paper by Atamanov *et al.* (2020) discussed the

implications of the change in the benchmark year on global poverty estimates, concluding that 2017 PPPs would lead to a reduction in the global poverty count.

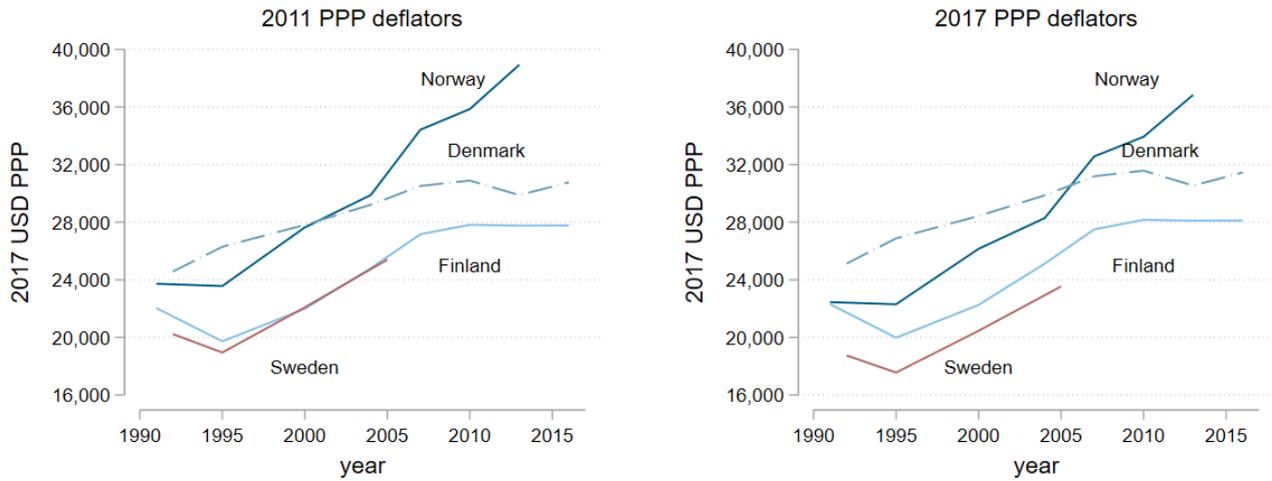
In this article, we raise the following question: *How are the LIS figures affected by the choice of the PPP benchmark year?* To answer this question, we prepared various figures analysing the difference between the 2011 and 2017 PPPs². Figures 1, 2 and 3 show trends in the equivalised median household disposable income for three regions: Northern Europe, Southern Europe and Latin America. All the values are expressed in 2017 international dollars. In the left-side panel, monetary values are first expressed in 2011 international dollars using the countries' consumer price index (CPI) and the 2011 revised PPP deflators and then updated to 2017 international dollars using the CPI of the United States³. In the right-side panel, all monetary values are expressed in 2017 international dollars using countries' CPI and the 2017 USD PPPs. By comparing right and left-side panels, we can see how the purchasing power parities have changed for each country. For example, Norway's purchasing power has been adjusted downwards after introducing the 2017 PPPs, which means that with the same amount of income in Norway one can buy fewer goods than previously thought (Figure 1). The same is true for Sweden, which saw real income drop due to the change in PPPs. Due to the changes in purchasing power parities in Sweden and Norway, Norway only overtook Denmark as regards real equivalised household disposable income about 5 years later (2006 compared to 2001), and Sweden's income no longer catches up with that of Finland's in the early 2000s.

Some changes in the real income rankings due to the new PPPs can also be observed in the Southern European countries (Figure 2). With 2017 PPPs, all Southern European countries in the LIS database had their purchasing power adjusted upwards with respect to the international dollars. However, the change has not been uniform, with the largest increase in real income in Spain, and the lowest in Italy, leading to some changes in the country rankings. Interestingly, using the 2017 methodology, Greece and Italy switch income rankings in 2005 and then again just before the Great Recession of 2008. In addition to this, when 2017 PPPs are applied the median equivalised household disposable income in Spain ranks higher than that of Italy since 1998, but the countries change rankings several times using the 2011 revised PPPs.

Finally, Figure 3 shows trends in real income in Latin American countries using both sets of purchasing power parities. Among the Latin American

Figure 1. Trends in real income in the Northern European countries

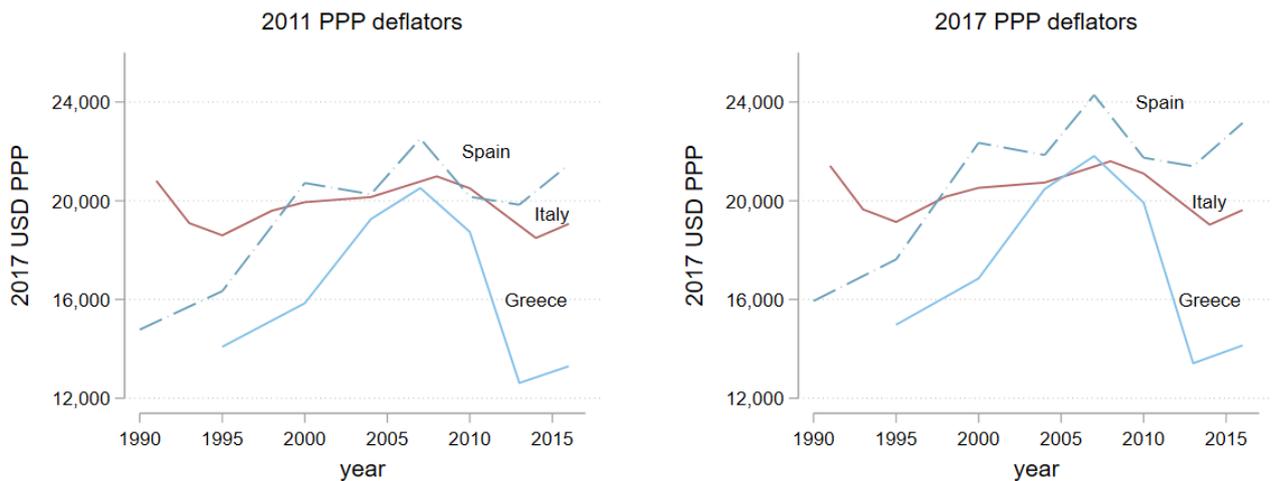
Median equivalised household disposable income, 2017 USD PPP



Source: LIS database.

Figure 2. Trends in real income in the Mediterranean countries

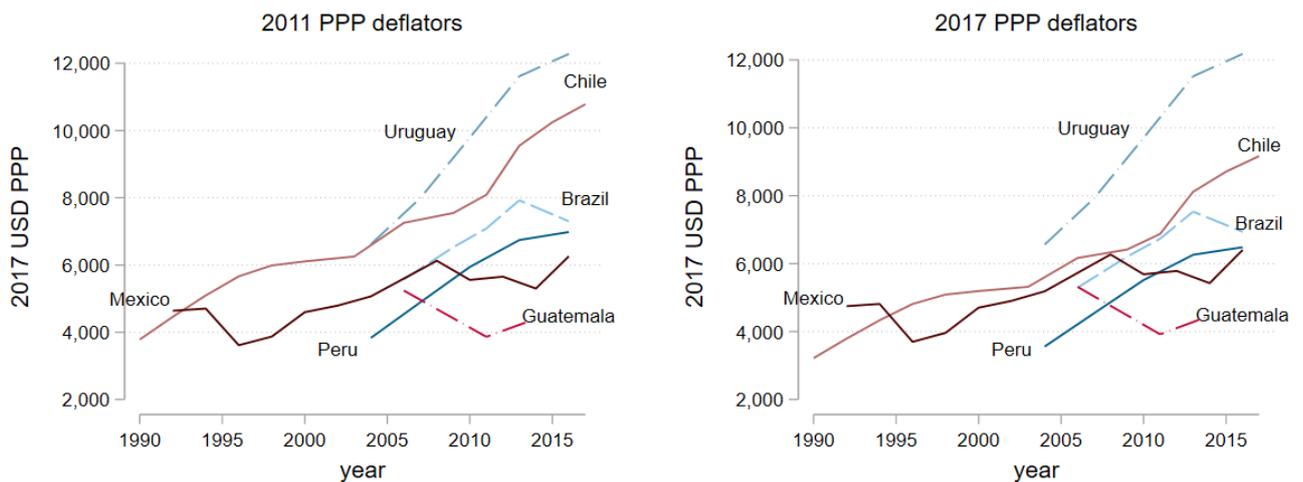
Median equivalised household disposable income, 2017 USD PPP



Source: LIS database.

Figure 3. Trends in real income in the Latin American countries

Median equivalised household disposable income, 2017 USD PPP



Source: LIS database.

due to the 2017 PPPs. However, the change in PPPs in Chile only has an impact on country rankings for the early 1990s, when, using the new PPPs, the real median equivalised household disposable income in Chile surpassed that of Mexico a few years later. In addition to this, some minor changes in the timing of when the country rankings changed can be observed in Peru, Uruguay, Brazil and Mexico.

Overall, the introduction of 2017 PPPs has led to some changes in the country rankings in the LIS data with respect to the median equivalised household disposable income in each country. However, such changes only affect indicators that use absolute monetary values, as the relative poverty and inequality indicators remain unchanged with the new PPPs. With both 2011 and 2017 PPPs directly available via the remote data execution system LISSY, LIS users can explore income and wealth data using both sets of PPPs.

More information on the LIS PPP deflators can be found on the [LIS website](#) and in the [Online Tutorial Series](#).

- 1 PPP conversion factor, private consumption (LCU per international \$) (<https://data.worldbank.org/indicator/PA.NUS.PRVT.PP>)
- 2 Underlying data for all countries in the LIS database can be downloaded at <https://www.lisdatacenter.org/wp-content/uploads/files/nl-2020-15-im-data-ppp.xls>.
- 3 For example, median equivalised household disposable income in Norway in 2013 (359341.5 Norwegian Kroner) is divided by the change in its consumer price index between 2011 and 2013 (102.83/100) and the 2011 PPPs (9.78) (or simply by the LISPPP factor of 10.057), and then multiplied by the change in the consumer price index in the US between 2011 and 2017 (108.97/100).

References

Atamanov, A., Lakner, C., Mahler, D. G., Tetteh Baah, S. K., & Yang, J. (2020). The Effect of New PPP Estimates on Global Poverty: A First Look.

Data News / Data Release Schedule



LIS is happy to announce the following data updates:

Ireland – Annualisation of the country series from 2002-17 for the LIS Database (11 new datasets and 8 revised)

Panama – PA16 added to the LIS Database (1 new dataset and 3 revised)

Switzerland – Annualisation of the country series from 2006-17 for the LIS Database (9 new datasets and 6 revised)

Estonia – Addition of a new country to the LWS Database (2 new datasets)

Property taxes and housing costs – Revision of variables *hxptax* and *hhouscost* in LIS and LWS Databases (78 LIS and 4 LWS datasets revised)

United Kingdom – Information on individual level income was removed in LIS UK69.

Data Releases – Luxembourg Income Study (LIS)

Ireland

Thanks to the provision of the complete annual series of Survey on Income and Living Conditions (SILC) data from the [Central Statistics Office \(CSO\) of Ireland](#), LIS has annualised its Irish series from 2002 onwards.

During this process, 13 new LIS datasets have been added to the LIS Database (IE02, IE03, IE05, IE06, IE08, IE09, IE11 to IE17), while the previously existing ones based on the same survey (IE04, IE07, and IE10) were fully re-harmonised on the basis of the newly provided data. LIS could not retain the same level of detail for all the LIS variables for those revised datasets, as the original variables were provided in a different format. In addition, the earlier datasets based on different sources (IE87, IE94, IE95, IE96, IE00) have been partly revised for consistency with the new ones.

Panama

One new dataset from Panama, PA16 (Wave X) has been added to the LIS Database. The dataset is from the August 2016 Labour Market Survey (Encuesta de Mercado Laboral – EML) version of the [Continuous Household Survey](#) (Encuesta Continua de Hogares) carried out by the [National Institute of Statistics and Census](#) (Instituto Nacional de Estadística y Censo – INEC).

In addition, the earlier datasets from the same survey (PA07, PA10, PA13) have been slightly refined for procedure of calculation of tax amounts, as well as for the placement of social benefits and pensions. Also other miscellaneous variables were updated in line with to the harmonisation practices carried out in PA16.

Switzerland

Thanks to the provision of the complete annual series of Statistics on Income and Living Conditions (SILC) data from the [Swiss Federal Statistical Office](#), LIS has annualised the Swiss data series from 2006 onwards.

During this process the previous nine new datasets were added to the LIS Database (CH06, CH08, CH09, CH11, CH12, CH14 to CH17), while the previous existing ones based on the same survey (CH07, CH10, CH13) were fully re-harmonised on the basis of the newly provided data. Differences between the old and new versions are minimal and concern mostly the placement of social benefits in the insurance, universal and assistance categories. Also the previous datasets based on the Income and Expenditure Survey (CH00, CH02, CH04) have been updated in order to ensure a consistent placement of social security benefits.

Data Revisions – Luxembourg Income Study (LIS)

United Kingdom – UK69: Information on individual level income was removed because of its incompleteness.

Data Releases – Luxembourg Wealth Study (LWS)

Estonia

LIS is delighted to announce that Estonia has been added to the LWS Database. Now two new datasets are available, EE13 (Wave IX), and EE17 (Wave X). The datasets are from the Household Finance and Consumption Survey (HFCS-Estonia), carried out by [Statistics Estonia](#), and [Bank of Estonia](#).

General Database Revisions (LIS & LWS)

Variables *hxptax* (property taxes) and *hhouscost* (housing costs) were revised in all datasets where they were filled, as they wrongly contained some taxes which were not connected with the property and which are now thus only to be found only at the aggregated level in *hxotax* (other direct taxes). We apologise for any inconvenience.

In the LIS Database the following 78 datasets were updated: CA04 CH92 CH00 CH02 CH04 DE81 DK87 DK92 DK95 DK00 DK04 DK10 DK13 DK16 ES85 FI87 FI91 FI95 FI00 FI04 FI07 FI10 FI13 FI16 FR78 FR84 FR89 FR94 FR00 FR05 FR10 GT06 GT14 MX08 MX10 MX12 MX14 MX16 MX18 NO86 NO07 NO10 NO13 PE04 PE07 PE10 PE13 PE16 PL99 PL04 PL07 PL10 PL13 PL16 PS17 PY00 PY04 PY07 PY10 PY13 PY16 RO95 RO97 SE00 SE05 SI99 TW81 TW86 TW91 TW95 TW97 TW00 TW05 TW07 TW10 TW13 TW16 UK94.

For the following datasets, this means that there are no longer contents in *hxptax* (property taxes), but *hxotax* (other direct taxes) might contain an inseparable mix of property taxes and other direct taxes in variable *hxotax*: CA04 DK10 DK13 DK16 ES85 GT06 GT14 NO86 NO07 NO10 NO13 PY00 PY04 PY07 PY10 PY13 PY16 SI99 UK94CA04 DK10 DK13 DK16 ES85 GT06 GT14 NO86 NO07 NO10 NO13 PY00 PY04 PY07 PY10 PY13 PY16 SI99 UK94. We advise our users to consult the codebooks in METIS for more detail.

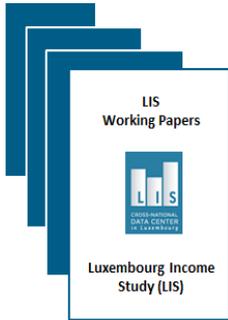
As not all 78 datasets had valid contents in *hhouscost* (housing costs) before, the corrections for housing costs have a restricted scope: CH00 CH02 CH04 DH95 DK00 DK04 FR78 FR00 FR05 FR10 MX08 MX10 MX12 MX14 MX16 MX18 PE04 PE07 PE10 PE13 PE16 PL07 PL10 PL13 PL16 PY00 PY04 PY07 PY10 PY13 SE00 SE05 TW97 TW00 TW05 TW07 TW10 TW13 TW16.

In the LWS Database the following 4 datasets were updated: NO10 NO13 SE02 SE05.

LIS/LWS Data Release Schedule

| | Winter 2020/21 | Spring 2021 |
|---------------------|-----------------------|----------------------------|
| LIS Database | | |
| Belgium | Annual data BE03-BE17 | |
| Egypt | EG18 | |
| Estonia | EE16 | |
| Iceland | IS13/IS16 | |
| Israel | | Annual data IL02-IL18 |
| Laos | | LA02/07/12 |
| Latvia | Annual data LV13-LV18 | |
| Luxembourg | | LU16 |
| Mali | | ML14/ML18 |
| Netherlands | NL15/NL16/NL17 | |
| Norway | NO16 | |
| Slovakia | | SK14/SK15/SK16/SK17 |
| South Korea | KR14/KR16 | |
| Vietnam | | VN93/98/02/04/06/08 /10 |
| United Kingdom | Annual data UK08-UK17 | |
| LWS Database | | |
| Austria | AT17 | |
| Chile | | CL07/12/14/17 |
| Luxembourg | LU17 | |
| Norway | NO16 | |
| United Kingdom | UK13/UK15/UK17 | |

Working Papers & Publications



Focus on 'Inequality, Poverty and Child Benefits: Evidence from a Natural Experiment' [🔗](#) **LIS WP No.799** by **Piotr Paradowski** [✉](#) (LIS, and Gdansk University of Technology, Faculty of Management and Economics), **Joanna Wolszczak-Derlacz** [✉](#) (Gdansk University of Technology, Faculty of Management and Economics), and **Eva Sierminska** [✉](#) (Luxembourg Institute of Socio-Economic Research)

In this paper, the authors assess the impact of a new policy action in the form of cash child benefit introduced in Poland in 2016 (the program Family 500 +) on inequality and poverty. The analysis is based on micro-level household data from the Luxembourg Income Study (LIS) and Statistics Poland. In addition, they examine the changes in various indicators of inequality and poverty (Gini index, subjective and relative poverty rates) and their decomposition. They find evidence that the program substantially reduces inequality and poverty. This is confirmed by difference-in-difference estimation, in which treated and non-treated households are compared before and after the program's introduction.

Focus on 'Public Income Transfers and Wealth Accumulation at the Bottom: Within and Between Country Differences in Canada and the United States' [🔗](#) **LWS WP No.31** by **David Rothwell** [✉](#) (College of Public Health and Human Sciences, Oregon State University), **Leanne Giordano** (Oregon State University), and **Jennifer Robson** (Carleton University)

Both Canada and the United States are considered liberal welfare states, yet exhibit notable differences in income poverty attributed to social policy. While a more generous welfare system lifts many above income poverty, models of household financial behavior suggest that more income from the state should displace private savings via a substitution effect. Using nationally representative wealth surveys from Canada and the US from 1998/1999 to 2016 the authors extend knowledge on the relationship between the welfare state and private wealth accumulation. Specifically, studying household asset poverty defined as financial asset levels that fall below three-month adjusted income poverty threshold. Asset poverty rates varied over time in the two countries and were higher in the less generous US welfare state. Further, income transfer share was positively related to asset poverty in Canada but not in the US. Counterfactual estimates offered evidence of the substitution effect in Canada, where higher levels of transfers may crowd out private asset accumulation. Results invite further consideration of the concept of asset poverty and its relationship to welfare state characteristics.

LIS working papers series

LIS working papers series - No. 797 [🔗](#)

Inside the Black Box: Intra-household Inequality and a Gendered Pandemic

by *Deepak Malghan, Hema Swaminathan*

LIS working papers series - No. 798 [🔗](#)

Patterns of Regional Income Inequality in Egypt: Implications for Sustainable Development Goal 10

by *Ioannis Bournakis, Mona Said, Antonio Savoia, Francesco Savoia*

LIS working papers series - No. 799 [🔗](#)

Inequality, Poverty and Child Benefits: Evidence from a Natural Experiment

by *Piotr Paradowski, Joanna Wolszczak-Derlacz, Eva Sierminska*

LIS working papers series - No. 800 [🔗](#)

Taxation of Families and "Families of Taxation"? Inequality Modification Between Family Types Across Welfare States

by *Manuel Schechtel*

LIS working papers series - No. 801 [🔗](#)

Financialization and Income Generation in the 21st Century: Rise of the Petit Rentier Class?

by *Adam Goldstein, Ziyao Tian*

LWS working papers series

LWS working papers series - No. 31 [🔗](#)

Public Income Transfers and Wealth Accumulation at the Bottom: Within and Between Country Differences in Canada and the United States

by *David Rothwell, Leanne Giordano, Jennifer Robson*

Technical working papers series

Technical working papers series - No. 9 [🔗](#)

Top and Bottom Coding at LIS

by *Jörg Neugschwender*

News, Events and Updates

Introducing DART – LIS New Data Visualisation Tool!

LIS is happy to announce the launch of **DART**– the new LIS data visualisation tool. DART is a powerful web-based interactive tool that allows users to select and visualise income and wealth indicators, countries, and time periods, and to decompose them by a multitude of individual and household characteristics, all based on the LIS harmonised databases. With the launch of DART, LIS breaks new ground with data provision, as a broader base of users, including scholars, journalists, teachers, NGO staff, other analysts, and the general public, will be able to easily obtain and visualize a rich array of income and wealth indicators disaggregated across several dimensions.

DART Main Features

- Richness of overtime and cross-country inequality measures disaggregated by different social strata.
- No prior knowledge of statistical packages or coding skills required.
- Visualisation of data through different charting types (Trends, Scatter plots, Distributions, and Maps).
- Table format display of the aggregated data used to generate the plotted graph(s).
- Export of all the graphs/tables produced in pdf and excel formats.

Access DART from [here](#).

For more information about DART, see [here](#).

Launch of LIS Online Tutorial Series!

LIS is happy to announce the launch of its **online tutorial series**. The tutorials cover various topics and partially replace the LIS Summer Workshop 2020. The tutorials include the following:

- Introductory sessions on the LIS/LWS Databases
- How to work with LIS MetaData Information System (METIS)
- How to get started with the LIS remote execution system (LISSY) – Basic
- How to get started with the LIS remote execution system (LISSY) – Advanced
- Advanced methods and hands-on applications on the usage of LIS/LWS Databases
- Research showcases on the usage of LIS Databases

The tutorials were prepared mostly by LIS data staff members and recently gained valuable contributions from Professor Philippe Van Kerm (University of Luxembourg and LISER).

Stay tuned for more tutorials to come by Professor Louis Chauvel (University of Luxembourg)!

To view the tutorials, please follow this [link](#).

New Top and Bottom Coding Methodology at LIS

LIS is in the process of adopting a new practice of setting extreme income values for a bottom and top code for its Key Figures and DART. In **LIS Technical Working Paper- No.9 “Top and Bottom Coding at LIS”**, Jörg Neugschwender compares the previous top and bottom coding procedures used at LIS with alternative measures. These sensitivity analyses for top and bottom coded incomes were motivated by the many additions of datasets from emerging economies with income distributions that are generally more unequal than those of mature economies. After carefully analysing the results, LIS is in the process of adopting a new practice of setting extreme income values for a bottom and top code for its Key Figures and DART.

LIS granted the 2019 Aldi Award

This year’s winner of the LIS **Aldi Award** is Hugo del Valle-Inclán Cruces from Universidade de Vigo, Spain, for LIS Working Paper No. 764 entitled **“Estimating Inequality of Opportunity in More Periods Than Ever Before: The Capital Income Approach”**. The paper was selected from 19 eligible papers by six reviewers from several social sciences disciplines.

LIS Webinar Sessions

During the past two months, LIS has held two interactive webinar sessions on different topics related to the Luxembourg Wealth Study Databases (LWS). These sessions were presented by Piotr Paradowski, LIS Data Expert and Research Associate. The sessions attracted many scholars from different fields and countries.

New complementary database: Family Tax Benefit Database

LIS recently added to its complementary databases section a new dataset on Family Tax Benefit Database for use with the Luxembourg Income Study Database. This dataset, created by Manuel Schechtel (Humboldt University Berlin). The dataset includes country-level indicators on the national income tax system and family-related tax expenditures (such as single parent reliefs or joint filing for couples) based on OECD benefits and wages data country reports and national expert’s responses to an online survey. The country and year selection of the tax indicator information matches the latest available dataset for most countries that provide tax data in the Luxembourg Income Study (LIS). Therefore, the data can be used for cross-national comparisons of public policy, tax policy or social policy.

Users can access the data and its documentation from [here](#).

Tenth call for the InGRID-2 Visiting Grants will be Open Soon!

Applicants working and living within the EU member states or associated countries can now apply for a funded visit on the LIS site through the European Commission’s H2020 Framework Programme: the **InGRID-2 (Inclusive Growth Research Infrastructure Diffusion) project**.

Check the upcoming dates for the 10th call application from [here](#).

Stone Center – “Inequality by the Numbers” Workshop – Converted to Videos

The Stone Center’s sixth annual weeklong summer workshop on inequality research and methods – “Inequality by the Numbers” – was scheduled for June 2020 but had to be canceled. The live workshop was replaced by a set of 14 lectures recorded on video. The videos, each about 30 minutes long, cover diverse topics related to inequality. The whole set is available for viewing [on the Stone Center website](#).

The lecturers include Jordan Conwell, Miles Corak, Nancy Folbre, Janet Gornick, Lane Kenworthy, Michael Kraus, Paul Krugman, Leslie McCall, Branko Milanovic, Ruth Milkman, Salvatore Morelli, James Parrott, Florencia Torche, and Bruce Western. The video recorded by Janet Gornick focuses on [LIS and the LIS data](#).

Stone Center – Third Cohort of Postdocs

The Stone Center will post applications for two more postdocs – the fifth and sixth to join the Stone Center – within the next month. Both positions, which will run from September 2021 through August 2023, will be open to scholars of inequality. One will be “open topic” and the other will be targeted on research on high-end wealth. Check the Stone Center website and [Twitter feed](#) for updates.

In spring 2020, the Stone Center selected its second cohort of postdocs. Two new postdocs joined the Stone Center in September 2020:

- [Bennett Callaghan](#) received his PhD from Yale University in May 2020. He is a social psychologist who studies inequality’s influence on politics and public opinion.
- [Jaquelyn Jahn](#) received her PhD from Harvard University in May 2020. She is a social epidemiologist who studies the consequences of social policies for population health and health equity.