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What works to mitigate and reduce relative (and absolute) inequality?

A systematic review

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Abstract: Over the past two decades, research on the impacts of a diverse range of public policies and income inequality has seen rapid growth. Despite the large number of publications to date, there remain important lacunae in our understanding of how policy interventions might help to reduce income inequality. This paper aims to fill this void by providing a systematic literature review of 270 publications that examine four key policy areas: (1) tax policy, (2) social benefits, (3) labour market interventions, and (4) education policy. We describe patterns of empirical findings and implications drawn from the reviewed publications. The strengths and weaknesses of the existing literature are also discussed, along with potential future research avenues.

Key words: income inequality, systematic literature review, tax policy, social benefits, labour market, education policy

JEL classification: H23, I24, I38, J08

Note: a summary table is available in the online appendix [here](https://www.wider.unu.edu/publication/what-works-mitigate-and-reduce-relative-and-absolute-inequality) (<https://www.wider.unu.edu/publication/what-works-mitigate-and-reduce-relative-and-absolute-inequality>).

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1 Introduction

The rise of inequality in a large number of countries, whether they are considered developing, emerging, or developed countries, has placed inequality at the forefront of the public debate (Atkinson 2015). A critical question for governments is which public policies are the most effective to deal with the growing inequalities worldwide. Hence, it is not surprising that there is renewed interest, both in the academic literature and international policy fora, in how government policies may help to mitigate inequality and increase the incomes of the more disadvantaged population (Hoynes and Patel 2018; Jorda and Niño-Zarazúa 2019).

Despite the fact that a large literature has emerged which documents the impacts of a diverse range of public policies and income inequality, there remain important lacunae in our understanding of the dynamics of this ubiquitous issue, since no consensus has been reached as to the efficacy of policy interventions to alleviate income inequality. Thus, in this paper we aim to contribute to the current debate on which policies are most effective at reducing income inequality, by conducting a systematic review of the empirical literature published between January 1990 and June 2019. The existing literature reviews on the topic have focused largely on a particular policy domain, such as education (e.g. Abdullah et al. 2015), on a restricted group of developing countries, and/or on a relatively narrow set of public policies (e.g. Anderson et al. 2015). A comprehensive systematic review of the empirical evidence on the impact of government policies on economic inequality would, therefore, cast valuable light on the relative merits and flaws of different public interventions.

The relevance of our review is threefold. First, given the potential importance of public policies for addressing income inequality, we build on the existing literature reviews and focus also on empirical studies that assess the impacts of social policies, labour interventions, and fiscal policies. Second, income inequality might have detrimental consequences for individuals' well-being not only in developing economies, but also in developed countries. For this reason, we include in our literature review studies related to all types of countries—that is, developing, emerging, and developed. Finally, we place special emphasis on the type of inequality measure used to assess the effect of policy interventions. In this sense, a central contribution of this review is to identify whether the impact of government interventions is different for absolute and relative inequality measures. During the systematic review, we adhere to the widely used 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) (Moher et al. 2009), based on the definition of systematic review used by the Cochrane Collaboration (www.cochrane.org), which ensures transparent and reproducible reporting (Liberati et al. 2009).

The rest of the paper is organized as follows. We begin in Section 2 by describing the trends and evolution of income inequality worldwide. Next, in Section 3, we discuss the main theoretical arguments on whether, how, and why policy design might affect income inequality. In Section 4 we depict the method used to conduct the systematic literature review. The policy implications of our findings are then explored, and conclusions follow.

2 Income inequality: measurement and stylized facts

Changes in income inequality are considered a crucial factor in explaining both the causes and the potential consequences of inequality and poverty (Stiglitz 2012). Unsurprisingly, then, the role that changes in income distribution can play in shaping different socio-economic aspects, such as growth, consumption, and human capital formation, is widely documented in the academic literature (e.g. Barro 2000; Krueger and Perri 2006). This paper, however, focuses on the large body of research that examines the factors explaining geographical differences in inequality and their evolution, considering macro-processes (in-

cluding supply and demand, trade, globalization, and technology change), structural conditions, and institutional constructs as major elements of inequality formation (Kanbur 2015).

The main goal of this report is to understand the role of institutions and public policies in relation to income dispersion. To better understand the mechanisms through which government interventions may affect income inequality, it is essential to identify first what is meant by economic inequality. Hence, we need to define the variable of interest in terms of the income concepts included, the way that family or individual units are defined, the particular inequality measures used for the analysis, and the origin and the structure of the data. Most of the contradictory conclusions on recent trends in income inequality reported in the literature are mainly explained by different choices on these dimensions. Hence, before presenting the current stylized facts of the literature concerning income inequality, we delineate the frame of our analysis by answering four basic questions:

1. Inequality of what?
2. Inequality among whom?
3. How do we measure inequality?
4. Where do the data come from?

2.1 Inequality of what?

Inequality arises in many dimensions of human well-being. Academics have repeatedly argued that the same monetary amount may yield different standards of quality of life for people with different needs. Hence, the level of income (or consumption) is a crude proxy of well-being that an individual enjoys. Even though a consensus has slowly emerged among scholars that economic inequality is a multidimensional construct, most of the early work in this area relies almost exclusively on income variables. Thus, for the sake of clarity and in order to keep the number of reviewed studies within reasonable limits, we focus here on one particular dimension: income inequality. Even limiting attention to income inequality, there are several interpretations and distinctions that should be carefully drawn. Prior research on public economics identifies six broad concepts of income (Atkinson 2016).¹

- *Income from employment* comprises wages and salaries received by employees and incomes from self-employment, including commissions, bonuses, subsidized goods, and social security contributions (Canberra Group 2011). This income concept is usually measured at the individual level.
- *Household market income* is the income from employment plus income from rent, land, and capital, and transfers from private bodies, such as pensions.²
- *Household gross income* equals household market income plus state transfers from the government.
- *Household disposable income* is obtained from household gross income by subtracting direct taxes, such as income tax and social security contributions.

¹ The terminology proposed by Atkinson follows the standard notation in the literature on income inequality (see, e.g. Goñi et al. 2011; Hoeller et al. 2014). However, some studies apply a slightly different nomenclature. For instance, Lustig et al. (2011) extend these general concepts and propose additional categories, namely net market income and post-fiscal income.

² Ideally, we should also include imputed rent for owner-occupied housing and other consumer durables, such as furniture or IT equipment. Although imputed rent is rarely included, it is certainly relevant to policy reforms as regards the housing market. There is also a substantial literature arguing that household income should incorporate valuations of unpaid domestic services (see, e.g. Canberra Group 2011; Jenkins and O'Leary 1996).

- *Equivalized household disposable income* is computed from household disposable income by applying an equivalence scale that takes into account the size of the household and economies of scale.³ This concept no longer refers to the household level but to the individual level.
- *Household extended income* equals household disposable income plus the value of public services, such as health, education, water sanitation, and social care.

Household extended income reflects the concept of income adopted by the Canberra Group (2011), defined as the sum of all receipts, whether monetary or in-kind (goods and services), that are received by the household or by individual members of the household at annual or more frequent intervals, excluding irregular and one-time receipts. Although, in practice, public services are not easily valued, they undoubtedly contribute to the resources available to households. In this sense, if public health, for example, were not provided, individuals would have to finance it privately out of their disposable income. Thus, some studies attempted to calculate this income concept by imputing the cost of public services by household, using the average cost of these services (see Aaberge and Langørgen 2006; Mahoney 2013).

There is also a substantial body of research that relies on consumption inequality because it is regarded as a more reliable indicator, especially in developing countries, where income data are hard to collect. Building on the conceptual base of the Canberra Group, *household consumption expenditure* is defined as the value of consumer goods and services acquired, used, or paid for by a household to satisfy the personal needs of its members (Canberra Group 2011). This definition includes non-consumption expenditures—that is, interest payments on consumer credit and expenditure incurred as transfers to government, non-profit institutions, and other households, without acquiring any goods or services in return for the satisfaction of the needs of its members.

In this review, we consider all these concepts of income, since we think that all forms of evidence should be brought to bear. Indeed, studies often rely on more than one income concept to explore the implications of these definitions for the evaluation of the impact of the government interventions analysed.

2.2 Inequality among whom?

Data on income inequality may refer to differences between and within households, between individuals, or between tax units. For instance, earnings are typically considered at the individual level, but most empirical research is based on households' evidence, since surveys are typically conducted at the household level. As a matter of fact, in an overwhelming majority of studies, researchers do not have full discretion over the unit of analysis. However, this choice may have important consequences for the evaluation of the potential redistributive impact of government interventions. For example, Atkinson et al. (2017) found that an increase in the national minimum wage in the UK would result in a very limited reduction of inequality in household disposable income. The reduced equalizing effect of this policy partly reflects the fact that many minimum wage, low-paid workers are teenage employees from relatively well-off families (Burkhauser et al. 1996). Hence, the evaluation of this policy at the individual level may reflect significantly higher reductions in income inequality.

Which of these units should be used? It depends on the extent to which members of the household share equally its resources. If there is equal sharing, then using total household income would be a sound

³ A simple proposal for equivalence scale is the square root of household size. The OECD applies a method that gives 1 for the first adult, 0.5 for subsequent adults, and 0.3 for each child. Using different equivalence scales might affect the estimates of inequality measures, so we should carefully consider the policy implications derived from cross-national comparisons of inequality (Buhmann et al. 1988).

measure. In fact, household income remains the most often used and the basis for the measurement of income inequality. Although economic well-being is acknowledged to be an individual rather than a collective notion, the household is considered the most suitable unit of income statistics for pragmatic reasons:

The starting unit is the individual, but as individuals typically share income with the other persons with whom they live, most surveys collect information on the income streams of all members of a larger statistical unit, most commonly the household. That is, while it is advisable to collect data about individuals, the household is the basic data collection unit. [...] A full appraisal of income sharing within a household would require collecting data on the income transfers made within the household which would obviously be very difficult to implement. (Canberra Group 2011: 24–5)

The formation of households may lead to different changes in the distribution of incomes, depending on the correlation of earnings between the working members of the household, the share of the earnings of each working member in total household income, and the level of earnings inequality within each group of workers. In other words, in coupled households an increase in the correlation between spouses' earnings would lead, everything else being equal, to an increase in the household inequality. However, this effect can be partly mitigated if the distribution of women's earnings becomes more equal over time, especially when the share of women's earnings is large.⁴

Households with more than one person might exhibit returns to scale as a result of sharing a dwelling and durable and consumer goods and household public goods. A crucial question is, therefore, how to correct reported household incomes to take into account differences in household size and composition. The lack of data on the allocation of resources within households hinders the measurement of the marginal income needed to keep constant the level of economic well-being with the inclusion of an additional member. The use of different equivalence scales is far from innocuous (see Buhmann et al. 1988; Jäntti and Danziger 2000) and the lack of a unified framework has weakened the comparability of inequality estimates. At the same time, it is not clear that economies of scale are the same in countries with different development levels, in which case we should consider adjusting equivalence scales by country (Lancaster et al. 1999).

Incomplete sharing poses an ever greater challenge to policy-makers seeking to analyse the effectiveness of public policies in reducing inequality. Equivalized household income assumes that all household members enjoy the same economic position, hence the distribution within the household is rarely considered in inequality estimates. Ignoring the distribution of resources within the family yields unreliable estimates at best, and deeply flawed estimates at worst, if the family structure experiences a big change over the period under analysis (Chiappori and Meghir 2015).

2.3 How do we measure inequality?

A whole range of measures has been proposed to assess inequality levels, including the Gini index, the Atkinson index, generalized entropy measures, and percentile and share ratios, among others.⁵ The Gini index, based on the Lorenz curve,⁶ is the most popular measure of income inequality partly because of its intuitive interpretation as the area between the Lorenz curve and the egalitarian line. Hence, this

⁴ See Nieuwenhuis et al. (2019) for a detailed analysis of the impact of women's earnings inequality among coupled households.

⁵ It is worth noting that the aim of this subsection is not to provide a comprehensive review of all inequality measures, but to provide an overall picture of the most widely used measures.

⁶ The Lorenz curve is considered one of the most powerful tools to compare and order distributions according to their inequality levels. If two Lorenz curves do not cross, the closest distribution to the egalitarian line would be declared as less unequal by

statistic is, by definition, very sensitive to the middle of the distribution. This particular weighting scheme may not be ideal for analysing, for example, means-tested benefits. Since the eligibility for this type of transfer remains constrained by poverty targeting, it would be more appropriate to use inequality measures that are more sensitive to the bottom part of the income distribution.

The Atkinson index and the generalized entropy measures are distribution-sensitive, which means that both include a parameter to set the importance given to the differences at the tails of the distribution. The use of this type of measure becomes particularly relevant when there is no Lorenz dominance. If two Lorenz curves cross, inequality measures can yield different rankings of distributions depending on their sensitivity to the left or the right tail.

Percentile ratios are intuitive measures that also provide valuable insights into the evolution of different parts of the distribution of income. Prior research, especially on labour economics, has made extensive use of these statistics, which include percentile ratios that consider the whole range of incomes (typically the ratio of the 90th to the 10th percentile of the distribution), only the bottom part of the distribution, the ratio of the 50th to the 10th percentile (or the top tail), and the ratio of the 90th to the 50th percentile. Similarly, income shares ratios are often used as a generalization of the Palma index—that is, the share of the richest 20 per cent divided by the share of the bottom 40 per cent. Other studies analyse the impact of policy interventions at different parts of the distribution by looking at the evolution of income shares.

A further consideration in the selection of inequality measures would be the way in which differences in income contribute to inequality levels. In this regard, inequality measures can be classified into relative and absolute measures. To explain the difference between these types of measures, consider the following example. Let us assume that we would be interested in measuring inequality between just two individuals in two different countries: citizen X in country A earns US\$500 per calendar month, while citizen Y earns US\$5,000 per month; in country B, the monthly salary of individual X is US\$600, while individual Y receives US\$6,000. Relative inequality measures would show that both countries are equally unequal since the relative difference between both individuals in these two countries would be 1/10. By contrast, absolute measures, such as the variance or the relative mean deviation, would rank country B as more unequal, since the absolute income difference between the two citizens is US\$5400, whereas in country A it is US\$4500.

2.4 Data sources

Until the early 1990s, much of the scholarship on economic inequality was constrained by a lack of individual-level data. Over the last decades, however, there have been important developments in data collection, both at the supra-national and national levels, particularly in developing countries. In this regard, the periodic release of certain summary statistics on the distribution of income has become relatively common, thus improving the availability of internationally comparable data on income inequality. Much progress has also been made towards the standardization of data into a common framework of income, unit of analysis, and equivalence scale.

It is worth highlighting that, although the availability of income data is currently expanding at an ever-increasing pace, there are still severe data limitations in terms of comparability and reliability of observations. In this section, we present the main sources of data used for the analysis of income inequality and highlight their principal limitations. We review international datasets with standardized microdata and secondary datasets, and introduce notable examples of national surveys widely used in country case studies.

any inequality measure consistent with the Lorenz order (Jordà and Alonso 2017). However, if two Lorenz curves cross, their associated distributions cannot be ranked. This potential limitation has motivated the use of alternative inequality measures.

Evidence on income inequality worldwide is now available thanks to the periodic release of summary statistics on the distribution of income. The World Income Inequality Database (WIID) deserves particular attention since it is, to date, the largest cross-country database reporting country–year estimates of grouped income/consumption data, mostly summary measures of income distributions, such as the Gini index, and population shares.⁷ This explains why this database has been widely used by prior research on international income inequality. The WIID brings together a heterogeneous collection of datasets in terms of the welfare concept, unit of analysis, equivalence scale, data quality, and population and area coverage. Therefore, despite the WIID’s comprehensiveness in terms of geographical and time coverage, the mentioned heterogeneity and the lack of data comparability are often seen as potential drawbacks of the database.

To overcome this limitation, Solt (2016) developed a standardization method to improve the comparability of income inequality data while maintaining geographical coverage. The Standardised WIID (SWIID) provides a balanced panel of Gini indices of gross and net income for 173 countries since 1960 along with their standard errors. The methodology and the data used to construct the SWIID are presented by Solt (2016).⁸ Despite the great coverage of the SWIID, critics have claimed that the imputation is based on an extremely opaque and highly complicated procedure that raises concerns about potential bias in inequality levels (Jenkins 2015).

The World Bank’s PovcalNet gathers summarized information (mostly) from household surveys for virtually all developing countries in the world since 1978. This database includes data on poverty and inequality measures and 100 points of the Lorenz curve.⁹ The main limitation of this data collection is that advanced economies are excluded from the sample. PovCal data could be completed with other datasets also collected by the World Bank, such as the World Development Indicators (WDI) or the World Income Distribution Dataset (WYD). However, data on developed countries are surprisingly scarce, with data missing for several years.¹⁰ It should be noted that distributional data from the World Bank suffers from the same comparability issues as the WIID. The data refers often to consumption (especially in developing countries, where data on income is hard to collect), but in some cases only income (either gross or net) data is available.

The World Wealth and Income Database (WID) is the result of a collaborative project originated in the early 2000s by Facundo Alvaredo, Tony Atkinson, Thomas Piketty, Emmanuel Saez, and a network of collaborators. This dataset produces distributional national accounts by combining survey, fiscal, and national accounts data sources in a systematic way, thus allowing comparisons between countries over long periods of time.¹¹ The dataset includes information on the distribution of income and wealth for nearly 70 countries for time periods that span from 1800 in some cases. The main limitation of this database is that tax-exempted income is typically not recorded. Hence, the omission of the bottom tail of the income distribution would introduce a downward bias in the estimates on inequality measures.

In the last decades, there has been a rapid proliferation of comparable primary datasets that store income data. Compared to secondary datasets, the key asset of primary datasets is the high degree of standardization, which allows for consistent cross-country comparisons, but at the cost of somewhat limited geographical and time coverage. The Luxembourg Income Study (LIS) gathers the largest database of

⁷ The WIID dataset v.4.0 is available at the UNU-WIDER website at www.wider.unu.edu/research/Database.

⁸ The SWIID can be downloaded at <http://myweb.uiowa.edu/fsolt/swiid/swiid.html>.

⁹ The PovcalNet tool is accessible at <http://iresearch.worldbank.org/PovcalNet/index.htm>.

¹⁰ To download the WDI data, visit <http://databank.worldbank.org/data/home.aspx>. The WYD data are freely available at <http://go.worldbank.org/IVEJUI0FJ0>.

¹¹ Data from the WID can be downloaded from <https://wid.world> or accessed using the Stata package. See all the information at <https://wid.world/news-article/new-get-wid-world-inequality-data-stata-ssc-package>.

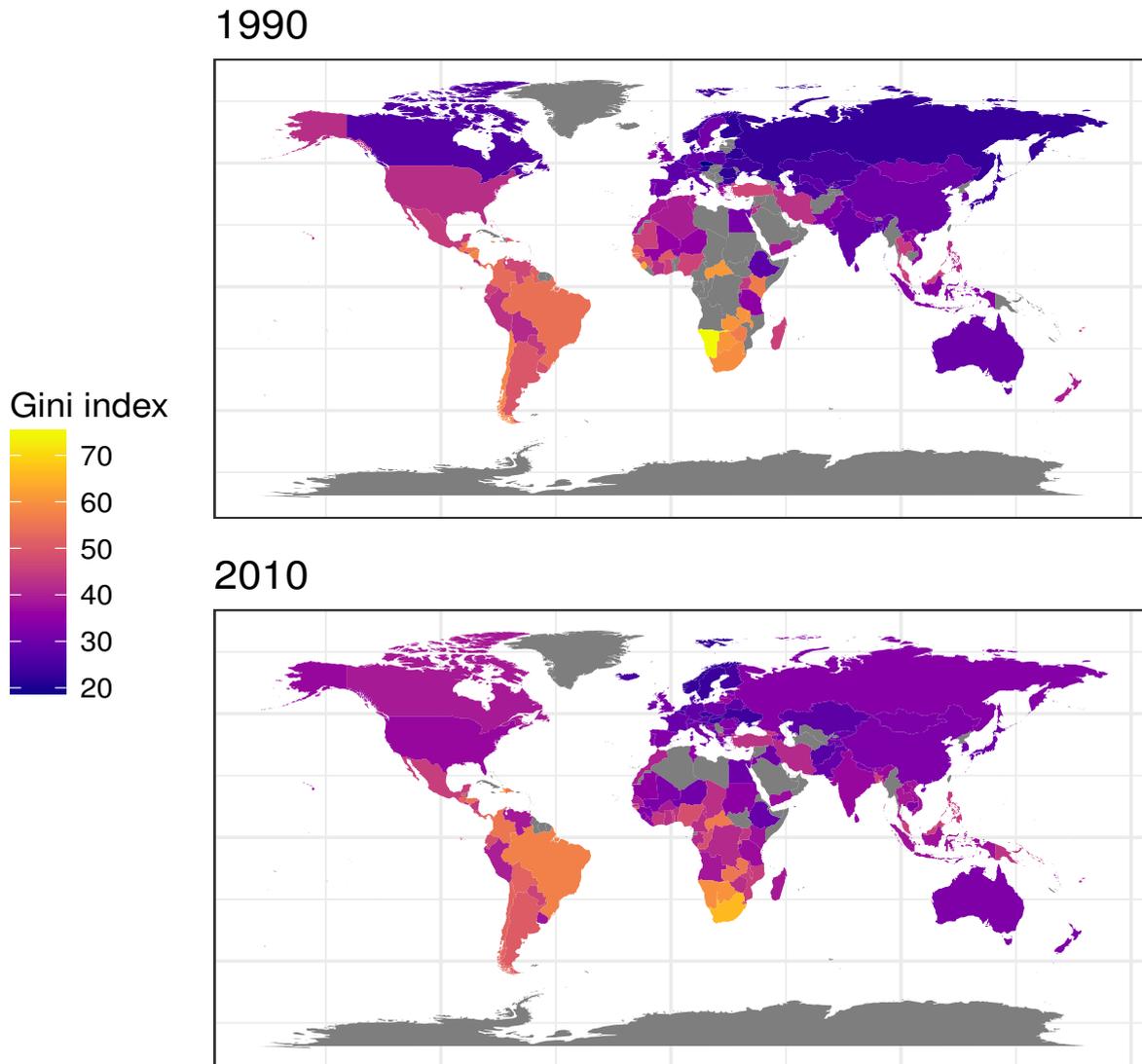
microdata for almost 50 countries across five continents. Harmonized into a common framework, LIS data includes household and individual information on different income concepts since 1980 at (approximately) five-year intervals. The Statistical Office of the European Union (EUROSTAT) has maintained, since 2004, the Household Survey on Income and Living Conditions (EU-SILC), available for the 28 member countries (including the UK) and 4 non-EU countries. Income data is collected on an annual basis from a rotational panel (generally with a duration of four years). The longitudinal character of this database and the regular annual publication of the data are the main assets of the EU-SILC. The LIS data, however, is available for a much longer period.

It should be noted that the coverage improvement over time of international datasets, such as the WIID, LIS, PovcalNet, and others, reflects considerable improvements and massive efforts in data collection at the national level, in particular in developing countries. This is of paramount importance not only because it has led to the aforementioned improvements in coverage over time, but also because country case studies often rely on national surveys produced by national statistical agencies. Surveys typically include income data, disaggregated by concept, at the individual and the household levels. For example, in the USA, the Current Population Survey (CPS) is the primary source of monthly labour force and income statistics; the British Household Panel Survey (BHPS) provides income data for a representative sample of individuals in the UK since 1991; the Socio-Economic Panel (SOEP) study is a longitudinal study of more than 15,000 households across Germany, launched in 1984; the Chinese Household Income Project collects information on the distribution of personal income in rural and urban areas of the People's Republic of China for several years since 1988; the Mexican Family Life Survey is a longitudinal survey representative of the Mexican population in both urban and rural areas; and the Encuesta Permanente de Hogares (EPH) provides information every three months on socio-economic characteristics of Argentinian households since 2003.

2.5 Cross-country levels and evolution of income inequality

In this section, we present some stylized facts about the evolution of income inequality. Figure 1 shows the Gini index of disposable income of all countries that had available data in 1990 and 2010 in version 3.4 of the WIID. All countries that present values of the Gini index larger than 60 per cent are located in sub-Saharan Africa. Latin America is also characterized as a highly unequal region, with most countries presenting Gini coefficients greater than 50 per cent, figures almost double those of the Nordic countries. Despite the high levels of income inequality in these two regions, no progress has been achieved in reducing the levels of disparity, so most countries are still characterized by considerably unequal distributions in 2010. In Asia, many countries have widened their inequality levels from 1990 to 2010. Notably, China had a Gini coefficient of 30.6 per cent in 1990; by 2010, inequality rose by 10 per cent in this country, with a Gini coefficient of 33 per cent. In Eastern Europe, waves of conflict and social unrest after the collapse of the Soviet Union at the end of the 1980s and throughout the 1990s have led to a rise in income disparities in the region. Finally, Anglo-Saxon countries show much higher levels of income inequality than Continental Europe and much higher than the Nordic countries.

Figure 1: Inequality around the world: 1990–2010



Source: authors' compilation based on data from version 3.4 of the WIID.

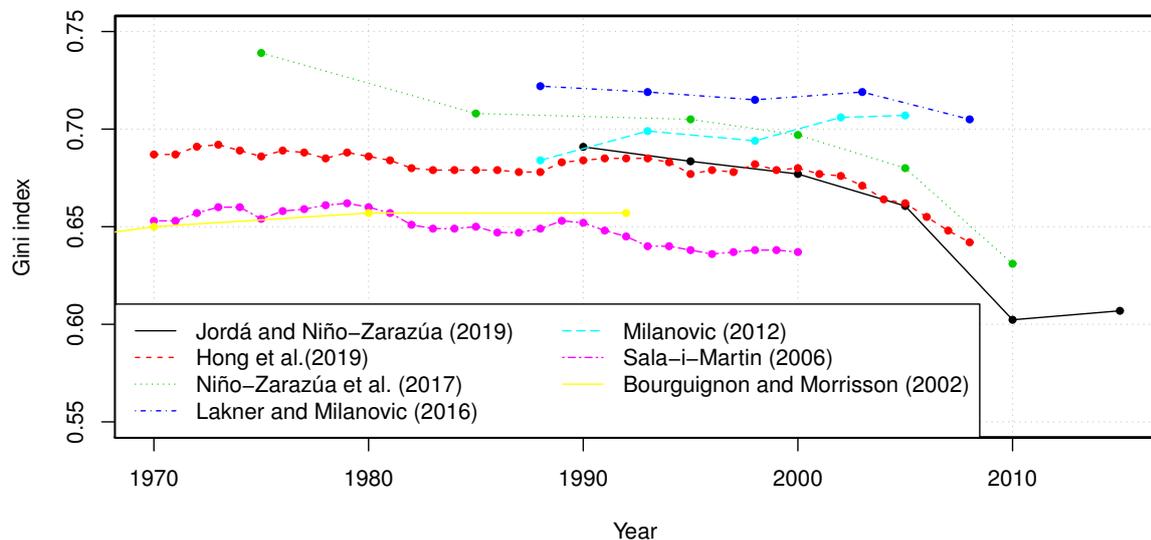
Global inequality among citizens reflects the combined effect of inequality within countries and differences in per capita income between countries. In the aftermath of the most severe financial crisis since 1929, there has been a renewed interest in its evolution. Motivated by the wide availability of income data, a substantial body of studies has aimed at estimating world levels of income disparities.¹² Figure 2 summarizes some of the previous evidence on the trends of global inequality since 1970. To facilitate the comparison of these trends, we only show the estimates of the Gini index, the inequality measure used in virtually all studies on global inequality. These estimates reveal a world characterized by extraordinarily high levels of income inequality, even higher than those observed in the most unequal countries. Despite relatively small differences in inequality levels, previous studies show very similar trends in income disparities. Global inequality remained relatively stable until 1990. From 1990 to 2010, global inequality levels exhibited a steady decrease¹³ that became significantly more pronounced at the turn of the century. The decrease in global inequality has been largely driven by a decline in between-country

¹² See Anand and Segal (2008) for a thorough review of prior research on global inequality.

¹³ Milanovic (2012) is the only study that suggests that the world has become more unequal from 1993 to 2005.

inequality, fuelled by the rapid economic growth that populous countries such as China and India have experienced over the past 30 years (Lakner and Milanovic 2015; Niño-Zarazúa et al. 2017). By contrast, differences in incomes within nations have become much wider since 1990.

Figure 2: Inequality around the world: 1990–2010

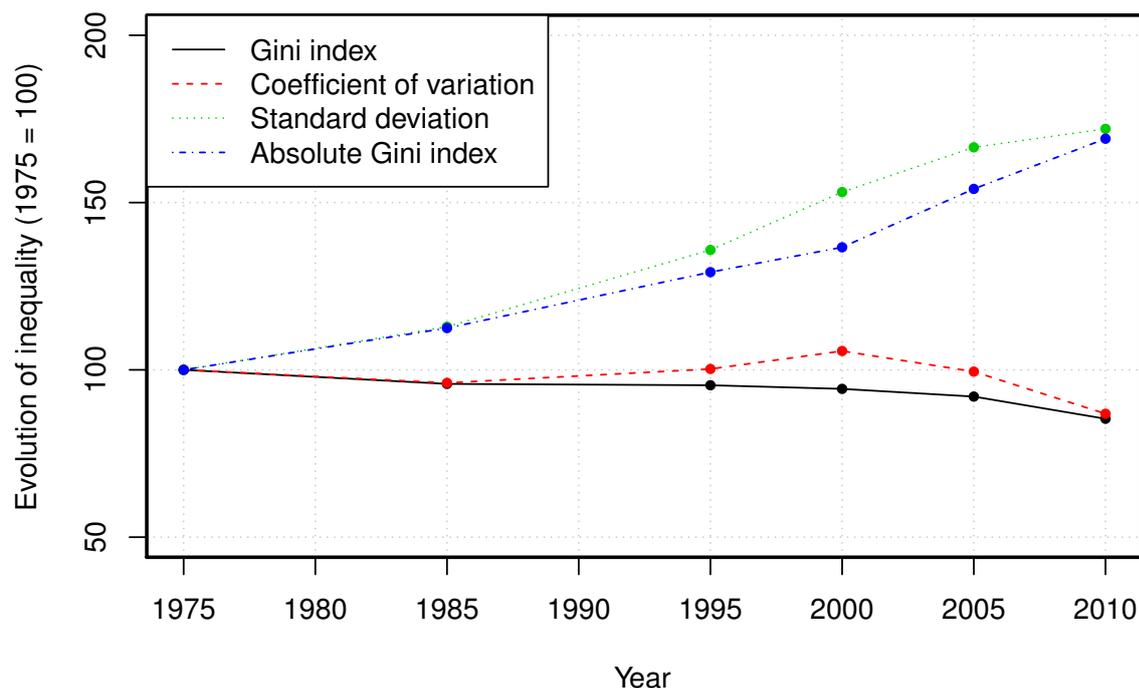


Source: authors' compilation based on the data sources listed in the figure.

While the extant studies, for the most part, do point towards fairly similar inequality trends, the controversy centres on the magnitude of the changes and the levels of inequality. In 2000, for example, inequality estimates of the Gini index go from 0.63 (Sala-i Martin 2006) to 0.72 (Lakner and Milanovic 2015). Bourguignon and Morrisson (2002) present estimates of similar magnitude to those reported by Sala-i Martin (2006). The most recent works, Jorda and Niño-Zarazúa (2019) and Hong et al. (2019) show virtually identical estimates, whereas Niño-Zarazúa et al. (2017) presents slightly greater estimates of inequality.

Another source of conflict in the existing evidence on income inequality is driven by the use of different inequality measures. The manner in which differences between individuals are conceptualized, in relative or absolute terms, is not neutral and might affect not only the levels, but also the trends in income inequality. Figure 3 presents the evolution of two relative measures—the Gini index and the coefficient of variation—and two absolute indices—the standard deviation and the absolute Gini index. The main pattern observed in Figure 3 is that relative global inequality has declined steadily since 1970, whereas absolute inequality, as captured by the standard deviation and the absolute Gini index, has increased substantially throughout the period 1970–2010. The opposite trends depicted by these two types of inequality measures poses an even greater challenge to evaluate the potential effects of policy interventions. It is worth noting that two relative inequality measures can also reflect diverging trends. The coefficient of variation increased by 10 percentage points from 1995 to 2000; the Gini index, instead, presents a reduction of 2 per cent. Therefore, the choice of different inequality measures is a central issue that might have important consequences for the assessment of the effects of government interventions.

Figure 3: Global income inequality: 1975–2010



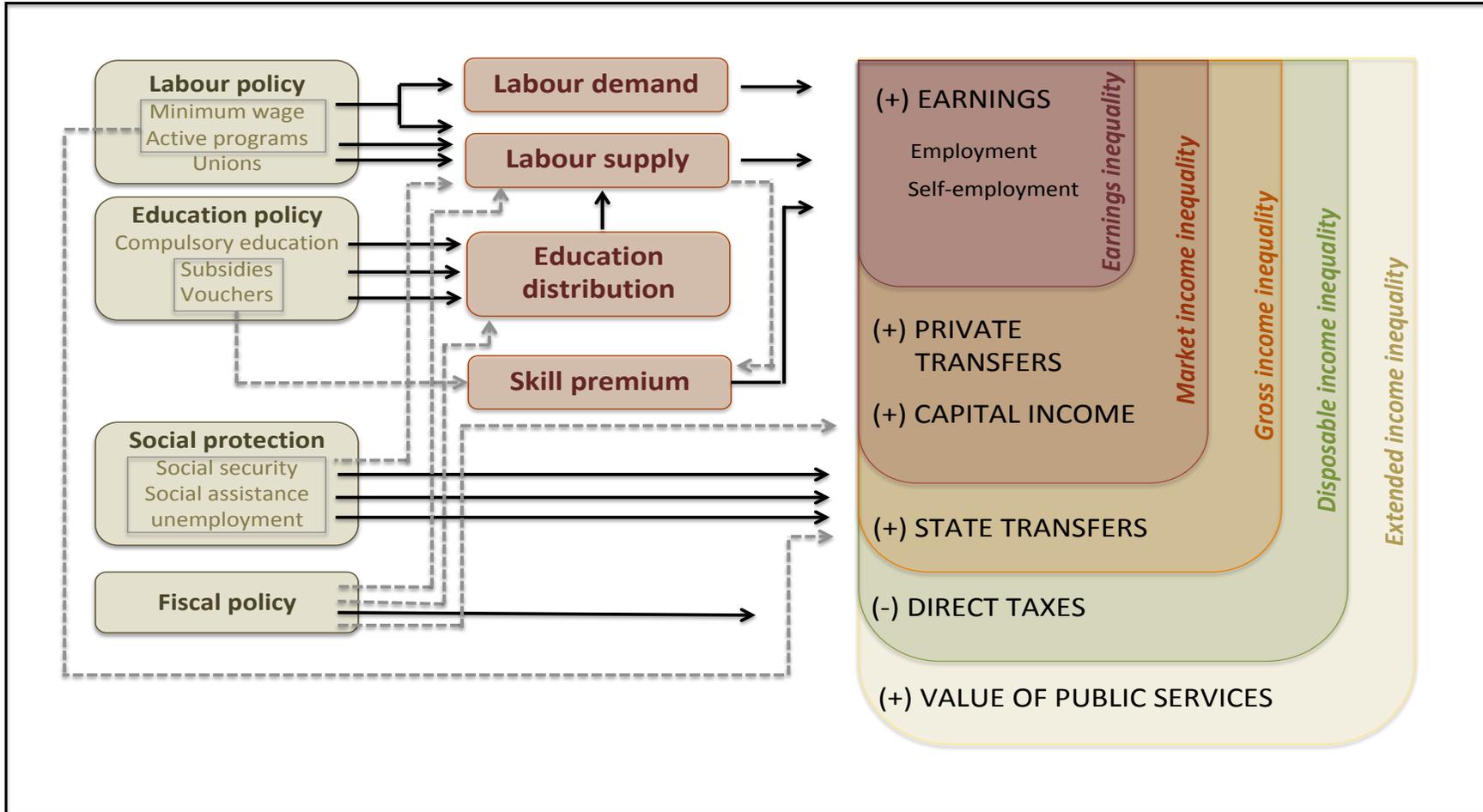
Source: authors' compilation based on data in Niño-Zarazúa et al. (2017).

3 Policy design and inequality: a theory of change

Social policy design has long been an important objective for national and regional governments across the globe as they seek to deal with, among other issues, inequality, poverty, and vulnerability (Atkinson 2016). In this section, we discuss the theoretical framework explaining how such policies might affect economic inequality, with a particular focus on public education, labour interventions, fiscal policies, and social protection. Figure 4 illustrates the theoretical links between these policies and income inequality. Solid arrows show the direct effect of the intervention on different macro-processes and income concepts (first-round effects). Dashed arrows represent the potential behavioural responses, which might also have a substantial impact on income inequality (second-round effects).

Earnings are commonly the most relevant part of household incomes, thus inequality of labour income is a fundamental determinant of income inequality at face value. Minimum wage policies would stimulate the labour supply and increase the size of the active population. The amount of labour hired, however, decreases due to the rise in labour costs, thus increasing unemployment. The impact of this type of intervention on income inequality would depend on the wage elasticity of supply of labour and the generosity of unemployment benefits (Brito et al. 2017). If the supply elasticity is high, raising the minimum wage will reduce employment levels substantially. In this context, income inequality can only contend with generous unemployment benefits in terms of both quantity and duration (Dosi et al. 2017). However, this type of benefit might distort incentives to work by making workers more reluctant to accept low-paid jobs. As a result, income inequality rises because unemployment benefits do not provide full compensation for lost wages. On the other hand, active labour programmes, including short-term subsidies and training programmes for unskilled-intensive non-tradable sectors might contribute to reducing earnings inequality but without the risk of rising unemployment (Vanhoudt 1997). Subsidies will increase the amount of workers hired in the low-skilled sector and training programmes might help employees to find better-paid jobs.

Figure 4: Conceptual framework



Source: authors' compilation.

It should be noted that labour supply and demand do not determine the market wage completely. Workers might have some degree of bargaining power, usually influenced by the union's power. Workers' leverage also depends on the rigidities of the labour market, and on the cost of remaining unemployed. Hence, social protection, in general, and unemployment benefits, in particular, might affect the labour supply by increasing the reserve wage of the economy (Adams and Atsu 2015).

The distribution of earnings partially inherits the structure of the distribution of education. The definition of a level of compulsory years of schooling reduces educational disparities and, consequently, reduces income inequality (Brunello et al. 2009). However, subsidies directed at higher educational levels might have an ambiguous effect because of the confluence of two forces of opposite direction (Arabsheibani et al. 2006). On the one hand, education expansion at post-primary education levels (i.e. secondary and tertiary or higher education), allows more individuals to have better wages in the future, thus raising inequality levels (structure effect). If the demand for high-skilled workers does not outstrip supply, the returns of higher education will fall, which would compress the distribution of earnings inequality (price effect). Hence, the final impact of education expansion on earnings inequality crucially depends on the magnitude of these two effects (Yang and Gao 2018).

In this paper, we also look at the equalizing effect of redistribution via taxes and social benefits. Benefits can be introduced in the form of income transfers, tax cuts, or subsidies through direct or indirect payments. In the design of the optimal transfer scheme, it is essential to correctly define the target population. In such a way, benefits can be universal, means-tested, or conditional on some particular requirement that determines the eligibility rule. Despite the different nature of these transfer schemes, its impact on income inequality involves in all cases three main channels (Rickman and Snead 2007). First, social benefits affect directly household incomes by raising the level of disposable income. The other channels relate to second-round effects of social benefits. On the one hand, households might change their willingness to participate in the formal labour market, which in turn would generally affect the skill premium, with the subsequent response of the high- and low-skilled individuals to this change. Finally, social benefits are by no means neutral in terms of the net effect on state budgets. To the extent that the rise in the costs are financed by higher tax burdens on households that are not recipients of these benefits, there will be additional labour supply effects. The overall distributional effect of social policies would, therefore, depend on the design of the transfer scheme and the changes introduced in the tax system to finance them.

In this sense, direct taxes are one of the main instruments used to achieve redistribution. However, prior research suggests that income redistribution via direct taxes is fairly limited, especially in developing countries (Ciminelli et al. 2019; Keane and Prasad 2002). Moreover, direct taxes have important behavioural effects that would impact on education choices, labour demand, and saving/consumption patterns. An increase in the effective tax rates of highly productive workers is detrimental to their incentives to supply labour (Lehmus 2014). Tax-induced behavioural responses also include evasion and avoidance, which are more related to income shifting rather than actual changes in income distribution (Duncan 2014). The behavioural response is particularly prominent among the richest because their supply elasticity of wage is much higher than for the rest of the population (Alvaredo et al. 2013; Viegas and Ribeiro 2013).

Indirect taxation has a weaker distorting impact on the labour market. It is the cornerstone of fiscal systems in developing countries, which rely less on income taxation because their income tax base is relatively small due to their low income levels. Moreover, the informal sector in these countries, which does not pay income taxes, is relatively large (Cornia 2010). However, prior studies argue that indirect taxation tends to be regressive, thus increasing income inequality (Salotti and Trecroci 2018). While this is true for relative inequality, indirect taxes are redistribution-neutral if inequality is evaluated with absolute measures.

Besides the general channels described above, some transfer schemes involve further ways to impact on the distribution of income. If the benefit is introduced as a means-tested transfer conditional on working in the formal sector, low-skilled labour supply would increase and low-skilled wage would decline as a result. On the other hand, too generous non-contributory transfers might create negative incentives to work (Coady and Harris 2004). The explicit requirements of child subsidies instrumented as conditional cash transfer programmes act as an incentive device, which might influence not only the working hours of the parents, but also other aspects such as children’s education by mitigating the opportunity costs of schooling, which will have a long-lasting impact on economic inequality (Kornstad and Thoresen 2006). Child subsidies also introduce an additional factor that might influence the distribution of income. Subsidies affect the household decision on whether to rely on formal or informal—provided by friends or relatives—childcare (Rickman and Snead 2007). Increasing demand for formal childcare services increases the labour demand for low-skilled workers, hence affecting the skill premium.

4 Review methodology

4.1 Search protocol

In this report we conduct a systematic literature review following the PRISMA guidelines (Moher et al. 2009), based on the definitions of systematic review and meta-analysis used by the Cochrane Collaboration (for a comprehensive description of the method, see www.prisma-statement.org). First, we collected data by carrying out an electronic search in the ISI Web of Knowledge database. We restricted our search to studies published from 1990 onwards. In doing so, we used a combination of the search terms indicated in Table 1. The table shows three sets of overall terms (column A—policies, column B—income, and column C—inequality), each containing a list of sub-terms that were used in the database search for each type of policy review (i.e. (1) tax policies, (2) labour market interventions, (3) education policies, and (4) social policies). Sub-terms within columns A, B, or C were combined with OR (if more than one sub-term); columns B and C were combined with the proximity operator *NEAR/n*, where *n* is the number of words that separate the terms from two columns (we set *n* = 2); column A was combined with the combination of B and C, using the AND command. The use of the proximity operator enables capturing phrases such as ‘distribution of income’, ‘inequality of income’, ‘income distribution’, and ‘income inequality’. Before all these Boolean operators we included the specific terms reported in Table 1 for each type of policy followed by AND. We restricted the search to TITLE–ABSTRACT–KEYWORDS.

Table 1: Concepts used in the literature search strategy

A: Policies	B: Income	C: Inequality
(1) Tax policy (tax* OR fiscal)		
(2) Labour market (labor OR labour OR wage*)		
(3) Education policies (educ* OR skill OR human capital)		
(4) Social policy (social* OR ‘basic income’ OR ‘welfare state’ OR transfer OR benefit OR insurance OR protection)		
Polic*	Income*	*equal*
Intervention*	Expenditure	*distribut*
Program*	Capital	
Reform*	Earnings	
Legislation*	Consumption	
Govern*		

Source: authors’ compilation.

More specifically, the Boolean expressions for each type of policy would be:

(1) $TS = ((tax* OR fiscal) AND (polic* OR intervention* OR program* OR reform* OR legislation* OR govern*) AND (((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *distribut*) OR ((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *equal*)))$

(2) $TS = ((labour OR labor OR 'labor market' OR 'labour market') AND (polic* OR intervention* OR program* OR reform* OR legislation* OR govern*) AND (((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *distribut*) OR ((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *equal*)))$

(3) $TS = ((educ* OR skill* OR 'human capital') AND (polic* OR intervention* OR program* OR reform* OR legislation* OR govern*) AND (((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *distribut*) OR ((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *equal*)))$

(4) $TS = ((social* OR 'basic income' OR 'welfare state') AND (polic* OR intervention* OR program* OR reform* OR legislation* OR govern* OR transfer OR benefit OR insurance OR protection) AND (((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *distribut*) OR ((income* OR expenditure* OR consumption OR earning* OR capital) NEAR/2 *equal*)))$

4.2 Inclusion criteria

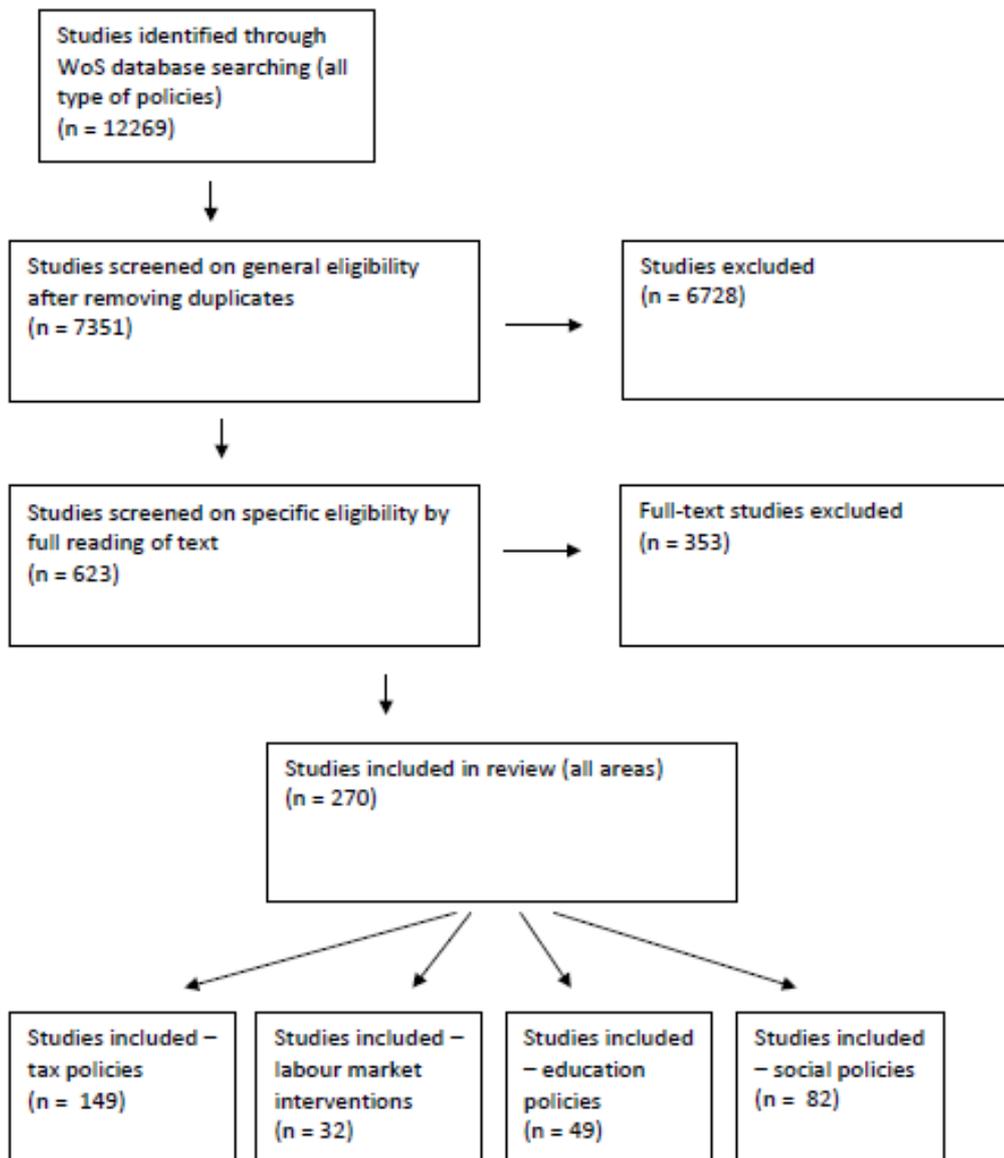
The selection process is reported in Figure 5. Our search strategy resulted in 12,269 studies. However, as mentioned above, we conducted an independent search for each type of policy, and some studies addressed the effect of two, three, or all types of policies at the same time, hence when pooling all four searches some studies were duplicated. After removing duplicates, there were 8,436 studies to evaluate for eligibility. Studies from the described search were included in the systematic review if they met the following criteria:

- Type of study: studies should aim to evaluate the impact of tax, labour, education, and/or social policies on income inequality.
- Study approach: only quantitative empirical studies were included.
- Publication status: only international peer-reviewed journal articles and books from established academic publishers were included.
- Language: only studies published in English were included.
- Year of publication: only studies published between 1990 and 2019 were included.

As a first step, we screened all titles and abstracts and, based on the eligibility criteria, we excluded 7,352 studies from our analysis. The main causes of exclusion were the following:

- The document was not in English.
- The aim of the study was completely unrelated to income inequality.
- The aim of the study differed from analysing the impact of policy measures on income inequality (we excluded analyses that focus on more general determinants of income inequality or those that refer to other aspects of well-being, such as education or health inequality).
- The study did not focus on vertical inequality (horizontal inequality analyses differences between groups, such as ethnic groups, gender, and educational levels; analyses on inequality of opportunity were also excluded).
- The study uses qualitative methods.

Figure 5: PRISMA flow diagram



Source: authors' compilation.

To further facilitate the screening of the studies, we developed an MS Excel sheet to summarize, for each study, the type of publication, author(s), title, journal, publication year, abstract, eligibility (yes/no), and, if the study was not eligible, the cause of exclusion as indicated above. In a second step, we screened studies by reading the full text. Here, we excluded further studies mainly because they were descriptive in nature or had a weak empirical design, and/or used unreliable data. The number of studies excluded in this second step was 353, resulting in 270 studies being included in the systematic review, from which 149 are related to tax policies, 32 to labour market interventions, 49 to education policies, and 82 to social policies.

5 Synthesis of evidence

5.1 Redistribution: taxes and social benefits

In recent decades, income inequality has grown in most developed countries, thus triggering widespread calls for redistribution. Despite the collective demand for more egalitarian societies, welfare states in developed countries have tended to reduce their levels of redistribution (Wang et al. 2014).¹⁴ Thus, government efforts were generally insufficient to completely mitigate the rise in market income inequality (Bargain and Callan 2010; Bargain et al. 2017), except in Canada and Germany (Fritzell 1993).

Although prior studies have extensively investigated the effect of redistribution policies on income inequality, the findings are inconclusive, especially in developing countries (Bird and Zolt 2005). Much of the conflicting evidence from previous work in this area stems from the tendency to examine redistribution in isolation. Redistribution analyses should involve both taxes and transfer schemes embedded into general societal functioning, which also considers welfare outcomes generated by the market and the family. Within this complex setting, the same egalitarian commitments of two welfare states may lead to different results (Esping-Andersen and Myles 2009). Thus, measuring the overall impact of redistribution becomes prohibitively difficult.

It is therefore advisable to first examine welfare state interventions on a programme basis before generalizing the results to the level of welfare regimes. (Foerster and Tóth 2015). Hence, we focus first on the tax system, discussing the implications of taxing different concepts at a particular rate. Then we examine the distributional effect of different social benefits.

Tax policy

Table 2 presents the number of reviewed studies that examine the potential impact of fiscal policies on economic inequality. Since one of the main contributions of the review is to determine whether the impact of public policies is different for relative and absolute inequality measures, we have also listed the measure used to evaluate income inequality. We have also classified the studies into three categories according to the development stage of the countries included in the analysis, since it is conceivable that the efficacy of these policies would be influenced by the macroeconomic context.

Table 2: Types of fiscal policies and inequality measures

	Fiscal system (general)	PIT	VAT	Other policies
<i>Inequality measure</i>				
Gini index	87 (58%)	34 (23%)	6 (4%)	5 (3%)
Distribution sensitive	13 (9%)	8 (5%)	1 (1%)	2 (1%)
Coeff. variation	5 (3%)	2 (1%)	0 (0%)	0 (0%)
Quantile ratios	10 (7%)	5 (3%)	2 (1%)	0 (0%)
Absolute measures	3 (2%)	0 (0%)	0 (0%)	0 (0%)
Other inequality measures	9 (6%)	6 (4%)	0 (0%)	3 (2%)
<i>Development level</i>				
Developed countries	70 (47%)	27 (18%)	5 (3%)	4 (3%)
Developing countries	27 (18%)	10 (7%)	4 (3%)	5 (3%)
Economies in transition	10 (7%)	5 (3%)	2 (1%)	0 (0%)
<i>Total</i>	98 (66%)	42 (28%)	7 (5%)	9 (6%)

Note: PIT, personal income tax; VAT, value-added tax.

Source: authors' compilation.

¹⁴ Canada is one of the few exceptions, where the tax and transfer system in 2000 was by far more redistributive than that in the 1980s (Frenette et al. 2009).

Progressive taxation tends to be less effective than transfers to reduce income inequality, mainly because taxes trigger behavioural effects that generally raise pre-tax income inequality, thus reducing the potential impact of first-round effects (Doerrenberg and Peichl 2014). Moreover, the tax system in some OECD countries, such as Sweden, seems to be regressive because their tax regimes are characterized by constant tax rates for highest incomes and particularly low rates applied to capital income—typically concentrated among the richest individuals (Gustafsson and Jansson 2008; Whiteford 2010).

Prior research has paid particular attention to the American case. One of the tax reforms that has attracted the attention of scholars is the Tax Reform Act of 1986. The US tax system became less progressive, thus contributing to an increase in income inequality (Aronson et al. 1999; Berliant and Strauss 1993). Lower tax rates in the highest income bracket increased net wages for higher-income earners, thus creating incentives for agents to increase their labour supply. As a consequence, the behavioural impact of the new tax structure led to a substantial increase in market income inequality, which dominated any increase in post-tax inequality (Altig and Carlstrom 1999; Karoly 1994).

Despite the omnipresence of fiscal policy in debates about inequality-reducing actions, few evaluations consider absolute measures. Reinbold (2016) investigates the impact of the tax-transfer system in the USA. The main conclusion is that fiscal programmes appear much less effective in reducing absolute inequality than relative inequality. Tax exemptions benefit higher-income households in absolute terms, but lower-income households in relative terms. Hence, exemptions are an equalizing tool when relative measures, such as the Gini index, are used, but inequality-enhancing when absolute measures are considered. The feasible policy options that would be effective in reducing both absolute and relative income inequality are expanding the Earned Income Tax Credit, which would have a greater effect on relative measures (Meyer 2010) and reducing tax deductions for high-income taxpayers (with a higher incidence in reducing absolute inequality).

Fiscal systems in Latin America are still in their infancy, which makes them inefficient in the fight against inequality (Bargain et al. 2017). As we shall discuss later, social transfers do not seem to target the poorest members of the population, which reduces their redistributive power. As regards the tax system, with very few exceptions, the redistributive impact is proportional to the tax effort, so tax collection is far below the international norm (Agostini et al. 2012; Cabrera et al. 2015). Even if social transfers were better designed and targeted and the tax schedule became more progressive, with such low tax efforts it would be virtually impossible to stop the ascending trend of gross income inequality (Goñi et al. 2011). However, a major limitation of these studies is that they fail to incorporate the impact of indirect taxes (value-added and property taxes) and in-kind benefits, which, as a result, produce biased estimates of the redistributive effect of welfare states.

We now turn our attention to specific types of taxation. The optimal mix between direct and indirect taxation is the subject of long-standing debates. The coexistence of both fiscal instruments is essential as they address in a different manner the objectives of efficiency and redistribution. The redistributive impact of indirect taxation, in general, and VAT, in particular, has been extensively investigated in the literature. The main asset of this tax is that it is not affected by the cascading effect and its evasion is harder to achieve (Alavuotunki et al. 2019; Pestel and Sommer 2017). Moreover, taxing consumption has a less distorting impact on the labour market than direct income taxation.

However, this kind of taxation is generally regressive as it tends to increase disposable income inequality (Salotti and Trecroci 2018).¹⁵ Indeed, the only way to keep redistribution levels when raising indirect taxation is to increase the progressivity of the direct tax system (Decoster et al. 2010). The negative effect of VAT on the distribution of income might also be attenuated if the country is characterized

¹⁵ By contrast, the redistributive effect on consumption inequality seems to be neutral (Alavuotunki et al. 2019; Decoster et al. 2010).

by low levels of corruption, real democracy, and government stability (Chang et al. 2018). Countries with effective governance allocate a larger share of the revenue to funding education, health, and social policies that contribute to mitigating income inequality (Mahadevan et al. 2017).

Although higher reliance on direct taxation is generally associated with more inequality, tax systems in developing countries rely more heavily on indirect taxes than direct taxes because, given their low income levels, the tax base is relatively small, and therefore indirect taxes represent an easier way to increase the government revenue.¹⁶ Moreover, the efficiency of tax collection in developing countries is often poor and tax evasion is high because these countries generally have large informal sectors that do not pay income taxes (Claus et al. 2013). Hence, indirect taxation tends to be more attractive for developing countries, which partly explains why tax systems tend to be regressive (Nantob 2016).

Moving now to direct taxation, prior scholarship on redistribution has directed special attention towards PIT. The definition of the tax brackets with their corresponding marginal tax rates, deductions, exclusions, and tax credits are the main components that will determine the level of redistribution of this tax. Progressive tax rates help to promote a more equal distribution of income and smooth household consumption over time, which is especially important in the absence of insurance markets (Conesa and Krueger 2006). Progressive taxation, however, might distort incentives for labour supply and savings decisions of private households and firms. To minimize the impact of behavioural responses, most countries have simplified their PIT regimes by reducing the number of brackets and the top marginal tax rates. These reforms have resulted in less progressive PIT systems, with a much more limited redistributive impact (Duncan and Peter 2016).¹⁷

Although tax regimes became less progressive over time, other components of the PIT have favoured a more egalitarian distribution of net income. Governments have a long history of providing income tax relief to their elderly constituents and vulnerable populations. In Italy, almost half of the total redistributive effect of the PIT is due to employment and pension tax credits, while deductions seem to play a very marginal role, with a contribution of less than 1 per cent (Barbetta et al. 2018). Wu et al. (2006) evaluated the impact of the Earned Income Tax Credit benefit in the USA (1981–97), designed to supplement the incomes of the poorest households. Their results revealed that this transfer had an equalizing effect if inequality measures that are sensitive to the middle and the bottom of the distribution are used. As expected, the results suggested that this programme had a neutral effect on economic inequality if the evaluation is based on inequality measures more sensitive to the right tail.

Similarly, the replacement of the family credit by the more generous working family tax credit in 1997 strongly contributed to equalizing the distribution of income in the UK (Bargain 2012). In Sweden, child allowances have a deep equalizing effect even though they are not income-tested, because families with more children belong to the bottom part of the income distribution (Schwarz and Gustafsson 1991). There are, however, fiscal benefits that turn out to be regressive, such as the employer-sponsored insurance (ESI) exclusion in the USA, with five-sixths of the benefits allocated above the median (Gruber 2010). Despite its regressive nature, the welfare impact of this exclusion goes beyond reducing inequality, with a clear focus on promoting health coverage for the working population.

¹⁶ For case studies in which PIT do not contribute to raising substantially the tax revenue due to their limited tax base, see Amir et al. (2013) for Indonesia and Ma et al. (2015) for China).

¹⁷ Most prior research on fiscal redistribution relies on country case studies. We refer the reader to Aaberge et al. (1995) for a case study on Norway; Gastaldi et al. (2008) for Italy; Čok et al. (2012) for Slovenia; Miyazaki and Kitamura (2016) for Japan; Ma et al. (2015) and Zhan et al. (2019) for China; Piketty and Qian (2009) for India; Mertens and Montiel Olea (2018) for the USA; Nyamongo and Schoeman (2007) for South Africa; Amir et al. (2013) for Indonesia; and Janský and Röhryová (2016) for the Czech Republic.

In most developed countries, income tax systems provide a favourable treatment of homeownership instrumented by a mortgage loan deduction. Because homeowners are more concentrated at the top of the income distribution, this mechanism tends to be regressive. In Belgium, the suppression of this deduction would decrease the Gini coefficient by 1.4 per cent (Xhignesse and Verbist 2019). Moreover, this type of benefit is deemed to create distortions in investment decisions. Figari et al. (2017) investigated the redistributive effect of removing the income tax provisions favouring homeownership in six European countries—Belgium, Germany, Greece, Italy, the Netherlands, and the UK. Their results suggest that, if a non-neutral revenue scenario is considered and the net imputed rent is added to cash income components in the PIT bases, inequality would decrease in all countries. If revenue-neutrality is introduced through a tax rate reduction, disposable income inequality rises in all countries but Germany. By contrast, if neutrality is achieved via tax exemption, inequality falls but at lower rates than those observed under the non-neutrality scenario.

Although progressive taxes are designed to be pro-poor, as the structural progressivity rises, individuals respond by reducing their gross income. This can be achieved by working less or via tax evasion. Hence, the complexity of the income tax system can hinder fairness and efficiency beyond the costs of compliance and administration (Duncan and Peter 2016). To simplify the PIT system, many countries have considered the introduction of a flat rate. In 2009, there were nearly 30 countries with flat-rate tax systems, most of them in Eastern Europe (Paulus and Peichl 2009).¹⁸

The extant scholarship suggests that a flatter PIT schedule reduces the tax burden on the rich relative to the poor, thus increasing inequality.¹⁹ However, this form of tax base simplification would potentially stimulate labour supply and reduce unemployment (Jacobs et al. 2010). High-productive workers would experience a rise in their net wages, thus increasing their work effort. However, low-productive workers would pay more taxes and have to work harder to maintain their level of consumption because they are liquidity constrained (Lehmus 2014). Thus, flat tax rates illustrate the classical trade-off between equity and efficiency.

Prior studies also argue that the regressive character of the flat tax could be the outcome of specific reforms rather than an intrinsic feature. A pure flat tax would have a neutral incidence on relative inequality (Paulus and Peichl 2009). However, if this tax scheme is combined with a basic allowance, the PIT regime becomes progressive. If the allowance is high enough, the reform would reduce inequality, but at the cost of negative economic growth (González-Torrabadella and Pijoan-Mas 2006).

While most empirical research has tended to assess the potential equalizing effect of PIT, evaluations concentrating on other direct taxes are surprisingly scarce. Using a global sample of countries, Martínez (2012) found that corporate income tax helps to mitigate income disparities, but its effect declines with the degree of openness of the economy. High capital mobility partly translates the corporate tax burden to labour income, which tends to worsen income inequality because workers generally have lower incomes than capital income earners. To prevent capital flight, capital income is usually taxed at lower rates, if not exempt, which intensifies the regressivity of this tax (Gustafsson and Jansson 2008).

¹⁸ Estonia and Lithuania introduced a flat-rate tax in 1994 with rates of 26 and 33 per cent, respectively. A year later, Latvia approved a flat-rate tax of 25 per cent. Nowadays, Georgia (12 per cent), Russia and Ukraine (13 per cent), Serbia (14 per cent), Romania (16 per cent), and Slovakia (19 per cent) have also introduced flat-rate income taxes (Jacobs et al. 2010).

¹⁹ The existing evidence draws mainly on case studies in high- and middle-income countries, including the USA (Conesa and Krueger 2006; Correia 2010), Italy (Aaberge et al. 2004), the UK (Paulus and Peichl 2009), the Netherlands (Jacobs et al. 2010), Spain (González-Torrabadella and Pijoan-Mas 2006), Romania (Voinea and Mihaescu 2009), Finland (Lehmus 2014), Hungary (Benzùr et al. 2018), Russia (Duncan 2014), Germany (Fuest et al. 2008b), Norway (Aaberge et al. 1995), and Iceland (Martorano 2015).

Social protection

Table 3 shows the number of reviewed studies that examine the impact of different types of social policies. The social public policies that have been adopted by governments are varied and numerous. In this review, studies have been classified into five main categories. First, 60 per cent of the documents look at the equalizing effect of social expenditures, without focusing on any particular programme or reform. The design of the pension system and its potential consequences for income distribution have been discussed in 17 of the reviewed studies. The role of conditional cash transfers in reducing economic disparities has also received much attention in the literature. Although most family policies involve conditional cash transfers, we opted for classifying them in a separate category because these policy interventions share the aim of providing work incentives to families with children.

Table 3: Types of social policies and inequality measures

	Social spending	Family policy	Public pensions	Conditional cash transfers	Other policies
<i>Inequality measure</i>					
Gini index	44 (54%)	7 (9%)	13 (16%)	6 (7%)	4 (5%)
Distribution sensitive	6 (7%)	1 (1%)	0 (0%)	0 (0%)	1 (1%)
Coeff. variation	1 (1%)	1 (1%)	1 (1%)	0 (0%)	0 (0%)
Quantile ratios	3 (4%)	0 (0%)	3 (4%)	0 (0%)	1 (1%)
Absolute measures	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Other inequality measures	2 (2%)	2 (2%)	0 (0%)	1 (1%)	0 (0%)
<i>Development level</i>					
Developed countries	27 (33%)	6 (7%)	7 (9%)	1 (1%)	2 (2%)
Developing countries	21 (26%)	1 (1%)	3 (4%)	5 (6%)	2 (2%)
Economies in transition	5 (6%)	0 (0%)	2 (2%)	0 (0%)	0 (0%)
<i>Total</i>	49 (60%)	8 (10%)	17 (21%)	6 (7%)	4 (5%)

Source: authors' compilation.

The reviewed studies have also been disaggregated by inequality measure and the development level of the countries involved in the analysis. The widespread use of the Gini index as an indicator of income inequality is quite evident for this type of policy. The number of studies that evaluate the impact of social policy programmes with absolute measures is so limited that it is not possible to draw even tentative conclusions for this type of inequality. Thus, the discussion of the existing evidence in this section is restricted to relative inequality.

The reviewed studies generally find that welfare states are able to correct rising trends in market income inequality through cash or in-kind means-tested benefits and the provision of public goods (Lobao and Hooks 2003). Anderson et al. (2017) conducted a systematic review of the academic literature regarding the impact of government spending on income inequality. Their estimates from a meta-regression analysis suggested that, on average, there is a negative relationship between government spending and income inequality in low- and middle-income countries. However, prior empirical evidence also suggests that the impact in the least developed countries might not significantly help to reduce economic disparities (Yi and Woo 2015). By contrast, the incidence of social spending appears to be stronger in advanced economies (Rudra 2004).

The lack of effectiveness of social transfers in reducing economic disparities might also be explained by the use of the Gini index to evaluate the impact of this policy. Since this inequality measure is more sensitive to changes in the middle of the distribution, improvements among the poorest population through, for example, means-tested benefits would marginally decrease income inequality. The use of distributionally sensitive measures, such as the Atkinson index or the generalized entropy measures, would reveal that as one attaches more weight to income transfers at the lower end of the distribution, the impact of social spending on the reduction of income inequality increases. This pattern is consistent with empirical evidence from the UK (Atkinson et al. 2017), Poland (Keane and Prasad 2002), and China (Gao 2008). Although absolute inequality measures also indicate that government intervention

successfully contributes to mitigating income differences in market income (Bartels and Bönke 2013), it is not clear whether this type of indicators would be more affected by social benefits than relative measures because none of the previous studies has considered both types of inequality measures for the assessment of social policies.

Although the incidence of social spending on income inequality is not the same in all countries (Sánchez and Pèrez-Corral 2018), virtually all case studies found a weakening impact of net government expenditures in reducing inequality over time.²⁰ This could be linked to the lower progressivity of the tax system (Caminada and Goudswaard 2001) or even regressive schemes in the case of some countries such as Brazil (de Moura et al. 2013) or the USA (Wolff and Zacharias 2007), as pointed out earlier. Hence, even though the welfare state, as an institution, aims at promoting economic equality, this goal was not achieved in most countries.

As regards the incidence of different components of public spending, prior evidence suggests that it might not be the same in all countries. The redistributive effect of social housing is rather limited for the majority of European countries, except for France, where in-kind housing benefits lead to a reduction in the Gini index of six points (Verbist and Grabka 2017). In emerging economies, spending on health and social protection is negatively correlated with income inequality (Sánchez and Pèrez-Corral 2018). In Serbia, for example, the impact of public spending on these concepts seems to be small but still significant (Ivančev and Jovičić 2011). For the rest of the EU countries, however, social protection plays a key role in redistribution.

Government spending on health and education in developing countries does not make a substantial contribution to reducing economic inequality because middle-income groups receive a large proportion of the benefits (Anderson et al. 2017). The small redistributive effect of public health expenditure can be partially attributed to the fact that the distribution of disease and disability is not uniform across the population. Considering the provision of public, free, and universal health care equivalent to a subsidy, its impact on the income distribution depends on the correlation between the health condition and individual income (Spadaro et al. 2013).

The way in which universal health insurance is financed is also a fundamental factor for the success of this policy in reducing income inequality. Taxes that are found to be progressive induce a pro-poor income redistributive effect of the health financing system. Notwithstanding the effectiveness of progressive taxation to mitigate income inequality, a number of studies have suggested that financing global health coverage with indirect taxation might also have an equalizing effect. Mulenga and Ataguba (2017) argue that financing health services with indirect taxes leads to a more equal income distribution in Zambia. This evidence chimes with the positive vertical effect of indirect taxes observed in developing countries like Tanzania and Ghana, which seems to be related to exemptions on products primarily consumed by the poor (Mtei et al. 2012).

Therefore, the role that social policies play in the distribution of income greatly depends on its composition and design. In particular, the target population for social benefits is key to understanding the role of public spending on income inequality. Consider, for example, the case of Brazil, where social transfers contribute to increasing income inequality because these resources may not be reaching the poorest families (Ferreira de Mendonça and Martins Esteves 2014). As a result, non-contributory social assistance has gained prominence as a fundamental instrument to mitigate the ascending trend of market income inequality in many developing countries (Obi and Ndhleve 2011; Tekgüç 2018). When transfers are tied to demographic characteristics, their redistribution effect is limited to the extent that those

²⁰ We refer the reader to Wolff and Zacharias (2007) for the USA, Steiner and Wakolbinger (2013) for Austria, Caminada and Goudswaard (2001) for the Netherlands, Gao et al. (2013, 2019) and He and Sato (2013) for China, and Cornia (2010) for an analysis of Latin American countries.

characteristics are related to income variables. This partly explains why even though cash transfers in socialist economies during the years immediately preceding the collapse of communism accounted for a similar proportion of income as in welfare economies, its equalizing effect was fairly limited (Milanovic 1994).

With the aim of maximizing the impact of public transfers on low-income households, many governments in both developed and developing economies moved towards better-targeted transfer programmes. In developed countries, these programmes mainly take the form of cash transfers or tax credits.²¹ Despite the popularity of social transfers in developed countries, social policy is now shifting towards a social investment approach. From this perspective, policies are aimed at investing in human capital development and improving the efficiency in the use of human capital in terms of labour market participation. As a result, welfare state programmes are less generous in order to make them more activating. As mentioned in Section 5.2, even though training programmes seem to have a positive impact on the earnings of individuals, the benefits of the programme are concentrated above the median (Friedlander and Robins 1997). Moreover, the social investment approach would have a negative impact on the welfare of the poorest households remaining unemployed. The detrimental effect of social investment policies, however, cannot be generalized across a larger group of European countries (Van Vliet and Wang 2015). In Austria, for example, the limitation of social transfers in favour of activating policies had a neutral effect on inequality because the unemployment system still features generous subsidies for marginal employment (Steiner and Wakolbinger 2013).

The literature on social protection identifies an additional category of public transfers: social insurance. Whereas social assistance transfers have explicit objectives, such as reducing poverty and inequality, the aims of social insurance systems are smoothing consumption profiles over the lifetime and alleviating poverty among the elderly. Social assistance is found to have a stronger impact on reducing inequality partly because social insurance programmes tie eligibility to participation in the formal labour market. Hence, the poorest individuals are missed by this transfer scheme because they constitute the largest part of the informal labour force (Skoufias et al. 2010). Social assistance appears to be more effective in the battle against inequality than social insurance in some developed countries, including Finland and the Netherlands, whereas in Sweden and Denmark social insurance helps more than means-tested benefits to mitigate economic disparities (Ferrarini and Nelson 2003).

In South Asia, social policy is mainly based on subsidized food rations. However, conditional cash transfers are a more powerful instrument to reduce income inequality (Coady and Harris 2004). This might explain why social programmes in Latin America are implemented with this transfer scheme. Besides the aim of taking people out of poverty, these programmes generally seek to improve the health condition and the educational level of the children in beneficiary households, thus conditioning the cash transfer on the regular monitoring of different aspects of all members of the household, such as attending school or medical check-ups. In Peru, *Juntos*, a large-scale conditional cash transfer programme, contributes to poverty alleviation, which was translated into a reduction of nearly six points in the Gini index from 2004 to 2012 (Flachsbarth et al. 2018). The programme *Jefes y Jefas* in Argentina led to similar reductions in income inequality (Gertel et al. 2008). A similar programme implemented in Brazil—*Bolsa Família*—seems to have a much more limited impact on economic inequality (Azzoni et al. 2009). The programme *Oportunidades* in Mexico also reduced income inequality and increased the average income of the poorest households by 23 per cent (Debowicz and Golan 2014).

Since expensive childcare may serve as a barrier to employment for low-income households, academics have devoted substantial attention to the potential consequences of child subsidies. Before summarizing the reviewed evidence, it is important to highlight that none of the analyses takes the financing part

²¹ The evidence on the impact of tax credits on disposable income inequality is presented in the previous subsection.

into account. Hence, second-round effects would be only partially assessed. A further added limitation is that virtually all the early work in this area relies on evidence from developed economies. Hence, the potential redistribution impact of these policies cannot be extrapolated to low- and middle-income countries.

Prior research has evaluated the likely effects of four key family policy reforms on the distribution of income. First, the abolition of queues in the market for care in childcare centres seems to have little redistribution effect because it translates into very moderate effects on the working hours of the parents. By contrast, the withdrawal of the home care allowance has a direct effect of reducing disposable income of the beneficiary households. Although this effect is partially attenuated by the increase in the labour supply of the mothers, income inequality would increase (Kornstad and Thoresen 2006). An alternative policy would be the introduction of a variant of the working families tax credit in the UK, which seems to have strong effects on labour participation.²² Since the transfer is tested against household income, the poorest families benefit the most, not only from the direct effect of the subsidy, but also from the rise of women's working hours. In Italy, however, child benefits appear to be a more effective tool for redistribution than family tax credits (Gastaldi and Liberati 2009). The reason seems to be that, in this country, the credit tax rate is fixed, whereas in the UK the credit varies according to family income. These results are consistent with the empirical evidence found in other developed countries, including Sweden (Brink et al. 2007) and Australia (Kalb and Thoresen 2010).

Prior research also evaluated the impact of reductions in childcare fees on economic inequality. This policy would be more beneficial for high-income families because of the positive relationship between income and the use of centre-based childcare. Reduced childcare fees would encourage female labour supply, but this effect would not make income distribution more equal. Therefore, there might be trade-offs between the aim of redistributing incomes and the objective to attract more women to the labour market. In this sense, Nieuwenhuis et al. (2019) assess the impact of this type of family policy on female labour force participation in 18 OECD countries. Generous parental leave and public childcare services boost women's labour participation, which tends to reduce earnings inequality among coupled households because it is associated with lower earnings inequality among women. Family allowances and child benefits, however, do not seem to have a significant impact on female labour participation.

We move now to the analysis of the studies that evaluate the impact of the pension system on economic inequality. Pension systems are a fundamental force responsible for shaping income distributions and smoothing consumption over the lifetime by saving part of the earnings during the working life, so that retirees have access to an adequate level of income, but without generating distortions that interfere in the growth path or lead to intergenerational inequality. The most popular characterization of the notion of pension systems emerged from the World Bank's report *Averting the Old Age Crisis*, which defines three main pillars or tiers to support the system. The first pillar is a non-contributory basic pension that guarantees a minimum level of income in retirement. The second is a mandatory contribution that, in old age, benefits more those workers who contributed the most. The last pillar consists of voluntary savings that complement the retirement income from the previous two pillars.

Therefore, post-retirement income does not depend solely on individual savings, but on how governments distribute national savings. The final redistributive impact of the pension system is determined by the relative weight of the three pillars (Riekhoff and Järnefelt 2018). Since the first tier of the pension system is independent of earning history, it leads to status-levelling outcomes by reducing income disparities in the population after retirement. The second pillar of the pension system ties retirement

²² The working families tax credit consists of a basic credit that starts at 16 hours of work per week, which is complemented with an additional credit for those couples in which at least one member works 30 hours or more per week. The tax credit also includes a child credit complemented with a childcare tax credit if both spouses work at least 16 hours per week. The credit has an income taper rate of 55 per cent depending on the net family income adjusted for capital.

income to earnings history, which will perpetuate income disparities in old age. Finally, individual savings, the third pillar of the pension system, can lead to status divergence, thus reinforcing the economic disparities among retirees.

Governments in advanced and emerging economies have enacted or are currently considering integral structural reforms of their pension programmes. The aim of this reform is to restrain the increase in pension deficits caused by low fertility and rising longevity. To ensure financial solvency of the state pension system, most governments have proposed a shift from a pay-as-you-go tax-financed system, in which savings on current workers are distributed to retirees, to a mixed formula that combines elements from the last two tiers. The prominent place of investment-based accounts in the reformed pension system of developed countries weakens the redistributive character of pension programmes, which results in higher economic inequality (Been et al. 2017).

The potential distributional effect of pension systems has been the subject of empirical evaluations in several countries. Findings from previous studies agree that shifts from a defined-benefit system towards a quasi-actuarial defined-contribution scheme would reduce intragenerational redistribution, hence increasing the levels of inequality among retirees (Fasang 2012; Lindbeck and Persson 2003; Piirits and Vörk 2019; Tyrowicz et al. 2018). Fortunately, this is not associated with higher consumption inequality. A potential explanation for this result is that households use assets to smooth consumption over their life cycle (Sánchez-Marcos and Bethencourt 2018).

Within the defined-benefit scheme, the way pension benefits are calculated when considering heterogeneous work histories and age-earnings profiles can have important consequences in terms of income redistribution (Le Garrec 2012). The extension of the reference period used to compute the amount of this benefit seems to have an equalizing effect on lifetime disposable income distribution (Klazar and Slintàková 2012). During the early years of a working career, people invest time to be trained—including higher education and job training—so this period is characterized by relatively low earnings. Thereafter, salaries increase thanks to the human capital investment acquired in the first period. Hence, age-earnings profiles typically rise, except for those workers who drop out of high school, whose age-earnings profiles are almost flat. Hence, the pension benefit for highly educated workers would be lower if the whole working history is considered, which leads to a decrease in income inequality.

An increase in the normal retirement age is an effective measure to alleviate some pressure exerted by the demographic transition to an ageing population on the pension systems. This reform would create financial incentives to postpone retirement. However, since the labour market of the elderly is generally rationed, the impact of this measure on the labour supply might not increase one-to-one (Etgeton 2018). Low-skilled individuals have fewer possibilities to adjust their retirement age because they are more likely to experience involuntary job loss. This reform, therefore, would contribute to increasing economic inequality. This potential negative effect can be ameliorated with a flexibilization of early-retirement conditions (Echevarría and Iza 2011).

Most public pension plans in developed countries include a minimum pension benefit to mitigate poverty in old age, which would have an equalizing effect among retirees. This impact, however, might be offset by the distortionary effect of a tax-financed scheme. Simulations on the US economy show that, although the introduction of a minimum benefit would be beneficial to both high-ability and low-ability agents, median-ability agents always experience a welfare loss. Since most agents have ability levels close to the median, inequality remains constant or even increases for generous non-contributory pensions (Huggett and Ventura 1999). Other non-contributory elements of the US pension system, including spousal and survivor benefits, which work as a minimum benefit for second earners, seem to be determinants in mitigating income-related disparities (Sánchez-Marcos and Bethencourt 2018).

The belief that social pensions represent a fundamental part of national social protection systems has spread beyond developed countries. In South Korea, major welfare programmes, such as the Basic Living Security System and the Basic Elderly Pension, were introduced or expanded after 1997. Despite these major efforts to improve the coverage of social protection, only a select group of retirees with relatively secure and long work histories joined the National Pension System. Since a large proportion of the elderly population does not receive any form of public pension, the introduction of public pensions in this country has not yet helped to mitigate inequality and poverty in old age (Hwang 2016). The Old Farmer Pension Program, introduced in Taiwan in 1995, contributed to increasing economic inequality. After 10 years, the government introduced a second wave of reforms in the programme that increased the coverage and the amount of payments, adjustments that effectively helped to mitigate household income inequality. Improvements in population coverage—either through contributory pensions or the establishment of non-contributory old-age benefits—appear to be an effective tool to reduce economic disparities in other middle-income countries such as Mexico (Antòn 2012).

5.2 Labour market interventions

Table 4 provides a summary of the reviewed studies according to the types of labour policies identified in the analysis. The studies are also disaggregated by inequality measure and the development level of the countries involved in the analysis. About one-quarter of the reviewed studies analyse the role of minimum wages in the evolution of earnings and household income inequality. Among those studies, only Wu et al. (2006) consider relative and absolute inequality measures, finding that their results were robust to the measure used to evaluate income inequality. Their estimates suggest that the effects of raising the minimum wage are different for rural and urban areas. Variations in the minimum wage significantly increase the level of household income inequality, but only in urban areas of the USA. Raising the minimum wage has a distortionary effect on employment, which is disproportionately concentrated among low-income families. The establishment of a minimum wage would only increase the earnings of low-skilled workers, with the corresponding response of the labour supply to higher employment costs that would raise unemployment in this sector. Their results also suggest that this policy had no impact on income dispersion in rural areas. The minimum wage law is less likely to be enforced in rural areas (Devarajan et al. 1997), which is why agricultural workers are more likely to be paid less than the minimum wage (Moretti and Perloff 2000). Hence, distortionary costs of this kind of regulation are limited due to noncompliance, thereby minimizing their impact on both unemployment and income distribution.

Table 4: Types of labour policies and inequality measures

	Minimum wage	Unions	Active policies	Passive policies	Other policies
<i>Inequality measure</i>					
Gini index	6 (20%)	3 (10%)	2 (7%)	2 (7%)	3 (10%)
Distribution sensitive	3 (10%)	0 (0%)	0 (0%)	1 (3%)	0 (0%)
Coeff. Variation	2 (7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Quantile ratios	0 (0%)	5 (17%)	1 (3%)	1 (3%)	0 (0%)
Absolute measures	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Other measures	3 (10%)	3 (10%)	5 (17%)	0 (0%)	1 (3%)
<i>Development level</i>					
Developed countries	4 (13%)	11 (37%)	7 (23%)	4 (13%)	2 (7%)
Developing countries	2 (7%)	1 (3%)	0 (0%)	0 (0%)	1 (3%)
Economies in transition	0 (0%)	1 (3%)	0 (0%)	0 (0%)	1 (3%)
<i>Total</i>	7 (23%)	11 (37%)	6 (20%)	3 (10%)	4 (13%)

Source: authors' compilation.

Even though the establishment of a minimum wage seems to be detrimental for income disparities, other studies suggest that this policy might have a positive, although limited, impact in advanced nations (Shin 2019). Gilbert et al.'s (2001) simulations indicate that the implementation of this type of labour regulation in the UK at the beginning of the 1990s would have reduced household income inequality, with

the decrease far steeper in remote rural areas. The equalizing effect of this policy would have halved in well-connected rural areas, which would have experienced similar reductions to those observed in urban areas. The mixed empirical evidence might be mainly explained by methodological issues. The simulations of the impact of imposing a minimum wage in Gilbert et al. (2001) are based on the assumption that compliance level would be the maximum, so all workers would earn at least the minimum wage. More importantly, this analysis does not account for the distortionary effects of enforcing the minimum wage law.

Using the same type of methodology, Atkinson et al. (2017) simulated the impact of an increase in the national minimum wage in the UK. Although 22 per cent of the households would see some income gain (with an increase from £6.31 to £9.15 if living in London, or to £7.85 for those living outside London), the immediate impact of this policy is relatively modest, with only a marginal reduction of the Gini coefficient, from 31.9 to 31.7. This partly reflects the fact that minimum wage low-paid workers are evenly distributed across the household income distribution since many of them are teenage employees from relatively well-off families (Burkhauser et al. 1996). A further explanation of the limited equalizing effect of the increase in the minimum wage is related to some features of the tax-transfer system. Some of the gains from the higher wage might be offset by the withdrawal of means-tested benefits.

The potential effects of minimum wage regulations are not necessarily the same in developing countries. Bogliacino and Rojas-Lozano (2017) analyse the determinants of income inequality in 17 Latin American countries, including fiscal variables (direct and indirect taxes and social expenditure) and labour market variables (the labour share, minimum wage, the proportion of informal workers) as potential determinants of the evolution of income disparities. Their results suggest that only the minimum wage is negatively correlated with the Gini coefficient. This is consistent with the results reported by Cornia (2010) and Brito et al. (2017), which suggest that minimum wage regulations contributed by about 64.5 per cent to the reduction of inequality in Brazil since 1995, with the impact of this policy being particularly large in poorer areas. The different effects of minimum wage regulations in developing countries might be partly explained by different elasticities of labour demand and supply and the size of the informal sector that affects the level of noncompliance.

Much of the work in this area was directed at disentangling the relationship between unionization and economic inequality. Unions are considered key market actors that might affect income inequalities for two reasons: first, unions' strength may help to reduce within-firm earnings differences (Card 2001); second, unions may push for the implementation of public policies favouring the less affluent (Greenstone 1969), which would prevent the increase in inequality.

Volscho and Kelly (2012) found that unionization density has long-term effects on the evolution (reduction) of the top 1 per cent in the USA. Hence, the growth of earnings at the very top of the distribution can be partially explained by declining union strength because collective bargaining traditionally restrained the compensation of corporate executives. The extant scholarship also suggests that union density might be an equalizing tool in other OECD countries (Darcillon 2016; Golden and Wallerstein 2011; Koske and Wanner 2013). These studies, however, rely on cross-sectional data, being potentially biased due to omitted variable bias and simultaneity. Indeed, studies drawing on panel data techniques report different findings. For the USA, Jacobs and Myers (2014) find that the proportion of workers in unions reduced household income inequality only before 1981. Kogan (2017) uses the different timing of the implementation of Right to Work legislations in different US states to identify the effect of weakened unions and income inequality, but finds no statistically significant effect.

A further explanation for the lack of relationship between unionization and income inequality in advanced industrial societies is that union coverage plays a larger role than union density (Golden and Wallerstein 2011). Wage setting also seems to impact negatively on income inequality, although the effect of this kind of labour regulation is closely tied to the influence of unions in the wage-setting process

(Oliver 2008). The larger the proportion of wages determined in a centralized manner, either through collective bargaining or parliamentary action, the lower the level of earnings inequality.

The reviewed literature also suggests that employment protection would be an effective policy to deal with income inequality (Darcillon 2016; Dosi et al. 2017). Labour market regulations could potentially reduce income inequality in both developing countries (Adams and Atsu 2015) and advanced nations. Darcillon (2016) examined the effect of the deregulation of the labour market in Germany, known as the Harz Reforms. The immediate effect was the fall in the reservation wage, thus reducing unemployment by creating new and cheaper jobs in the non-tradable sector. As a result, the Harz Reforms lowered unemployment at the cost of increasing inequality.

We move now to passive labour market policies, such as unemployment benefits and early-retirement compensation. Despite the high cost of passive labour market policies, unemployment benefits are far more prevalent in the OECD countries than active policies (Vanhoudt 1997). This type of policy might distort incentives to work, including the effort and time devoted to job search, because unemployment benefits make them more reluctant to accept low-paid employment (Rueda 2015). A rise in unemployment would increase market income inequality through wage competition in low-skill or low-wage sectors. Disposable income inequality would also increase because unemployment benefits do not provide a full replacement for lost wages. However, Rueda (2015) finds no significant relationship between passive labour market policies and the level of unemployment, which suggests that inequality does not seem to be affected by the generosity of unemployment benefits (Rueda 2015; Vanhoudt 1997).

Despite the lack of empirical support arguing against passive labour policies, in the 1990s the debates about the welfare state were dominated by arguments emphasizing the need to move from passive policies, which cover for potential risks that arise from the social and demographic transformation of families, to active measures, directed at avoiding these risks by investing in human capital and addressing possible market failures. Active labour policies include short-term subsidies to unskilled-intensive non-tradable sectors combined with a pro-skill education and training programmes, which boost employment without lowering wages. The main argument in favour of active policies was to compensate for the increase in unemployment generated by passive policies and, if possible, to mitigate their costs (Vanhoudt 1997).

In line with this argument, the German government in 2005 reduced the duration of unemployment benefits and the level of social assistance. Heer (2006) evaluated the impact of this policy on the earnings distribution. Although Heer's (2006) results show only a marginal increase in the Gini coefficient, complementary simulations suggest that further reductions in the level of unemployment benefits would have increased inequality substantially because the limitation of unemployment benefits, either by reducing their generosity or by making eligibility more difficult, would push individuals into low-pay employment. Hence, the limitation of social benefits should simultaneously involve the implementation of active labour market policies to mitigate the potential negative impacts on income distribution.

However, the success of active labour programmes in the reduction of inequalities crucially depends on their design. Transfers conditional on being employed may generate a more equitable distribution than unconditional ones (Kolm and Tonin 2015) because workers are willing to accept lower wages, which leads to job creation and lowers the unemployment rate and boosts participation. Hence, although the absolute income gap between workers and unemployed would be larger with conditional transfers, the more positive labour market conditions lower the share of the population with low income, thus making the overall income distribution more equitable. The impact of this type of labour programme, however, seems to vanish once the subsidy is no longer available. Bitler et al. (2008) evaluated the impact of a generous earnings subsidy for full-time work directed at single-parent recipients of welfare benefits on the gross earnings at different parts of the distribution of the participants under the Self-Sufficiency Program in Canada. Their results point towards an equalizing effect of this policy, but only

while the programme was active. Hiring subsidies, instead, weaken inequality levels by bringing long-term unemployed back to work, which has much stronger effects on economic disparities (Brown et al. 2011).

Training and employment programmes seem to have long-lasting effects on income distribution. The immediate effect of employment programmes would be positive for those individuals who would not have found a job without the programme's assistance (Friedlander and Robins 1997). On the contrary, the effect of this programme on the top quantiles is negative. The emphasis on rapid employment may reduce the earnings of the most able participants because the programme pushes them to accept less attractive jobs than those that they ultimately would have taken after a longer job search. Autor et al. (2017) examined the effect of Detroit's Work First Program, directed at placing individuals rapidly into jobs. Using a sample of 30,500 individuals, their estimates suggest that direct-hire placements significantly increase earnings after the programme was no longer available for half of all placed participants. However, temporary help placements have zero or negative effects on the earnings distribution, which are significantly large for the top quantiles.

The reviewed evidence therefore casts doubt on the efficacy of employment programmes that focus solely on helping individuals to find a job quickly. Alternatively, the income effects of training programmes seem to be spread along the distribution with a positive impact on the earnings of all individuals (Friedlander and Robins 1997). However, the benefits of the programme are concentrated above the median, which raises income inequality.

5.3 Education policies

Table 5 presents the types of education policies examined in the studies included in this review. We also identify the inequality measures that are used for the analysis and the development level of the countries involved. While the positive correlation between education and earnings at the individual level is a well-established fact in the economic literature, the empirical evidence of its impact on economic disparities is still mixed. Most prior research on the effects of education expansion points towards the possibility that higher levels of education are observed in more unequal societies (González and Martner 2012; Panori and Psycharis 2019). However, this positive impact of education on economic inequality has been strongly questioned by other studies that found in the expansion of educational levels an effective equalizing tool (Gregorio and Lee 2002; Lin 2007).

Table 5: Types of education policies and inequality measures

	Education distribution	Public spending	Voucher	Compulsory education	Other policies
<i>Inequality measure</i>					
Gini index	14 (29%)	13(27%)	4 (8%)	0 (0%)	1 (2%)
Distribution sensitive	3 (6%)	1(2%)	1 (2%)	0 (0%)	0 (0%)
Coeff. Variation	1 (2%)	0(0%)	2 (4%)	0 (0%)	0 (0%)
Quantile ratios	3 (6%)	1(2%)	1 (2%)	0 (0%)	1 (2%)
Absolute measures	1 (2%)	3(6%)	2 (4%)	0 (0%)	0 (0%)
Other measures	5 (10%)	1(2%)	0 (0%)	3 (6%)	1 (2%)
<i>Development level</i>					
Developed countries	10 (20%)	10(20%)	0 (0%)	1 (2%)	0 (0%)
Developing countries	15 (31%)	5(10%)	1 (2%)	1 (2%)	0 (0%)
Economies in transition	4 (8%)	1(2%)	0 (0%)	0 (0%)	0 (0%)
<i>Total</i>	24 (49%)	17(35%)	5 (10%)	3 (6%)	3 (6%)

Source: authors' compilation.

The existence of a non-linear relationship seems to reconcile the previous empirical evidence on the impact of education on income inequality. Josifidis and Supic (2019), using a sample of 35 developed countries, found that investments in human capital tend to equalize the income distribution first, but there is a turning point above which overinvestment in education raises income inequality. The inclusion of

developing countries in the sample seems to invert this U-shaped pattern (Bergh and Fink 2008). The variation in the results observed in the literature stems from the confluence of two forces with opposite impacts on the distribution of income (e.g. Yang and Gao 2018). The structure effect has a negative impact on inequality because education expansion allows a wider range of individuals to attend higher levels of education, associated with better wages in the future, hence promoting increased economic inequality. If the demand for highly educated employees does not outstrip supply, the increased proportion of high-skilled workers would lower the returns of higher education, hence reducing the wage gap with the less-educated individuals. This is defined as the price effect. The impact of education expansion on earnings inequality would, therefore, depend on the magnitude of these two effects.

Despite the ambiguous effect of education on economic inequality, the extant literature suggests that compulsory education contributes to the compression of the earnings distribution (Brunello et al. 2009; Eckstein and Zilcha 1994; Yang and Qiu 2016). Besides the innate ability, compulsory years of schooling are key to explaining economic inequality (Yang and Qiu 2016). Brunello et al. (2009) find that compulsory reforms mainly affect individuals at the left tail of the distribution of educational attainment. Their estimates also suggest that, conditional on ability levels, additional schooling reduces wage dispersion.

Because tertiary education is very sensitive to the structure and price effects, prior research furnishes mixed empirical support for its impact on economic inequality. Some studies suggest that the promotion of higher education seems to have a negative impact on economic inequality. Koske and Wanner (2013) use Bayesian analysis to identify a negative relation between college education and earnings differentials. Ferreira et al. (2008) found that the increase in household income inequality in Brazil during the 1980s was mainly attributed to the increase of tertiary education attainment. Hence, the climbing levels of inequality are due to the disequalizing structure effect of the expansion of education. However, Arabsheibani et al. (2006) and Shimeles and Nabassaga (2017) found that, even though the top quantiles of the income distribution are characterized by higher returns of education, this does not necessarily result in higher inequality levels. This pattern seems to be particularly prevalent in developing countries, where greater disparities in the rates of returns concurred with labour market-rewarded endowments, which partially offset the structure effect. In the long term, the greater supply of college graduates contributes, albeit with a delay, to the containment of wage differentials between higher-educated and lower-educated workers (Fortin 2006). Hence, the fall of returns to skill caused by the price effect stands out as the predominant force in the observed decrease of economic inequality (Sotomayor 2004).

Prior studies suggest, therefore, that increasing college education might have long-lasting effects on income distribution that are different from the immediate impact of this policy. Human capital accumulation leads to an increase in the wages of the high-skilled employees, but stagnates or even lowers the earnings of low-skilled workers, which results in an increase in inequality. The effect of this policy, however, eventually trickles down due to the complementarity of different types of human capital and a potential increase in human capital devoted towards R&D investment for producing low-skilled labour-intensive goods (Böhm et al. 2015). Consistent with this theory, Qazi et al. (2018) found evidence that suggests that the promotion of tertiary education plays no role in the containment of economic disparities in the short run in Pakistan, but, in the longer run this policy has an equalizing effect.

Besides the structure and the price effect, in the case of higher education, the so-called quality effect also seems to play an important role in the definition of inequality levels (Fortin 2006). However, the impact of this effect on economic inequality is not unambiguous. A greater proportion of university graduates among the college-age population could lead to more skill heterogeneity among college graduates, thus enhancing wage differences within this labour group. Increased skill heterogeneity might simultaneously lower the pressure on the college premium, thus reducing wage inequality (Juhn et al. 2005).

Silos and Smith (2015) examined whether skill heterogeneity of college graduates is a relevant factor in the evolution of income inequality. Mandatory specialization, which results in homogeneous highly skilled workers, generates lower earnings but also helps to control the level of wage dispersion. On the contrary, a flexible system that allows for more diversification in the skills of college graduates produces a trade-off between higher earnings and a marginally more unequal income distribution. The equalizing effects of standardization in education are also observed for the compulsory level. The introduction of a central examination is correlated with lower inequality (Checchi and van de Werfhorst 2017).

Prior research has also investigated the impact of educational inequality on income disparities. Overall, cross-sectional studies suggest that larger differences in educational attainment lead to higher levels of economic inequality (Gregorio and Lee 2002; Lee and Lee 2018; Lin 2007). Developing countries seem to be more sensitive to changes in educational inequality (Coady and Dizioli 2018). The quality of education also seems to be a key factor explaining the level of economic inequality. Checchi and van de Werfhorst (2017) found that inequality in the quality of education affects inequality in earnings, even controlling for inequality in quantity.

The recognition of education as a key driver of economic inequality goes some way towards explaining the large body of research that focuses on the impact of education expenditure on income disparities. In this sense, it is essential to define the level or levels of education that should be financed by the public sector. There exists a lower bound on funding basic education because it is required for attending higher education. Once this premise is satisfied, the decision on allocation of funds for basic and advanced education would be strongly conditioned by the level of development of the economy. Contrary to the current policies implemented in most developing countries, for an economy in its early development stage, focusing on basic education for a sufficiently long period is the only way out of polarization (Su 2004). Moderate investments in basic education would only benefit the richest through a highly exclusive advanced education system, which would lead to a more unequal distribution of income. This pattern also applies to developed economies, but because the entire population has at least medium qualifications, fewer funds need to be directed at financing basic education to decrease inequality levels.

Koutsampelas and Tsakoglou (2015) examine the short-run distributional effects of public investment in education in Greece. Their estimates indicate that public spending in education at all levels contributes to lower relative inequality. This result is robust to the consideration of absolute inequality measures for basic education. For secondary education, transfers have an ambiguous effect, but appear to be clearly regressive for advanced education. Bergh and Fink (2008) found that public subsidies to higher education have no significant impact on income inequality for a sample of 120 countries. This result suggests that the private benefits of college education are high enough to promote enrolment in rich countries in the absence of public support. It should be noted, however, that this does not necessarily apply to the subsidization of primary schooling. The most effective way to reduce economic disparities is to subsidize compulsory education, and especially for children from low-income families. Subsidies to poor parents would mitigate poor families' budget constraints, thus enhancing educational investment that would result in an increase in the quality of that education (Yang and Qiu 2016).

Educational vouchers, conceived as a mechanism for expanding the opportunities of poor children to attend private schools, generally tend to increase wage inequality (Cardak 2005; Chen 2005). However, the consideration of peer effects may weaken or even overturn the results (Caucutt 2004). Bravo et al. (2010) examined the changes in economic inequality after the school reform in Chile, which introduced a nationwide school voucher programme. Their estimates suggest that this reform leads to a modest decline in inequality. The reform increased the returns to primary education, which unambiguously raised earnings for individuals at the bottom of the distribution. Returns to secondary education, instead, declined, thus reducing the earnings of the population around the median. Both forces tend to compress the distribution of earnings.

6 Conclusions and future research agenda

Our study contributes to the growing literature on relative and absolute inequality by conducting a systematic review of the empirical literature on the measures to mitigate both types of inequality. In doing so, we have reviewed the available empirical knowledge published between January 1990 and June 2019, with a particular focus on four policy areas: tax policies, social protection policies, labour market interventions, and education policies. Further, we suggest in this concluding section potential future research avenues, thereby contributing to the further understanding of potential beneficial effects of public policies on reducing inequality.

A number of important conclusions can be drawn from the systematic review of the literature. First, our systematic review indicates that most of the scholarship dealing with the impact of public policies on inequality has rarely focused on measures of absolute inequality, even though there might be substantial differences in inequality trends in the function of the measure of inequality used (e.g. Ravallion 2018).

Second, it seems that much of the conflicting evidence on the relationship between redistribution and inequality arises from analysing different approaches to redistribution separately. Most of the existing scholarship on the impact of government expenditures on income distribution relies on evaluations of the incidence of the allocation and distribution of taxes and government expenditures on the distribution of disposable income. This technique is also deployed to examine the trends in redistribution over time. Despite being a simple and intuitive approach, insights derived from these studies should be interpreted with caution. Furthermore, an important drawback of this method is that behavioural responses to changes in tax or social protection policies are not evaluated. Empirical studies found, however, that first-round effects account for a large share of the variation in the distribution of income. For instance, Herault and Azpitarte (2016) found that the direct effect of redistribution accounts for half of the observed increase in income inequality in Australia, whereas behavioural changes in response to tax reforms were marginal. Thoresen's (2004) estimates suggest that behavioural responses to lower marginal tax rates seem to have little or no effect on pre-tax income inequality. The first-order approximation is reasonably accurate for small variations in marginal tax rates with inelastic demand, typically observed in labour supply functions in incidence analysis, at least in the short run (Gravelle 2003). Top income earners, however, are characterized by higher elasticity of taxable income, hence changes in the top tax brackets do lead to substantive behavioural change (Alvaredo et al. 2013; Hatch and Rigby 2015). Studies that deploy general equilibrium models to evaluate indirect effects of social and fiscal reforms tend to focus on the efficiency implications, with a very limited analysis of the impact on income distribution. A further added criticism directed at this type of model is the large degree of arbitrariness in the definition of the underlying utility and production functions.

Another potential source of bias in most scholarship on redistributive impacts of welfare states is that in-kind transfers are rarely considered. In developing countries, in-kind transfers in education and health seem to reduce inequality more than cash transfers (Lustig and Pereira 2017). The consideration of in-kind transfers is also crucial in the analysis of welfare systems in developed countries. Even though the consideration of in-kind transfers does not affect the overall picture, which presents Scandinavian countries as the most equal and the USA as the most unequal, cross-national differences in the redistributive impact of welfare systems are substantially reduced (Garfinkel et al. 2006). Hence, besides data from household income surveys, studying the impact of redistribution policies requires the imputation of this type of benefit (Whiteford 2010).

Furthermore, prior studies of social policies have extensively used decomposition techniques. This statistical technique allows analysis of the overall impact of public policies, but first- and second-round effects are not properly identified. Another potential limitation is that inequality decomposition by sub-

groups or income sources restricts the analysis to measures with particular decomposability properties. Finally, inequality decomposition does not allow studying the isolated effect of policy changes, since the potential impact of a given policy is analysed jointly with its interaction with the underlying population. Hence, this method does not identify whether higher levels of redistribution are a consequence of an increase in the generosity of the welfare regime, or just because of an automatic increase in social spending from major programmes, such as unemployment or pension benefits.

Another important drawback of existing studies is that many of them rely on secondary datasets that collect data on income distribution based on different income concepts, equivalence scales, and units of analysis. The consequences of such heterogeneity of income distribution indicators for policy evaluation are crucial. Using these datasets, it is not possible to assess unambiguously the actual evolution of inequality or to make cross-country comparisons (Atkinson and Brandolini 2001). In addition, the use of heterogeneous data would weaken standard econometric analyses of the impact of government interventions on income inequality, since the introduction of measurement error in the dependent variable could bias the estimates. Following from this, the use of secondary data could be particularly problematic in developing countries, where the informal sector is often large. As a result, inequality estimates from surveys or national statistics might be biased upwards—for example, accounting for households' own production and income from the informal sector halves the Gini index in Indonesia (Nugraha and Lewis 2013).

Finally, one of the main methodological limitations we found in most of the reviewed studies is the lack of a credible identification strategy. Unfortunately, the problem of bi-directional causality, among other endogeneity issues, and the lack of credible identification limits the extent to which we have good causal estimates of the impact of public policies on reducing inequality. Improvements in empirical research standards for credible identification of the causal impact of public policies on inequality would undoubtedly help to cast light on the effectiveness of public policies regarding inequality.

6.1 Future research agenda

Based on the results of the review, we now outline possible future methodological and empirical avenues to further increase our understanding of how public policies shape inequality.

First, given that the picture that emerges using absolute measures of inequality seems to be different from the results obtained using relative inequality measures (Niño-Zarazúa et al. 2017), along with the very few empirical studies using such absolute measures, more research is needed to pinpoint the processes through which public policies shape absolute inequality. Following from this, another important direction for further research would be to apply sensitivity tests to different equivalence scales. For example, Reinbold (2016) examines the impact of considering the size of the household. Taking individuals instead of families as a unit of analysis provides a more optimistic picture, in which taxes and transfers present more redistributive power. In a similar vein, Creedy et al. (2010) compare the redistributive impact of taxes and transfers using equivalized household income and per capita household income. When the equivalence scale is used, both taxes and transfers are similarly redistributive, but the estimates for household income per adult suggest that transfers seem less redistributive than taxes. These contrasting results might be explained by the composition of transfers in New Zealand, dominated by the Working for Families Tax Credit, which strongly depends on the number and the age of the children in the family. Despite the particularities of the New Zealand case, this analysis reveals the key role of considering different methodological choices in the estimation of inequality, so policy-makers can understand the actual impact of programmes on household income.

Next, the impact of tax policies, labour market interventions, and social and education policies largely remain under-researched in developing countries, particularly in sub-Saharan Africa. Mitigating in-

equality is an important challenge in developing countries, where institutions and public services, such as education and healthcare, are often too low quality (World Bank 2019).

Finally, we explicitly recognize in this review the fact that there are important methodological issues in the study on how public policies affect inequality. This calls for caution regarding using many of the analysed studies to infer causal relationships. For these, we suggest potential routes forward, such as the use of both experimental and quasi-experimental techniques. Over the past two decades, the number of policy evaluation studies using credible identification strategies, both experimental and quasi-experimental, has increased substantially in many fields, and constitutes nowadays what has been called the ‘empirical revolution’; hence, we encourage researchers aiming to study the relationships discussed in this paper to put time and effort into designing strong and credible empirical strategies.

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