Using tax records for economic analysis of inequality and fairness

by

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DECLARATION

Whilst registered as a candidate for the above degree, I have not been registered for any other research award. The results and conclusions embodied in this thesis are the work of the named candidate and have not been submitted for any other academic award.

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ABSTRACT

This body of nine works has a common thread of using tax records for economic analysis. This approach offers significant benefits, yet it also underscores the necessity for dedicated efforts to ensure the optimal utilisation of the data. The work is divided into two themes. The first theme concerns physical persons and households, with a focus on inequality and intergenerational mobility. The second theme concerns firms, with a focus on multinational enterprises' profit shifting and fairness. About the first theme, Paper 1A analyses income concentration in Italy with greater territorial granularity than surveys and examines personal income tax redistribution. Papers 1B and 1C employ inheritance tax data, integrated with other sources, to assess wealth distribution of the Italian population over the 1995-2016 period. Results demonstrate higher wealth concentration and clearer increasing trends than in surveys. Paper 1D punctually links income of parents and children across two generations of Italians, to study the degree of intergenerational mobility with a precision never reached by other studies for Italy. Paper 1E analyses indicators of the tax burden on labour income in EU countries. The second theme is closely related to the first one, as minimisation of tax liabilities by multinational enterprises benefits disproportionately top income and wealth individuals. Paper 2A employs macro data variables for 172 countries to evaluate the amount of foreign direct investments driven by potential profit shifting. Papers 2B and 2C use microdata derived from the recently introduced mandatory Country-by-Country reports of multinational enterprises. By leveraging the superior worldwide coverage of this dataset compared to financial accounts datasets, the analysis revealed a more pronounced phenomenon of profit shifting by multinational enterprises in the lowest tax jurisdictions, compared to previous literature. Conversely, Paper 2D demonstrates how targeted and well-designed tax incentives for firms can generate positive spillovers for the economy.

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LIST OF ABBREVIATIONS

Abbreviation	**Meaning**
BEPS	Base Erosion and Profit Shifting
BvD	Bureau Van Dijk
CbCR	Country-by-Country Reports
CIT	Corporate Income Tax
DINA	Distributional National Accounts
ECB	European Central Bank
FATS	Foreign Affiliates Statistics
FDI	Foreign Direct Investments
GloBE	Global Anti-Base Erosion Rules
GVC	Global Value Chain
ICT	Information and Communication Technology
IGE	Intergenerational Elasticity of Income
ITR	Implicit Tax Rate
MNEs	Multinational Enterprises
NA	National Accounts
OECD	Organisation for Economic Co-operation and Development
PIT	Personal Income Tax
RRS	Rank-Rank Slope
SDGs	Sustainable Development Goals
SHIW - *IBF*	Survey on Household Income and Wealth – *Indagine sui Bilanci delle Famiglie*
SILC	Survey on Income and Living Conditions
UPE	Ultimate Parent Entity

Table 1: List of papers submitted, contributions, and citations

N.	Title	Journal - Series	Contri-bution	# of cita-tions*
Theme 1 - Income and wealth inequality and intergenerational mobility				
1A	Acciari, P., & Mocetti, S. (2012). ***The geography of income inequality in Italy***	Politica Economica - Journal of Economic Policy (PEJEP), issue n. 3, Il Mulino.	50%	64
1B	Acciari, P., & Morelli, S. (2022). ***Wealth Transfers and Net Wealth at Death: Evidence from the Italian Inheritance Tax Records 1995–2016***	Chapter in: Measuring Distribution and Mobility of Income and Wealth, Studies in Income and Wealth Vol. 80, NBER, University of Chicago Press.	50%	20
1C	Acciari, P., Alvaredo, F., & Morelli, S. (2024). ***The concentration of personal wealth in Italy 1995–2016***	Journal of the European Economic Association.	33%	46
1D	Acciari, P., Polo, A., & Violante G.L. (2022). ***'And Yet, It Moves': Intergenerational Mobility in Italy***	American Economic Journal: Applied Economics, American Economic Association.	33%	161
1E	Heijmans, P., & Acciari, P. (2004). ***Examination of the macroeconomic implicit tax rate on labour derived by the European Commission***	Taxation Papers, Directorate General Taxation and Customs Union, European Commission, n. 4.	50%	3
Theme 2 - Fair taxation of multinational enterprises				
2A	Acciari, P., Tomarelli, F., Limosani, L., & Benedetti L. (2015). ***Measurement of Base Erosion and Profit Shifting phenomena through the analysis of FDI stocks***	Ministry of Economy and Finance of Italy, Department of the Treasury, Working Paper n. 3.	25%	10
2B	Santomartino, V., Bratta, B., & Acciari, P. (2022). ***Analysing MNEs structure and activities using Country-by-Country Reports. Evidence from the Italian dataset***	UNCTAD Transnational Corporations, Vol. 29, n.2.	33%	4
2C	Bratta, B., Santomartino, V., & Acciari, P. (2024). ***Assessing profit shifting using Country-by-Country Reports: a non-linear response to tax rate differentials***	National Tax Journal, American Tax Association, Vol. 77, no. 2.	33%	38
2D	Bratta, B., Romano, L., Acciari, P., & Mazzolari, F. (2022). ***Assessing the impact of digital technology diffusion policies. Evidence from Italy***	Economics of Innovation & New Technology.	25%	18

Note: * Data from Google Scholar updated on 12th July 2024, including working paper versions of the articles. For Paper 1E, citations by REPEC-IDEAS are also included as Scholar does not correctly capture 2 citations.

Commentary

1. Introduction

1.1. Background and motivation

The common feature of using tax records in the submitted papers stems from my professional experience at the Italian Ministry of Economy and Finance - Department of Finance (where I still work as Director in charge of consultancy, studies and research), at the European Commission, Economic Aspects of Taxation Unit, and participation in OECD works, in particular at Working Party no. 2 on Tax Policy Analysis and Tax Statistics and the OECD Task Force on Digital Economy. Given the background described, all the papers focus directly or indirectly on the policy implications of the analysis. The submitted papers are a selection from my body of work, chosen to ensure coherence.

At the European Commission the topics of interest were quite broad, dedicated to the analysis of the structure of the tax systems in EU countries (e.g. Paper **1E,** focused on labour taxation). At the Ministry, part of my responsibility was the compilation and publication of aggregated statistics on Personal Income Tax (hereafter PIT) and Inheritance Tax (Italian Ministry of Economy and Finance, 2024). Those activities gave me the opportunity to use tax records to analyse the redistributive effects of the Italian tax system and the related issues of income and wealth inequality and intergenerational mobility, as in Papers **1A, 1B, 1C,** and **1D**. This research activity has also influenced the way the Ministry disseminates statistical data to the public, enriching information useful to analyse inequality.

The activities of the OECD working groups have focused much more on ensuring a fair taxation of multinational enterprises (hereafter MNEs) in periods of groundbreaking international agreements. These include the *Base Erosion and Profit Shifting* (hereafter *BEPS)* project (OECD, 2015a, 2015b) and the *Pillar II* agreement on global minimum taxation (OECD, 2021), with the associated need for economic analysis of these issues using all useful sources, including tax records, as in Papers **2A, 2B,** and **2C**. The issue of fair taxation of companies also includes analysis of the policy issues related to well-designed tax incentives for investment to promote positive spillovers for the economy, which is investigated in Paper **2D**.

1.2. Using tax records for economic analysis

Administrative data are collected by governments or other organisations for non-statistical reasons. In particular, tax records are a kind of administrative data collected for tax purposes. All the papers included in this commentary, with the only exception of **2A**, are based on tax records. Table 2 gives an overview of the tax records used in each paper, as well as the use of other administrative data. The main sources used are PIT returns and Inheritance Tax returns with regard to Theme 1 and Corporate Income Tax (hereafter CIT) returns and Country-by-Country reporting with regard to Theme 2.

Table 2: Use of tax records

Theme and Paper	Use of tax records	Use of other administrative data, on top of tax records
Theme 1 - Income and wealth inequality and intergenerational mobility		
1A	Personal income tax returns	-
1B	Inheritance tax returns	-
1C	Inheritance tax returns Personal income tax returns	-
1D	Personal income tax returns	-
1E	Personal income tax returns (indirectly)	-
Theme 2 - Fair taxation of multinational enterprises		
2A	-	-
2B	Country-by-Country reporting	Consolidated and unconsolidated financial accounts
2C	Country-by-Country reporting Corporate income tax returns	Consolidated and unconsolidated financial accounts
2D	Corporate income tax returns	Unconsolidated financial accounts Jobs inflows/outflows

Using tax records or, more broadly, administrative data, means that activities need to be carried out to make proper use of the data. On the one hand, the use of administrative data for economic analysis has clear advantages over survey data: 1) they have much larger samples, often covering the entire population; 2) they have an inherent longitudinal structure; 3) they provide much higher quality information than is typically available from survey sources, which suffer from high and rising rates of non-response, attrition and underreporting (Card et al., 2010, p. 2). On the other hand, as administrative data are typically collected for specific administrative purposes, the way in which certain variables are recorded deviates from basic economic concepts (Kunn, 2015, p. 2). Moreover,

administrative data themselves suffer from data quality limitations and missing data: for example, missing data can occur when an individual does not interact with a service and is therefore not recorded in the administrative data (Harron et al., 2017).

Connelly et al. (2016) examine the advantages of administrative data for social research and present a comprehensive review of the main papers based on these data. However, they also carefully analyse the challenges associated with the use of administrative data. According to them, when using administrative data, researchers should, with some careful investigative work, have a clear idea of the population that the data cover (Connelly et al., 2016, p. 4). In contrast to more traditional types of social science data, administrative social science data may be less systematic and require more data enabling by researchers to facilitate data analysis. Due to the lack of clear documentation that accompanies many administrative data sources, researchers need to invest time and effort in understanding what types of questions could feasibly be answered using the administrative data. Because the data were not collected for research purposes, they are not documented to support data analysis. In order to fully understand administrative datasets, researchers need to make an effort to uncover the data generation processes that determined how these data were created (Connelly et al., 2016, pp. 7-8).

All these challenges with administrative data are magnified when it comes to tax records. Missing data occur, for example, when a particular form of income or wealth is exempt or subject to substitute taxation and is not required to be declared on the tax forms. Definitions of variables are linked to the tax domain (e.g., the concept of income usually has the meaning of taxable income) and do not necessarily coincide with accepted economic definitions, like the ones included in the Canberra Group Handbook on Household Income Statistics (United Nations, 2011). The administrative documentation associated with tax returns, as instructions on how to complete the forms, is sometimes voluminous, but far from having the standard characteristics of metadata requested in official statistics to help the data user (for an analysis of metadata standards see Bargmeyer & Gillman, 2000). Slemrod (2016), while highlighting how promising tax records can be for economic research, warns of the caveats associated with them and provides a very detailed analysis of the problems encountered with different tax return models in the specific case of the United States.

As a result, dealing with missing data, different concepts and definitions or, more generally, correctly interpreting the data can be a major challenge for economists who want to use tax information for economic analysis, as tax legislation is complex and differs from country to country. Using tax data without a thorough analysis of the economic meaning of the data leads to biased results.

In terms of definitions and documentation, to give an idea of the complexity of the tax domain, the Italian personal income tax return model, compiled in 2023, is 51 pages long and the associated instructions are 383 pages long. The corporate tax model has a similar length, 62 pages for the model and 316 pages for the instructions.

This demanding research activity of "decoding" the information available in tax records is probably not work that can be outsourced to lawyers, who often speak a completely different language from economists. Some examples of the operations carried out for the correct use of tax data are given specifically in the discussion of the papers under Theme 1 and Theme 2 of this commentary. However, just to give a quick example, in the Italian tax legislation wealth and income from immovable property usually are not taxed applying market values but cadastral values, which are notional values used for tax purposes, normally outdated. When analysing issues relating to inequality, referring simply to tax records, without appropriate corrections to retrieve market values from cadastral values, would produce biased results of landlords' wealth and income.

1.3. The broad picture: the importance of analysing inequality and the role played by corporate income taxation in economic literature

Discussions on economic inequality date back to the birth of political economy itself. According to Rasmussen (2016), Adam Smith expressed worries about some of the consequences of extreme economic inequality, while Walraevens (2021) sustains that Smith was interested in the causes of inequalities and addressed several contemporary issues such as the links between inequalities, economic growth, and social mobility.

After the turn of the millennium, there has been a growing interest in the analysis of inequalities in the economic literature, in particular the long term evolution of income and wealth inequality. The

first of this new stream of works were Piketty (2003) and Piketty and Saez (2003), based on tax records from France and the US, respectively. Their work built on the trailblazing research by Kuznets and Jenks (1953) who produced the first comparable long-run income distribution series, using US tax return data.

Few years later, following the 2008 big recession, some authors have identified increased inequality as one of the causes of the crisis (see, e.g., Atkinson & Morelli, 2011, and Van Treeck, 2013). Additionally, there has been concern about the effects of the crisis on the poor and social cohesion (see, e.g., Ötker-Robe & Podpiera, 2013). One aspect of inequality is the idea of equality of opportunity, which can be measured by intergenerational mobility (Roemer & Trannoy, 2015, and Corak, 2013). An empirical negative association has been extensively documented in economic literature between income inequality and the country's level of intergenerational mobility, named as the "Great Gatsby Curve". Moreover, inequality has been found to be more detrimental to economic growth for lower levels of intergenerational mobility (Ayar & Ebeke, 2020).

During the Covid-19 economic crisis, there has been a growing concern about the impact on the poor and social cohesion: Blundell et al. (2020) suggest that the crisis could worsen pre-existing inequalities, with long-term effects that are likely to be unequal (for further information on the long term effects of Covid-19, see also Furceri et al., 2022). Concerns have also been raised regarding the impact of the war in Ukraine on energy and food prices (Ari et al., 2022).

The World Inequality Lab started in 2011 to monitor and analyse inequality in academia. It is a collaborative effort of over 150 researchers worldwide who maintain the World Inequality Database and regularly publish the World Inequality Report. The latest edition was released in 2022 (Chancel et al., 2022). The Lab also invests in communicating inequality issues to the broader public.

CIT plays a crucial role in personal inequality, as explained by Saez and Zucman (2019). Top income individuals end up paying relatively lower taxes than low and middle-income individuals due to preferential tax rates for long-term capital gains, tax avoidance, and a low corporate income tax rate. For these reasons, the effective tax burden on capital of the wealthiest individuals is usually lower than the effective tax rate on labour of low and middle-income workers.

Faccio and Iacono (2022, pp. 821-826) surveyed the literature on the relationship between corporate income taxation and inequality, highlighting several patterns. As corporations' shareholders are typically concentrated at the upper end of the personal income and wealth distribution, the level at which corporations are taxed has a direct impact on the taxation of the better off, which in turn affects post-tax income (or wealth) distribution. Nallareddy et al. (2018) estimated the causal effect of US states' corporate tax cuts on top income inequality and found that a 1 percent cut in corporate taxes increases the share of income accruing to the top 1 percent by 0.9 percentage points. According to their explanation, the observed outcome is primarily a result of high earners transferring their income from labour to capital in response to corporate tax reductions, with the aim of decreasing their tax obligations. Graham's (1936) study was one of the first to examine the undistributed profits tax. The study found that this tax would encourage corporations to distribute a greater proportion of their retained earnings to shareholders, who would then be subject to progressive PIT. Hager and Baines (2020) argue that the steady reduction in corporate taxation in the US has led to stronger corporate concentration. This has resulted in corporations prioritising shareholder value enhancements over productivity-enhancing investments that could benefit working-class employees, leading to wider household inequality. However, accurately assessing the impact of CIT on inequality requires analysing its economic incidence, as CIT liability may not always be entirely borne by shareholders. Higher CIT can increase the prices of products or services sold by corporations, partially transferring the burden to consumers (Ablett and Hart, 2005). It can also lead to a reduction in wages, transferring the burden to workers. According to Arulampalam et al. (2012) and Fuest et al. (2018), workers would bear half of the burden in case of an increase in CIT liabilities. However, Clausing (2013) expresses doubts about the robustness of empirical work in this specific area.

Against this background, the international dimension of CIT is a crucial issue. According to OECD (2015), many empirical studies, using different data sources and methodologies, have found evidence of tax-motivated profit shifting, resulting in significant global CIT revenue losses. Consequently, multinational enterprises' profit shifting has the effect of exacerbating inequality. On the one hand, it primarily advantages individuals at the top of the income and wealth distribution by reducing their tax liability. On the other hand, it reduces governments' resources available for social spending.

It is important to differentiate between features of corporate tax legislation that facilitate profit shifting and targeted corporate tax incentives that promote investments generating positive spillovers for the economy. R&D incentives effectively increase R&D investments and generate positive spillovers (Dechezleprêtre et al., 2016, and Guceri & Liu, 2019)

1.4. Inequality and corporate income taxation in the international policy debate

The topic of inequality has moved beyond academic debate and is now a subject of international political discussions. In 2015, the world's leaders adopted the 2030 United Nations Agenda for Sustainable Development (United Nations, 2015) and its 17 Sustainable Development Goals (SDGs), including Goal 10: "*Reduce inequality within and among countries*". The first target of this goal, Target 10.1, aims to "*by 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average*".

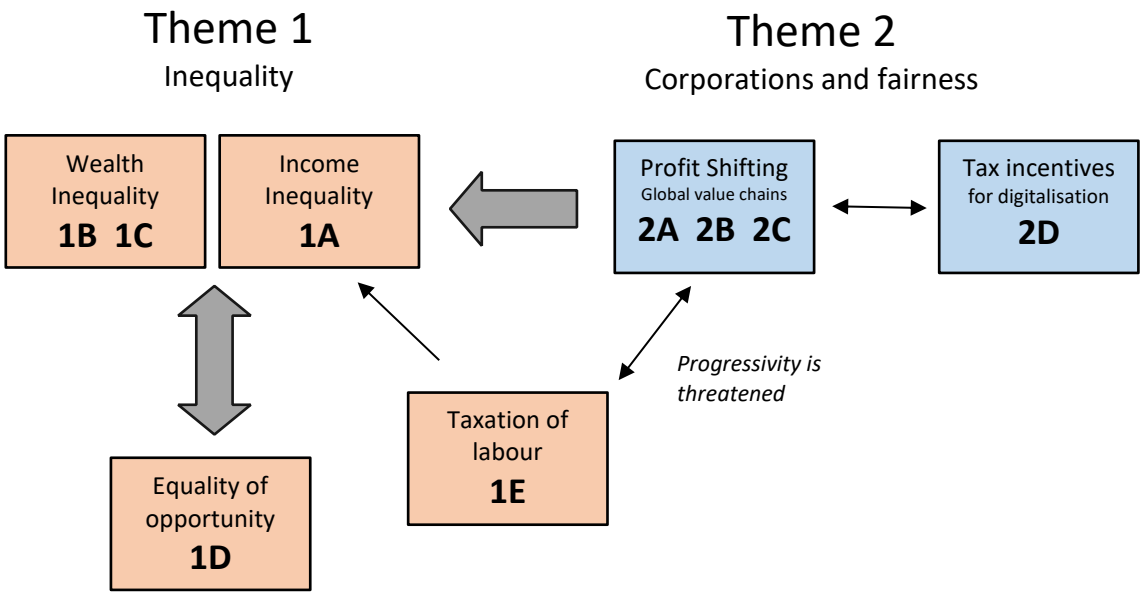
The Brazilian Presidency has recently taken a step forward in including the issue of inequality in international political discussions by placing it at the heart of the G20 agenda for 2024. The G20 concept note (G20 Brazilian Presidency, 2024) states that socioeconomic inequalities have fuelled political extremism in both developing and developed countries, with harmful consequences for global governance. The Presidency aims to promote a new form of globalization based on socio-environmental criteria. This involves realigning global production chains to reduce inequalities. To finance sustainable development, massive resources need to be mobilised. This requires coordination of economic and financial policies at the global level to ensure economic convergence. Additionally, international taxation needs to be reviewed to create more equitable and progressive systems. During Brazil's G20 Presidency, there will be an effort to enhance ongoing discussions regarding a fairer and more progressive global taxation system. This will go beyond the current negotiations on BEPS at the OECD.

As already mentioned, the OECD, with the support of G20, has been working to address international profit shifting. This work has resulted in a significant agreement among over 140 countries on the *GloBE - Pillar II* rules, which have introduced a global minimum corporate tax rate of 15% starting in 2024 (OECD, 2021). In November 2023, the Second Committee of the United Nations General Assembly adopted a resolution titled "*Promotion of inclusive and effective*

international tax cooperation at the United Nations" (United Nations, 2023). This resolution was adopted at the urging of the African Group of States led by Nigeria. The resolution established an Intergovernmental Committee to draft the terms of reference of a framework convention on international tax cooperation. The resolution acknowledges the negative impact that aggressive tax avoidance and tax evasion have on trust, financial integrity, the rule of law, and sustainable development, particularly affecting the poorest and most vulnerable. It also recalls a previous resolution committing Member States to improving the fairness, transparency, efficiency, and effectiveness of their tax systems.

1.5. Organisation of this commentary

The following sections of this commentary will discuss the submitted papers separately for the two connected themes: **Theme 1** "Income and wealth inequality and intergenerational mobility" and **Theme 2** "Fair taxation of multinational enterprises". Following the connections analysed in the introduction, Figure 1 illustrates in extreme synthesis the relationship between the papers included in this commentary and the two themes. **Theme 1** pertains to physical persons and households, including paper **1A** on income inequality, which is strictly connected with wealth inequality, analysed in papers **1B** and **1C**. Bearing in mind the "Great Gatsby Curve", Paper **1D** investigates the declination of inequality as equality of opportunity, analysing intergenerational mobility. Paper **1E** examines the tax burden on labour income which decreases disposable income, influencing inequality. **Theme 2** includes an analysis of global value chains and international profit shifting: paper **2A** assesses profit shifting using FDI data, **2B** exploits CbCR microdata to analyse global value chains, and **2C** uses the same data to assess profit shifting behaviours of corporations. Profit shifting, as previously discussed, has crucial effects on income and wealth inequality included in **Theme 1**. Against this background, progressivity is at risk, as the effective taxation on low and middle labour income might be higher than capital taxation of top incomes, with clear outcomes on inequality. Finally, Paper **2D** analyses targeted and well-designed tax incentives for firms, with positive spillovers for the economy.



Note: thick arrows represent stronger relations.

Figure 1: Schematic illustration of the topics of the papers and their connections.

2. Theme 1 – Income and wealth inequality and intergenerational mobility

2.1. Paper 1A

This paper exploits data from income tax returns with the aim of doing a spatial analysis of inequality in Italy, a dimension much less explored than the longitudinal one. A second objective of the paper, preparatory to the first, was to assess the usefulness and suitability of the tax returns data for analyses on income distribution (this aspect is summarised in Table 3). Before this paper, an in-depth analysis of the geography of inequality in Italy had not been attempted due to a lack of data. The sample surveys typically used for the analysis of income distribution, such as the Survey on Households Income and Wealth derived by Bank of Italy (SHIW, or *indagine sui bilanci delle famiglie* – *IBF* in Italian) or the Survey on Income and Living Conditions (EU-SILC) derived by the Italian Statistical Institute, in fact, do not allow to make sufficiently fine partitions of the territory. As described at page 2 of the paper, previous territorial analysis of inequality in Italy could be conducted only for the largest regions, or just to compare the Centre-North with the South, while this paper computes inequality indices for each of the 103 provinces for the historical series 2000-2011.

Table 3: Data aspects regarding income tax returns used in Paper 1A

Source	Unico, 730 and 770 tax forms
Income definition	Total income, gross (or net) of PIT. Main components: employment and assimilated income, income from self-employment and business, income from participation in partnerships, pension income and income from land and buildings. Does not include: - income subject to substitute taxation (mainly financial income and minimum taxpayers' regime income) - income of taxpayers who have only exempt income (e.g. social pensions, family allowances, scholarships, low real estate income, etc.)
Check with aggregate National Accounts (NA) data	Data from tax returns, re-aggregated at the regional level, compared to data on net disposable income from the National Statistical Institute (ISTAT). Tax returns data lower on aggregate than NA, mainly because: 1) Black economy included in NA 2) MEF data do not include capital income subject to withholding tax at source (about 10 per cent of the taxable income, usually concentrated in the highest decile) 3) real estate income included in MEF data are at cadastral values. Despite this underestimation, the correlation between the two sources at regional level is very high (0.99). We also compare tax data with the ones from the SHIW survey, finding generally lower levels in tax data, especially in the lowest deciles and in the top decile.
Individual Vs household data	MEF data based on individuals. Traditionally study on inequality use households' data, as household is an instrument of redistribution both between income recipients and non-income recipients (minors, unemployed, homemakers) and between unequal income recipients.
Check with IBF and EU-SILC surveys	Despite biases due to the use of individual data and tax evasion, we found strong correlation of our results with more aggregated inequality indices available from other sources, both in dynamic and cross-sectional terms.

Coming to the results of the data analysis, we find that in 2011, the Gini index was 40 percent. In the South, the index was 3 percentage points higher than in the Centre-North, mainly because of a smaller share of income held by the lower tail of the distribution. Caltanissetta showed the highest value (44.6) and Vercelli the lowest (35.0). Inequality is also higher in major metropolitan areas. The Gini index has been increasing during the Great Recession, driven by a reduction in incomes, larger for individuals below the median, and regional disparities have been increasing as well.

We have also analysed the redistributive role of taxation, finding a higher redistribution of the tax system in the North (measured by the Reynolds-Smolensky index), despite a higher progressivity of the tax system in the South (measured by the Kakwani index). This apparently contradictory result is driven by the higher average tax rate in the North.

Regression analysis shows that inequality is higher in provinces where ICT use is higher and the incidence of traditional industrial sector is lower. With reference to labour supply, a greater presence of foreigners and graduates in the population is positively correlated with a greater dispersion in the distribution of incomes. These results suggest, therefore, that income inequality is correlated above all with heterogeneity of skills among workers and heterogeneity of productive sectors.

The paper has been largely cited in literature, as reported in Table 1, the inequality indicators at the provincial level computed in the paper have been used in numerous studies of regional economics and the approach to data collection proposed in our paper generated the interest of researchers in using income tax returns data for inequality analysis at the local level. For example, D'Onofrio et al. (2019) use data of the paper to investigate the impact of local banking development on income inequality. This has induced the Ministry of Economy and Finance to enrich the datasets disseminated for research purposes, considering the non-negligible constraints posed by the legislation on personal data protection. As of year 2014, the Ministry disseminates yearly datasets containing data by income classes at the municipal level (for the more than 8,000 municipalities in Italy), largely used by researchers to compute local inequality indicators, such as in Mastronardi and Cavallo (2020). Since the major metropolitan cities in Italy have only one municipality, as of year 2021 the Ministry disseminates data by income classes for the major Italian metropolitan areas at the level of postcodes areas, allowing researchers to perform inequality analysis also by

neighbourhood. For example, researchers Lelo, Monni and Tomassi use those data for their in-depth socio-economic analysis of the metropolitan city of Rome published in the internet site “mapparoma.info”.

2.2. Paper 1B

Wealth transfers, including bequests, inheritances, and gifts between living persons (i.e., *inter vivos* gifts), are crucial economic resources for households and their accumulation of wealth. In rich countries, their scale relative to the total national income has increased substantially over recent decades. The groundbreaking work by Piketty in the early 2010s documents the evolution of annual wealth transfers as a share of total national income in France since 1820, showing that their estimated share has increased threefold since 1950, from a level of 5 percent to 15 percent in 2010. In the same years, Atkinson and other authors estimate corresponding series indicating a similar trend toward an increasing relative weight of inheritances and gifts in other economies, such as the UK, Germany, Sweden, and the US. In Italy, the stock of net wealth owned by households has been increasing and is equivalent to six years of national income and almost eight years of household disposable income as of 2016. This makes Italy one of the countries with the highest wealth-to-income ratio in the world.

Very little attention has been devoted to understanding whether this rise in the wealth-income ratio in Italy led to an increase in bequests and wealth transfers in the population. Paper 1B make use of a newly assembled microdata set from the inheritance tax records which provides a direct measure of the flows of bequests (e.g., wealth-holding of decedents), and has not been systematically exploited so far. This dataset is also the main source for the analysis done in Paper **1C**, a companion paper of this one. The dataset assembles the inheritance tax forms filed with the Italian Revenue Agency on behalf of decedents from 1995 to 2016. The Italian inheritance tax data also have a very good coverage of the upper end brackets, despite the claims of avoidance and evasion that are typical of tax systems. This is the result of the combination of the very high home-ownership rate, with a key administrative feature of the tax, which is connected to the upkeep of the real estate cadastral register: all inheritances involving the transfer of real estate property are obliged to file a return, even when no tax is due. Consequently, the coverage rate is high by international standards,

as it remains above 50 percent of decedents throughout the period and reaches a peak of 63 percent in 2014.

However, the use of inheritance tax data needs some caution. Real estate assets are declared using a notional valuation, based on cadastral rents, for inheritance tax purposes, rather the current market value. The process to correct this source of bias and other data corrections are reported in Table 4.

Table 4: Correction of immovable property values and other data adjustments in Paper 1B

Identifying cadastral undervaluation	• Italian real estate cadastral rents are typically well below market values. The use of unadjusted amounts declared in the inheritance tax returns will lead to distorted distributional information as well as an underestimation of the value of personal wealth. • To overcome this problem, the following steps are applied in the paper to derive an **annual adjustment factor**.
Market values and cadastral rents 2009-2016	• Average annual **market value** of properties owned by physical persons for the years 2009-2016 is obtained from the "*Osservatorio del Mercato Immobiliare* - OMI", published by the Revenue Agency/Nomisma. • Similarly, data on the **average annual cadastral rent** of houses owned by physical persons are derived from the internal data of the Revenue Agency and the MEF used for the biannual publication "*Gli immobili in Italia*". • The average cadastral values are then derived multiplying average cadastral rents by **tax coefficients** used for the inheritance tax base (changed periodically).
Market values and cadastral rents 1995-2009	• Databases used for years 2009-2016 not available for years 1995-2009. • Average **market value** is estimated using the observed yearly variation of housing prices (source: Bank of International Settlements and Bank of Italy). • Similarly, the average yearly percentage change of **cadastral rent** over the period for 2007-2013 was used to estimate the average cadastral value for the previous years.
RESULTS	• Changes in the tax legislation affecting the cadastral values and tax coefficient were also taken into account. • **The derived yearly adjustment factors applied to the cadastral values range between 1.9 in 1995 to 3.3 in 2013 to obtain market values.**
OTHER ADJUSTMENTS: **Abolition of Inheritance tax**	• The inheritance and gift taxes were abolished in 2001 but reintroduced in 2006. • Despite six years' repeal, inheritance tax form filing remained compulsory for estates including housing or land wealth, but the **financial part of wealth** is largely missing for those years and **needs to be imputed.**
OTHER ADJUSTMENTS: **tax planning, nonfilers, exemptions**	• Inheritance tax planning may be used to reduce the tax liability at death if assets are donated in life, even if anti-avoidance provisions apply. So, the amount of **intra-vivo gifts**, subject to gift tax, is also considered in the analysis. • Because of reporting **exemptions thresholds**, which have varied several times during the period under observation, the inheritance of the "nonfilers" (between 37 and 48 percent of the decedents) needs to be imputed. • **Tax exempt assets** which are not reported in the tax forms must be imputed.

Paper 1B makes a series of contributions. First, it derives a new series of total annual inheritance flow of all assets (tangible and financial assets, net of financial liabilities) transmitted at death or through *inter vivos* gifts from 1995 to 2016. It finds that the share of annual wealth transfers in household disposable income almost doubled during the 20 years analysed, from approximately 9.6 percent in 1995 to 18.5 percent in 2016. Meanwhile, wealth accumulated via savings dropped from 16 percent of annual disposable income in 1995 to 3.2 percent in 2016. This is an important indication that, other things being equal, "self-made" wealth (i.e., savings) has been dramatically declining as compared to inherited wealth, not a positive sign in terms of potential intergenerational wealth mobility. Second, the paper documents the decline in tax revenues arising from wealth transfers, from 0.14 percent to 0.06 percent of total tax revenue between the end of the 1990s and 2016, which is partially due to a fall in the number of wealthy estates that are subject to taxation. Third, it provides a detailed analysis and description of wealth left at death across demographic and geographic dimensions. Similarly, it describes the importance of looking within wealthy groups to uncover heterogeneity in the estate composition: for example, financial assets become the most important holdings at the very top. Finally, the evidence also suggests that bequests are becoming more concentrated. Reported estates of at least €1 million were worth almost 15 percent of total net estate value at the end of the 1990s, and this share increased to 25 percent by 2016. Estates left at death by the richest 0.01 percent of decedents (individuals with a declared total estate greater than €17 million) as a share of total estates, were approximately 1 percent at the end of the 1990s. By 2016 this share almost tripled to approximately 3 percent.

Paper 1B is cited, *inter alia*, by Black et al (2022), who find that inheritance and gifts in Norway, despite being much more important source of inflows for the top 0.1 percent of the population than the remaining 99.9 (classified by total inflows throughout the lifetime), have very little effect on the distribution of total inflows. However, comparing Norway with other countries in terms of private wealth using the World Inequality Database, they acknowledge that the importance of inheritances relative to other income sources is likely to be lower in Norway than France and Italy. Paper 1B is also cited in the book by Alfani (2023) "As Gods Among Men: A History of the Rich in the West".

2.3. Paper 1C

This paper uses as main source of data the same inheritance tax returns dataset used for Paper **1B**, raising the informative scope of the data used to a higher level.

As indicated before, Italy has one of the highest wealth-to-income ratios in the developed world. Yet little is known about how this wealth is distributed. This paper presents estimates of Italy's distribution of personal wealth between 1995 and 2016 across the entire population, with a focus on high-end wealth groups, based on the full records of inheritance tax files, combined with household surveys and the national balance sheet, and triangulated with additional sources to assess wealth concentration and its drivers more accurately. Inheritance tax data are crucial to widen the windows of observation on the distribution of wealth. We also distribute personal wealth from national accounts (NA), providing a new perspective on personal wealth in Italy compared with previous studies that rely solely on household surveys. This paper thus presents the first set of comprehensive estimates of wealth distribution and concentration that complement those from the SHIW, administered by the Bank of Italy since the late 1980s. Utilizing multiple data sources to study wealth inequality is essential, given that every source comes with its advantages and drawbacks. Moreover, household surveys are generally deemed to be less suited to capturing the wealth holdings at the very top, largely due to the lack of over-sampling of wealthy households, as well as the differential non-response and under-reporting rates across wealth classes. Inheritance tax data, on the other hand, increase the probability of better covering top wealth groups, even considering the existence of tax avoidance and evasion. As explained for Paper **1B**, administrative data guarantee a good coverage of the asset holdings of Italy's decedents.

Our findings indicate that wealth concentration is higher and displays a more pronounced upward trend compared with what household surveys have been able to capture. According to the SHIW, the share accruing to the richest 1% (half a million adults) remained relatively unchanged between 1995 and 2016, at 14%, and these figures align with previous research. However, our estimates reveal a different picture, suggesting that the share of the top 1% increased from 16% in 1995 to 22% in 2016, despite a considerably higher wealth aggregate. Furthermore, the share accruing to the richest 5,000 adults (the top 0.01%) nearly tripled, rising from 1.8% to 5%. Our results show a stark inversion of fortunes since 1995: the richest 0.1% saw a twofold increase in their real net

wealth per adult (from €7.6 million to €15.8 million at 2016 prices), doubling its share from 5.5% to 9.3%. In contrast, the share controlled by the poorest 50% has decreased from 11.7% in 1995 to 3.5% in recent years. This corresponds to an 80% drop in the average net wealth (from €27,000 to €7,000 at 2016 prices). Consequently, Italy stands out as one of the countries with the strongest decline in the wealth share of the bottom 50%. Our series are also triangulated with external evidence: namely *Forbes* rich list (which tracks the evolution of the share of the five richest individuals since 1988, and the richest 10 since 2001) and Credit Suisse Report, both of which are broadly consistent with the evidence assembled here.

The use of tax data entails costs and requires adjustments. In addition to the ones described for Paper **1B**, there are some more applied in this Paper, such as converting decedents' distribution to living wealth holders using the mortality multiplier method. The benchmark approach in this study is to fully distribute the household sector's balance sheet from NA, requiring imputing unobserved wealth from tax records and household surveys. In any case, we also present series based on tax and survey data before imputations, as well as series that incorporate unreported offshore wealth and household durables, showing that key findings regarding wealth concentration evolution in Italy are not driven by the imputations. This multiple series approach also enables comparisons with historical series that are not scaled to the NA as well as to recent work on the US, France, Spain, and Germany which follows the Distributional National Accounts (DINA) framework.

The level of wealth concentration observed in Italy appears to be in line with other European countries; however, its evolution over time is closer to that found in the US, showing a sharp increase in recent years. By contrast, whereas the share of Italy's middle 40% (P50–90) remains relatively high, the share of the bottom 50% experienced the strongest decline since the mid-1990s when compared with other countries.

The paper also sheds light on the determinants of the wealth inequality trends revealed by our analysis, thus making important contributions to the literature. First, our estimates suggest that age and life-cycle factors do not explain the current level of wealth concentration. Second, we document how the heterogeneity of portfolios across the distribution influences the dynamics of wealth concentration. Whereas housing wealth plays a significant role for the middle 40% group, the accumulation of wealth at the top is primarily driven by financial and business assets. Moreover,

changes in currency and deposits, along with increasing levels of indebtedness, contribute significantly to the net wealth decrease of the bottom 50% group. Third, we investigate the relative role of savings and asset prices. Our results show that changes in total savings account for a very large portion of growth in net wealth, both in the overall population and within the top decile. Interestingly, this occurred despite a sustained declining trend in the saving capacity of households over recent decades.

Our analysis of the *joint distribution of income and wealth* also reveals that the probability of top 1% and top 0.1% of labour income earners climbing to the top 1% of the wealth distribution doubled between 2001 and 2014. Although changes to asset prices are not the predominant force behind the increase in wealth concentration, certain interesting findings are worth noting. Our results show that little of the change in wealth recorded between 1995 and 2016 across the distribution can be attributed to changes in house prices. On the contrary, changes in equity prices account for a large share of wealth growth above the 99th percentile and are practically irrelevant in the middle and bottom parts of the distribution. This result shows the link between Theme 2 and Theme 1 of this Commentary, as low taxation of MNEs advantages individuals at the very top of wealth and income distribution.

Lastly, resulting from companion Paper **1B**, we present evidence on the increasing significance of wealth transfers, such as inheritance and *inter vivos* gifts, as well as their growing concentration at the top, accompanied by a decreasing tax burden of wealthy inheritors, following tax policy changes that have undermined the progressive nature of inheritance and gift taxes. These changes in the patterns of wealth transfers and their impact on long-term wealth concentration dynamics have been overlooked in empirical studies.

The results of Paper 1C have been extensively used by Guzzardi et al (2023). Their work reconstructs novel series on income distribution in Italy combining survey data, tax data, and National Accounts both at the national and regional levels, and it analyses the overall progressivity of the tax system. They declare that their study is the first able to correct income for the impressively incomplete reporting of capital income information by combining survey data with new series on wealth distribution in Italy estimated in Paper 1C. Their fresh estimates show higher income concentration at the top 1% and 0.1% with respect to previous studies in order of 1.5 percentage points. They also

show that the Italian tax system is only slightly progressive up to the 95th percentile of the income distribution, and regressive for the top 5%. Moreover, leveraging again data from Paper 1C, they assess that the Italian Tax System is regressive throughout the whole distribution when individuals are ranked with respect to their net wealth. Interestingly, the authors find that the top 0.1% income individuals earn a higher fraction of capital income and undistributed profits, observing that most of the taxes paid by this income group are related to their businesses and the corporations in which they own shares. Again, the link with Theme 2 emerges, as MNEs tax avoidance reduces effective taxation of very top income individuals.

In the framework of the new Experimental Distributional Wealth Accounts (DWA) for the household sector published in January 2024 by ECB (European Central Bank, 2024), the estimates for Italy, performed by Bank of Italy, have used the results of Paper 1C as a term of a comparison. The main DWA methodology uses "rich lists", i.e. lists of the richest households published in the press, such as Forbes World's Billionaires and applies a Pareto distribution fitted to the data available.

Paper 1C has been cited also, *inter alia*, by Blanchet et al. (2023) studying the interaction between the long-term dynamics of aggregate household wealth and the wealth distribution in Europe and the United States.

2.4. Paper 1D

Over the last decade or so, the empirical literature on intergenerational income mobility has witnessed a strong revival thanks to the ability to access large administrative data in a handful of countries (e.g., United States, Canada, Australia, Denmark, Sweden, Norway). These very large datasets have led to precise estimates of mobility indices and have opened the possibility to analyse upward mobility patterns within countries, at a very disaggregated geographical level. This variation has been exploited to learn what socioeconomic factors are strongly correlated with upward mobility across regions while controlling for the common institutional framework. Paper 1D adds to the recent wave of studies and introduces a new dataset that allows us to develop the first systematic investigation of intergenerational income mobility for the Italian economy.

Our starting point is the administrative electronic database on individual tax returns from the Ministry of Economy and Finance. From this data source, we extract a sample of children born between 1979 and 1983 and match them to their parents through their social security numbers. Our final dataset contains nearly 1,720,000 parents-child pairs with detailed income information for 3 years in each cohort, 1998, 1999, 2000 for parents and 2016, 2017, 2018 for children. As discussed regarding paper **1A**, there are some issues related to tax definitions, particularly relevant in this paper considering that the Italian PIT system has changed considerably between the late 1990s and the late 2010s. However, those issues have been specifically addressed applying corrections and robustness checks, some examples are reported in Table 5.

Table 5: Examples of how issues related to tax definitions have been addressed in Paper 1D

Challenge	Solution adopted
In the 2010s many taxpayers, especially young ones, are not taxed anymore under PIT but with an **alternative forfeit substitute taxation** for self-employed.	Complementing PIT income data with specific income data of forfeit substitute taxation.
***"770"* tax form in the 1990s did not include children tax code**, unlikely from forms "*730"* and "*Unico".* The "770" model is compiled by employees and pensioners having only one kind of income with only standard deductions.	Reweighting the sample to take into account missing information about children of parents filing "770" model.
For some children no income information are found in the tax forms in the 2010s, probably because they have no income or an income under the PIT exemption threshold.	As a robustness check, imputing zero income for children with missing income information.
Capital income is largely missing in PIT tax forms, as it is **subject to substitute taxation withheld at source by financial institutions.**	Imputing capital income information from the SHIW, considering the different way capital income was partly reported in PIT tax returns in the late 1990s and in the late 2010s.
Tax evasion can determine underestimated income reported in tax forms by some individuals.	Inflating self-employed and rental income according to evasion shares, differentiated by income deciles, provided by the economic literature for Italy.

We begin from the analysis of intergenerational mobility at the national level. We estimate that, in Italy, a child born from parents with income below the median of the parental income distribution is expected to reach the forty- fifth percentile of his/her own income distribution as an adult. In other words, s/he is expected to move upward but to remain below the median. When we examine the full intergenerational income transition matrix across quantiles, we estimate that, for a child born from parents in the top quintile, the probability of keeping her/his parents' rank as an adult is 33 percent. For a child in the bottom quintile, the probability of rising to the top quintile is 11 percent. We also find that upward mobility is larger for sons, for firstborn children, for children of self- employed parents, and for children who, once adult, migrate to other regions within Italy. We also estimate the relationship between the average rank of the child and average rank of the parents in their respective national distributions to learn about relative mobility patterns. We find that this relation is markedly linear, except at the very top, where it markedly bends upward. Its slope—the rank- rank slope (RRS)— is a measure of relative mobility for children with different initial conditions in terms of parental income. The estimated RRS is 0.22. To understand the meaning of this value, consider two children, one from parents in the top decile and one from parents in the bottom decile of the national distribution—a gap corresponding to a differential in their fathers' earnings of around €36,700. An RRS of 0.22 means that, when adults, these children will be on average still 2 deciles apart, a gap that translates into nearly €6,100 of annual earnings. The median rank- rank slope (i.e., the slope of the median, as opposed to the mean, rank of the child conditional on parental income) is 0.32 and thus much higher than the mean one. The discrepancy between mean and median is due to the fact that the conditional distributions of child ranks are skewed—to the right at the bottom of the income distribution of parents and to the left at the top. Remarkably, at the upper tail of the income distribution, the mean RRS is close to 1, which implies that rank differentials fully perpetuate a generation later.

Even though the expected rank of a child, conditional on parental rank, has a highly significative estimated slope, the R-Squared of the rank-rank regression is low. Conditional on a particular percentile of the parental income distribution, even controlling for all observable variables in our dataset, economic outcomes of children remain vastly different. For example, if we condition on children with parents in the ninetieth percentile, the bottom quarter of these children will be below the thirty- fifth percentile of their own national distribution. Among children from families at the tenth percentile, the top quarter of them will be above the sixtieth percentile. For completeness,

we also compute a more traditional measure of intergenerational mobility, the intergenerational elasticity of income (IGE). The two main shortcomings of our data are (i) life cycle and attenuation biases due to the short within- individual panel dimension and (ii) possible distortions arising from tax evasion for the self- employed. Correcting for these biases increases somewhat our estimates of intergenerational rank persistence; for example, the RRS rise to 0.3. Overall, even after these corrections, Italy emerges as less immobile than how it was depicted in previous studies that did not have access to the same high- quality data as we do.

When placing our estimates of positional income mobility in a comparative context, upward mobility in Italy appears higher than in the United States (0.34) but lower than in Scandinavia: Denmark (0.18) Norway (0.19) and Sweden (0.20). In other countries we observe Australia (0.21), Chile (0.21), and Canada (0.24). Interestingly, Italy displays stronger rank persistence at the top. We also compute an alternative measure of mobility—namely, the probability that a son earns at least as much as his father in real terms—used recently in economic literature, which allows to isolate the role of differential income growth and differential income inequality when comparing mobility patterns across countries. Italy and the United States have similar shares of sons who overtake their fathers in terms of income (0.53 and 0.55). This similarity, however, is the result of two strong but exactly offsetting forces: lower income growth and less dispersed income distribution in Italy relative to the United States.

Next, we explore the geographical differences in upward mobility across the 110 Italian provinces. We document a staggering amount of variation, with a steep South– North gradient. Relative to the South of Italy, provinces in the North (especially in the Northeast), are both more egalitarian—i.e., they display higher relative mobility—and more upward mobile—i.e., they display higher absolute mobility (as measured, for example, by the expected rank of a child born from parents below the median). The level of upward mobility in northern Italy exceeds that of Scandinavia and that of the most mobile cities in the United States (e.g., Salt Lake City and Pittsburgh), whereas in southern Italy it is comparable to that of the least mobile cities in the United States (e.g., Atlanta or Charlotte). We uncover a Great Gatsby curve with a negative slope linking upward mobility and several measures of income inequality across Italian provinces.

We then investigate which socioeconomic indicators correlate, at the provincial level, with upward mobility. We use nearly 50 markers for productivity, labour market conditions, demographic structure, educational attainment, family instability, crime, and economic openness from ISTAT, the National Statistical Institute. In addition, we have several measures of social capital and a unique and very detailed set of indicators of school quality. Most of these variables correlate with upward mobility with the expected sign. A limitation of this unconditional analysis is that all these socioeconomic variables are also highly correlated among each other. We therefore proceed with a multivariate conditional correlation analysis where we extract a small number of principal components for each broad category to collapse the number of covariates. Overall, the included categories explain nearly 90 percent of the geographic variation in rates of upward mobility. The key explanatory variables are the local labour market conditions, indicators of family instability, and three specific indices of school quality: quality of early childhood education, quality of school organization and services, and students' grades and test scores.

Thanks to the quality of microdata used and the exact match of income information of parents and children, Paper 1D is the first work doing a systematic investigation of intergenerational income mobility for the Italian economy, and for this reason it is widely cited in national and international economic literature.

2.5. Paper 1E

This Paper analyses the Implicit Tax Rate (ITR) on Labour derived by the European Commission. The implicit tax rate on employed labour is defined as all direct and indirect taxes and employees' and employers' social contributions levied on employed labour income divided by the total compensation of employees working in the economic territory, so it is a macroeconomic indicator of effective taxation on labour.

To construct the ITR on labour, revenues from PIT, typically levied on comprehensive income, need to be split. This exercise is done yearly by the Ministries of Finance of EU Member States, who provide data to the European Commission using PIT tax records and considering all deductions and tax credits, in particular the ones related to specific sources of income (e.g. deductions for labour income).

The Paper shows the relationship of the ITR on labour with the widely recognised (microeconomic) tax wedge indicator for an average production worker from the "Taxing Wages" approach of the OECD. Both the macroeconomic and the microeconomic indicator appear to have comparable informative content as regards to general increasing or decreasing trends over time. The two indicators can be considered complementary instruments for evaluating tax policy, since the ITR has the advantage to implicitly capture all the feature of the tax systems affecting labour, while the tax wedge is better suited to analyse the tax burden on specific types of workers (e.g. low-wage workers, workers with dependent children, etc.).

Regarding inequality and fairness, the uneven tax treatment of labour income and capital income plays a role, since capital income is usually concentrated at the top of the income distribution, as discussed previously. The most recent data of ITR on labour for the EU-27 average is 37.8% in 2022, particularly high if compared to the minimum effective taxation of MNEs that has been recently agreed by OECD-G20 at a level of 15%, which, until profits are actually distributed, is the only taxation borne by the shareholders. The issue of MNEs minimum taxation is discussed also in Paper **2C** of Theme 2.

This paper has been cited, *inter alia*, in Mara (2021) who finds that a higher tax burden on labour, measured by the ITR on labour, can have a positive and significant effect on the shadow economy.

3. Theme 2 – Fair taxation of multinational enterprises

3.1. Paper 2A

This paper was intended to provide a useful contribution to the OECD-G20 project to address the issue of international tax avoidance by multinational corporations, known as BEPS, focused on the issue of "how big a problem is BEPS".

At the time of the publication of Paper 2A, the main difficulty encountered in the assessment of the scale and impact of BEPS stemmed from the lack of complete and reliable worldwide corporate micro-data sources, as the available databases, such as Orbis – Bureau Van Dijk based on corporate financial accounts, did not have a sufficient coverage of tax havens, where most profit shifting takes place. This issue and new sources of data are discussed also in Paper **2B**.

Other difficulties stemmed in the variety and complexity of the tax planning strategies exploited by multinational corporations to reduce their corporate tax burden and the connected problem in choosing an exhaustive tax variable to identify a low-tax system, since both the statutory tax rate and the different specifications of the effective tax rates have some drawbacks.

The strategy to assess profit shifting applied in this work tries to overcome those difficulties by basing the analysis on inward FDI stocks for a wide set of countries, leading to an indirect identification of foreign direct investments that are driven by BEPS phenomena as those FDI stocks that are not justified by economic reasons. The econometric analysis performed makes use of a database constructed collecting different data sources (UNCTAD, The World Bank, International Telecommunications Union, International Labour Organization, Transparency International, WTO, UNESCO, IMF) on structural and context variables identified in the economic literature as FDI determinants, for the years 2005-2012 and available for a set of 172 countries.

Through the application of a mixed model on repeated observations, it was possible to identify a variable intercept which captures the individuality of each country in that it explains the differences linked to the exploitation of favourable tax systems. The results show that nearly 1,900 billion USD of inward FDI stocks are potentially driven by BEPS phenomena, with a high concentration in a small

group of countries. Among the countries identified by the first 13 intercepts there are 12 tax havens or offshore financial centres, corroborating the validity of the approach used. In addition, the analysis shows that extremely high levels of the ratio inward FDI/GDP are often associated with an "unexplained" share of FDIs, likely driven by BEPS phenomena, and this result contributed to the development of indicators of BEPS. This paper is referenced, *inter alia*, by OECD Action 11 final report dealing with measuring and monitoring BEPS, OECD (2015a): interestingly, this final report formally introduced an indicator of BEPS: *Indicator 1 - "Concentration of foreign direct investment relative to GDP"*, while previous OECD publications on the topic only reported anecdotical evidence of high levels of FDI in some tax havens. The Action 11 final report also acknowledged the lack of data to assess MNEs profit shifting, and recommended to use as soon as possible the new source, Country-by-Country reporting (CbCR), established by OECD (2015b) as of financial year 2016; in this context see also Paper **2B** and Paper **2C**. More recently, this paper is also cited by Sallusti (2024), who measures profit shifting using "resident" information.

3.2. Paper 2B

As anticipated, Paper 2B is based on CbCR – the new reporting tool to be filed by MNEs introduced in the framework of the BEPS project (OECD, 2015a, 2015b). The working paper version, published in 2020, has been the first work analysing CbCR microdata, originating in the first collection of this source, concerning financial year 2016, while the first aggregated statistics regarding MNEs headquartered all over the world have been published in OECD (2020). After illustrating the data cleaning process that is needed to overcome some filing errors (see Figure 2), probably due to the novelty of this reporting, the paper analyses the conceptual differences between CbCR and other widely used MNEs data sources, such as Eurostat's inward and outward foreign affiliates statistics (FATS), worldwide datasets of corporate financial accounts and tax returns data.

The CbCR dataset used covers the operations of both nationally and foreign headquartered MNEs with a presence in Italy, presents the case of MNE activities in Italy and it is used to understand the global distribution of MNE activities. Results show that foreign activities are mostly concentrated in high-income countries for all economic indicators. In low-income countries, MNEs activity appears to be concentrated in labour-intensive industries. Middle-income countries have a relatively higher importance in terms of tangible assets and employment opportunities than they do in terms of

revenues and profits. As expected, investment hubs have a relatively higher share in global MNEs profits than they do in global MNEs tangible assets and employment (the issue of profit shifting is investigated specifically in Paper **2C**). The paper concludes that CbCR data can be useful for policymakers to obtain an indication on how a country is positioned in the global value chain (GVC) and its attractiveness for foreign companies.

This paper is quoted, *inter alia*, by Vicente (2024), in particular the part comparing CbCR data with other worldwide datasets based on MNEs' financial accounts.

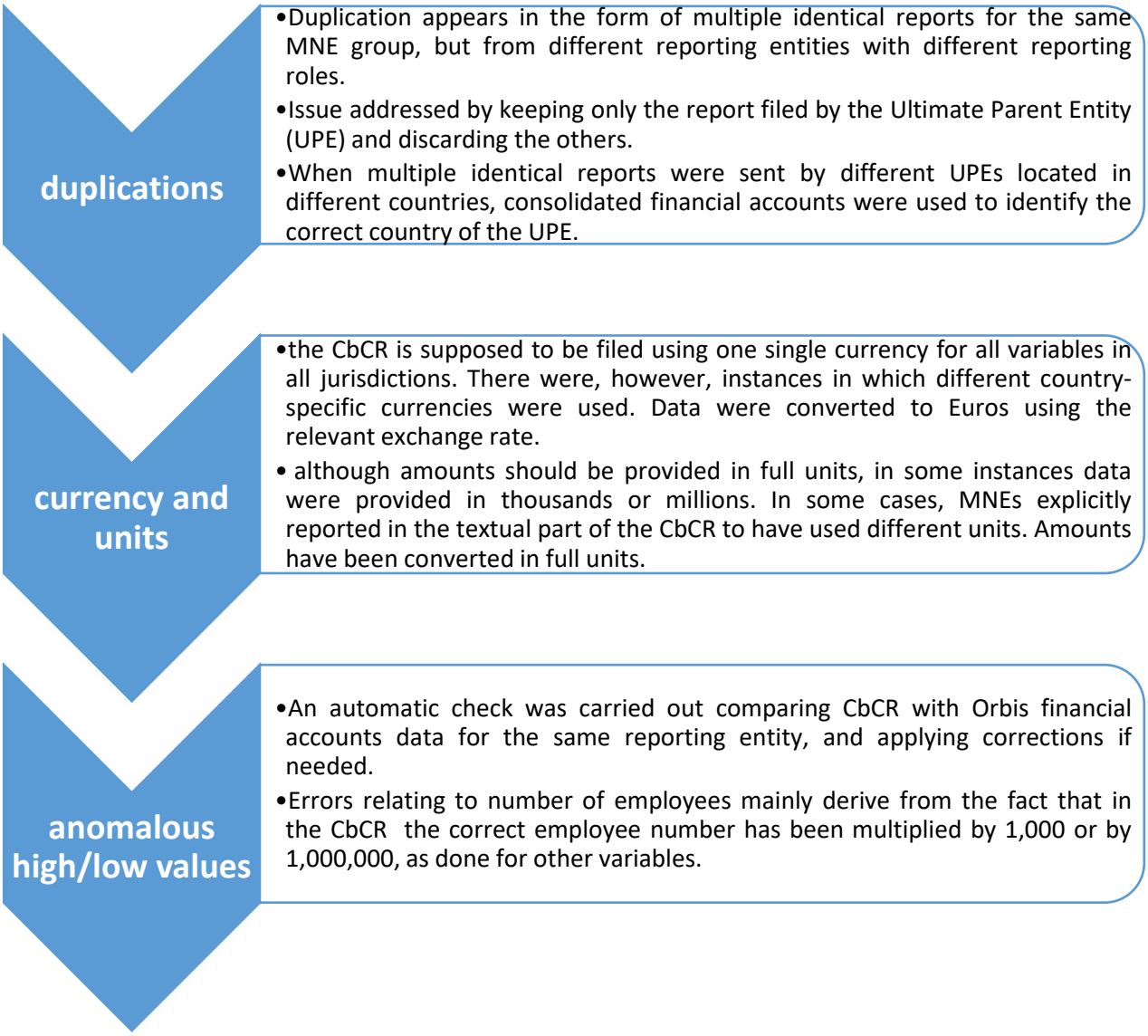


Figure 2: Filing errors found in CbCR data and cleaning steps applied

3.3. Paper 2C

In Paper 2C we estimate profit shifting using the novel firm-level CbCR data, which allows us to overcome the main limitations of previous micro-founded profit shifting analyses. We compare our dataset with Orbis BvD financial accounts database, providing evidence for the better coverage of our data on different levels and regarding tax havens.

With this new data source, we move beyond the classic linear estimation commonly used in the literature and provide evidence of the existence of a strong non-linear response of MNEs' profit allocation to tax rate differentials. To the best of my knowledge, ours is the first paper providing non-linear estimations for MNEs of all major jurisdictions, as the existing few papers focusing on non-linearity exploited data on domestic-headquartered MNEs only. We find that profit allocation in a jurisdiction is non-linearly dependent on the differences between the tax rate in that jurisdiction and the average CIT rate faced by the MNE group. We further examine nonlinearity, pointing to our finding that the effect of changes in CIT rate differences on profit allocation is statistically and economically significant when allowing for an inverse U-shaped semielasticity function.

Our results suggest that low tax countries do not have any incentive to increase their tax rate as this would lead to a reduction in tax base. Hence, they may be seen as prisoner of their own low tax rate. Conversely, countries with a higher CIT rate would not benefit from reducing their rate as their attractiveness would still be limited; any effort in tax competition among high-tax countries would be then extremely inefficient.

We also find that the nationality of MNEs matters in terms of the profit shifting decision. European MNEs carry out, on average, less profit shifting compared to their American and Asia/Oceania's counterparts. However, MNEs from Europe and the Americas are more inclined to shift profits toward low tax-rate countries, being more elastic to changes in these countries. Finally, we find that profit shifting increases with MNE size but at decreasing rate, suggesting that they incur in fixed costs when shifting profits that only become sustainable above a certain MNE size.

Our results differ substantially from conventional estimates of profit-shifting elasticities. The estimated semi-elasticity in our approach is up to eight times larger than those yielded by linear

estimation approaches for MNEs facing very high negative CIT rate differentials (i.e. in countries with very low CIT rates). At the same time, for MNEs facing similar CIT rates across different countries close to the worldwide average, our estimates of semi-elasticities are 60 percent lower than for linear ones. Our findings thus suggest that linear specification substantially underestimates the relative magnitude of profit shifting in countries with CIT rate very distant from the average, while substantially overestimating profit shifting in countries where the CIT rate is closer to the average.

We also provide new estimates regarding the size of profit shifting and associated revenue loss by country. We estimate that in 2017, a total amount of €290 billion in profits was shifted due to differences in tax rates, with a total revenue loss of €78 billion. In terms of gains and losses, we find that profit shifting is very concentrated in a small number of countries.

Our results have potentially highly significant policy implications. Given that shifted profits appear to be concentrated in a few countries, and as the elasticity of reported profit to tax rate in these countries appears to be highest, policies aimed at guaranteeing a minimum level of taxation may be effective and efficient to curb profit shifting. Triggered by this suggestion, we estimate the impact of implementing a reform providing for a minimum level of corporate taxation and find that it would reduce profit shifting. With our framework we could not estimate the impact of a minimum effective taxation, as in OECD Pillar II, but we could do the exercise with a nominal rate. Our estimate suggests that by introducing a minimum nominal CIT rate of 15 percent, profit shifting would decrease by 28 percent to €208 billion. In addition to the increase in revenue due to the decrease in profit shifting, revenue would further increase due to the application of the top-up tax on undertaxed profits.

This paper is used, *inter alia*, in the framework of the World Inequality Report (Chancel et al., 2022) by Baraké et al. (2022) for the revenue estimate of Pillar II, when trying to consider behavioural effects of MNEs. The paper is also used by Garcia-Bernardo and Janský (2024) who estimate profit shifting applying a logarithmic function to aggregated CbCR data provided by the OECD, and by Fuest and Neumeier (2023), who acknowledge the growing literature finding non-linearities in profit shifting.

3.4. Paper 2D

Differently from the other three papers of Theme 2, Paper 2D investigates targeted corporate tax incentives that promote investments generating positive spillovers for the economy. It exploits the introduction in 2017 of a fiscal incentive granted to all Italian companies purchasing tangible goods instrumental to their digital transformation (hyper-depreciation), consisting in an additional 150% deductibility on top of depreciation costs, thus reducing tax liability for the lifetime of the asset. The paper applies the diff-in-diff methodology using a dataset of firm-level tax returns matched with financial accounts, jobs inflows/outflows and ISTAT ICT Survey.

In performing the analysis, attention has been paid to correctly interpret data from tax returns, for example taking into account that depreciation in the first year is included at 50% of its ordinary amount or considering that assets ordered in one year could be interconnected and depreciated with one year of delay.

In line with recent findings in the literature, we find no evidence of firm-level employment displacement effects associated with the purchase of advanced machinery and equipment. On the opposite, our results indicate strong and persistent positive employment effects induced by smart investments (3 percentage points higher than the control group), benefiting especially young individuals and medium-skilled blue collars. The analysis also shows that 74% of firms using the incentive had low or very low digital maturity and most firms were investing in digitalisation technologies for the first time, meaning that the policy was effective in promoting digitalisation.

This paper is cited, *inter alia*, by Nie (2023), investigating the effects of technology diffusion on innovation under duopoly competition. This paper is also cited by Burgisser (2023) who, concerned by issues of inequalities, focuses technology-induced labour market vulnerability and the ability of public policies to moderate its well-documented political downstream consequences. This also denote an additional link of paper 2D with Theme 1 of this commentary.

As regards policy implications, the results of this paper have been functional to underpin the inclusion of a similar tax measure in the Italian National Plan for Recovery and Resilience (Transition

4.0 tax credit) funded by the EU, which also provides for an ex-post economic evaluation of the measure (Cfr. European Commission, 2021 page 110).

4. Conclusion

The use of tax records is extremely useful for the analysis of income and wealth inequality and intergenerational mobility, as well as the connected issue of fair taxation of firms and MNEs. The use of these data in the papers synthesised in this commentary has shown, *inter alia*, that inequality is more pronounced and is growing more rapidly than previously thought with survey data, and that corporations engage in profit shifting, minimising their tax liability, with higher intensity than previously understood. Data also showed that intergenerational mobility in Italy is much higher than in the US and lower than in the Scandinavian countries, and that the quality of education, especially at the primary level, can enhance equality of opportunity.

It is appropriate that those data become more and more available for economic research, so that they can be used first to draw a complete picture of facts and dynamics and consequently to find possible policy responses to the undesirable outcomes of economic reality.

Both academics and policy makers worldwide seem to acknowledge this necessity, and positive recent developments are, for example, the new dissemination of wealth distribution statistics by the European Central Bank and the recent EU directive on the public disclosure of most of the variables included in CbCR.

Despite it is not always easy to find a political momentum at the national and international level to really tackle the problems described in this commentary, the recent OECD-G20 agreements on MNEs minimum taxation have shown that finding solutions is possible, and the recent attention of the Brazilian G20 Presidency on the issue of inequality is a further hopeful element.

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ANNEX I

DOI or URL of the papers submitted

1A. Acciari, P., & Mocetti, S. (2012). The geography of income inequality in Italy. Politica Economica - Journal of Economic Policy (PEJEP), issue n. 3, Il Mulino, 2012
http://www.rivisteweb.it/doi/10.1429/74177

1B. Acciari, P., & Morelli, S. (2022). Wealth Transfers and Net Wealth at Death: Evidence from the Italian Inheritance Tax Records 1995–2016 Chapter in: Measuring Distribution and Mobility of Income and Wealth, Studies in Income and Wealth Vol. 80, NBER, University of Chicago Press, 2022
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1C. Acciari, P., Alvaredo, F., & Morelli, S. (2024). The concentration of personal wealth in Italy 1995–2016. Journal of the European Economic Association, January 2024
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1D. Acciari, P., Polo, A., & Violante G.L. (2022). 'And Yet, It Moves': Intergenerational Mobility in Italy. American Economic Journal: Applied Economics, American Economic Association, 2022
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1E. Heijmans, P., & Acciari, P. (2004). Examination of the macroeconomic implicit tax rate on labour derived by the European Commission. Taxation Papers, Directorate General Taxation and Customs Union, European Commission, n. 4, 2004
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2A. Acciari, P., Tomarelli, F., Limosani, L., & Benedetti L. (2015). Measurement of Base Erosion and Profit Shifting phenomena through the analysis of FDI stocks. Ministry of Economy and Finance of Italy, Department of the Treasury, Working Paper n. 3, 2015
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2B. Santomartino, V., Bratta, B., & Acciari, P. (2022). Analysing MNEs structure and activities using Country-by-Country Reports. Evidence from the Italian dataset. UNCTAD Transnational Corporations, Vol. 29, n.2, 2022
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2C. Bratta, B., Santomartino, V., & Acciari P. (2024). Assessing profit shifting using Country-by-Country Reports: a non-linear response to tax rate differentials. National Tax Journal, American Tax Association, Vol. 77, no. 2 June 2024
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2D. Bratta, B., Romano, L., Acciari, P., & Mazzolari, F. (2022). Assessing the impact of digital technology diffusion policies. Evidence from Italy. Economics of Innovation & New Technology, 2022
https://doi.org/10.1080/10438599.2022.2075357

FORM UPR16

Research Ethics Review Checklist

Please include this completed form as an appendix to your thesis (see the Research Degrees Operational Handbook for more information

Postgraduate Research Student (PGRS) Information				**Student ID:**	2255604
PGRS Name:	Paolo Acciari				
Department:	School AEF	**First Supervisor:**	Federica Alberti		
Start Date: (or progression date for Prof Doc students)	**1st February 2024**				
Study Mode and Route:	Part-time ☒	MPhil ☐	MD ☐		
	Full-time ☐	PhD ☒	Professional Doctorate ☐		

Title of Thesis:	Using tax records for economic analysis of inequality and fairness
Thesis Word Count: (excluding ancillary data)	9,953

If you are unsure about any of the following, please contact the local representative on your Faculty Ethics Committee for advice. Please note that it is your responsibility to follow the University's Ethics Policy and any relevant University, academic or professional guidelines in the conduct of your study

Although the Ethics Committee may have given your study a favourable opinion, the final responsibility for the ethical conduct of this work lies with the researcher(s).

UKRIO Finished Research Checklist:
(If you would like to know more about the checklist, please see your Faculty or Departmental Ethics Committee rep or see the online ve the full checklist at: https://ukrio.org/publications/code-of-practice-for-research

a) Have all of your research and findings been reported accurately, honestly and within a reasonable time frame?	YES ☒ NO ☐
b) Have all contributions to knowledge been acknowledged?	YES ☒ NO ☐
c) Have you complied with all agreements relating to intellectual property, publication and authorship?	YES ☒ NO ☐
d) Has your research data been retained in a secure and accessible form and will it remain so for the required duration?	YES ☒ NO ☐
e) Does your research comply with all legal, ethical, and contractual requirements?	YES ☒ NO ☐

Candidate Statement:

I have considered the ethical dimensions of the above named research project, and have successfully obtained the necessary ethical approval(s)

Ethical review number(s) from Faculty Ethics Committee (or from NRES/SCREC):	ETHICS-11017

If you have *not* submitted your work for ethical review, and/or you have answered 'No' to one or more of questions a) to e), please explain below why this is so:

Signed *(PGRS)*:	Paolo Acciari	**Date:** 18th July 2024

Authorship credit statement

To whom it may concern, as regards the article:

Paolo Acciari, Alberto Polo and Giovanni L. Violante, ***"'And Yet, It Moves': Intergenerational Mobility in Italy"***, American Economic Journal: Applied Economics, American Economic Association, 2022.

The three authors have have contributed equally to the work (i.e. 33.3% each).

Conceptualization: Acciari, Polo, Violante; Methodology: Acciari, Polo, Violante; Data curation/Formal analysis; Acciari, Polo, Violante; Writing: Acciari, Polo, Violante

This article might be part of a package of prior publications that Paolo Acciari will submit to award a "PhD by publications".

11th October 2023

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Authorship credit statement

To whom it may concern, as regards the article:

2) Vera Santomartino, Barbara Bratta and Paolo Acciari, ***"Analysing MNEs structure and activities using Country-by-Country reports. Evidence from the Italian dataset"***, UNCTAD Transnational Corporations, Vol. 30, n.2, 2022

The three authors have contributed equally to the work (i.e. 33.3% each).

Conceptualization: Bratta, Santomartino, Acciari; Methodology: Bratta, Santomartino, Acciari; Data curation/Formal analysis; Bratta, Santomartino, Acciari; Writing: Bratta, Santomartino, Acciari.

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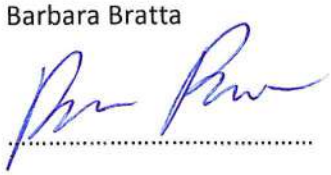
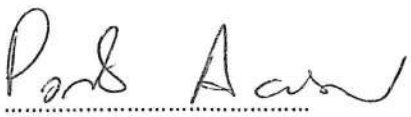
Barbara Bratta



Paolo Acciari



Authorship credit statement

To whom it may concern, as regards the article:

Barbara Bratta, Livio Romano, Paolo Acciari and Francesca Mazzolari, ***"The Impact of Digitalization Policies. Evidence from Italy's Hyper-depreciation of Industry 4.0 Investments"***, Economics of Innovation & New Technology, 2022

The four authors have have contributed equally to the work (i.e. 25% each).

Conceptualization: Bratta, Romano, Acciari, Mazzolari; Methodology: Bratta, Romano, Acciari, Mazzolari; Data curation/Formal analysis; Bratta, Romano, Acciari, Mazzolari; Writing: Bratta, Romano, Acciari, Mazzolari

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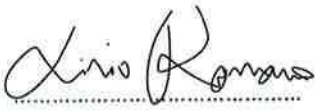

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Authorship credit statement

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Paolo Acciari, Facundo Alvaredo and Salvatore Morelli, ***"The concentration of personal wealth in Italy 1995–2016"***, accepted for publication on 22nd June 2023 by the Journal of the European Economic Association, also available as working paper in CEPR Discussion Papers / Paris School of Economics Working Papers / World Inequality Lab Working Papers / Ministry of Economy and Finance-Department of Finance Working Papers

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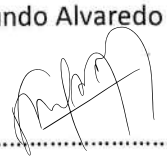
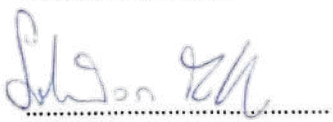


Salvatore Morelli



Authorship credit statement

To whom it may concern, as regards the article:

Barbara Bratta, Vera Santomartino and Paolo Acciari, ***"Assessing profit shifting using Country-by-Country Reports: a non-linear response to tax rate differentials"***, conditionally accepted on 9th October 2023 by the National Tax Journal, American Tax Association, and also available as a pre-print in the WP series of the Italian Department of Finance and in the working paper series of the Oxford University Centre for Business Taxation

The three authors have contributed equally to the work (i.e. 33.3% each).

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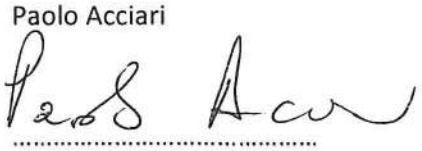

Salvatore Morelli

Authorship credit statement

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12th October 2023

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Sauro Mocetti

MOCETTI SAURO Firmato digitalmente da MOCETTI SAURO
Data: 2023.10.12 14:03:41 +02'00'

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Authorship credit statement

To whom it may concern, as regards the working paper:

Paolo Acciari, Francesca Tomarelli, Laura Limosani and Laura Benedetti, ***"Measurement of Base Erosion and Profit Shifting phenomena through the analysis of FDI stocks"***, Ministry of Economy and Finance, Department of the Treasury, Working Paper n. 3, 2015

The four authors have have contributed equally to the work (i.e. 25% each).

Conceptualization: Acciari, Tomarelli, Limosani, Benedetti; Methodology: Acciari, Tomarelli, Limosani, Benedetti; Data curation/Formal analysis; Acciari, Tomarelli, Limosani, Benedetti; Writing: Acciari, Tomarelli, Limosani, Benedetti.

This working paper might be part of a package of prior publications that Paolo Acciari will submit to award a "PhD by publications".

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Authorship credit statement

To whom it may concern, as regards the work:

Peter Heijmans and Paolo Acciari ***"Examination of the macroeconomic implicit tax rate on labour derived by the European Commission"*** Taxation Papers, Directorate General Taxation and Customs Union, European Commission, n. 4, 2004

The two authors have contributed equally to the work (i.e. 50% each).

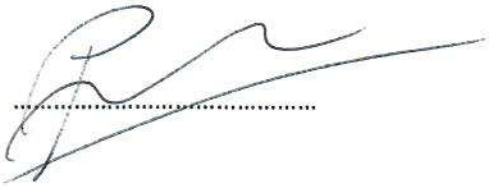
Conceptualization: Heijmans, Acciari; Methodology: Heijmans, Acciari; Data curation/Formal analysis; Heijmans, Acciari; Writing: Heijmans, Acciari.

This work might be part of a package of prior publications that Paolo Acciari will submit to award a "PhD by publications".

12th October 2023

Signatures

Peter Heijmans



Paolo Acciari