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GINI

INEQUALITIES' IMPACTS

State of the Art Review

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APRIL 2011

GROWING INEQUALITIES' IMPACTS

May 2011

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Inequalities' Impacts

State of the Art Review 1

May 2011

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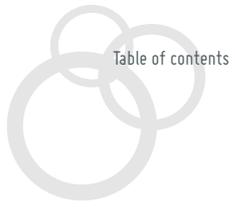


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By way of introduction

This report provides the firm foundation for anchoring the research that will be performed by the GINI project. It subsequently considers the fields covered by each of the main work packages:

- inequalities of income, wealth and education,
- social impacts,
- political and cultural impacts, and
- policy effects on and of inequality.

Though extensive this review does not pretend to be exhaustive. The review may be “light” in some respects and can be expanded when the analysis evolves. In each of the four fields a significant number of discussion papers will be produced, in total well over 100. These will add to the state of the art while also covering new ground and generating results that will be incorporated in the Analysis Reports to be prepared for the work packages. In that sense, the current review provides the starting point.

At the same time, the existing body of knowledge is broader or deeper depending on the particular field and its tradition of research. The very motivation of GINI’s focused study of the impacts of inequalities is that a systematic study is lacking and relatively little is known about those impacts. This also holds for the complex collection of, the effects that inequality can have on policy making and the contributions that policies can make to mitigating inequalities but also to enhancing them. By contrast, analyses of inequality itself are many, not least because there is a wide array of inequalities; inequalities have become more easily studied comparatively and much of that analysis has a significant descriptive flavour that includes an extensive discussion of measurement issues. @GINI hopes to go beyond that and cover the impacts of inequalities at the same time.

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1. Measurement of input distribution and redistribution

Virginia Maestri, Elena Meschi and Francesco Scervini

1.1. Introduction

Inequality is a well-known and intrinsically clear concept in the policy debate. Nevertheless, though the idea and the current picture of inequality (and poverty), as provided for instance by *Growing Unequal?* the extensive 2008 report by the OECD¹ which serves as a source of inspiration and benchmark for GINI, shows little ambiguity, a deeper understanding of the causes, consequences and patterns of income dispersion calls for a clearer and more explicit definition of what different measures of inequality convey. We start with a summary consideration of this issue to provide a good starting point for the remainder of the chapter. The aim of this report, or of the GINI project as such, is not to go beyond the state of the art with regard to the precise measures of inequality; instead we hope to improve upon the existing practice of measurement by paying attention to the details – where we know the devil resides – by requiring uniformity of measurement across subjects and countries where we can, and by stimulating coherence between measurement and method.

The very first step of inequality studies, the measurement of inequality, involves four main “dimensions”:

1. the nature of the many indexes used as synthetic inequality measures of input distribution;
2. the sources of the inputs that are the object of the inequality measurement and the “items” included in those “sources”;
3. the recipient unit of the input and the equivalence scale (to be) applied for comparability of those inputs across such units;
4. the “dynamics” of the measurement (cross-sectional, time trend, lifecycle, intergenerational mobility).

The four “dimensions” of inequality represent, to some extent, preferences of the researcher and/or constraints imposed by the available data. Nonetheless, all these aspects are very important for the interpretation of inequality measures, and the choice that is made at each step should be taken into account when drawing conclusions about the inequality drivers and their effects, when comparing different countries and/or studies and when “quantifying” the extent of inequality.

¹ Extensively cited below, simply as *Growing Unequal?*



In the rest of this section we provide some (non-exhaustive) insights into each of the four “dimensions” of the measurement of input distribution. Although the analysis of the dispersion can endorse both the more general concept of inequality and the more specific but certainly not less important concept of poverty, we will focus mostly on the former for the purpose of this review and touch upon the latter when relevant. This report covers economic inequality – defined over purely economic variables such as income, wealth or employment – as well as educational inequality – defined over educational accomplishments as such – and specifically discusses the differences in the nature of each of these.

1.2. Indexes of inequality

This section illustrates a set of widely used indices of inequality, briefly mentioning their pros and cons. It is beyond the scope of this work to discuss the problems and the properties of the different measures in details. For thorough reviews of these issues, we refer to existing detailed overview (e.g. Jenkins and Van Kerm 2009; Cowell 2000) and to the classical papers by Theil (1967), Atkinson (1970), Bourguignon (1979), Dasgupta, Sen and Starrett (1973).

The **standard deviation** ($\sigma_x = \sqrt{\frac{\sum_i (x_i - \mu)^2}{N-1}}$) is the mean distance between every observation and the population mean. It is a very simple index that fits well with almost any kind of variable, and it is thus widely used in empirical research. As all synthetic measures of inequality, it does not provide information on the distribution of the investigated variable and hence it is not useful to detect changes at particular points of the input distribution (e.g. the tails) A drawback of this measure is that it is not scale invariant: it depends on the length scale of the unit of measure (e.g. the standard deviation of earnings is different whether one measures it in euro or Hungarian forint).

The **coefficient of variation**, and its half-squared variant (HSCV), is simply the standard deviation normalized for the mean value of the population.

The **variance of logarithms**, and also its half squared variant, is another measure of dispersion. This statistic has the property of decomposability but it excludes zero values.

The **Gini coefficient** ($G_x = \frac{1}{2N} \sum_i \sum_j \frac{|x_i - x_j|}{N^2}$) is based on the pairwise distance between individuals, making it particularly sensitive to changes around the mode. In other words, the distance between individuals with income around the mode, representing most of the population, determines to a large extent the level of inequality. However, the appealing interpretation of the Gini index as the area between the Lorenz curve on the one hand and the perfect equality line makes it very popular in different contexts but alas often its suitability for the purpose is not

discussed. The particular sensitivity of the Gini coefficient to changes around the mode makes it particularly unsatisfactory when looking not only at categorical ordinal variables, such as educational attainment², but – to some degree – also at low-varying cardinal variables, such as years of education, since the relative distance is zero in a non-negligible number of observations and the mode does not change continuously

The set of generalized **entropy indices** includes the well known **Theil index** ($T_x = \frac{1}{N} \sum_i \left(\frac{x_i}{\mu} \ln \frac{x_i}{\mu} \right)$, coefficient=1) (Theil 1967, Conceicao and Ferreira 2000) and the **mean logarithmic deviation** ($T_x = \frac{1}{N} \sum_i \left(\ln \frac{x_i}{\mu} \right)$) (MLD). The difference between them is that the latter is more sensitive to changes in the left tail of the distribution, while the former is more sensitive to changes in the middle, analogously to Gini index. However, they share the main advantage of entropy indices, that is the exact decomposability: these indices allow to decompose inequality into the “within” and “between” group components with no residuals.

Nonetheless, a potential disadvantage of using logarithms of original variables is the automatic exclusion of zero values, which translates into the exclusion of people with zero incomes. Inequality indicators based on such exclusion obviously suffer from sample selection. Moreover, the exclusion of zero values embedded in all entropy indices make them more suitable for the measurement of e.g. hourly wages or earnings inequality than for income inequality, in particular when the recipient unit is the individual rather than the household. An alternative solution to avoid the exclusion of zero values is to (arbitrarily) scale up all values such that the zero values become positive values very close to zero.

Furthermore, as changes in the income distribution of the last decade occurred mostly at the top of the distribution, mean log deviation does not seem the most suitable inequality measure to assess inequality trends. However, other indexes of the entropy family (with a coefficient bigger than 1) are more sensitive to the higher end of the income distribution. With respect to education, it is meaningless to compute such indices for a categorical variable, while they perform well with the continuous-like measures of years of education and competences.

Analogous to general entropy indices, the **Atkinson indices** (Atkinson 1970), $A_x = 1 - \frac{1}{\mu} \left(\frac{1}{N} \sum_i x_i^{1-\alpha} \right)^{\frac{1}{\alpha}}$, vary according to a positive coefficient, the inequality aversion parameter. As entropy indices, they cannot include individuals with a value of zero for the underlying variable. Thus, also inequality indicators based on the Atkinson indexes suffer from sample selection and seem more indicated for measuring variables that cannot (or do not normally) take zero values (e.g. earnings for those in employment). With respect to education this is not a problem when looking at competences, but it could lead to an underestimation of inequality in years of education if there is a non-negligible share of individuals with no formal schooling. As the indexes of the entropy family, it has the

² In order to compare the concentration of categorical variables one can compare Lorenz curves and apply stochastic dominance tests.

advantage of being exactly decomposable (e.g. it allows the decomposition of inequality between/within groups with no residuals).

Decile or percentile ratios ($P_{p+n} / P_p = \frac{\mu_{p+n}}{\mu_p}$ or $P_{p+n} / P_p = \frac{\max[x_{1,p+n}, \dots, x_{N,p+n}]}{\max[x_{1,p}, \dots, x_{N,p}]}$) – and

also corresponding shares ($\frac{\sum_{i=1,p+n}^{N,p+n} x_{i,p+n} / \sum_{i=1}^N x_i}{\sum_{i=1,p}^{N,p} x_{i,p} / \sum_{i=1}^N x_i}$) – represent an intuitive and effective way to measure the dis-

tance between extremes, or the polarization, of a distribution. According to theoretical and empirical needs, one can compute ratios for the distribution at large by choosing percentiles close to the tails. Here the most common ratios concern P10/P90 or P25/P75 in case of high sensitivity to extreme values. Ratios can also be used for separate parts of the distribution such as the top (P99/P90), upper half (P90/P50) or the lower half (P50/P10), or even further entrenched within the distribution for considering its polarization by measuring the distance from or around the middle (e.g. P75/P25). In principle, it is possible to compute such statistics with all the distribution. However, ratios based on the tails of the distributions (e.g. 99th percentile) may be more sensitive to measurement error and outliers. In particular for educational inequality, one must be aware that since measure of educational attainment are not perfectly cardinal, the interpretation of the different ratios may not be straightforward.

One often used specific example of ratios and shares is the measure of two-thirds of the median wage as a definition of the upper boundary of low pay (Lucifora and Salverda 2009); similarly top incomes are defined as over and above the 90th, 95th or 99th percentile and, depending on data, also the top half-percent (P99.5) and one-tenth percent (P99.9) share (Atkinson and Piketty 2007; Leigh 2009).

A distinguishing characteristic of the P-ratios with respect to summary inequality measures such as the Gini coefficient, is that they provide information on the shape of the distribution more than on the overall level of inequality.

The individual relative position in the distribution was introduced by Checchi, Visser and van de Werfhorst (2010) as a measure of earnings inequality enabling the use of an individuals' position as an explanatory factor in analysing the impacts of inequality. It corresponds to the individual relative distance to the median, normalized by the median. Positions above or below the median are kept distinct in their paper. The measure can be used in combination with a macro-level indicator in a multilevel analysis (Steijn et al. 2010).

The last measure we mention is a simple “poverty” ratio, just computing the share of individuals below a given threshold. This measure is universal, inasmuch as it can be computed for every possible distribution and its meaning is self-defined. The Eurostat definition of poverty risk is households with income below 60% of median equivalised household income in the country. Note that this dispersion-based approach differs fundamentally from a definition of poverty based on defined needs to which an income is attached that may subsequently be related to the dispersion of incomes. This underlies the US approach to poverty, resulting in no less than 48 precisely defined poverty lines for the US population, ranging from \$ 10,000 to \$ 48,000 depending on size and composition of the household and based on the idea that needs will differ between them. Naturally, the equivalisation of household incomes in the European approach reflects the same principle.

Summary of pros and cons of inequality indexes:

- Gini coefficient provides a intuitive and synthetic measure of inequality, it is sensitive to changes around the mode, but not sensitive to variations in the tails;
- the indexes of the entropy family have the advantage of being exactly decomposable (with no residuals) but automatically exclude all zero values;
- P-ratios are an intuitive and effective way to evaluate the shape of the distribution

1.3. Sources of economic and educational inequality

The level and trend of inequality may differ for the same country according to the source, or type of input, for which inequality is being measured. For instance, Sweden has a high wealth inequality and a low income inequality. Moreover, the economic drivers of inequality may have different effects on different sources (as in the case of business cycles on earnings and income, see Section 4.4). The choice between different sources and the precision of cross-country comparability is often constrained by the availability of the data. For example, a potential contribution to inequality may be represented by employer social security contributions, that are often excluded from earnings statistics (as they obviously do not pass through the employee). However, a clear indication of the source considered and of the universe and items included considerably helps in interpreting the results.

Though in the current literature on inequality a precise definition of the source/items/universe of inequality considered is sometimes missing and the use of comparable sources weak, in the review presented in the next subsections we try, as far as possible, to identify the issues presented in the following “toponymy” and to endorse them in interpreting the findings in the literature. A notable example of a clear specification of the source/universe/

items of inequality considered in an attempt to improve the comparability of country-specific data is provided by the guidelines of the special issue of the *Review of Economic Dynamics* on “Cross-sectional facts for macroeconomists”. Herein, we offer a short overview on what we believe are important issues related to different sources of inequality.

1.3.1. Working hours, wage and earnings

As Blau and Kahn (2009) have shown, total earnings inequality can be decomposed into hours and wage rates. This holds, of course, mainly for measures based on monthly or yearly earnings and not automatically for measures based on hourly earnings. People who work longer hours earn more per month, and per year. This distinction is helpful in disentangling the contribution of hourly wage from that of the number of hours worked, as done by, among others, Krueger *et al.* (2009).

When studying earnings inequality there are some important caveats that need to be kept in mind. Firstly, it is important to distinguish the ‘distribution of what’ is the object of a study: wages, including or excluding bonuses and other extra payments; hourly, monthly or yearly earnings; gross or net earnings. The choice of source depends on the analytical use of the inequality measure as contributing elements may be differently determined. For example, hours of work may be subject to individual choice to a much larger extent than hourly earnings which are often heavily institutionally influenced. So the finetuning of labour-market effects of in/on inequality may choose to focus on hourly wages. At the same time earnings aggregated over hours to months or years correspond with incomes received by labour supply and are important if the analysis ventures that way. Annual earnings may provide a fuller measure of overall earnings (hourly wage times hours worked, including extra payments, bonuses etc.) and be less sensitive to transitory income components, though Atkinson and Bourguignon (2000) suggest their reporting may be more inaccurate than monthly earnings. By contrast, hourly earnings depend on the observation of such variables together with that of the hours of work and measurement errors may cumulate. Also hours of work are not a singular concept but may relate to contractual hours or include overtime, to hours usually worked or actually worked (because of e.g. illness). Finally, for the dispersion of hourly earnings there is a choice of unit or universe in the sense that the dispersion can be taken over the persons receiving (hourly) earnings or the hours paid c.q. the persons weighted by their hours of work.

Most analyses of earnings inequality exclude employers social security contributions – if only for reasons of data availability. However, including these can be important for future inequality as the example of pension contributions can demonstrate.



Secondly, it is important to specify ‘among whom’ these earnings are compared – salaried workers and/or self-employed, full-time and/or part-time employed. Atkinson (1999) has argued that inequality among those in work has to allow for the self-employed, whose importance in the distribution has been stressed by Goodman and Webb (1994), Jenkins (1995) and Parker (1996). Evidently, covering both full-time and part-time workers in the analysis makes little sense without the use of hourly wages.

However, sometimes the definition of earnings/wage and income depends on the universe considered: employees (generally, full-time and part-time) on one side, plus unemployed and self-employed on the other, such as to include all households, as in *Growing Unequal?* A critical aspect in the inclusion/exclusion of workers holding non-standard jobs classified as self-employed, generally excluded from earnings statistics.

1.3.2. Income

When one speaks about *income* inequality, what most people actually think of is rising *earnings* dispersion. This is also the aspect which has received most attention from the economics profession (Atkinson 1997; Atkinson 2008). But although the rise in earnings dispersion is a powerful contributing factor to the rise in income inequality, it is only part of the story. Earnings and income are often treated synonymously, but there are several steps in going from individual earnings to the income of families or households (Atkinson 1999). For instance in the *Growing Unequal?* the steps from earnings toward market income, for the calculation of inequality, are:

- the inclusion of self-employed;
- the inclusion of unemployed;
- the inclusion of income from capital (rent, dividends and interests).

Since *Growing Unequal?* focuses on the working age population only, this list can be extended with pensioners. Retired individuals are not included when calculating earnings inequality, but they can be included in calculations of income inequality.

The concept of income is better understood as overall income, from labour and from capital. In practice, capital income is generally underestimated in distribution data. A comparison with national account (for France) suggests that the Gini coefficient of household income could be underestimated by 2 percentage points (even before considering undistributed dividends or implicit rents) (Atkinson and Bourguignon 2000).

1.3.3. Wealth

The notion of (net) wealth corresponds to non-financial assets (principal residence, real estates), plus financial assets (deposit, bonds, stocks, mutual funds), minus debts. A considerable form of wealth that is often missing in wealth distributional analysis is represented by (public and private) pension assets³.

The existing literature on inequality focuses more on earnings and income inequality than on wealth inequality. The main reason of this imbalance is the lack of cross-country comparable time series of wealth data. If earnings are a source of wealth inequality (together with inheritances) and the returns from wealth are usually included in measures of income inequality, three issues remain underinvestigated:

- the correspondence between earnings and wealth at the individual level;
- the inclusion of non-monetary wealth sources in measures of economic inequality;
- the inclusion of non realized returns from net worth.

As for the first point, if at the aggregate level wealth inequality is (positively) determined by the income inequality (and the interplay with this and the ratio stock prices/house prices⁴), at the individual level the correspondence is not unequivocal. Indeed, *Growing Unequal?* shows that (equivalised household) income and wealth by quartile groups are correlated, but not perfectly: for example, about 5% of low-income people have high wealth. For the second point we refer to the next subsection. Finally, the third issue refers to a measure of comprehensive income as, in particular, expressed by Smeeding (2010) in his definition of More Comprehensive Income (MCI) such that it aims to include actual returns plus imputed returns to all forms of net worth. The MCI methods may also be useful for measuring overall income in case of misreporting of returns from capital and of tax evasion.

1.3.4. Non-monetary sources of income

Measures of inequality are generally based on a monetary concept of income. Nonetheless, as suggested first by the UN as early as 1968 (Frick and Grabka 2002) there are important non-cash components of income, such as imputed rent for homeowners and tenants with below-market rent⁵. Considering non-cash advantages bound in housing allows for a more comprehensive measure of economic well-being. The inclusion of imputed rent in the notion of income has, potentially, an impact on four dimensions of the income distribution and redistribution:

3 OECD and Eurostat are carrying out a survey on of occupational pension-scheme providers and large employers. Brugiavini et al. (2005) addresses some questions for the measurement of pension wealth.

4 The analysis of Wolff (1992) is based on US data from the 1970s to the late 1980s.

5 According to EU Commission regulation no. 1980/2003 (Frick et. al. 2008).



inequality, poverty, progressivity and reranking. Frick and Grabka (2002) distinguish four different methods to calculate imputed rent:

- *market value*: gross rent value is estimated by using actual rent values in the private market according to selected characteristics (type, size, year of construction, area of dwelling etc.);
- *capital market*: the market value of owner estimated housing (as assessed by the owner himself or estimated) is multiplied by a given interest rate on capital;
- *self-estimation*: the owner occupiers are asked directly which rent they would had to pay if they lived in their home as tenants;
- *opportunity cost*: is based on the market value of the rent, from which all owner related costs (maintenance, property taxes, mortgage interests, etc.) are deducted.

Table 1.1 Potential “item” coverage by method of rent imputation

	HOME-OWNERS	TENANTS	GROSS	NET
MARKET VALUE	x	x	x	
CAPITAL MARKET	x		x	
SELF-ESTIMATION	x	x	x	
OPPORTUNITY COST	x	x		x

The latter approach seems to be the most suitable (as it provides a measure of net imputed rent⁶) and can be used for international comparative analyses of income distribution based on the EU-SILC and LIS data⁷. However, the choice of the estimation method also depends on the availability of specific questions in each survey and on the presence of a not too small a private rental market⁸. Results on the inclusion of imputed rent in the income concept are sensitive to the method of estimation, in particular according to the “item” coverage implicit in each method (as shown in Table 1.1).

Overall, the inclusion of imputed rent in the measurement of economic well-being reduces both inequality and poverty, especially among the elderly for all countries with some exceptions for the UK (Frick and Grabka 2009) and the Netherlands⁹ (Frick *et. al.* 2008). In particular, changes in inequality are more evident through changes in the Mean Log Deviation (MLD) and the Half Squared Coefficient of Variation (HSCV), which are more sensitive to changes close to the bottom and the top of the distribution, rather than the Gini coefficient that is relatively more

6 However, the mortgage interest tax relief common to many countries is not necessarily taken into account in this approach. Consequently, net imputed rent may underestimate the actual imputed rent for home-owners with outstanding mortgages.

7 Both datasets provide ready-made measures of imputed rent.

8 For instance, in countries such as the Netherlands, the tiny size of the private rental market renders the estimation of market rents problematic.

9 By using the capital market approach (rent is imputed for homeowners only) inequality and poverty do increase. On the other hand, if market rent is imputed also for tenants with below-market rent inequality and poverty decrease (de Vos 2007).

sensitive to changes in the middle (Frick *et. al.* 2008). The size of the effect varies considerably between countries: by using the MLD and the HSCV the inclusion of imputed rent¹⁰ reduces inequality by more than 10% in Greece and the UK¹¹, by between 7% and 10% in Italy, by less than 7% in Belgium, Germany and Ireland, while it remains stable in the Netherlands (Frick *et. al.* 2008). The importance of the effect of imputed rent on measures of income distribution and redistribution depends on the share of home-owners and of tenants with below-market rent in each country, their location along the income distribution, their relative income change, etc. Notwithstanding the different impact of imputed rent on inequality across countries, their ranking according to the inequality level does not change substantially: only Italy becomes more unequal than the UK when imputed rent is included (Frick *et. al.* 2008).

The inclusion of imputed rent seems particularly relevant for poverty analysis and might help explain why only 20% of people deprived in two or more items have income below the median (*Growing Unequal? 191*). The choice of whether to include also tenants as beneficiaries of imputed rent (and therefore of the estimation method) is crucial for income distribution results. Obviously, the inclusion of tenants with below-market rent reduces poverty and inequality. On the other hand, the inclusion of home-owners only as beneficiaries of imputed rent leads to less positive results: according to Frick *et. al.* (2008) inequality and more considerably poverty tend to increase, in particular in Germany. Finally, if imputed rent is considered as part of the household income, but this non-monetary source of income is not taxed (or at least not as much as labour income¹² some concern may arise about the progressivity of income redistribution and about the reranking of taxpayers. Indeed, the fact that the reduction in inequality by using the Gini coefficient is smaller than by using the MLD or HSCV suggests that the “middle class” benefits less from the inclusion of imputed rent¹³. For a treatment of the regressive effect caused by the tax treatment of home-ownership see Section 3.1.1.

1.3.5. Education

Individual education can be measured using various indicators. The economic literature has mainly used three types of measure capturing different aspects of people’s human capital.

10 Frick *et. al.* (2008) use the opportunity cost approach for Belgium, Germany, Greece, Italy and the UK, while for Ireland and the Netherlands they adopt the capital market approach. For a comparison of the distributional effects of imputed rent estimated with different approaches see Appendix 1.A in Frick *et. al.* (2008).

11 However, Frick and Grabka (2002) find that for the UK the Gini coefficient slightly increases when imputed rent is included.

12 Imputed rent may be subject to property taxes, depending on the country, the year and in proportion to a given formula that not necessarily corresponds to market values.

13 Also de Vos (2007) finds that by including both home-owners and tenants with below-market rent reduces the P90/P10 and the P50/P10, but increases the P90/P50.



The first indicator refers to the duration of formal schooling, measured by *years of education*. The main advantage of this method is that years of schooling can be easily computed and compared across countries. On the other side, this measure refers only to the “quantity” of education, disregarding its effectiveness, both in terms of results and in terms of different careers and achievements.

A second indicator is based on *attainment* levels, capturing the highest level of formal education an individual achieved. The advantage of this method with respect to years of education is that it accounts for different durations of analogous school cycles. Moreover the use of a categorical indicator that specifies the type of education completed potentially allows to measure what kind of education one achieved (i.e. academic vs. vocational tracks, etc.). The drawback of such a measure in cross-country analyses is that levels, types and duration of specific educational programmes depend on the institutional structure of educational systems and, given the high degree of differentiation of educational systems across countries and over time, it is difficult to construct a classification of educational qualification that is valid and comparable internationally (see Section 2.1.1 “Measuring educational inequality) – Cross-country comparability). Another drawback of this measure is that it is a discrete categorization that disregards by definition intermediate cases, such as dropouts or partial attendance.

At the country level, it is possible to construct an index that summarises the average education level completed and the corresponding years of schooling. Following Ram (1990) and Rodríguez-Pose and Tselios (2007), the index can be expressed as follows:

$$AEL = \sum_j L_j S_j$$

where $j \in \{1, \dots, N\}$ are the mutually exclusive educational categories, L_j is the proportion of individuals falling in the j^{th} category and S_j is the number of years of schooling to which the j^{th} educational category corresponds.

However, such a measure is not only difficult to compute for different periods, since the factor S_j changes over time, but it is also not fully comparable with the years of education directly collected in the surveys, since it does not consider dropouts and partial attendance, resulting in a simple rescale of a categorical variable.

A third measure used in the literature consists of international achievement data that measure people’s *competences*. International testing programs such as PISA¹⁴, PIRLS¹⁵, TIMSS¹⁶, ALL/IALS¹⁷ aim to measure competences of children and adults in various fields, such as reading and comprehension, mathematics, problem solving. These international surveys of learning achievement of children and functional literacy of adults present a number of advantages compared to school attainment data. First, they were specifically designed for cross-country

14 Programme for International Student Assessment.

15 Progress in International Reading Literacy Study.

16 Trends in International Mathematics and Science Study.

17 Adult Literacy and Lifeskills / International Adult Literacy Survey.

comparison and are therefore readily comparable both across countries and over time. Secondly, by testing what people actually know, they measure effective cognitive skills and are thus related to both the quantity and quality of schooling. In this way, they allow to directly test the effectiveness of education systems among school-age population or later in life. Third, cognitive skills are found to be a better measure of human capital¹⁸ in that they are much more relevant than school attainment in explaining individual earnings and economic growth (see Hanushek and Woessmann 2008). Finally, test scores are closer to continuous variables and are therefore more suitable for creating inequality indices.

However, there are also drawbacks in the use of this data. First, the collection of data is difficult and expensive and as a consequence they are not as widely available as data on years of schooling or qualifications achieved. Second, most of the surveys are characterised by a cross-sectional design that does not allow to track individuals over time. Third, data generally refer to specific and recent cohorts and do not permit describing long run trends. Finally, individuals' competences can be affected by a virtually infinite number of factors independent of education quantity and quality, such as family, peers, social networks, employment, etc. and can therefore be misleading when analysing the role of schools.

An ideal “toponymy” of the sources of inequality should distinguish between:

- wages, specifying the universe (full-time, employees, etc.);
- working hours;
- earnings (as the combination of the first two), specifying the temporal unit (weekly, monthly, yearly, etc.), the “items” included (bonuses, extra payments, company cars, etc.);
- income, specifying which returns from capital are included (rent, dividends, realized, unrealized and/or from non-monetary sources of capital, e.g. housing);
- wealth, specifying which forms of wealth are included (financial and non financial assets) and, in particular, pension assets;
- education; specifying whether it correspond to years of education, attainment level or competences.

18 Discussing this issue, Hanushek and Woessmann (2008) argue that “We have come to conclude that cognitive skills are THE key issue. It is both conventional and convenient in policy discussions to concentrate on such things as years of school attainment or enrolment rates in schools. These things are readily observed and measured. They appear in administrative data and they are published on a consistent basis in virtually all countries of the world. And, they are very misleading in the policy debates” (Hanushek and Woessmann 2008, p. 608).



1.4. Recipient unit and equivalence scales

Often, the passage from earnings towards income inequality entails a, *somehow unreasonable*, switch in the recipient unit from the individual to the household. This is often due to the difficulty in imputing income (not earnings) to the single individuals within a household. Once the unit of analysis is defined at the household level (sometimes intended as nuclear family, sometime as people living together and sharing expenses), the use of equivalence scales is imperative. By means of equivalence scales, total income can be adjusted according to the size and type of the household. Finally, a weight for the household unit must be chosen between either one, the number of individuals in the household to which equivalised household income is attributed in equal shares, or the number of equivalent adults (Atkinson and Bourguignon 2000).

First, whenever the household is chosen as recipient unit the implicit assumption in the interpretation of inequality statistics is of no inequality within the household, but only across households. According to Atkinson and Bourguignon (2000, 34) on the choice between individual and household unit:

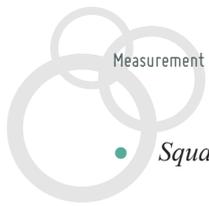
[...] if all households had the same size, if the number of earners were the same, and if individual earnings within a household were perfectly correlated – i.e. perfect “homogamy” – then there would be a straightforward relation between the definitions. On the other hand, random marriage, and independence between household size and the income of the adults in the household, would lead to a different relationship between the different definitions. Practically, the real world is at a changing position somewhere between these two extremes.

Atkinson and Bourguignon (2000) compare the distributions of individual and household income (with French data 1979–1994) and conclude that there are indeed differences between the two, though the pattern is not clear-cut.

Second, the rationale behind the adjustment factor (or equivalence scale) is that households enjoy economies of scale in consumption: the needs of a household grow with each additional member but not proportionally. According to the OECD¹⁹, *the factors commonly taken into account to assign these values are the size of the household and the age of its members (whether they include adults or children). A wide range of equivalence scales exist, many of which are reviewed in Atkinson et al. (1995). Some of the most commonly scales include:*

- OECD equivalence scale. This assign a value of 1 to the first household member, of 0.7 to each additional adult and 0.5 to each child.
- OECD modified scale. This scale, assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

19 What are equivalence scales? <http://www.oecd.org/dataoecd/61/52/35411111.pdf>.



- *Square root scale.* Recent OECD publications comparing income inequality and poverty across countries use a scale which divides household income by the square root of household size. This implies that, for instance, a household of four persons has needs twice as large as one composed of a single person.

Indeed, the OECD's *Growing Unequal?* uses the square root scale to equalise income across households and then attribute to each member the (same) equivalised household income .

The use of equivalised household income, especially the square root scale that does not distinguish between adults and children, may mask a different distribution of (individual) incomes. For a critical treatment on the assumption implicit in the use of equivalence scales see Fisher (1987). Individuals may “adjust” household size and type according to their incomes. For instance, the choice of having children or living with parents at older ages may be determined by economic factors. On the other hand, “homogamy” could amplify individual differences. For example, the use of equivalised household income to compare Nordic and Mediterranean countries may be inaccurate, as they have very different household structures. For instance, 82% of 25–29 year-old, 49% of 30–34 year-old and 22% of 35–39 year-old live with their parents in Italy, compared to only 11% 2% and 2%, respectively, in the Netherlands²⁰. Households may act as a welfare cushion for inequality situations and this may be different across countries. Therefore, the use of equivalised household income should be further investigated, both for within country analyses and for cross-country comparability, and results using individual and household units, different equivalence scales and different weight should be provided as in Atkinson and Bourguignon (2000) and Figini (1998). For cross-country comparison Burniaux (1998) concludes that the level and the composition of income poverty are affected by the use of different equivalence scales, though trends and rankings are much less affected.

To sum up:

- inequality calculated at the individual level does not require any assumption (such as, e.g., the same distribution of income within the household, and does not require equivalence scales;
- when the household is chosen as recipient unit, statistics on inequality using different equivalence scales, weights and the individual unit should possibly be supplemented.

20 Data from Alessie et al. (2005).

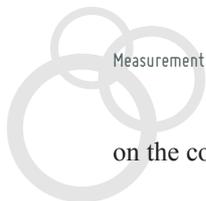


1.5. Dynamics of inequality

The inequality literature usually analyses cross-sectional inequality, that is average inequality across different cohorts and ages at a particular moment in time. Cross-sectional data are often analysed in a time-series perspective, in order to depict the trend of average inequality over time. An interesting issue about inequality is to understand how much of cross-sectional inequality is transitory and how much is permanent. In other words, what is the age profile of inequality: for example, is there more inequality at the beginning or the end of the life-cycle? This issue somehow parallels studies of the persistency of poverty, though it does not refer to longitudinal individual data. Another interesting question is whether, for example, income is distributed more unequally among some cohorts than others. Clearly, one would like to control for age, time and cohort effects. However, this is not possible as the first is a linear combination of the other two (age is equal to the year of the survey minus the year of birth). Therefore, analyses that want to disentangle each of the three effects should choose between controlling for age and year or for age and cohort (Krueger *et al.* 2009). Unfortunately, empirical analyses show that the choice for either time or cohort effects has a drastic impact on the age contribution to inequality. However, Heathcote *et al.* (2004) show (with US data from 1967 to 1996) that if time trends have been important, cohort effects do not seem to have played a role.

Beyond life-cycle patterns, a further “dynamic” of inequality is represented by intergenerational mobility and equality of opportunity. Measuring this kind of inequality is much more difficult than the simple dispersion for two reasons: on the one hand, we need data on earnings/income or education/competences of parents and children; on the other, intergenerational mobility deals with two dimensions: inputs of parents and inputs of children. This means that each scalar of earnings, income or education distribution is replaced by a vector with at least two elements: parents’ and children’ inputs. Indeed, the most used way to represent intergenerational mobility is the transition matrix, in which each cell includes the share of households with the corresponding set of inputs: e.g., earnings/income fractiles or educational/competence levels. The more immediate consequence is that it is very difficult to summarize such matrices with a single index. Nevertheless, there are ways to give a rough idea of intergenerational mobility in a society. First of all, if we look at absolute levels, we can simply count the share of individuals who improved (or worsened) their position with respect to their parents.²¹ Second, if we want to measure the level of mobility, we can simply count how many individuals stay in the diagonal cells of the transition matrix, who are those with the same earnings/income position or education as their parents, either in absolute or in relative terms. However, opposite to the case of inequality, in the literature there is not a set of frequently used and agreed indices of intergenerational mobility. It is possible, indeed, to build several indicators of intergenerational mobility, based

²¹ In relative terms it is meaningless to count how many people improved or worsened their position, since it is a zero-sum transition.



on the correlation between parents' and children' position. In general, several mobility indices can be created, according to the quality and structure of available data.

Further studies should also pay attention to:

- life-cycle dimension of inequality (temporary or permanent).
- intergenerational dimension of inequality.

1.6. Redistribution

The introduction of taxes and transfers exerts two main effects on the initial distribution of income: it can reduce, leave unchanged or increase the level of inequality and it can re-arrange the original distribution of income and wealth. More in detail, the introduction of taxes (and benefits) may have three distinct effects on the distribution of income: vertical, horizontal and reranking (Aronson and Lambert 1994). The vertical effect concerns the unequal tax treatment of unequals or the redistribution that would have occurred if there were no unequal treatment of equals and no reranking of income units (Aronson and Lambert 1994; Verbist 2004). A popular measure of the redistributive effect of taxation is the Reynold–Smolensky index (*IIRS*), which equals the difference between the Gini coefficient of pre-tax income (G_x) and the concentration coefficient of post-tax income²² (C_{x-t}):

$$\Pi^{RS} = G_x - C_{x-t} \quad (1)$$

A related but different concept is that of the progressivity of the tax system. The Kakwani index (*IK*) measures the departure from proportionality as the difference between the concentration coefficient of taxes²³ (C_t) and the Gini coefficient of pre-tax income (G_x):

$$\Pi_T^K = C_t - G_x \quad (2)$$

The redistribution index is a function of the progressivity and the level of the tax (Verbist 2004):

$$\Pi^{RS} = t \Pi_T^K / (1-t) \quad (3)$$

Another way of measuring the progressivity of a given tax system is to consider the concentration coefficient of tax liabilities alone (C_t), as used e.g. in *Growing Unequal?*. The horizontal effect corresponds to the unequal tax treatment of equals (Aronson and Lambert 1994), e.g. on the basis of non-income characteristics such as marital

22 The concentration coefficient of post-tax income is derived from the distribution of post-tax income of individuals ranked on their pre-tax income.

23 The concentration coefficient of taxes is the share of taxes paid by individuals ranked on their pre-tax income.

status, household size²⁴ and tenure choice. However, the identification of “equals” is empirically problematic²⁵. The reranking effect concerns the further reordering of individual income units arising when moving from the pre-tax to the post-tax distribution of incomes. For instance, reranking may occur when eligibility for substantial benefits (e.g. housing) is subject to having income below a given threshold. The reranking effect (R) is measured by the difference between the Gini coefficient of post-tax income²⁶ (G_{x-t}) and the concentration coefficient of post-tax income (C_{x-t}):

$$R = G_{x-t} - C_{x-t} \quad (4)$$

The extent of reranking (and of horizontal inequality) reduces the redistributive effect of taxation as measured by the Reynold–Smolensky index. Indeed, the equalizing effect of progressive income taxation is²⁷ (Lambert 1993):

$$G_x - G_{x-t} = (G_x - C_{x-t}) - (G_{x-t} - C_{x-t}) = \Pi^{RS} - R \quad (5)$$

Verbist (2004) calculates the redistributive effect of taxes and social contributions in the EU–15 by taking into account the reranking effect. The extent of reranking reduces the vertical effect of total taxes²⁸ (as measured by the Reynold–Smolensky index) by 6%, on average for the EU–15 countries. This reduction ranges from a minimum of zero for Spain to a maximum of –19% for Sweden, followed by Germany (–14%) and France (–9%) (Verbist 2004). The ranking of countries according to their redistributive capacity (as measured by the Reynold–Smolensky index) does not change much when taking into account the reranking effect, with the exception of Sweden and Germany (Verbist 2004). Therefore, the vertical effect of taxes is a good proxy of the redistributive effect of taxes, if one is interested in the simple ranking of countries.

Analyses of the role of taxes and transfers in reducing inequality should devote further attention to:

- the overall redistributive effect of the tax code;
- the inclusion of a more comprehensive economic base;
- reranking effects possibly generated by specific policies (e.g. housing).

24 Van de Ven and Creedy (2005) consider the implications for reranking of the equivalence scale implicit in the tax policy.

25 For a suggestion on a strategy to define close-equals see Van de Ven et al. (2001).

26 The Gini coefficient of post-tax income refers to the distribution of post-tax income of individuals ranked on their post-tax income.

27 Here horizontal inequality is not considered.

28 Personal income taxes, social contributions plus other taxes (according to the availability in EUROMOD input data, they are not the same in every country).





2. Educational Inequality

Elena Meschi and Francesco Scervini

2.1. Introduction

The positive effects of education have been widely recognised in the economic literature and a key policy aim of many countries is to increase population educational attainment. Accumulation of human capital is crucial for economic growth (see among others, Hanushek and Kimko 2000; Krueger and Lindhal 2001; and De la Fuente and Domenech 2006), and beneficial to individuals and societies. Positive effects of education range across several fields. From the individual point of view, more educated people are more likely to have better labour market outcomes in terms of employability and wages (see the surveys by Card 1999 and Harmon *et al.* 2003), but they also experience better health, fertility, well-being, less probability of engaging in crime and other non monetary outcomes (see for example Lochner and Moretti 2004 and the survey by Grossman 2006). Moreover, education has wide spill-over effects, generating not only *private*, but also *public* benefits. Increasing education seems in fact to influence positively also social cohesion, citizenship, and political participation (Green *et al.* 2003; Milligan *et al.* 2004).

During the last decades, mass education improved significantly the average level of education in western European countries, as well as in other developed economies. However, education is still very much unequally distributed and highly related to people's family background. The recent expansion of higher education has not been equally distributed across people from richer and poorer background. The extensive literature on intergenerational mobility has highlighted the strong and persistent link between parents and children educational attainment (see Black and Devereux 2010, for a review), suggesting that the opportunities are not evenly spread and that life-chances of individuals will reflect factors for which they are not responsible.

An important issue policymakers need to face is thus educational inequality. This can be defined along two dimensions, fairness and inclusion as suggested by OECD (2007). Fairness implies that personal and social circumstances, such as gender, socio-economic status, ethnicity, region of residence, should not be an obstacle to educational success. Inclusion implies a minimum standard of education for all and has to do with whether overall levels of provision are sufficient and effective.

Improving equity in education is relevant under many perspectives. First of all, as mentioned above, equality in educational outcomes is an important determinant of the extent of intergenerational mobility different countries may achieve. Lower levels of education inequality will result in less unequal opportunities for households less endowed with education. This is important from a social justice perspective but also from an efficiency point of view. In fact, insofar as opportunity is not distributed fairly there will be an underutilization of talent; some people will not develop their skills and abilities with consequent loss not only to them but to the society generally (Levin 2003).

Second, since education is intimately related to income and wage, fostering equality in education is a powerful tool to decrease income inequality (see Checchi 2001) and in this sense equity in education supports social equity (OECD 2007). Moreover, since higher levels of education are associated with positive life outcomes as stressed before, social costs for security, health, income support, child welfare, and so on will be higher in societies with significant numbers of people without adequate skills to participate socially and economically (Levin 2003).

Third, symmetric to what happens to income, reducing education inequality means primarily increasing education attainment of less educated people, something that – as stressed above – benefits many aspects of the society. Fourth, opposite to income inequality, education inequality is an ever-lasting phenomenon and redistribution is not an available option. The amount of adult schooling programs is limited in many countries and it is less effective in providing individuals with competences and certificates (see the debate in Heckman and Krueger 2003), so that education inequality within currently young cohorts will impact on general education inequality for the next 6-8 decades. Fifth, parallel to the theory of Galor and Zeira (1993), a more equal distribution of human capital allows individuals to escape “poverty traps” and to increase the total amount of investments in (human) capital, benefiting the whole system. Sixth, since education cannot be redistributed, the traditional trade-off between equity and efficiency seems not to apply to education, unless we can imagine an individual disincentive effect to get more education in a system where distribution of education becomes increasingly left-skewed. This means that reducing education inequality does not reduce average education in the population and that equity and efficiency in education are complementary in economic development (see World Bank 2006)

This part of the report reviews and discusses several aspects of the literature on educational inequality. In the first section we discuss the methodological issues related to the measurement of educational inequality, with a particular focus on a cross-country perspective. The second section overviews the sociological and economic literature that studied the causes and the effects of the educational expansion process. The third section discusses the returns of a person’s education received in the labour market. The fourth section focuses on one particular aspect



of educational inequality, namely inequality of opportunities, which is also linked to intergenerational mobility. Finally in the fifth section we review the empirical works that have investigated the extent to which institutional features of education systems help reducing or instead exacerbate educational inequalities.

2.2. Measurement and indicators of education inequality

Quantifying the extent of educational inequality is not trivial. The measurement of educational levels is not straightforward in itself, especially in an international context. Individual education can in fact be measured through different indicators, such as years of education, levels and types of qualification achieved or test scores capturing actual competences. Therefore one has to choose which variable is more relevant for her aim and then make sure that this is comparable across countries, typically characterised by different educational systems.

Then education inequality analysis faces the additional problem of aggregation and index generation, since - as we will discuss - distribution of education is more complex than distribution of income from a statistical perspective. The possibility of creating synthetic indices depends on the adopted measure of educational level, as not all of them are suitable for the construction of measures of dispersion.

Moreover, the use of different indicators depends on the definition of inequality one has in mind. Inequality in education can be defined in terms of dispersion of educational outcomes, but also in terms of their dependence on individuals' socio economic background.

This section discusses these issues in details. In particular, subsection 2.1.1 reviews the main indicators used in the economic literature to measure individuals' education, and 2.1.2 comments the related problems of cross-country comparability. Finally, subsection 2.1.3 focuses on inequality measures.

2.2.1. Measuring education

Individual education can be measured using various indicators. The economic literature has mainly used three types of measure capturing different aspects of people's human capital.

The first indicator refers to the duration of formal schooling, measured by *years of education*. The main advantage of this method is that years of schooling can be easily computed and compared across countries. On the other side, this measure refers only to the "quantity" of education, disregarding its effectiveness, both in terms of results and in terms of different careers and achievements.

A second indicator is based on *attainment* levels, capturing the highest level of formal education an individual achieved. The advantage of this method with respect to years of education is that it accounts for different duration of analogous school cycles. Moreover the use of a categorical indicator that specifies the type of education completed potentially allows to measure what kind of education one achieved (i.e. academic vs. vocational tracks, etc.). The drawback of such a measure in cross-country analyses is that levels, types and duration of specific educational programmes depend on the institutional structure of educational systems and, given the high degree of differentiation of educational systems across countries and over time, it is difficult to construct a classification of educational qualifications that is valid and comparable internationally (see the next subsection). Another drawback of this measure is that it is a discrete categorization that disregards by definition intermediate cases, such as dropouts or partial attendance.

At country level, it is possible to construct an index that summarises the average education level completed and the corresponding years of schooling. Following Ram (1990) and Rodríguez-Pose and Tselios (2007), the index can be expressed as follows:

$$AEL = \sum_j L_j S_j$$

where $j \in \{1, \dots, N\}$ are the mutually exclusive educational categories, L_j is the proportion of individuals falling in the j^{th} category and S_j is the number of years of schooling to which the j^{th} educational category corresponds.

However, such a measure is not only difficult to be computed for different periods, since the factor S_j changes over time, but it is also not fully comparable with the years of education directly collected in the surveys, since it does not consider dropouts and partial attendance, resulting in a simple rescaling of a categorical variable.

A third measure used in the literature consists of international achievement data that measure people's *competences*. International testing programs such as PISA²⁹, PIRLS³⁰, TIMSS³¹, ALL/IALS³² aim at measuring competences of children and adults in several fields, such as reading and comprehension, mathematics, problem solving. These international surveys of learning achievement of children and functional literacy of adults present a number of advantages compared to school attainment data. First, they were specifically designed for cross-country comparison and are therefore readily comparable both cross country and over time. Secondly, by testing what people actually know, they measure effective cognitive skills and are thus related to both the quantity and quality

29 Programme for International Student Assessment
 30 Progress in International Reading Literacy Study
 31 Trends in International Mathematics and Science Study
 32 Adult Literacy and Lifeskills / International Adult Literacy Survey



of schooling. In this way, they allow to directly test the effectiveness of education systems among school-aged population or later in life. Third, cognitive skills are found to be a better measure of human capital³³ in that they are much more relevant than school attainment in explaining individual earnings and economic growth (see Hanushek and Woessmann 2008). Finally, test scores are continuous-like variables and are therefore suitable to create inequality indices.

However, there are also drawbacks in the use of this data. First, the collection of data is difficult and expensive and as a consequence they are not as widely available as data on years of schooling or qualifications achieved. Second, most of the surveys are characterised by a cross sectional design that does not allow to track individuals over time. Third, data generally refer to specific and recent cohorts and they do not permit to describe long run trends. Moreover, since tests are usually submitted to pupils at a given age (e.g. at age 15 in PISA, at age 9/10 in PIRLS), the results cannot be generalised to the entire population but only apply to the specific cohort analysed.

Finally, individuals' competences can be affected by a virtually infinite number of factors independent of education quantity and quality, such as family, peers, social networks, employment, etc. and can therefore be misleading when analysing the role of schools.

Cross-country comparability

When choosing a measure to describe educational attainment, one has to consider the related issues of cross-country comparability. As mentioned above, the most problematic variable in this respect is the highest levels of qualification. Even if school systems share some common features in virtually all of the industrialized countries, it is very difficult to compare educational attainment both between countries and across cohorts, due to institutional reforms implemented over time in many countries (as extended documentation produced by Eurydice (2009a) and previous versions testify for European countries). Therefore, when comparing educational attainment across countries, there is no consistent definition of what a particular level means in terms of years of schooling, knowledge, competences and skills (Rodríguez-Pose and Tselios 2007).

33 Discussing this issue, Hanushek and Woessmann (2008) argue that “*We have come to conclude that cognitive skills are THE key issue. It is both conventional and convenient in policy discussions to concentrate on such things as years of school attainment or enrolment rates in schools. These things are readily observed and measured. They appear in administrative data and they are published on a consistent basis in virtually all countries of the world. And, they are very misleading in the policy debates*” (Hanushek and Woessmann 2008, p. 608).

Table 2.1 Educational levels in international classification ISCED

LEVEL	DESCRIPTION
Level 0	Pre-primary education
Level 1	Primary education or first stage of basic education
Level 2	Lower secondary or second stage of basic education
Level 3	(Upper) secondary education
Level 4	Post-secondary non-tertiary education
Level 5	First stage of tertiary education
Level 6	Second stage of tertiary education

A common internationally harmonised measure of educational attainment is the *International Standard Classification of Education (ISCED)* developed by UNESCO³⁴ in 1976 and then revised in 1997³⁵ that aims at rank and classify individuals according to the maximum level of educational attained and represents a major improvement on this issue. ISCED makes it possible to readily draw a comparable picture of education distribution across countries, independently of the duration of cycles, the length of compulsory schooling, and the heterogeneous structure of vocational and academic tracks. In particular, the classification distinguishes seven levels of education ranging from pre-primary education to second stage of tertiary education, as illustrated in table 2.1.

Mapping tables to link national educational programmes to these categories are available in OECD (1999), and Eurostat (2005). However, although the international standards are clearly defined, it is sometimes problematic for countries to integrate these standards with the national systems. In fact, as pointed out by Eurydice studies (Eurydice 2009b), not all school systems find univocal correspondence to ISCED: among European countries, for instance, many Nordic and Eastern countries³⁶ do not distinguish institutionally between primary and lower secondary levels, so that there is no distinction between ISCED level 1 and ISCED level 2. In other countries it is difficult to differentiate between ISCED 3 and 4 because the certificates awarded are the same, and just the pathway taken differs; the distinction between ISCED 4 and ISCED 5 is also not straightforward in countries with a unitary university structure that does not separate vocational and academic/ professional tertiary studies (see Schneider 2007 2009 and 2010 for a detailed discussion of these problems).

Moreover, information on ISCED levels are not directly asked to individuals when collecting data surveys, but they are derived from the answers they provide to country-specific questions. It may happen, therefore, that national questionnaires include less than 7 categories for educational attainment (this is the case, for instance, in most of the waves of International Social Survey Programme survey, ISSP), or that they do not separate vocational from

34 United Nations Educational, Scientific and Cultural Organisation.

35 See UNESCO 2006; OECD 1999.

36 Bulgaria, Czech Republic, Denmark, Estonia, Latvia, Hungary, Slovenia, Slovak Republic, Finland, Sweden, Iceland, Norway, Turkey



academic schools. Furthermore, even if national questionnaires are detailed enough, it is still possible to observe mistakes in the assignment of national educational programmes to ISCED categories and indeed Kerckhoff and Dylan (1999) noticed that ISCED is not always implemented in the way recommended by the OECD³⁷. Schneider (2007 and 2010) studied the implementation of ISCED in ESS and showed that in many cases, the national teams did not follow the definitions established by the UNESCO and OECD and different classification decisions were taken with respect to similar educational programmes in different countries.

Schneider (2010) therefore argues that the ISCED measure contained in European Social Survey (ESS) is not cross-nationally comparable and proposes a new scale called ESS-ISCED that builds on the mapping of country-specific to international categories provided by ISCED, but eliminates some non useful distinctions and incorporates the differentiation of types of qualifications within levels of education underlying the CASMIN scheme³⁸. However, ESS-ISCED can only be coded to 15 countries in ESS, which significantly reduces the original sample of countries³⁹.

Despite these problems, the ISCED scale has the advantage that it can be used to regroup data on formal qualification held or stages of education completed, gathered in large scale social surveys and it is therefore available for a large number of countries and years. Moreover there is evidence showing that ISCED categories accurately reflect actual skills (see Steedman and McIntosh 2001)⁴⁰.

In terms of inequality indices, ISCED, being a categorical variable, performs poorly in generating aggregation statistics measuring inequality. Therefore, given its characteristics, ISCED is very useful for aggregated comparison of education systems (for instance, to measure how many individuals got a degree or the share of individuals with an upper secondary school) and to graphically analyze the shape of the distribution, but it is not suitable to compute any kind of inequality index.

A second way to compare educational levels cross-country is to use the duration of individual education. This measure has many advantages over attainment indicators, and some drawbacks: first of all, it is a cardinal measure, so that the difference among two individuals is not meaningless; second, even if many individuals conclude their education career at the end of a school cycle, there is a higher variability, either because of drop-outs or because of different duration of different tracks. Finally years of schooling are readily comparable across countries and do

37 This study refers to ISCED 76 (prior to the 1997 update) and therefore the new measure may not suffer from the same problem.

38 The CASMIN education scheme is a categorical measure of educational attainment developed by sociologists that classifies qualifications that are functionally equivalent across countries. Functional equivalence refers to the *selectivity effects* of different qualifications for social class reproduction. It is two-dimensionally structured by the following criteria: 1. The vertical distinction of levels of education, which is proxied by the costs, length and quality of the educational experience, intellectual abilities required and value of the resulting certificate in the labour market; and 2. the horizontal distinction between 'general' and 'vocational' education (Schneider 2010, p.3)

39 For a detailed description of the categories and detailed mapping for the ESS, see Schneider (2009), Section 6.3

40 Steedman and McIntosh (2001) showed that the ISCED 0/1/2 group comprises a large proportion of low-skilled individuals (as defined by IALS) and therefore constitute a good proxy for low skills.

not require any harmonisation. On the other side, focusing on years of education does not allow to discern general/academic from vocational secondary schools (as well as ISCED), it does not consider the effective attainment of any certificate/diploma/degree and it misleadingly accounts for year repetitions. Therefore, one has to keep in mind that the same years of schooling may entail different amount of learning and heterogeneous quality in different countries.

Because of these reasons, such a measure is intuitively rather bad in assessing the qualification achieved, but it is suitable to compute inequality indices. Indeed, even if it is not properly continuous, it spans from 0 to 20-25 years, depending on highest level educational institutions, with an acceptable level of variability.

Finally, regarding the comparability of the different international surveys of educational achievement, Brown *et al.* (2007) have tested the robustness of results when comparing findings across PIRLS, TIMSS and PISA surveys. They conclude that there is considerable consistency on both the median and the dispersion between the various tests contained in the different surveys as summarised by average ranks.

A potential problem related to international student achievement data is that they result from a sampling design and there could be sampling issues that might compromise comparability across countries. Non-random differences in patterns of school enrolment, sample exclusions, and non-response could influence rankings of countries in terms of average student achievement. Hanushek and Woessmann (2010b) studied this issue and investigated how sample selection may affect the results of analyses that use the international test score data. Their findings suggest that the sampling patterns do not affect the results of typical growth regressions and education production functions making use of international achievement data.

2.2.2. Measures of inequality

An issue intimately related to measurement of individual education is its inequality. Methodological problems on the creation of a synthetic index amplify and overlap those just described on education levels.

Typical inequality indices, such as Gini, Theil and Atkinson do not fit well to discrete variables, such as attainment measures. On the other side, the length of formal education is usually clustered at cycle achievement levels, so that – for instance – different duration of lower secondary cycle can lead *per se* to different values of inequality indices even in two otherwise perfectly symmetric systems. Moreover, opposite to income that is virtually unbounded in the upper tail, education cannot exceed a maximum level represented by postgraduate education.

Other types of widely used inequality indicators are not usable for categorical variables either. When referred to income inequality, percentile ratios measure how many times the x-th percentile individual is richer than the y-th percentile individual. Applying such an index to a categorical variable is not very informative for two reasons: first, there is no cardinality in the measure, since a person attaining, for instance, ISCED-4 is not educated twice as much as an individual attaining ISCED-2. Second, given the little variability, the resulting level of inequality would be the same in most of the relevant cases. Finally, inequality indices always refer to the relative distance among individuals. If a population is partitioned in very few categories, the relative distance is 0 in most cases, leading to a bad indicator for inequality.

The literature on the measurement of educational inequality is rather scant yet. Among the first attempts to measure inequality in education, there are Ram (1990) and Birdsall and Londono (1997) that used standard deviations of years of schooling. However, this is an absolute measure of dispersion and therefore it does not control for differences in the mean of the distribution. A step forward in the measurement was done by Castello and Domenech (2002), Checchi (2001) and Thomas *et al.* (2001) who used the Gini coefficient to measure inequality of education, using data on attainment levels from Barro and Lee (2001). Beyond Gini index, it is possible, in principle, to compute a wider set of dispersion indices, including all those implemented in the description of income inequality (see for instance the Theil indices computed by Thomas *et al.* 2002).

As a general statement, however, there are more subtle sources of inadequacy, since education – opposite to income – can be measured in several ways and not all the measures are suitable to construct inequality indices. Table 2.2 lists a set of possible indicators and highlights for which dimensions they can be computed.

Table 2.2 Measures of educational inequality

	YEARS OF EDUCATION	ATTAINMENT	COMPETENCES	BOUNDARIES
STANDARD DEVIATION	yes	yes	yes	unbounded
COEFF. OF VARIATION	yes	yes	yes	unbounded
GINI INDEX	careful	no	yes	0-1
THEIL INDEX	yes	no	yes	unbounded
MEAN LOG DEVIATION	yes	no	yes	unbounded
ATKINSON INDICES	careful	no	yes	0-1
DECILE RATIOS	yes	careful	yes	0-1
POVERTY RATIO	yes	yes	yes	0-1

For a detailed description on the use and the differences among the set of indices, you can refer to classical papers by Theil 1967, Atkinson 1970, Bourguignon 1979, Dasgupta, Sen and Starrett (1973) and the much newer works by Cowell and Fiorio (2009) and Cowell (forthcoming) and the references therein.

Standard deviation is the mean distance between every observation and the population mean. It is probably the most widely used index of dispersion and fits well to almost any kind of variable. Coefficient of variation is simply the standard deviation normalized for the mean value of the population. Opposite to these, Gini index is based on the pairwise distance between individuals, making it particularly sensitive to changes around the mode. This makes it particularly unsatisfactory when looking not only at categorical ordinal variables, such as attainment, but – at some degree – also at low-varying cardinal variables, such as years of education, since the relative distance is zero in a non-negligible number of observations and the mode does not change continuously. However, the appealing interpretation of the Gini index as the area between the Lorenz curve and perfect equality line makes it very popular in different contexts without many investigations on its suitability. Opposite to the mainstream use, we do not recommend its use referred to attainment.

The set of generalized entropy indices includes Theil index (Theil 1967, Conceicao and Ferreira 2000), the most common index among the family, and mean logarithmic deviation that shares the same properties but is less sensible to differences at the top of the distribution. Their greatest appeal is that it is possible to decompose inequality by groups in “within” and “between”-group in a rather intuitive way and by means of common statistical software, while the main drawback is that these indices are not upper-bounded. Also in this case, it is meaningless to compute such indices to a categorical variable, while they perform well with both years of education and competences.

Analogous to general entropy indices, also Atkinson’s indices (Atkinson 1970) refer to a single statistics, where a positive coefficient is the inequality aversion parameter. Opposite to them, however, they cannot include individuals with a value 0 for the underlying variable. This is not a problem – in our case – when looking at competences, but it could underestimate inequality in years of education if there is a non-negligible share of individuals with no formal schooling.

Decile ratios represent an intuitive and effective way to measure the distance between extremes, or polarization, of a distribution. According to theoretical and empirical needs, one can compute the ratio between different deciles, even if the most common are 90/10, 90/20, to measure polarization, 90/50, to measure the distance from the middle-class, 75/25 in case of high sensitivity to extreme values. In principle, it is possible to compute such

statistics with all the distribution, but one must be aware that the ratio can take different meanings: a ratio $Q_x/Q_y=2$ referred to years of education means that x-th individual received twice as much education as the individual y. The same ratio referred to attainment does not mean the same. According to the score test of competences, one should be careful in stating that individual x is twice as much competent as individual y.

The last measure we can use is a simple “poverty” ratio, just computing the share of individuals below a given threshold. This measure is really universal, inasmuch as it can be computed with every possible distribution and its meaning is self-defined.

The achievement test data are recorded on a continuous scale and therefore inequality in competences can potentially be measured using all the tools developed to measure inequality of incomes, and to compare this inequality across countries.

For example Denny (2002) uses methods developed for the measurement of poverty analyse levels of low literacy in IALS and compare these levels across countries. Drawing on the literature on poverty measurement, he argues that simply using the proportions of a sample below a given benchmark is not accurate to compare countries in terms of literacy levels. This measure is not sensitive to the distribution of literacy within the subset which are below the line, meaning that the *Monotonicity* and *Transfer* axioms⁴¹ do not hold. He therefore takes the class of index proposed by Foster, Greer and Thorbecke (1984) from the literature on poverty measurement and applies it to the measurement of literacy by replacing the poverty line with an “illiteracy line”.

However, as discussed in Micklewright and Schnepf (2006), the nature of the international achievement test data calls for caution in the use of the income inequality measurement toolbox (see also Schnepf 2008). The test scores are *derived* data providing estimates of proficiency in different subjects and their nature is therefore quite different from that of income data. Even if the scores are standardised, this “*does not make them inherently comparable across tests. The choice of item response model influences the shape of the estimated proficiency distributions and can do so in ways that change the cross-country picture*” (Micklewright and Schnepf 2006, p. 6). Moreover, since their aim is to compare inequality of learning across countries using three different surveys (PIRLS, TIMSS and PISA), they argue that the use of multiple sources of data complicates any dominance analysis aimed at ordering the country distributions independently of the choice of a particular inequality index. When having multiple sources, they suggest to use summary measures of learning inequality for each country that are easier to compare across tests and surveys. They therefore decide to describe inequality in learning using differences in quantiles of

41 These criteria were first formulated by Sen (1976 1979) and state that a measure of poverty should increase if one of the poor’s income falls, other things being equal (monotonicity axiom) and if there is a transfer from a poor person to one who is better off (transfer axiom)

the test score distributions (95th percentiles minus 5th percentile, the 95th percentiles minus 50th and the 50th minus the 5th percentile) that allow to explore the shape of test score distribution.

Until now we have considered inequality measures describing how much education is dispersed in a population at a given moment in a given society. However – as pointed out previously – there is another concept of education inequality more closely related to equality of education: intergenerational mobility and equality of opportunity in education.

Measuring this kind of inequality is much more difficult than the simple dispersion for two reasons: on the one side, we need data on education or competences of parents and children; on the other, intergenerational mobility deals with two dimensions: education of parents and education of children. This means that each scalar of an education distribution is replaced by a vector with at least two elements: parents' and children' education.

Indeed, the most used way to represent intergenerational mobility is the transition matrix, in which each cell includes the share of households with the corresponding set of educational (or competence) levels. The more immediate consequence is that it is very difficult to summarize such matrices with a single index. Nevertheless, there are ways to give a rough idea of intergenerational mobility in a society. First of all, if we look at absolute levels, we can simply count the share of individuals who improved (or worsened) their position with respect to their parents.⁴² Second, if we want to measure the level of mobility, we can simply count how many individuals stay in the diagonal cells of the transition matrix, that are those with the same education as their parents, either in absolute or in relative terms.

However, opposite to the case of inequality, in the literature there is not a set of frequently used and agreed indices of intergenerational mobility. It is possible, indeed, to build several indicators of intergenerational mobility, based on the correlation between parents' and children' position. Two recent examples are Di Paolo *et al.* (2010), who exploit the differences between fathers and mothers and sons and daughters, and Checchi *et al.* (2008) who looks at the time path of autocorrelation across cohorts. In general, several mobility indices can be created, according to the quality and structure of available data.

2.3. Education expansion and inequality

Over the last decades, developed countries have witnessed a significant expansion of the average level of education. The well-known dataset by Barro and Lee (2010) provides strong evidence in support of it: the shares of

⁴² In relative terms it is meaningless to count how many people improved or worsened their position, since it is a zero-sum transition.



population who achieve the three levels of education (primary, secondary and tertiary, however defined) show a positive trends in all developed countries irrespective of the level considered.

Causes and consequences of such a trend can be analyzed under many perspectives. Hereafter, we focus on two distinct, but related literatures: economic and sociological. Economic causes of education expansion refer mainly to the theory of human capital, that look at education as a mere investment: if returns to education are high enough to make further education attractive, then individuals choose to invest more in education, provided they can afford it. This branch of literature – both theoretical and empirical – is very wide and will be discussed in the next section 2.3.

On the other side, economists focused on the distributional *effects* of education expansion, whatever its reason. The literature on this topic, however, is scant and made up by a bunch of empirical studies that investigate the impact of education expansion on different classes of individuals (disaggregated by gender, parental background and socio-economic status, ethnicity, migration status, region of residence) or on the population as a whole.

Among these papers, only few of them have studied this topic in a cross country setting. For example, Chevalier *et al.* (2009), using IALS data for 20 countries to analyse intergenerational educational mobility, find no evidence that expansion of third level education has led to an increase in educational mobility between fathers and their children. Ram (1990) finds a Kuznets' style relationship between educational levels and inequality, finding that the turning point stands at about 7 years of education. Before this level, education expansion leads to a more dispersed distribution, after it education expansion is associated to a reduction of inequality.

Country-specific studies seem to confirm the finding of little impact of higher education expansion on educational inequality: Bratti, Checchi, and de Blasio (2008) investigate the impact of the increase in the supply of higher education (introduction of wider ranges of degrees and construction of new sites) that took place in Italy during the 1990s, using data from the Bank of Italy Survey of Household Income and Wealth. Their results suggest higher education expansion has not had any effects on the likelihood of graduation, but it did have a positive impact on student enrolment and retention (when expansion is measured by the creation of new courses). They also find that those who most benefited from the expansion of higher education are the individuals from the middle class. Therefore they conclude that the rapid expansion of higher education system has had a negligible impact on equality of opportunity in terms of completion of tertiary education.

By the same token, Blanden and Machin (2004) using longitudinal data for the UK, find that the recent higher education expansion has not been equally distributed across people from richer and poorer backgrounds. Rather, it has disproportionately benefited students from relatively rich families.

More positive effects are found by Holzer (2006) who studies the impact of the expansion in higher education that occurred in Sweden in the 1990s on intergenerational mobility. Her results reveal that higher education expansion generated higher mobility except for the group with the lowest educated parents. Her diff-in-diff estimates indicate that the increased local access seems to have weakened the importance of family background in the regions where new university colleges were created and encouraged more groups to attend higher education.

Similarly, Rouse (1995) analyzes the effect of the introduction of several regional two-year colleges, as a complement to the four-year colleges, on higher educational attainment in the United States. She finds a positive effect on increasing educational attainment, which suggests that the expansion was effective in influencing more people from lower social background to invest in higher education (she refers to this effect as a democratization effect). On the other hand, she also shows that more local access to shorter tertiary educational tracks at the two-year colleges also diverts some able individuals from lower socioeconomic backgrounds to choose shorter educations instead of investing in a longer educational program at the four-year colleges (diversion effect). However, she concludes that this effect is outweighed by the gains of those who otherwise would not have attended college at all.

Beside economic literature, and maybe more intensively, sociological literature has widely investigated the phenomenon of educational expansion, i.e. the increase in individual participation to school programmes, and has focussed on its macro determinants and consequences, looking at the institutional level and at long-run historical processes.

In particular, there is much work discussing the macro-level correlations between the expansion of schooling, i.e. the increase of school enrolments, and economic growth, a key evidence for human capital theory. First, sociologists working within a neo-institutionalist framework find that the origin and the diffusion of mass schooling can be better explained by institutional circumstances than by the level of economic growth and other related measures of economic performance. According to their analyses, the origin of the modern school systems can be found in the relations among nation states in 19th century Europe (Ramirez and Boli 1987), and their expansion should be explained as self-reinforcing diffusion process, as actors both at the macro and the micro level compete for their social position using education as an important resource (Meyer *et al.* 1977; Schofer and Meyer 2005). Second, sociologists cast some doubt on the effect of educational expansion on economic growth: they do not deny the existence of a correlation, but do not judge the existing evidence of a causal effect of the former on the latter as convincing, because of reverse causality, time frame limitations and measurement error (Hannum and Buchmann 2004).

In this work, what is more of interest from our point of view, and also more at odds with the standard view of educational expansion, is the idea of education as a positional good (Hirsch 1976), that is something whose value depends mostly, or even exclusively, from its social distribution. The utility of a positional good depends on how much one has with respect to everyone else. In fact, sociologists see the educational systems of contemporary societies as performing at least three important social functions (Brint 2006). First, there is the transmission of knowledge. Second, the process of socializing young individuals to social expectations and norms. Both functions are of course included in the human capital analysis. The third one is allocating individuals to social positions, an argument that comes close to signalling theory in economics (Spence 1973). From this perspective, the amount of education achieved by an individual, or her title of study, is used by employers as a screening device, to reduce costs of selection. The person with more education, or with a higher educational title, gets the position, as employers see education as a signal of productivity, trainability or (in the radical versions of the theory), as just a credential opening *per se* the access to better social positions. But if this is the case, the process of educational expansion can have undesired consequences: when the number of individuals holding a given educational title increase, the utility of the title as a screening device of course decrease. With an analogy to monetary inflation, this process has been called inflation of educational credentials (Collins 1979). After an increase in enrolments, a study title loses its value and people slowly turns away from the schools awarding it, making enrolments go down in a boom and boost process. In the case of pre-capitalist economies, research in historical sociology has shown this process to have taken indeed place in some historical settings, for instance in Spanish universities in the late Middle Ages (Collins 2000).

The sociological literature has also studied the implications of education expansion on stratification and educational inequality and has mainly focused on tertiary education. On the one hand, higher education expansion, especially when accompanied by hierarchical differentiation, may imply a process of diversion, whereby people from more disadvantaged background are channelled to position of lower status. According to this view as tertiary education expands and as differences between social classes in the probability of attending tertiary education reduce, inequality between social groups widen with respect to the kind of education attended (Arum, Gamoran and Shavit 2007, p. 5). This is consistent with the Effective Maintained Inequality Theory (EMI) proposed by Lucas (2001), which extends the Maintained Inequality (MMI) theory (see Raftery and Hout 1993). According to the MMI inequality between different social strata in the probability of attaining a given level of education persists until all education needs of the most advantaged social group are saturated and then begins to decrease. The EMI theory emphasizes the role of qualitative differences within education and argues that when saturation or achieve-

ment of a particular level is reached, “quantity inequality” declines, but is then replaced by “quality inequality”, meaning that the advantaged groups are able to secure quantitatively similar but qualitatively better education. Following this view, inequality is expected to rise as a consequence of tertiary education’s expansion and differentiation, as higher status university opportunities are reserved for the elite (Brint and Karabel 1989). On the other hand, the expansion of higher education also represents more opportunities for more people. Even the expansion of lower-tier postsecondary schooling, may reduce educational inequality by bringing into higher education students who would otherwise not have continued post secondary school (Dougherty 1994).

In sociological empirical literature the most influential comparative researches are the studies by Shavit and Blossfeld (1993) on thirteen countries and by Arum, Gamoran and Shavit (2007) on fourteen countries. While Shavit and Blossfeld (1993) find that in most countries educational expansion did not reduce inequality between different social classes, Arum, Gamoran and Shavit (2007) shows that expansion has been accompanied by increasing inclusion, that is by a decline in inequality of eligibility and inequality of enrolment.

2.4. Institutional features of school systems and educational inequality

Schools have a central role in shaping the ways educational inequalities are generated and perpetuated. Different characteristics of education systems may help to various extents reducing or reinforcing the advantage of pupils from high socio-economic background and educational inequality in general. School tracking, academic selection, school choice and competition, duration of compulsory school, pattern of provision of pre-primary education, the extent of school accountability and autonomy, the education funding systems and spending are all features of the schooling system that may affect equity.

This section reviews previous works that have studied whether and how school design affects inequality of educational outcomes and opportunities. We mainly consider economic studies but we shall mention few works from other fields as well, particularly sociology. Our focus is largely on cross-country studies, but we will also review some country specific empirical studies if they represent relevant contributions to the existing literature and help shading lights on the investigated topics.

The adoption of a cross-country approach making use of international data is valuable in this context, because most of the variation in the institutional features of schooling systems occur between countries rather than over time. As pointed out in Hanushek and Woessmann (2010a), the scarcity of within-country institutional variation makes the identification of the impact of different characteristics of the school systems very difficult using national data only. However, cross-country studies pose some challenges in terms of identification: any estimate

of a country-specific school design would be biased if there are unobserved country-level factors that are correlated with that institutional feature and with students' achievement. Therefore, since it is impossible to control for all the cultural, social and structural differences across countries, even in a cross-country setting only institutional features that vary over time can be correctly identified. Yet, cross-country studies can still be informative at a descriptive level and help highlighting how different educational outcomes are correlated to a wide range of country-specific institutional features. Throughout the review we shall discuss these problems and the empirical approaches adopted by different studies.

The section is organised in 4 subsections, each focusing on particular aspects of characteristics of the school system potentially affecting educational inequality. In particular, we discuss the impact of school tracking, of school choice and competition between schools, of accountability systems, and of pre-school education.

2.4.1. Selective versus comprehensive school system: the role of school tracking

An important feature of the school system regards its degree of stratification (or differentiation) which relates to the extent to which pupils with similar ability, socio-economic characteristics and interests are allocated to separate schools (Horn 2008). The role of stratification has been extensively investigated in the economic literature on educational inequality. In particular, most of the studies have focused on one specific aspect of stratification which is *school tracking*. A school system is characterised by tracking when children are allocated – at some stages of their career – to different tracks, characterised by different curricula offered (generally distinguishing between academic or vocational education) and different average ability of the enrolled students. School tracking introduces therefore a selection in the schooling process either in the form of self-selection or in the form of admission based on ability tests (Brunello and Checchi 2007).

National school systems differ widely in the amount of ability tracking of students they provide in school. In particular, they differ in the age at which the selection takes place and in the degree of differentiation, for example in the number of tracks. Primary schools are typically comprehensive in most countries, but after primary education some form of selection takes place at different stages in different countries. In the majority of OECD countries, tracking takes place at age 15 or 16, but in other countries the first tracking is much earlier (at age 10 in Austria and Germany, at age 11 in Czech Republic, Hungary and Slovakia, at age Netherlands and Belgium at 12)⁴³.

The theoretical justification of early tracking is based on the idea that it is easier to teach to homogeneous classes and this would make the system more efficient. However, while the efficiency gains of tracking are yet not

43 Information on age at first tracking is taken from Eurydice (http://eacea.ec.europa.eu/education/eurydice/index_en.php)

proved, many argue that tracking entails costs in terms of equity. In fact, when students are allocated to separate schools according to their ability, more able pupils will benefit from being with each other⁴⁴, while low ability pupils lose from not having this peer group around (see Manning and Pischke 2006, for a discussion). If different school types are hierarchically structured by performance, the learning of disadvantaged students allocated to lower tracks may be hampered by poorer educational quality and the lack of benefits from peer group (OECD 2007). Early tracking is thus likely to affect educational inequality, since it reinforces the ability gaps between pupils coming from different family backgrounds.

The empirical evidence has generally confirmed the inequality enhancing effect of early school tracking, while the evidence on its efficiency is more mixed. Empirical studies typically exploit the international variation in school tracking to estimate the impact on student outcomes. However, as mentioned above, the identification of a causal effect of institutional features in a cross-country framework is challenging, since one should control for unobservable country-specific factors that might affect educational inequality.

Hanushek and Woessmann (2006) identify the causal effect of early tracking by adopting a differences-in-differences approach based on the comparisons of pupils' results between two surveys, PIRLS (in primary school) and PISA (in secondary school when students are aged 15). The idea is that during primary school, the system is uniform and comprehensive in *all* countries, while after primary school, in *some* countries students are then allocated to different tracks. Therefore, "a comparison of the *change* in educational inequality between primary and the end of lower-secondary school between countries with and without early tracking can provide information on possible impacts of tracking" (Hanushek and Woessmann 2010a, p. 31). They found that early tracking systematically increases the inequality of student achievement, and found no evidence that it positively affect average school performance.

Ammermuller (2005) adopts a similar identification strategy (differences-in-differences approach using PISA and PIRLS) but focuses on the impact of tracking on a measure of inequality of opportunity rather than on the dispersion of student achievement and extends the number of institutional features investigated. In particular, he studies the role of four characteristics of the schooling system (number of tracks available at 9th grade, annual instruction time, the share of students in private schooling and school autonomy) on equality of educational opportunity defined looking at how strongly educational performance is determined by the background of the students. His results show that the number of tracks increases educational inequality by amplifying the role of family

44 For evidence on peer effects on students' achievement see Hoxby (2000b) and Hanushek *et al.* 2003.



background (proxied by parental education and social prestige, number of books at home and language spoken at home) on students' achievement.

Similar conclusions are reached by Schuetz, Ursprung and Woessmann (2008) who estimate the effect of different education policies, including school tracking, on equality of educational opportunity in 54 countries. They use TIMSS data on international achievement tests in math and science. They interact various measures of schooling institutions, including the age of first tracking, with the student family background (proxied by the number of books at home) to test whether tracking system affects the impact of parental background on educational attainment, controlling for systematic differences in the performance levels across countries. Their results suggest that indeed the impact of family background is larger in countries with earlier tracking, confirming the idea that “the earlier an education system tracks its students into different types of schools according to their ability, the more unequal are educational opportunities” (Schuetz, *et al.* 2008, p. 297).

Brunello and Checchi (2007) extend these analyses investigating whether the negative effect of early school tracking on equality of opportunity does persist beyond the school age. Using data from different surveys (ECHP⁴⁵, ISSP⁴⁶, and IALS⁴⁷) combined with national data on school design⁴⁸, they study the impact of school tracking on the effects of family background on educational attainment, competences in literacy and labour market outcomes of young adults. They organise the datasets by cohorts and identify the effect of tracking by exploiting variation in school design both across countries and over time (in 1985 /1995 and 2002). Interestingly, their results show that tracking not only increases the effect of family background on education (measured by years of completed education, and probability of dropping out and enrolling or graduating in college), but also on earnings, thus reducing intergenerational mobility. In contrast, they found that tracking does not affect the importance of family background for literacy of young adults, and argue that the channel through which early tracking reinforces the role of family background on earnings operates through its effect on educational attainment rather than on actual competences.

Waldinger (2007) challenges these results arguing that the estimates in the existing literature are not robust against the use of different tracking measures, samples and specifications. He applies a similar approach as in Ammermuller (2005) also adopting a diff-in-diff strategy using data from PIRLS, PISA and TIMSS. But contrary to previous findings, his results show that while family background is more important in early tracking countries, tracking does not *augment* the role of family background on students' performance. However, Hanushek and Woessmann, (2010a, p. 32) argue that Waldinger's insignificant results “may be largely due to limited degrees of

45 European Community Household Panel

46 International Social Survey Programme

47 International Adult Literacy Survey

48 They use three indicators of school tracking: the age at which selection takes place; the length of school tracking; the share of student in upper secondary vocational education.

freedom in samples of only 8-14 countries and a less informative tracking measure⁴⁹. Another paper finding results somewhat in contrast with the previous literature is Vandenberghe (2006) who studied the impact of different measures of school stratification (extent of tracking, grade repetition and interschool segregation) on educational performance using age 15 test scores in maths, science and reading literacy from PISA 2000. His results show that stratification does not affect school effectiveness (mean score) nor intensity of inequality (dispersion of scores among students). The only measure found to slightly affect dispersion is school segregation.

Checchi and Flabbi (2006) argue that the impact of school tracking on intergenerational mobility depends not only on the age of tracking but also on how the tracks are organized and on how the allocation of students to tracks is implemented. They use PISA test scores (as proxy for cognitive abilities) to analyse the relative contribution of ability and parental income in sorting into different tracks in Italy and Germany that are two countries characterized by early tracking (at age 10 in Germany and at age 14 in Italy). They find that in the case of Germany ability is more relevant than parental education, the opposite situation occurs in Italy, which tends to reinforce intergenerational persistence. Their conclusions suggest that tracking design can affect the extent of intergenerational mobility. In particular, sorting rules based on ability and not on parental background may enhance opportunities for mobility. This is an interesting result as it points out that the way tracking is designed and organised may have important policy implications. However, it is not obvious that even a system that sorts students only according to their ability would be really meritocratic and able to increase mobility, since it is well recognised in the literature that ability is not a genetic factor but it is very much affected by parental background (see, for example, Murnane 1981; Feinstein 2003).

Overall, the cross-country literature has suggested that early tracking accentuates the role of family background on pupils' attainment and therefore increases educational inequality. It has also found that the disequalising effects of tracking persist beyond school age and affect labour market performance as well (Checchi and Brunello 2007). In contrast, no robust evidence supports early tracking as a mean to increase average performance and thus schools' efficiency⁵⁰.

49 As a measure of tracking he uses the minimum school grade at which a significant proportion of student is educated in different types of schools and sets different thresholds to define early tracking (after grade 4 and after grade 8). His results are robust to different definitions of threshold levels for early tracking.

50 However, there are some papers that find positive effects of school tracking on pupils' results in a cross-country framework. See, for example, Ariga and Brunello (2007) who argue that de-tracking of secondary schools may have some efficiency costs, since they found that the length of tracking significantly affects the performance in standardized cognitive test of young adults, using IALS data.



These results are largely confirmed by the empirical evidence based on country specific studies. The empirical strategy in these types of studies is generally based on two approaches: some works exploit the variation of school policies across regions within a state (see for example, Dustmann 2004 and Woessmann 2007a for Germany; Bauer and Riphahn (2006) for Switzerland that all suggest early tracking reduces equity in various ways) while others use reforms in the school system and adopt a before-after approach exploiting the gradual introduction of the reform that makes the timing of the reform different across different areas. Different papers used this approach and found that reforms that replaced early tracking with a more comprehensive system tend to improve equity. See Meghir and Palme (2005) and Holmlund (2008) for Sweden; Pekkarinen *et al.* (2006) for Finland and Galindo-Rueda and Vignoles (2004) for the UK.

2.4.2. School choice and competition

Another institutional feature of school systems that can potentially affect inequality in pupils' outcomes relates to school admissions arrangements. Public school admissions can be broadly organised around two models of school provision: 1) *neighbourhood-based* systems, where admission is purely determined by where pupils live, typically with rigidly defined catchment areas; 2) *choice-based* systems that are meant to give parents wider choice set not limited to neighbourhood schools (Gibbons and Silva 2006).

Traditionally public school systems have been neighbourhood-based, but in recent years, some countries have increased the extent of choice, partly because of the increasing demand for choice from parents and partly as a policy tool to promote better performance (OECD 2007). Given the observed poor quality of many schools in neighbourhood-based systems, many governments implemented market-oriented reforms of public education aiming at increasing the competitions between schools and improving overall school quality. The idea is that if parents may choose between different options, then schools would have to compete for students and have an incentive to improve their performance to attract more pupils. More school options may also increase allocative efficiency by improving the match between students and their interests and needs (Rouse and Barrow 2009).

However, while the evidence on the effects of competition on school performance and efficiency is mixed⁵¹ and generally shows that the gains from competition are “modest in scope with respect to realistic changes in levels of competition” (Belfield and Levin 2002), critics of choice-based reforms argue that they may lead to increasing social stratification of schools along the lines of ability, ethnicity and socio-economic status. The argument is that that families with higher socio economic status benefit at the expense of the poor, because they are advantaged in their ability to exercise choice as they are better equipped at making good decisions and they are also less con-

51 Discussing in details the vast literature on school competition and students' outcomes is beyond the scope of this review; for a general overview of this literature see Belfield and Levin (2002), Hoxby (2003) and Rouse and Barrow (2009).

strained by transport costs. Moreover competition gives schools an incentive to “boost their league table position by selecting, or ‘cream-skimming’, pupils on the basis of ability or social criteria” (Allen 2007; p. N). On the other hand, in neighbourhood-based systems school choice can be made by residential choice, which would lead to stratification through the housing market⁵². Indeed the actual impact of admission arrangements and school competition is an empirical question that is still controversial in the literature.

Most of the empirical papers in the area are based on country-specific analysis and mainly focused on US and UK. While some works find that enhanced school choice is not associated with more ‘cream skimming’ and segregation (e.g. Hoxby 2000a for the US and Gorard, Taylor and Fitz 2003 for England), most of the papers show that greater competition arising from parental choice led to increased inequality between schools and thus higher social stratification (see among others, Rothstein 2006 for the US; Gibbons and Silva 2006; Allen 2007; and Burgess et al 2004 for UK). Cross-country evidence on the effect of school competition on educational inequality is scant, possibly due to the scarcity of comparable data on school competition at the international level.

There are some works that have studied the effects of school competition by measuring it in terms of private school enrolment (the idea is that in countries where there are a large number of private schools, public schools face more competition) but they mainly investigated its impact on average achievement rather than on inequality. For example, Woessmann (2003 2008) and Woessmann, Lüdemann, Schütz, and West (2007) using different datasets, find a strong positive correlation between the share of schools that are privately managed and the level of student achievement across countries. However these studies do not deal with the potential endogeneity of private enrolment to public school quality and are also potentially affected by omitted variable bias. West and Woessmann (2010) address the endogeneity issue using the share of Catholics in 1900 (interacted with a variable indicating that Catholicism was not the state religion at that time) as an instrumental variable for a country’s contemporary share of private schools and are able to identify the causal effect of competition from private schools on student achievement. Their results – based on PISA 2003 data - indicate that the share of schools that are privately operated has a significant positive effect on student achievement in mathematics, science, and reading, even after controlling for the current levels of Catholics and for the share of funding that privately operated schools receive from the government. These papers thus seem to suggest a positive effect of competition on school efficiency, but they do not investigate if this implies some costs in terms of equity.

52 There are indeed evidence showing that school quality affects local housing prices in neighbouring-based systems: see, among others, Black (1999) and Gibbons and Machin (2003 and 2006).

Schuetz, Ursprung, and Woessmann (2008) and Woessmann, Luedemann, Schuetz, and West (2009, chapter 7) showed that shares of privately operated schools and shares of public funding are not only associated with higher levels of student achievement, but also with a reduced dependence of student achievement on socio-economic background using TIMSS and PISA 2003 respectively. However these results are not confirmed by Ammermuller (2005) who used data from PISA and PIRLS and shows that the effect of students' social origins on students' performance increases between primary and secondary schools in countries with a large private school sector.

Jenkins, Micklewright and Schnepf (2006) examine levels of school segregation in different OECD countries using data from PISA 2000 and 2003 and relate them to the institutional features regulating school choice, meant as both choice of schools by parents and choice of pupils by schools. They show that differences in parental choice across countries are not strongly associated with differences in levels of social segregation. In contrast, segregation is generally higher in countries with greater levels of school choice, namely where school systems are more selective such as in Austria, Germany and Hungary.

On the whole, the findings of the existing literature are controversial. On the one hand, the available evidence from country specific studies does not seem to entirely confirm that the gains from competition and choice may to compensate for any losses resulting from greater inequality (mainly defined in terms of school social stratification). On the other hand, cross-country studies seem to find positive effect of competition (measured in terms of the size of private school sector) on school performance, while do not reach conclusive evidence on its impact on educational inequality.

2.4.3. School accountability

Pupils' educational attainment can also be affected by the extent of school accountability, generally defined in terms of the presence or not of external exit exams.

As summarised in Woessman (2008), international evidence suggests that institutional features that introduce accountability by externally testing and making public students' and schools' exams create the proper incentives to improve educational performance (see for example, Bishop 1997 2006; Jürges *et al.* 2005; Woessmann 2003 2005). External exit exams in fact introduce incentives for students for students, teachers, and schools (see Bishop 2006, for a theoretical argumentation). Students have more incentives because the results of centralised standardised exams – being more comparable - are more valuable as signals on the job market than the results of non-central examinations. Moreover, student test results can be also used to monitor teacher and teaching quality

on a regular basis and the reputation of entire schools can be based on the achievement of its students, with good schools attracting good students if the results of the tests are made public (Jürges *et al.* 2005).

Therefore some forms of accountability have been introduced in many countries to raise school performance. However, it not clear what is the impact of these policies in terms of other aspects than performance and inequality. Hanushek and Raymond (2003) review the literature discussing the unintended consequences that accountability has produced. They first stress that accountability systems focus attention on academic achievement ignoring other aspects of pupils' development. Moreover teachers may have an incentive to teach narrowly to the high, thus negatively affecting the generalisable learning.

More importantly, since school accountability and public disclosure of school performance increase the exposure of schools, schools may become more selective, and aim at choosing the best students, in order to improve school scores, not necessarily changing the quality of the teaching. In particular, as explained in Schuetz, West and Woessmann, (2007), if school accountability policies are based on performance levels rather than value-added, they may give undue advantages to schools serving students from high socio-economic backgrounds (e.g., Ladd and Walsh 2002). Even if they are based on value added, schools may still have an incentive to exclude disadvantaged students with slower rates of learning from official exams and place them in special education or counsel them to be absent on the day of testing⁵³. Indeed many studies for the US have in fact confirmed that schools reacted to accountability through exclusions, increases in special education placement and increased grade retentions (see for example Jacob 2005; Figlio and Getzler 2002). Moreover accountability systems may also induce teachers to concentrate mainly on achieving high average performance and neglect weak students, whose performance may be more difficult to improve, thus marginalizing low-performing students.

These mechanisms have clearly negative consequences in terms of equity, since it implies more exclusion, higher dropout rates, and a narrowing of the curriculum. However there is e scarcity of empirical works that have specifically looked at the impact of accountability on educational inequality. For the US, Hanushek and Raymond (2004 2005) find a positive impact of school accountability on students' achievement but in terms of distributional effects, they show that this effect varies by subgroup, with Hispanics gaining most and Blacks gaining least show that indeed the accountability system did not lead to any narrowing in the black-white achievement gap which appears to have been adversely impacted over the decade by increasing minority concentrations in the schools. Their conclusions thus suggest that *"The introduction of consequential accountability systems has a clearly beneficial*

⁵³ Hanushek and Raymond (2003, p. 19) explain this with a very illustrative example *"Take the example of a third grade student from a disadvantaged background who arrived at school less well prepared than the others in the school and who progressed at a slower rate each year through the third, i.e., falls further behind over time. The status model compares performance of individual classes each year to the prior year's class. Thus, if testing begins in the third grade, the school might exclude this slow student through, say, placement in special education or counseling the student to be absent on the day of testing. If excluded, the average of all remaining students would be higher than otherwise, and the school will tend to look better in comparison to the third grade in the prior year"*



impact on overall performance. But other forces are simultaneously pushing the distribution of performance—particularly as observed in the Black-White achievement gap—in less desirable ways. First, accountability as seen during the 1990s tended to help White achievement more than Black achievement. Second, the observed movement toward higher minority concentrations in schools has a detrimental effect on Black achievement, again pushing toward a wider distribution of achievement” (Hanushek and Raymond 2005, p.321).

To the best of our knowledge the only cross-country evidence on this topic is provided by Woessmann and co-authors’ works. In particular, Woessmann (2005) using student-level data from three international achievement surveys (TIMSS, TIMSS repeated and PISA), analyses the impact of external exit exams on student performance and finds heterogeneous effects depending on students’ backgrounds, on schools’ specific settings and on time patterns. Using quantile regressions to estimate the effect of central exams on student performance for students at different points on this ability distribution, he finds that the positive impact of central examination in performance is stronger for high ability students, which would tend to widen the achievement distribution. However he also finds some evidence (not robust to the use of different datasets) that the disadvantage of coming from an immigrant or less educated family background is reduced by central exams. The paper also shows that the positive effect of central exams on performance increases during the course of secondary education and is complementary to several dimension of school autonomy. The results of the paper therefore suggest contradictory conclusions regarding the impact of equity: on the one hand central exams seem to widen the achievement distribution, thus increasing inequality; on the other hand they appear to reduce the achievement gaps of disadvantaged students. However, the results of this paper are rather descriptive, and the impact of central exams may be biased by endogeneity or omitted-variable biases since they do not control for country specific effects that may affect both central exams and student performance.⁵⁴

Schuetz, West and Woessmann, (2007) relax the assumption that there is no unobserved cross-country heterogeneity in student achievement, including country fixed effects and identifying the effects of school accountability interacting the presence of central exams with students’ family background (measured by parents SES). In this setting the authors are able to identify the effects of accountability on equality of educational opportunity, namely looking at how it affects the effect of SES on student achievement. Their results show that external exit exams significantly increase student achievement but they also reduce the equality of educational opportunity since they increase the influence of SES on student achievement. Their results also show that equity is reduced in countries with more monitoring of teacher lessons by principals, as the difference in test scores between low- and high-

54 Their identifying assumption is that conditional on all the family, school and institutional background variables, there are no other cross-country features that are consistently related to both central exams and student performance.

SES students becomes wider. Therefore these findings seem to suggest that accountability systems may enhance achievement but reduce equity, but the authors also underline that other accountability devices, do not affect equality of opportunities (this is the case for external teacher monitoring) or even increase it (in case of the regular use of teachers subjective ratings to assess students).

2.4.4. Pre-primary education

While other aspects of school design have controversial effects on educational inequality and may entail a trade off between efficiency and equity, the literature seems to agree on the positive effects of pre-school education on both efficiency and equity of the education system.

The theory behind this idea is explained in various models developed by James Heckman and co-authors describing the technology of skill formation (see Cunha *et al.* 2006; Cunha and Heckman 2007 2008 and 2009). Building on the traditional theory of human capital (first developed by Becker 1964), they model the formation of skills as a life cycle process that exhibits both recursive productivity and dynamic complementarity. Recursive productivity means that the skills acquired at one stage are inputs into the learning process of the next stage, while dynamic complementarity implies that stock of skill acquired in a period makes investment in the next period more productive. Therefore investment in education at one stage raises not only directly the skills attained at that stage, but also indirectly the productivity with which educational investments at the next stage will be transformed into even further skills. This implies that investments in early education are more productive than those at later stages and can therefore increase the efficiency of the following learning process. They also impact on equity as the rates of return to investment in early education tend to be higher for children from disadvantaged families, while at older ages they tend to be higher for children from well-off families (see Cunha and Heckman 2007 and 2009).

The empirical literature, mainly based on US studies, indeed confirms that interventions in early childhood are very efficient, especially when targeted at disadvantaged children, and that the positive effects are persistent through time (see the surveys in Woessmann 2008; Waldfogel 2002; Carneiro and Heckman 2003; Currie 2001).

Results for other countries are fewer and tend to be similar. For Netherlands, Leuven *et al.* (2010) show that lowering the school starting age increases later educational performance of disadvantaged pupils (ethnic minority pupils and pupils with lower educated parents), thus contributing to reduce inequality⁵⁵. Goodman and Sianesi (2005) find significant and long-lasting effects of pre-compulsory education (preschool or school entry prior to age 5) on educational and labour-market outcomes in Britain, but they do not comment on its differential impact according to children family background. Berlinski *et al.* (2009) study the effect of a large expansion of universal

55 In Netherlands children are allowed to start school the day when they turn four years of age and the authors exploit the fact that the summer break (6 weeks) introduces exogenous variation in the age at which children start school.



pre-primary education on subsequent primary school performance in Argentina and identify the effect exploiting the variation in treatment intensity across regions and cohorts. Their results show that attending pre-primary school has a positive effect on subsequent achievement in primary school (somewhat higher for children from poor households), but also on behavioural skills such as attention, effort, class participation, and discipline.

The cross-country evidence is significantly sparser. Esping-Andersen (2004) shows that the impact of family background is smaller in countries characterized by extensive pre-school day care. Schuetz *et al.* (2008) find that the length of a country's pre-school education system is positively associated with cognitive performance in middle school. They also show that more extensive systems of pre-school education – in terms of both enrolment and duration – significantly increase equality of opportunity, as measured by a lower dependence of eighth-grade students' test scores on their family background. Overall, the literature suggests that preschool programmes can be both efficient and equitable. As stated by Woessmann (2008; p.), “early childhood education programmes that are particularly targeted at disadvantaged children seem to have strong potential for raising equity”.

2.5. Equality of opportunity in education

Scholars refer to inequality of opportunity as the “ethically offensive” (Checchi and Peragine 2010) part of observed inequality that is not due to individual choice (“ethically acceptable”), but to personal background and characteristics outside individual choice set. In general, the distinction between opportunity and effort is described by Roemer (1998) who conceptualizes the difference between “circumstance”, exogenous and independent of individual willingness, and “effort” that – instead – can depend both on personal motivation and on circumstances.

According to many theorists (the more frequently quoted – even with different approaches – are Fleurbaey 1995; Fleurbaey and Maniquet 2005; Roemer 1998), the aim of a “fair” society is not equality of outcomes, but equality of opportunities, since the final personal outcome depends also on the effort that every individual puts in the process and this is beyond the scope of the social planner. Summarizing the literature, we can assume a “vectorial” description of what opportunity is and how it relates to outcome and effort: $O=f(c, e(c))$, where the outcome “O” is a function of a set of circumstances “c” and an amount of effort “e”, that in turn may depend or not on individual circumstances. Of course, this general relationship takes different specifications depending on the outcomes one considers, on the elements and size of the set of circumstances and on the possible links between circumstances and effort.

In such an arbitrary framework it is difficult to unambiguously define what equality of opportunity is and – even more – how an opportunity-equalizing policy should look like. In an ideal world, it would be enough to provide all individuals with the same vector “c” in order to achieve equality of opportunity. Unfortunately, even the minimal vector of circumstances includes – depending on the outcome – elements that are outside political control, such as genetics, individual ability, ethnic characteristics and related habits and customs, family background, in addition to elements that may be unethical or even illegal to correct, such as living region or community, language, religious views.

Once recognized that it is not possible to equalize all the elements of the vector “c”, equalizing opportunities means compensating disadvantaged individuals with some policies related to efforts. Roemer (1998, chapter 4) provides a theoretical definition of such policies, assuming that an equalizing policy should give the same outcome to individuals putting the same level of effort. Since effort is the only source of ethically acceptable inequality, any other inequality is due to circumstances and must therefore be compensated. However – even if authoritative and widely shared – this is only one of many possible definitions and its practical implications – as well as empirical counterparts – are limited.

Depending on the outcome one focuses on, the nature of both circumstances and effort changes. Education – the topic of this review – is a good example of such a statement: when referring to income, the role of a “fair” society is to provide all the citizens with the same opportunity of finding a well paid job, given their effort, but independently of sex, race, household economic conditions, parental education and so on. Under this perspective, education is an element of the vector of circumstances, since – once in the labour market – individuals cannot usually go back to school and change their educational status. On the other side, effort might depend on the level of education, as well as on a set of other circumstances.

One question naturally arises related to this aspect: should a society implement policies reducing inequalities due to differences in the level of education? The answer is very much uncertain: some can argue that individuals who did not get a high level of schooling should not be compensated, because of the low effort they put⁵⁶, others can reply that such a low effort could be due to personal disadvantages, such as bad economic conditions, low quality of schools and teachers, ethnic discriminations and therefore they must be compensated.

Of course, both arguments can be ethically and theoretically sustained, and this is the reason why we focus on equality of opportunity in education.

56 For instance, Black and Devereux (2010) state that “As noted in Solon (2004), children of wealthy parents earn higher incomes in part because they invest more in human capital and have more education. As a result, observing zero intergenerational correlation would suggest no return to human capital investment, and it would be a strange market economy if higher human capital was not rewarded with higher earnings.”



The role of education, in this perspective, is functional to implement equality (or fairness) of both employment and income. Since education is one of the main instruments through which inequalities of circumstances can be overcome or perpetuated (Blanden and Machin (2004) and Chevalier *et al.* (2009) among many others), it can amplify or reduce equality of opportunities in the labour market. Indeed, the same circumstances that we may think to affect individual income also affect individual education: race, migration conditions, gender (hopefully, in some countries this aspect reduced in younger cohorts), family background play a role in determining both educational level and income level. Fostering equality of opportunity in education is also a way to reduce the impact of such circumstances on income inequality (even if – unfortunately – gender, race, being migrant are still a source of wage inequality for any given level of education attainment). Using the notation introduced before, we can extend the function as follows:

$$Y=g(c, e(c), S(c, e(c)))$$

where income depends on circumstances, effort (that may depend on circumstances) and schooling, that depends in turn on both of the previous factors.

Why should we focus specifically on education? First of all, because it is relevant *per se*, since it plays a role in social cohesion, political activity and awareness, citizenship and social capital, and so on. Under this wider perspective, equality of opportunity in education is a powerful instrument to make societies more equal and mobile, increasing the importance of personal effort and reducing that of exogenous circumstances. Second, because reducing the impact of circumstances on effort helps decreasing not only education inequality, but also income inequality through a double channel: the first is schooling, the second is effort in the job market, as long as it depends on the same set of circumstances and as much as their effects are equivalent. Third, there is evidence (among others, the recent and extended review by Black and Devereux 2010) that parental education is beneficial for offspring at any level of income, so that reducing inequality of opportunity in this specific sector gives long-term advantages and foster a virtuous loop that increases the level of education and lowers the need for equalizing-opportunities policies in the future.

What do we exactly refer to when analysing opportunity in education? Which are the specific characteristics of this concept?

Even if written more than four decades ago, the well-known review by Coleman (1967) exhaustively lists and comments a wide set of possible definitions of equality of educational opportunity, analysing the topic since pre-industrial society, when intergenerational mobility was virtually null and therefore there was no need for educational equality: every family was responsible for children's education, that was limited to the perpetuation of father's profession. It was only in industrial societies that the needs for different competences and the increase of social mobility opened up the scope for institutional education and the problem of equality of opportunity arose. Coleman's report (1967) also describes how the concept of equality of opportunity in education evolved over time and provides instruments to discern among different definitions.

Under the policy perspective, different definitions are relevant as far as they require distinct policies in order to achieve equality of educational opportunity.

The definition by Roemer (1998) simply implies that we should implement some policy such that all children putting the same effort should end up with the same level of education, no matter their circumstances, provided that circumstances do not influence the level of effort. Otherwise, one should also consider these effects and compensate for what the effort would have been if the circumstances were identical. For instance, assuming that the level of individual performance at school depends on resources and effort, that in turn depends on circumstances, it is possible to compensate a lower effort – due to circumstances – with higher resources.

Another, less popular concept of equality that is worth citing consists in the objective of perfect equality of outcomes. Provided that effort is a function of circumstances, then policies aimed at compensating the effects of circumstances should be able to equalize also efforts, so that individual outcomes can be equalized as well. This definition implicitly relies on two assumptions: first, effort depends *only* on circumstances; second, it is possible and appropriate to detect and compensate for the entire set of circumstances.

Since we observe some income inequality in all the economic systems, a baseline common to all the definition is the minimal provision of “free education up to a given level which constitutes the principal entry point to the labour force”, as Coleman (1967) stated. Of course, this does not match even the simpler requirement of equality, since – again citing Coleman (1967) – “free schools do not mean that costs of a child's education become reduced to zero for families at all economic levels”. However, any further policy statement inevitably refers to a specific definition of equality. For instance, the division between vocational and academic education can be seen – on one side – as a favourable policy, since it allows individuals with different interests and abilities to find an educational path close to their characteristics and to reduce drop-outs. On the other side, it can be seen as an instrument to per-



petuate inter-class differences, since circumstances do matter in the choice of educational track and there is strong evidence that vocational curricula are chosen by worse-off individuals (among others, Bauer and Riphahn 2006; Dustmann 2004; Feinstein and Symons 1999; Ermisch and Francesconi 2001).

But what should we include in the vector of circumstances? How these elements can influence individual effort? Which policy – if any – should we implement in order to foster equality of opportunity in education?

2.5.2. Implications

The first task a policy maker faces is the identification of relevant individual heterogeneity sources. The list can be virtually infinite, but the most common are gender, family income, ethnicity, language, ability and talents, parental education, effort. Second, the social planner should partition these sources of inequality between ethically acceptable and ethically offensive, that is – in our functional description – decide which are the elements of vector “c” and which are the components of “e”. This step is not so trivial as it may seem at a first glance. Being a woman is not usually seen as an acceptable source of inequality, while putting different levels of effort undoubtedly is. Much more questioned has been the role of talent and ability. Should we correct for heterogeneous ability? On the one side, low ability can be seen as something that cannot be corrected, whatever policy is implemented. Moreover, low ability means not only that more resources should be used to improve education, but also that this education will be “less productive” in the production process (Jensen 1969). On the other side, ability is something outside the individual choice set, so that – according strictly to the definition of Roemer (1998) – we should compensate for it.

The third step refers to the circumstances that can be somehow corrected and those that cannot, because of practical reasons due to non-observability: even if all agreed on the advisability of compensating for different abilities, how would it be possible to observe them? Is there a way to disentangle between ability and other circumstances? In addition to ability, there are other unobservable characteristics, such as psychological conditions and family affective support. Finally, once decided the set of circumstances and detected those for which is possible and appropriate to compensate, the social planner should implement the most effective policies.

2.5.3. Measurement

Ferreira and Gignoux (2008) summarize the theoretical framework for measurement of opportunity indices, unifying the methodologies adopted by Checchi and Peragine (2010) and Bourguignon *et al.* (2007a 2007b). Both parametric and non-parametric approaches are reviewed under a single perspective, in relation to the “benchmark” definitions provided by Roemer (1998). In principle, provided we are able to identify any possible circumstance

generating inequality of opportunity and partition the population according to these dimensions, there is perfect equality of opportunity whenever the total amount of inequality is due to within group inequality, while the between group contribution is null. This means that inequality is only due to different effort put by individuals with similar circumstances, while there is no difference on average among individuals with different characteristics – without any assumption on the relation between outcome and circumstances (non-parametric approach).

However, since this approach is very difficult to be implemented in practice, the parametric approach consists of estimating a distribution of outcomes assuming a (linear) relationship between circumstances, effort and (a function of) outcomes. The cost of an *a priori* assumption on the functional form is repaid not only by the chance to analyze relatively small samples, but also to quantify the effect of single circumstances on the level of equality of opportunity.

Apart from theoretical papers on general equality of opportunity, there are very few papers focusing on the level of equality of opportunity *in education*. A small number of studies focus on education mobility, a concept close but distinct from equality of opportunity (Chevalier et al 2009). Di Paolo *et al.* (2010) construct a mobility index analysing the correlation between parents' and children's years of schooling. Other researches investigate other topics, such as the effectiveness of a public school system in increasing mobility (Checchi *et al.* 1999), a cross-country comparison between income and education mobility (Comi 2004), while Chevalier (2004) focus on the effects of increasing compulsory school level, looking at UK reform in 70's.

2.5.4. Previous empirical evidence

The literature dealing with equality of opportunity is divided in two main branches: on the one side there are papers focusing on specific countries, trying to detect relevant and effective mechanisms and to generalize the results to a wider set of schooling systems. On the other, there is a smaller number of papers analysing cross-country dynamics, looking for empirical regularities more generally verified.

Among cross-country analysis, Hertz *et al.* (2008) is the only one that goes beyond Europe and the US and documents large differences in intergenerational education mobility around the world, with the expected result that Latin American countries show the highest educational intergenerational persistence and Nordic countries the lowest.

A higher number of papers focus on European countries and US, finding similar results: the most recent is Di Paolo *et al.* (2010), finding that – across Europe – educational mobility is large in Nordic countries, lower in Continental and even lower in Mediterranean countries. However, the gap is closing, since less mobile countries seem to catch up Nordic ones in the level of educational mobility. The effects of father's education are usually



higher than those of mother's, but also this source of immobility is decreasing over time, at faster rates if the gap is higher (apart from Italy and Portugal). Another recent paper is the chapter by Chevalier *et al.* (2009), who find very similar clusters of European countries, according to the level of intergenerational mobility in education.

Comi (2004) focuses on both income and education mobility using ECHP data, showing that more immobile countries are Italy, Portugal and Greece. A significant variation across Europe is found also by Weissman (2004): using TIMSS data, he compares US and 17 European countries and finds that US are not significantly different from EU as a whole, while there is a sensible variation across European countries in terms of equality of educational opportunities.

Because of easier data finding, the list of papers devoted to intergenerational mobility in education in a national perspective is larger than cross-country analyses. In what follows, we will report only those particularly attractive either for the methodology and data exploited or for the relevance of the result.

Blanden *et al.* (2003 2004, chapter 6) and Blanden and Machin (2004) found that educational performances in United Kingdom have become significantly more related to parental background, since higher education expansion benefited richer households much more than the others, also because of "regressive" reforms implemented in the '80s. In a couple of papers also referred to the United Kingdom, Chevalier (2004) and Chevalier *et al.* (2005) detect the positive role of parental education on children attainment – independent of income – finding also significantly different effects of father's and mother's education on daughters and sons.

Black *et al.* (2005) use an interesting set of econometric tools to analyse the Norwegian reform of expansion of compulsory education from the seventh to the ninth grade, finding that there is almost no effect of parental education on offspring education. However, they only focus on a single country and on the bottom tail of the population, so that results may not be generalised to other situations.

More recently, focusing on Germany Heineck and Riphahn (2007) do not find any significant change in the level of dependence between children outcomes and parental background in five cohorts between 1929 and 1978, in spite of massive policy interventions aimed at increasing equality of opportunity. On the other side, a paper by Bauer and Riphahn (2009) demonstrates a positive effect of early enrolment for children in Switzerland, arguing that such a policy may help reducing the disadvantage of less endowed children.

Finally, a set of papers focus on Italy: Brunello and Checchi (2005) main finding is that school quality can substitute parental education to provide low endowed individuals with the opportunity to attain higher education levels, Bratti *et al.* (2008) find that the increase of higher education supply had a very little effect on education attainment but a significant effect on enrolment. Finally, Checchi *et al.* (2008) provide a detailed analysis of trends

in intergenerational transmission of inequality in Italy, stating that – even if intergenerational mobility increased in the last decades – there is still a persistent gap between the two tails of the educational distribution.

Nature or nurture?

An issue strictly related to equality of opportunity is the role of genetics – or nature – in individual education attainment. Intergenerational persistence and correlation between parents and offspring's education could in principle originate from a pure natural process.

Of course, since this literature is inevitably border-line to other disciplines, such as psychology, ethology, pedagogy, we will refer to the limited amount of papers that try to empirically disentangle the two factors in relation to economic outcomes.

A literature review by Plomin and Petrill (1997) conclude that – despite the “swing” between nature and nurture as the believed main determinant of IQ scores in the last century – most of the recent (at that time) studies agreed that about 50% of IQ results is due to genetics and the rest is due to environment. More recent studies do not deviate significantly from their conclusions: Sacerdote (2002) made an attempt to disentangle the two effects by analysing twins. As he stated, “environment can be incredibly potent in determining children's outcomes and that environment's potency may vary with the outcome considered.” Bowles and Gintis (2002) also ascribe a little role to genetics in determining the correlation between parents' and offspring's economic success, that is – however – very little correlated to IQ. On the same path, Black *et al.* (2009) quantify in 0.32 the intergenerational elasticity of IQ, while it is only 0.20 for income. On the other side, Plug and Vijverberg (2003) quantify that “about 55–60 percent of the parental ability is genetically transmitted”, while Plug (2004) is even more pessimistic about the role of nurture.

At the other extreme there is a series of papers by Cunha *et al.* (2006) and Cunha and Heckman (2007) that stress the relevance of early interventions as a powerful equalizing tool. According to them, the role of nurture is prominent⁵⁷ but its effectiveness decreases sharply after the very first stage of children's lives. This implies that a necessary – but not sufficient – condition for a successful opportunity-equalizing set of policies is the early compensation for circumstances disadvantages (“Early interventions have a substantial effect on adult performance and have a high economic return.”).

57 “Ability gaps in both cognitive and non-cognitive skills across individuals and across socioeconomic groups open up at early ages. They are strongly correlated with family background factors, like parental education and maternal ability, which, when controlled for in a statistical sense, largely eliminate these gaps”, Cunha and Heckman (2006), p. 68.



Even if the evidence is far from being clear-cut and opinions on the relative importance of nature and nurture are also partially driven by ideology, here we just assume that the role of institutions is not negligible in affecting intergenerational mobility and individual opportunity to attain some level of education.

2.6. Returns to education and wage inequality

The extent to which inequality in educational attainment translates into wage inequality depends on the magnitude of the returns to education, determined by the interplay between demand and supply of education in the labour market. This chapter reviews the literature on returns to education relevant to understand the link between inequality in education and wages. In particular, the first section describes the empirical specification used in previous work to estimate the returns to education, within the framework of the human capital investment model. An important challenge in this literature is to identify the causal effect of education on earnings: we will briefly discuss the main problems that may bias the estimates and review the principal methods employed in the literature to find a genuine causal relationship. Since this literature is very vast and there are already comprehensive surveys, we will not discuss this topic in details, but will suggest relevant existing reviews. Section 2.3.2 reports evidence on the evolution of returns to education over time and discusses possible causes of the increase of the skill premium observed from the beginning of the 80s. Section 2.3.3 sketches empirical literature on the link between education and income inequality and its main results. Section 4 concludes.

2.6.1. Estimation of returns to education

Most of the issues underlying the analysis of returns to education can be understood within the theoretical framework of the *human capital investment model*, first proposed by Becker (1964) and Ben-Porath (1967) and successively extended (see, for example, Card 1999; Card and Lemieux 2001). According to this model, education is treated as an *investment* in human capital and the incentive to accumulate human capital is provided by the prospects of future gains. In particular, the theory assumes that education is chosen to maximise the expected present value of the stream of future incomes, net of the cost of education⁵⁸. Drawing on this model, the return to the s^{th} year of schooling can be approximately defined as the differences in log wages between leaving at s and at $s-1$ (see Harmon et. al 2003, for a formal derivation). Thus, one can estimate the return to s by looking at how log wages varies with s .

58 The costs of acquiring education can be classified in three different types (see Checchi 2008): direct monetary costs, such as tuition fees, book purchase, living costs, etc; indirect monetary costs (or opportunity costs), corresponding to forgone earnings due to school attendance; and non-monetary costs, such as the effort put into education acquisition.

The empirical approximation of the human capital theoretical framework is usually based on the Mincer's (1974) earning function, which allows the direct estimation of the rate of return to education using data from a representative sample of the working population. The advantage of this approach is that it allows to single out the part of the earnings variance that is due to education and the coefficient estimate of educational attainment can be easily interpreted as the percentage wage differential due to an additional year of schooling (when the educational attainment is measured by years of schooling). However, a shortcoming is that it neglects the cost of education, as well as the taxes and social benefits that workers pay/receive over the life-cycle (Boarini and Strauss 2007).

According to this model, the log of individual earnings (Y) in a given time period can be decomposed into an additive function of a linear education term, a quadratic experience term, a set of other variables (\mathbf{X}) assumed to affect earnings and a disturbance term (u):

$$\text{Log}(Y) = a + \beta S + \gamma E + \delta E^2 + \mathbf{X} + u$$

where S represents years of completed education, E represents the number of years an individual has worked since completing schooling and the quadratic term is included to capture the concavity of the earning profiles.

A direct measure of the private return to education can be obtained by an OLS estimation of b applied to a sample of working individuals.

$$\hat{b} = \frac{\text{Cov}(\log(Y), S)}{\text{Var}(S)}$$

However, OLS estimates of the returns to education can be upward or downward biased if no account is taken of the fact that education is not randomly determined. Educational attainment depends on individual choices, attributes and circumstances and if all these factors are not controlled for, then the measured differences in the wages of individuals with different levels of education may over- or under- estimate the true causal effect of education on wage outcomes. These biases arise because of correlation between unobserved individual attributes which determine individuals' education decisions and wage outcomes. In other words, OLS estimates are biased if the schooling variable S is not exogenous, that is if it is correlated with the residuals u . In particular, the literature has



identified three sources of bias in the OLS estimation of b : omitted variables, measurement errors⁵⁹ and heterogenous returns in the population⁶⁰.

The omitted variable bias is probably the most discussed in the literature and it applies whenever it is impossible to control for individual factors that affect the schooling decision and are also correlated with the wages. A common example is unobserved ability: if higher-ability or inherently more productive individuals tend to acquire more education, the intercept and S will be positively correlated, inducing an upward bias in the estimated average return (*ability bias*). This arises because the estimation procedure is unable to separate the contribution of unobserved ability to productivity from that made by education and ascribes it all to education (Dearden 1999).

Different approaches have been used to deal with this problem and recover the causal effect of education. Firstly, measures of ability have been incorporated to proxy for unobserved effects. The inclusion of direct measures of ability, such as IQ test, should reduce the bias since the coefficient of education is depurated from the effect of ability. However, IQ or cognitive tests are imperfect proxy for real ability, and it is therefore very likely that unobservable ability still bias the results (see for example the discussion in Dearden 1999). Another, more convincing, method is based on studies on identical twins. The idea is that twins share the same parental background and – under the assumption that ability is genetically transmitted – have the same ability. Therefore one can exploit within-twins differences in educational attainment and earnings and regress the wage difference within twins against their education differences so that unobserved effects (assumed to be common within twins) are differenced out (see for example Ashenfelter and Krueger 1994; Ashenfelter and Rouse 1998; Miller *et al.* 2005).

A third approach deals directly with the simultaneous relationship between schooling and earnings by specifying a two-equation system which is identified by exploiting instrumental variables that affect schooling but not wages. If an instrument can be found that is correlated with the true measure of schooling and uncorrelated with the unobservables in the outcome equation, then it is possible to achieve a consistent estimator of the returns (this is true in the homogeneous returns model but only in some special cases for the heterogeneous returns model, see Blundell *et al.* 2005). Several instruments have been proposed in the literature, and we will not review them (for detailed surveys, see Card 1999; Harmon *et al.* 2004; Blundell *et al.* 2005). The most widely used set of instruments are those that exploit educational reforms, such as changes in the duration of compulsory education, as

59 As explained in Blundell *et al.* (2005, p. 481) “One can think of u_i as including measurement error in the schooling variable S_i . Note that since the educational variable is a dummy or categorical variable, measurement error will be non-classical (in particular, it will vary with the level of education reported). Kane, Rouse and Staiger (1999) show that both OLS and instrumental variables estimates may be biased and that it is not possible to place any apriori general restrictions on the direction or magnitude of the bias of either estimator. By contrast, in the case of a continuous variable affected by (classical) measurement error, OLS estimates of the return would be downward biased and instrumental variables estimates consistent”.

60 Simple OLS constrains the returns to be homogeneous. If, by contrast, the effect of schooling varies according to some of the X_s , the OLS estimate of b will not in general recover the average treatment effect on the treated (ATT). See Blundell *et al.* (2005) for a discussion of the methods to estimate models with heterogenous returns.

source of exogenous variation (see for example Harmon and Walker 1995). Even if this method seems to ensure the exogeneity of the instrument, the interpretation of the IV coefficient still needs some caution. The IV would be a consistent estimate of the *average* return to education only under the assumption that all individuals in the population have the same marginal return. But in a context of heterogeneous returns the IV in fact estimates the rate of return only for the group affected by the policy change, the *compliers* (those who are induced by the instrument to change their behaviour). The IV therefore estimates the average returns among those individuals (with characteristics X) who are induced to change behaviour because of a change in the instrument. This is known in the literature as the *local average treatment effect* (LATE) estimator (Imbens and Angrist 1994). This interpretation helps explaining why most of the studies that have adopted an IV approach have found larger returns using IV than OLS, which should be upward biased.

The empirical papers that have estimated the returns to education for different countries using various methods are very numerous and it is certainly out of the scope of this survey to review all these works. For comprehensive and thorough surveys of this literature, see Card (1999), Harmon *et al.* (2003), Blundell *et al.* (2005) and Checchi (2008, Chapter 6).

2.6.2. The evolution of skill-premium

A large body of empirical studies, mainly based on US data, has shown that the returns to skills, as measured by the relative wages of college graduate workers to high school graduated, have tended to increase over the last decades, despite the large growth in the supply of college educated workers. In particular, by the early 1990s, a number of influential papers documented the decline in the relative wages of unskilled workers in the US starting from the beginning of the 80s (see, among others Bound and Johnson 1992; Katz and Murphy 1992; Levy and Murnane 1992; Murphy and Welch 1992 for the US and Freeman and Katz 1994; Machin and Van Reenen 1998 for other OECD countries). These papers agreed in identifying the increase in the *relative demand* for skills as primary factor behind the growth in the skill-premium (see Lemieux 2008). The fact that the skill premium increased in a period of substantial growth in educational attainment in fact means that that relative demand for skilled labour should have increased more than the (relative) supply.

Starting from this observation, the following literature has then focused on understanding the sources and the reasons underlying such increase in the demand for skills. During the 1990s a lively debate started between those who identified technological change as the principal culprit of the observed increased wage inequality and those who argued that international trade and outsourcing toward developing countries played a major role. We briefly review this debate in the next section, while the following section will focus on more recent explanations.



The debate in the 90s: Skill-Biased Technological Change or International Trade?

The first argument, the so called Skill-Biased Technological Change (SBTC) hypothesis, suggests that there is a close complementarity between new technologies and skilled workers, given that only the latter are fully able to implement those technologies. According to this view, improvements in technology naturally increase the demand for more skilled workers (college graduated relative to non-college workers). As explained in Machin (2001, p. 257): “the idea is that these new technologies lead to higher productivity, but that only some workers possess the necessary skills to use them. As such employers are prepared to increase the wages of the skilled workforce who are complements with the new technology. But at the same time less skilled workers do not possess enough skills to operate the new technologies and their wages are lowered or they lose their jobs. As such the relative wages and employment of the more skilled rise”.

The SBTC argument has been empirically confirmed by a large number of very influential papers that have shown how the rapid diffusion of new technologies (such as ITCs) in the US stimulated a significant substitution of unskilled for skilled workers causing the relative demand for skill labour to rise (see, among others, Katz and Murphy 1992; Berman, Bound and Griliches 1994; Autor, Katz and Krueger 1998; Autor, Katz and Kearney 2008). Other papers show that this idea does a good job of capturing major cross-country differences among advanced nations (see, among others, Katz, Loveman, and Blanchflower 1995; Davis 1992; and Murphy, Riddell and Romer 1998; Card and Lemieux 2001b; Atkinson 2008).

An alternative explanation identifies international trade as the main driver of the observed increase in the wage gap between skilled and unskilled workers. This argument can be framed in the theoretical setting of the Heckscher-Ohlin (HO) model and the related Stolper-Samuelson (SS) theorem. The HO model builds on Ricardian theory of comparative advantages by predicting pattern of trade and production based on the factor endowment of a trading region. The simplest version of the model (see Wood 1994) assumes only two production factors (skilled and unskilled labour) and two countries (the North, developed economies, and the South, developing countries) each producing two goods (high-skill intensive and low-skill intensive goods)⁶¹. The main prediction of the model is that a country will specialize and export the good whose production requires the intensive use of its relatively abundant and cheap factor and will import the good intensive in the relatively scarce and expensive factor. In this framework, since developed countries are relatively more abundant in skilled labour, thus having a comparative advantage in the production of high-skill-intensive goods, trade liberalisation will push them to specialize and export these types of goods, and will cause the production of low-skill-intensive goods to contract. Therefore in de-

61 It also assumes perfectly competitive markets and identical production function with freely available technology across countries and that the two countries are identical except for the relative factor endowments

veloped countries international trade is supposed to raise the demand (and the prices) for skilled-labour-intensive goods and thereby increase the relative demand of skilled labour⁶².

However, this theory generally found little empirical support as most of the empirical evidence concluded that trade accounts for a positive yet relatively small share of rising inequality (see the discussion in Slaughter and Swagel (1997), Slaughter (1998) and Wood (1995) that criticizes their conclusions). Therefore, trade-based explanation has been generally rejected as the main source of the increase in the relative demand of skilled labour in favour of the SBTC argument. In fact, if trade were the principal cause of increased demand for skilled workers, one should expect a labour reallocation across sectors: according to HO, in fact, skill-intensive sector should expand (and the weight in total production of skill intensive industries should increase) as a consequence of trade with DCs. On the other hand, the skill-intensity within each industry is expected to decrease (substitution effect). If SBTC were the main cause, instead, one should observe a within-industry skill upgrading.

The early estimates, mainly centred on the United States, reveal a critical impact from technological change and a rather weak influence of globalization and trade integration with unskilled labour intensive developing countries. Krugman and Lawrence (1993) and Krugman (2000) argue that trade cannot be the main explanation for the increase in relative demand for skilled labour because the weight in total industry of the traditional, low skill intensive production has not significantly changed and furthermore almost all sectors have become more skill intensive⁶³. Moreover, Lawrence and Slaughter (1993) have shown that prices have not grown faster in skill-intensive industries rather than in unskilled intensive one, which is contradictory with HOS approach⁶⁴. Many empirical works instead found evidence consistent with the SBTC hypothesis. As Berman, Bound and Machin (1998) summarize this idea is motivated by the combination of three kinds of evidence: 1) employment shifts to skill-intensive sectors seem to be too small to be consistent with explanations based on product demand shifts (Katz and Murphy 1992; Berman, Bound and Griliches 1994; Freeman and Katz 1994); 2) despite the increase in the relative cost of skilled labour, the majority of industries have had *within sector* shifts in the composition of employment towards skilled labour (see Katz and Murphy 1992; Berman, Bound and Griliches 1994, for the US and Berman, Bound and Machin 1998, for a panel of 10 OECD countries), and 3) there appear to be strong, within sector correlations

62 The links between product prices and factor returns is stated by the Stolper-Samuelson (SS) theorem, under the assumption of perfect competition and that the functional relationship between outputs of goods and inputs of factors is fixed (in other words assuming that technology is given)

63 Krugman (2000) explains the weak impact of international trade arguing that trade with South represent a very low percentage of North's GDP, thereby playing an insignificant role in the shift of factor demand.

64 However, Leamer (1994) challenged the evidence that relative prices are not fallen and found a close relationship between rising trade integration and declining prices of unskilled labour intensive products in 1970s, which resulted in lower relative wages for the unskilled workers.



between indicators of technological change and increased demand for skills (Berman, Bound and Griliches 1994; Autor, Katz and Krueger 1997; Machin and Van Reenen 1998).

However, some authors argue that in multi-sector framework it is the *sector bias* rather than the *factor bias* of technological change what is important to explain the rising wage differential between skilled and unskilled workers. While the factor bias implies a technological change that shifts the production towards more skill-intensive methods, the sector bias is the result of diverging rates of unbiased (factor neutral) technological change between different sectors: if the skill intensive industries exhibit higher rate of technological change and they expand relatively to other industries, then the aggregate relative demand of labour shifts towards skilled workers.

Leamer (1994) states that only the sector bias of technological change affects relative wages and, on this ground, he objects to the notion that SBTC is the dominant factor in explaining the decline in the demand for less skilled workers. Also Haskel and Slaughter (1998) argue that it is the sector bias of technological change that matters for relative factor prices. This is because with multiple sectors, relative wages changes are driven by relative profitability across sectors. Thus, it is crucial to understand in which sector the technological progress take place. They support this idea, by showing a strong correlation between changes in skill premia and the sectoral bias of technological change during the 1970s and 1980s for a sample of ten OECD countries. Instead, Krugman (2000) points out that *pervasive* (occurring simultaneously in all economies) SBTC does affect relative wages since an integrated world economy will respond to such TC as a closed economy would do (that is, as each industry reduces its proportion of unskilled labour, there will be an expansion of the production of the good intensive in unskilled labour: this would induce a decrease in the relative price of unskilled-labour-intensive good and hence a reduction of relative wages of unskilled workers).

Also Berman, Bound and Machin (1998) underline how the pervasiveness of the sector neutral, skill biased technological change can be a good explanation for the increased skill premium. They argue that pervasive SBTC has two testable implications: first, the within sector shifts away from unskilled labour should occur throughout the developed world; and second, these shifts should have been concentrated in the same industries in different countries. Using data on employment in manufacturing for 10 OECD countries they find evidence consistent with both predictions.

Summing up, after the intense debate in the 1990s, a consensus was reached about technological change as the leading driver of the increase in the skill-premium throughout the 1970s 1980s and 1990s (see the survey in Acemoglu 2002). More recently, more sophisticated versions of SBTC have been proposed: they are briefly reviewed in the next section.

Expansion of the classical SBTC hypothesis

More recent papers have extended and enriched the basic model of SBTC described above, defined the *canonical model*⁶⁵ by Acemoglu and Autor (2010), in order to account for more complex empirical evidence. The simple SBTC explanation is not able to account for the complex change in inequality observed over the last 15 years.

The canonical idea of SBTC in fact leads to predict a uniform shift in employment away from low-skilled and toward high-skilled occupations, but this contrasts with the recent empirical evidence that documented a *job polarization*, namely a growth in employment in both the highest-skilled (professional and managerial) and lowest-skilled (personal services) occupations, with declining employment in the middle of the distribution (manufacturing and routine office jobs). See, for example, Autor, Katz, and Kearney (2006) for evidence on US and Goos and Manning (2007) on UK. Autor, Levy, and Murnane (2003) proposed a richer model, able to explain the impact of technology in a more nuanced way and to account for the observed job polarisation.

They claim that the simple distinction between skilled and unskilled workers is not rich enough to capture the effect of technological change and introduce a tasks-based differentiation of occupations. They then argue that information and communication technology can replace human labour in routine tasks (tasks that can be expressed in step-by-step procedures or rules) but cannot replace human labour in non-routine tasks. Their model assumes that there are three types of occupations: unskilled non-routine jobs do not require a high level of schooling (skills); more skilled but routine jobs such as traditional blue-collar jobs; and non-routine high skill jobs such as doctors or executives. In this framework, the introduction of new technologies, mainly computers, substitute routine occupations thus depressing their wages relative to those of non-routine occupations. As a consequence, technology should increase top-end wage inequality by expanding the wage gap between middle-wage jobs and high wage jobs and decrease low-end inequality as wages in middle-wage jobs decline relative to those at the bottom.

Another extension to the canonical SBTC model is given by Acemoglu (1998 2002) that depart from the assumption that technological change is exogenously determined and skill-biased by its nature. He instead suggests that technological change is not skill biased by nature but by design and proposes a model where the direction of technological change is endogenous and is determined by the size of the market for different inventions. “When there are more skilled workers, the market for technologies that complement skills is larger, hence more of them will be invented, and new technologies will be complementary to skills” (Acemoglu 1998, p. 1082). This theory is particularly interesting as it implies that an increase in the supply of skills impacts on the skill premium, through two competing forces. “The first is the conventional substitution effect which makes the economy move along a

⁶⁵ This is characterised by two-skill groups performing two distinct and imperfectly substitutable occupations (or producing two imperfectly substitutable goods) and technology is assumed to be factor-augmenting (thus complementing either high or low skill)



downward sloping relative demand curve. The second is the directed technology effect, which shifts upward the relative demand curve for skills, because the increase in the supply of skills induces faster upgrading of skill-complementary technologies” (Acemoglu 1998, p.1057). This model with endogenous technological change thus helps explaining the historical patterns of the demand for skills and the skill-premium that first fell during the 1970s and then increased sharply during the 1980s following the large increase in the supply of skills.

2.6.3. Empirical evidence on the impact of educational inequality on income distribution

The previous section focused on the role of demand for skills in determining the wage gap between skilled and unskilled workers. However, wage gap and wage inequality in general are also affected by the evolution of the supply of education. In particular, increases in population’s educational attainment, but also the distribution of such attainment will interact with the demand for skills and affect wage inequality.

The present section focuses on empirical papers aimed at understanding how the distribution of education affects the distribution of income. Since data are aggregated, however, none of the papers in the literature can look at *individual* position in the two distributions, a topic closer to the theory of estimation of returns to education, reviewed in previous sections.

The empirical literature on the link between educational inequality and income inequality is rather scant and has suffered from data availability issues. Even among the few papers focusing on this topic, many shortcomings can be attributed to the lack of reliable data: first, all the papers focusing on this topic (apart from De Gregorio and Lee 2002) disregard the possible lagged effects, simply relating educational inequality to *contemporaneous* income inequality. Second, results often depend on the considered sample of countries, in particular in less recent papers. Finally, due to the small sample size, the number of covariates is usually very small and it is difficult to give any clue with respect to causalities.

Empirical strategy is common to most of the papers and very simple: cross-section regressions with an indicator of income inequality as a dependent variable and an indicator of educational inequality as the relevant explanatory variable. Quantity and quality of controls depend on data availability.

Becker and Chiswick (1966) and Chiswick (1971) were the first to deal with this issue. Using data on the states of the US and cross-country, respectively, they found positive correlations between income inequality and educational inequality. However, while the relationship between educational and income inequality is clearly positive, the link to returns to education is less clear-cut. Moreover, the number of observation is very low in the analysis by Chiswick (1971). Psacharopoulos (1977) estimated a very simple relationship ($Gini_i = f(EdIneq_i, Income_i)$), pag. 385) on a cross-section of 49 countries and found that educational inequality is positively correlated to income

inequality, even controlling for educational levels and per-capita income. Two years later, Winegarden (1979) estimated the same model – with slightly different data – including also a number of controls. Results are consistent to the previous papers for what concerns the link between educational and income inequality, that seem to be positively correlated.

In contrast to previous literature, Ram (1984) finds that both mean and variance of education have no significant effects on income inequality, once controlling for income and population growth rates. However, his sample included 26 developing countries over 28 and the different set of countries can be the reason for results so different from the previous literature.

Bourguignon and Morrisson (1990) found a positive effect of both level and dispersion of education (even if measured using macro data) on income inequality, measured as the share of income of bottom 40% or 60% of the population. Moreover, opposite results are found when regressing the share of income of top 20%, so that they can also conclude that schooling has an equalizing effect.

A second paper in contrast with previous literature is by Psacharopoulos (1996). Using a sample of 59 countries, he found that the level of education (measured as years of schooling) has a strong equalizing effect. Moreover, this effect overrules the one predicted by Kuznets, since both linear and squared income is ineffective in explaining the level of income inequality. Regarding education dispersion, results are less sharp: it seems to significantly increase inequality if measured as standard deviation, but to have virtually no effects (or weakly positive, in the sense that it decreases income inequality) if measured as coefficient of variation.

Park (1996) found different results depending on the inequality measure adopted. Standard deviation of years of schooling is positively correlated to income inequality, while its coefficient of variation is very low significant and with the opposite sign. His explanation relies on the high (negative) correlation between educational levels (also included as a regressor) and its coefficient of variation.

Checchi (2004) exploited the data published by Barro and Lee (1996) to run a panel analysis on 94 countries over 35 years, with a total of 454 observations. His findings suggest that education expansion has a negative effect on educational inequality (i.e., an increase of average years of education decreases the level of inequality) and, in turn, this is negatively correlated to income inequality. However, it is possible to find four different patterns by

splitting the sample in different geopolitical areas, reconciling the differences in Ram (1984) with respect to papers focusing on developed countries.

De Gregorio and Lee (2002) investigated not only the link between education and income inequality, finding the “usual” positive correlation, but also the determinants of educational inequality. Interestingly, it appears to be unrelated to the level of income, but strongly dependent on the level of education in a quadratic way. Results suggest the presence of a Kuznets’ curve also for education, in which levels and dispersion show an inverted-U relationship.

To summarize, literature gives evidence for a positive correlation between education and income inequality in developed countries. However, low data quality and the consequent sensitivity of results to different specifications and controls do not allow to exactly quantify the effects and to perfectly disentangle it from other mechanisms, such the dependency of income inequality from the level of income itself. Moreover, results for developed countries cannot be generalized to developing ones: Ram (1984) and Checchi (2004) find that developing countries follow patterns different from developed world. In addition, by splitting these countries in homogeneous geo-political subsets, they seem to be different also among each other.





3. Labour market and inequality

Marloes de Graaf-Zijl and Wiemer Salverda

3.1. Introduction

Since labour market earnings are on average the most important component of household incomes, a substantial part of income inequality resides on the labour market. Who works or not and, if so, how much they work and subsequently how much he or she earns determine the part of household income inequality that can be attributed to the labour market. This section follows this arrangement to discuss the relationship between income inequality and the labour market. Section 3.1 introduces the relationship between income inequality and earnings and discusses relevant determinants of earnings. Section 3.2 discusses the relationship between income inequality and labour force participation. Section 3.3 presents some evidence on the way labour productivity is related to income inequality, both the effect of productivity on inequality and the impact of income inequality on labour productivity.

3.2. Income inequality and earnings

3.2.1. Measurement of earnings inequality in the literature

We refer to section 1.2 for the issues involved in the measurement of earnings inequality. In the literature wage and earnings inequality are often used as synonyms. In the following review we try to specify whether hourly wages or a combination of the hourly wage and the hours of work are considered. We will refer to the second concept as earnings or simply the wage.

Atkinson and Brandolini (2006) have presented GINI indices for all employees aged 15–64 including part-time workers and part-year workers, for both net and gross earnings. Their conclusion is that the literature on earnings dispersion has brought together a wide variety of empirical evidence, contrasting individuals, countries and time periods. But because of the variety in the measures used, it is difficult to compare and contrast the different findings. They explicitly stress the importance of setting findings of empirical cross-country studies alongside each other and confront them with each other in order to get a good idea of the impact that the different definitions and coverage can have on the comparison. Blau and Kahn (2009), have presented an international comparison of earnings inequality measured by the P90/P10 ratio, as well as wage inequality at the bottom (P50/P10 ratios) and the top (P90/P50 ratios) for the weekly/monthly/annual gross earnings for full-time and in most countries full-year

workers only. Their analysis reveals that the pattern in inequality at the top of the distribution is not necessarily the same as inequality at the bottom (see for more detail Section 2.1.3). OECD (2008) has provided an overview of the earnings of full-time workers.

Table 3.1 Variation in earnings inequality according to different sources

	ATKINSON & BRANDOLINI (2006)	ATKINSON & BRANDOLINI (2006)	ATKINSON & BRANDOLINI (2006)	BLAU & KAHN (2009)	BLAU & KAHN (2009)	BLAU & KAHN (2009)	OECD (2008)
YEAR	2000	2000	2000	2000	2000	2000	Mid–2000s
MEASURE	Gini coeff	Gini coeff	Gini coeff	P50/P10	P90/P50	P90/P10	P90/P10
EARNINGS CONCEPT	Not clear	Not clear	Not clear	Varies (weekly, monthly, annual)	Varies (weekly, monthly, annual)	Varies (weekly, monthly, annual)	Varies (hourly, weekly, monthly, yearly)
GROSS/NET	Gross wages and salaries	Gross labour earnings	Gross labour earnings	Gross, except for France			Mostly gross
AMONG WHOM	All employees	All employees	All persons	Men full-time / Women full-time	Men full-time / Women full-time	Men full-time / Women full-time	Full-time workers
AUSTRALIA	-	-	-	1.7 1.6	1.8 1.6	3.1 2.6	3.1
CANADA	44.5	45.5	56.3	2.2 2.3	1.7 1.8	3.8 4.0	3.7
DENMARK	-	-	-	-	-	-	2.6
FINLAND	40.8	41.1	52.4	1.5 1.3	1.7 1.5	2.5 2.0	2.4
FRANCE	-	-	-	1.6 1.6	2.1 1.7	3.3 2.7	3.1
GERMANY	41.0	41.6	56.8	1.6 1.7	1.8 1.6	2.9 2.8	3.3
ITALY	-	-	-	1.4 1.3	1.7 1.6	2.4 2.1	
JAPAN	-	-	-	1.6 1.4	1.7 1.6	2.7 2.3	3.1
NETHERLANDS	37.8	38.5	57.9	1.6 1.6	1.8 1.6	2.8 2.6	2.9
NEW ZEALAND	-	-	-	1.8 1.7	1.9 1.7	3.6 2.8	3.5
NORWAY	39.0	38.9	46.5	-	-	-	2.2
SWEDEN	40.6	40.5	49.6	1.4 1.4	1.7 1.5	2.4 2.0	2.3
UNITED KINGDOM	40.9	42.6	60.9	1.8 1.7	1.9 1.8	3.4 3.1	3.5
UNITED STATES	47.4	48.1	59.2	2.2 1.9	2.2 2.1	4.8 4.1	4.9

For most countries the inequality is based on gross wages, for others on the net wages. The data also relate to different earnings concepts (hourly and weekly earnings in most cases, annual and monthly earnings for others) and include different elements of the employee remuneration packages. Following Atkinson (2007) the OECD stresses that because of these differences, earnings data are better suited for assessing changes over time than for comparing levels of earnings inequality across countries. With this caveat in mind, Table 3.1 provides an overview of the earnings inequality measures of these three comparative studies, that all use their separate definitions and



measures of inequality. For some countries, e.g. Canada, the position in the country ranking by earnings inequality differs substantially between the various concepts.

3.2.2. Earnings versus income inequality

As already put forward in section 1.2.2, most attention has focused on individual earnings, and we have to remember that this is only one determinant of household disposable incomes and that there are other factors affecting the evolution of income inequality, including the distribution of capital and income from capital, movements in factor incomes, and the impact of the government budget, read taxation and subsidies. Atkinson and Brandolini (2006) have determined the differences between several measures of earnings and income inequality using data from the Luxembourg Income Study for eight OECD countries, showing the transition from individual gross earnings to household disposable income. The Gini indices for all persons aged 15–64 are between 47 and 61 per cent. The Gini indices are reduced by between 18 percentage points (Norway) and 28 percentage points (Germany) when household total after-tax income attributed on a per capita basis to persons aged 15–64 is considered. The order of the countries from country with the highest index to the country with the lowest index for persons aged 15–64 is: U.K., U.S., Netherlands, Germany, Canada, Finland, Sweden, Norway. The order for household total after-tax income attributed on a per capita basis to persons aged 15–64 is: U.S., U.K., Canada, Netherlands, Germany, Sweden, Norway, Finland.

There are many notable illustrations available that stress how income and earnings equality are not the same. Especially in the US, many researchers have made an attempt to pin down to what extent the change in income inequality has been due to changing earnings dispersion. Even though Gottschalk and Dantziger (2005) have concluded that the increased family income inequality in the US primarily reflected increased inequality of wage rates, Burtless (1999) has found that the direct contribution of increased earnings inequality on income inequality in the US has been surprisingly modest. Even if male and female earnings inequality had remained unchanged at their 1979 levels, about two thirds of the observed increase in overall U.S. inequality would have occurred. Karoly and Burtless (1995) have shown that forty percent of the reduction in income inequality in the US in the 1960s occurred because of the decline in earnings inequality among male heads of families; more than one-third of the increase in inequality after 1969 occurred because inequality in male earnings soared. Gottschalk and Smeeding (1997) have compared the increases in the dispersion of both individual earnings and total household income in the United States with those in Europe. They have shown that the increases in the dispersion of both individual earnings and total household income in the United States were larger than in almost all other countries. While most countries experienced at least modest increases in earnings and market income (income before direct taxes and

public income transfers) inequality, these were largely offset by changes in other sources of income, producing a more modest increase in the inequality of disposable incomes in most other nations when compared to the US.

For the UK Jenkins (1996) has shown that a wider focus beyond wage inequality trends for employed prime-age working men is required to explain income distribution trends. Trends among groups such as the self-employed and among non-working families and for other income sources have also been significant. Adam and Nosal (1982) as well as Kattuman and Redmond (2001) have provided examples of the Hungarian case, where at some point in time, income differentials considerably narrowed, while at the same time earnings differentials widened substantially. For a selection of Eastern European countries, Milanovic (1999) has attempted to explain the increase in inequality that has been observed in transitions economies. He has found that increased inequality of the wage distribution has been the most important factor driving overall inequality upwards. The non-wage private sector has contributed strongly to inequality only in Latvia and Russia. Pensions also pushed inequality up in Central Europe, while non-pension social transfers were too small everywhere and too poorly focused to make much difference.

3.2.3. Earnings inequality and its determinants

A recent descriptive overview of the international differences in wage inequalities is given by Blau and Kahn (2009), using both overall wage inequality measured by the P90/P10 ratio, as well as wage inequality at the bottom (P50/P10 ratio) and the top (P90/P50 ratio) – see Table 3.1. The US and Canada have especially large P50/P10 gaps. While Canada's P50/P10 gap is much higher than the average for all countries, its P90/P50 gap is roughly the same as the average. For the US both the P50/P10 and P90/P50 gaps are much larger than the all-country average. Finland, Germany, Italy the Netherlands and Sweden all have especially small P50/P10 gaps, both compared to the all-country average and relative to their P90/P50 gaps. In interpreting these numbers, one should keep in mind the caveats mentioned in section 1.1. The inequality measures for the various countries are not based on the same earnings concept.

As Lane (2009) points out, the central role of earnings dispersion in contributing to income inequality has long been recognised. Yet, disentangling the sources of changes in earnings dispersion has been difficult (Atkinson and Brandolini 2006). Most analytical work has been based on the examination of the individual characteristics of workers, explaining at most 30 percent of variations in earnings (Mortensen 2005; Abowd et al 1999). Among these are:

- human capital related wage differences,
- male-female wage differential,
- age and tenure related earnings profiles,



- wage discrimination of ethnic minorities,
- union wage differentials,

The discussion of this is beyond the scope of this review.

The well-known literature review by Groshen (1991) has pointed out that there are other reasons than worker quality for wages to differ across workers. There are also employer and job related impacts on wage differentials.

The discussion of these has long been restricted to the study of:

- compensating wage differentials for the type of work,
- firm-size wage differentials,
- inter-industry wage differentials.

Apart from these, Groshen (1991) has suggested that random variation and job rationing (good jobs versus bad jobs) might be important. The good jobs versus bad jobs might be the result of some firms paying efficiency wages in order to reduce shirking, reduce turnover, improve the pool of applicants, or to create a high-morale-high-productivity work environment (Lane 2009). Or they might result from rents that arise as a result of market frictions, shared by firms with their workers (Mortensen 2005).

The new availability of matched employer-employee data has opened new possibilities to investigate the relative importance of worker, firm and match effects on wages. The seminal work by Abowd *et al.* (1999 2006) has found that person effects, especially those not related to observables like education, are a very important source of wage variation in France. Firm effects, while important, are not as important as person effects. Person effects explain about 90 percent of inter-industry wage differentials and about 75 percent of the firm-size wage effect while firm effects explain relatively little of either differential. Woodcock (2008) followed up on this by demonstrating that any decomposition of wage differentials that does not control for person, firm, and match effects can be misleading.

3.2.4. Wage floors: Minimum wages and collective bargaining.

The goal of minimum wages is to alter the distribution of income in favour of low-income households. The recent renewed interest in minimum wages can among others be explained by the growth of low pay. Countries such as the UK and Ireland did not have a statutory minimum wage in combination with a rather decentralised system of collective bargaining. These countries decided to implement a system of statutory minimum wages to address the growth of low pay (Vaughan–Whitehead (2008, p.8). Indeed the findings by Blau and Kahn (2009) for the P50–

P10 gap (see Table 3.1) suggest the importance of wage floors for earnings inequality, since all of the countries where these gaps are small except Japan have extensive coverage by collective bargaining systems.

But one should keep in mind that a national minimum wage, or wage floors in general, can also have the opposite effect on the income distribution. It not only increases wage levels at the bottom of the distribution, but may also reduce the amount of jobs at the lower end of the labour market, forcing more people into joblessness. This in turn has equilibrium effects on supply and demand of skill types and their relative wages (Teulings 2002). A good illustration has been provided by Johnson and Browning (1983), who have shown that in the US at that time more than 80 percent of low-income households were harmed by the minimum wage, while more than 10 percent of high-income households actually gained. This result arises in part because many low-wage earners live in high-income families and because low-income households receive only a small share of their income from low-wage earnings, so that even a large increase in the earnings of low-wage workers does not cause large increases in the income of low-income households. When disemployment effects are taken into account, the gains to lower-income classes are diminished even more and the losses to upper-income classes are greater. However, Volscho (2005) has used decennial US state data covering 1960–2000 and still found state minimum wages to reduce family income inequality.

Card and Krueger (1995) compared unemployment and wages in New Jersey and Pennsylvania before and after the increase of the minimum wage. They found no evidence that minimum wage increases reduce poverty. Neumark and Wascher (2008) provide evidence that the Earned Income Tax Credit (EITC) is a far more efficient policy mechanism for reducing poverty among working Americans. Unlike the minimum wage, which raises the wages of all affected workers, including the majority who are second or third earners in non-poor families, the EITC only subsidizes the wages of low-income families and does so via the tax system, hence avoiding the negative employment effects of minimum wage increases.

Most other studies have focused on the relationship between minimum wages and *earnings* inequality. The effect of the national minimum wage on wage inequality depends on the numbers of workers who are affected both directly and indirectly by the minimum wage, the level of the minimum wage and the initial level of wages (Dickens and Manning 2004). There is empirical evidence to suggest that the minimum wage in the USA has had a powerful influence on wage inequality in the bottom half of the earnings distribution (see DiNardo *et al.* 1996; Lee 1999; and Teulings 2002). In the 1980s, when the federal minimum wage was kept at a fixed nominal level and consequently declined in relation to average earnings, wage inequality in the bottom half of the distribution rose dramatically. And, in the 1990s when the federal minimum was raised three times, this trend was stopped and



even partially reversed. According to Lee (1999) the declined minimum wage can account for much of the rise in dispersion in the lower tail of the wage distribution in the period 1979–1989, particularly for women. Teulings (2002) has confirmed these conclusions regarding the wage distribution, by showing that the return to human capital has also increased strongly because of the fall in the minimum wage, for wage levels up to twice the minimum. This effect explains virtually the whole increase in inequality in the lower half of the distribution. A 10 percent reduction of the minimum wage causes the wage of a worker earning the minimum wage before the reduction to fall by 8 percent. However, as has been pointed out by Gramlich *et al.* (1976), as the minimum wage is increased beyond its historical range of 40 to 50 percent of the median wage, more and more workers confront the grab-bag combination of a higher wage but a reduced probability of having a job. At some point these complications make it unwise to boost the minimum wage any more.

Dickens and Manning (2004) have contributed to the discussion of the effect of the minimum wage on earnings inequality in the UK by investigating the sensitivity of results to alternative methods of estimating the wage distribution. Their main conclusions show that the national minimum wage has had a detectable effect on the wage distribution, but since the minimum wage has been set at a low level such that only 6–7% of workers are directly affected and the minimum wage has had virtually no effect on the pay of workers who are not directly affected, one can see the effect of the minimum wage on the fifth percentile of the wage distribution, but there is no effect on the 10th percentile.

Pachego (2009) has used the differential rates of minimum wage increase between adults and youth in New Zealand that all indicate a significant and negative relationship between the real minimum wage and lower-tail wage inequality for youth.

3.2.5. Wages at the top: Superstars and hierarchy, and tax rates.

Top incomes have risen much more strongly than average incomes in many countries in recent decades. In contrast to before most top incomes now rely on wage earnings. Atkinson (2008) call this the ‘fanning out’ at the top of the income distribution and calls for a behavioural model to understand the underlying change in the differentials. Search theory highlights the uncertainty for both employer and employee of reaching a proper match between the worker and the job and the surplus that this can generate. In Atkinson’s view (2008, 73) the indeterminacy of how this surplus will be shared between the two parties may allow social norms to play a role. Reputational codes through conformity to these may reinforce such norms. However, this may be up to a tipping point, and as a result

exogenous shocks sudden reversals can occur. Such shocks can affect employee support for redistribution or employer views on the importance of reputation.

Atkinson (2008, Chapter 9) considers the literature on two possible approaches for relating this to the growth of top incomes: the theory of superstars where technological advance enables the best performer in a field to extract an increasing rent. He thinks, however, that a technological explanation cannot be sufficient as its unidirectional nature would predict a steady increase, which conflicts with declines in top incomes during the period preceding the current expansionary one. Also a superstar explanation – because it rests on individualised remuneration – cannot apply to all top earners and therewith the phenomenon of rising top incomes as a whole. A second possible explanation rests on the hierarchical organisation of production and employment, where each next-higher level of hierarchy requires a higher level of remuneration. In principle this can generate a steep upper (Pareto) tail of the distribution. However, this approach is also deemed insufficient as in practice the outcomes at the top of the wage distribution exceed significantly the predictions of the model. In addition, hierarchy at the very top may have become less important as a determinant of pay as executive remuneration is increasingly related to firm performance. As a solution – and an item on the agenda for future research – Atkinson advocates combining the two approaches and sees three forces at work: increased concentration of rents, steeper pay hierarchies and increasing rent-sharing at the top.

Leigh (2009) in his review of the literature adds to the above the more gradual and mundane relationship between marginal tax rates and top incomes shares. Atkinson and Leigh (2010) estimate that for the set of five Anglo-Saxon countries (AUS, CAN, NZL, UK and USA), chosen to reduce the possible effects of cultural and social differences, reductions in tax rates can explain between one third and one half of the rise in the income share of the richest percentile group over the period 1970-2000. Clearly, there is an agenda for research here for other countries. More discussion of taxation is found in Chapter 3.

3.3. Labour force participation

3.3.1. Household joblessness

Gregg and Wadsworth (1996 /1998) were the first to note that the pattern of employment in economies of certain countries had become increasingly unevenly distributed across working-age households and that concentration on individual-based measures of joblessness did not reveal such disparities. Since then, the European Union (European Commission 2001; Eurostat 2003), as well as the OECD, have begun to include household-based workless



information among their key social indicators. The growing disparity between individual and household level joblessness has raised the question what caused the concentration to increase and what are its impacts. The causes of household joblessness can be found in the marriage market –the increase of single-adult households–, in the labour market –persons with certain characteristics are earning below or above average earnings– and the combination of the two –the increase of homogamy. An early study by Ultee *et al.* (1988) concluded that labour market inequalities are aggravated by marriage market outcomes. But, in addition, the finding of persistent couple effects suggests that other processes are taking place after marriage.

Household joblessness is thought to have many negative consequences, most obviously on poverty and deprivation, but also on psychological well-being, social relations and long-term effects on children. OECD (2008) has suggested that household joblessness plays an important role in understanding the relationship between income and earnings inequality and Esping–Andersen (2005) has argued that the joint effect of rising marital homogamy in terms of human capital and labour supply contributes generally to widening the income gap between households. No empirical evidence has been presented so far for the actual relationship between household joblessness and inequality. Instead efforts were focussed on establishing the relationship with income poverty. Focussing on the differences between individual and household joblessness and looking at those household in which no member worked during the whole year, OECD (1998 2001 2009) have found that individuals living in jobless households have far greater probability of low income (the bottom quintile of household annual income distribution) compared to those living in households with some work, especially in Australia, Finland, Ireland and the UK. Members of jobless households with children are particularly exposed to the risk of low income. Whiteford and Adema (2007) have assessed the extent to which child poverty is associated with the work status of parents and found that in nearly all OECD countries child poverty rates are significantly higher for jobless families than for families with at least one parent in employment.

3.3.2. Working hours

As we anticipated in section 1.2.1 both hourly wages and hours worked contribute to the dispersion of earnings. For the same wage rate, people who work longer hours earn more per month, and per year. But the literature on the part-time wage gap demonstrates that the hourly wage is also higher for full-time workers compared to part-time workers (e.g. Hirsch 2005; Hardoy and Schöne 2006; Manning and Petrongolo 2005; McGinnity and McManus 2007). Johnson and Kuhn (2007) have tested empirically what share of the increase in weekly earnings inequality can be attributed to the increased inequality in hourly wages and what part is due to increased inequality in working hours. Their analysis reveals that increases in hourly wage inequality are primarily responsible for increases in

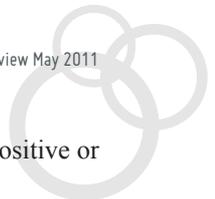
weekly earnings inequality in both the US and Canada. Increases in the dispersion of hours worked per week have played a more important part in explaining the increase in earnings inequality in Canada than in the United States. Another illustration, again for the US, is provided by Ragan and Bratsberg (1995), who have examined trends in inequality for young workers and found that rising inequality of wage rates has been overwhelmed by declining inequality of hours worked. As a consequence, earnings inequality of young workers declined during the 1980s.

The relationship between working hours and inequality is not one-sided. Bowles and Park (2005) have shown that the level of inequality in an economy determines the choice of working hours of its citizens as well. They have modelled the choice of working hours, taking account of the influence of the consumption of the well to-do on the marginal utility of own consumption of the less well-off. They used data on working hours in ten countries over the period 1963–98 and have shown that these hours are increasing in the degree of income inequality. The idea behind this so-called Veblen effect is that of comparison-based utility functions. Individuals compare their own financial situation with a reference group. Their decisions are based on their position in the distribution. The results are consistent with the hypothesis that social comparisons are upwards to a richer reference group and is inconsistent with the alternative hypothesis that social comparisons are downward-looking. When inequality is higher, people experience a stronger incentive to work longer hours in order to catch up with their reference group. Increased inequality induces people to work longer hours and the underlying cause is the Veblen effect of the consumption of the rich on the behaviour of those less well off. These ‘Veblen effects’ are large and the estimates are robust using country fixed effects and other specifications.

In the same line, Bell and Freeman (2001) have argued that workers choose current hours of work to gain promotions and advance in the distribution of earnings. Since US earnings are more unequally distributed than German earnings, the same extra work pays off more in the US, generating more hours worked. Supporting this inequality–hours hypothesis, the authors show that in both countries the number of hours worked is positively related to earnings inequality in cross-section occupational contrasts and that hours worked raise future wages and promotion prospects in longitudinal data.

3.3.3. Female labour force participation

The assumption that families are headed and supported by a single ‘male breadwinner’ has led to women’s earnings being regarded as unimportant for family welfare and only weakly linked to income inequality no longer holds true. The ‘male breadwinner’ family model is in rapid decline. The female labour force participation has increased rapidly during the last decades. The share of male earnings in the total family income of couples dropped dramatically over the decade, while female earnings accounted for a steadily rising proportion of the family budget.



Depending on which women participate and earn most, one might expect this increase to have either a positive or negative effect on household income inequality. Esping–Andersen (2005) shows that only under very restrictive conditions, namely when the labour supply of low educated women grows disproportionately fast, will women’s earnings contribute to more equality. This result arises because the increased female labour force participation is usually combined with a high rate of marital educational homogamy. Indeed, for the US the estimates of Burtless (1999) suggest that family composition effects have had a significant disequalising effect. A growing positive correlation between husbands’ and wives’ earnings, taken together with an increased proportion of families headed by a single person, has increased household income inequality between 1979 and 1996 to an extent not dissimilar in magnitude to that of the rise in individual earnings dispersion. Similarly, Karoly and Burtless (1995) show that since 1979 females’ gains in earnings have increased income inequality in the US because these gains have been concentrated increasingly in families with high incomes. And Blackburn and Bloom (1994) find that for married couple families in Canada, Sweden, the United Kingdom, and the United States, increased inequality of family income is closely associated with an increased correlation between husbands’ and wives’ earnings.

There are, however, notable empirical contradictions to Esping–Andersen’s prediction. Maxwell (1990) analyses US data from 1947 to 1985, which reveal that increased female labour force participation equalized the income distribution of male-headed income-receiving units and husband-wife families. For husband-wife families prior to 1970, the equalizing impacts stem from the relatively high participation rates of women married to low-earning men. After 1970, however, increased participation came mainly from women with above-average earnings growth who were married to high-earning men. Hence, continued increased female labour force participation may increase inequality for dual-earning husband-wife families. This is partly confirmed by Cancian and Reed (1999), who find for the US that despite the rising correlation between husbands’ and wives’ earnings, changes in wives’ earnings do not explain a substantial portion of the increase in family income inequality. Wion (1990) presents earnings of husbands, wives, and couples by quantile shares for the US, showing how the proportion of wives with earnings and the amount they earn vary across declines of husbands’ earnings. His simulation gauges what the distribution of couples’ earnings might have looked like in 1984 had wives exhibited the labour force patterns of 1967, and suggests that the influx of working wives over the period had a neutral impact on income inequality among couples. Callan *et al.* (1998) find even more pronounced effects for Ireland. Despite an increased correlation in the earnings of spouses the recent increases in female labour force participation and female wage rates account for between 20% and 50% of the recent fall in income inequality in Ireland. The remainder of the reduction is attributed to factors not directly related to wives’ earnings. Similarly, Harkness *et al.* (1999) show that in the UK

since the 1970s changes in women's earnings have exerted an equalising influence on the distribution of family income among couples. This is because the biggest changes in female labour force participation occurred where women had low-earning partners. However, employment rates and earnings shares of the partners of unemployed or inactive men have not increased and there has been a rise in the prevalence of 'non-earner households', as was already suggested in the previous section. Machin and Waldfogel (1994) evaluate the hypothesis that the over-representation of women amongst the low paid is of little importance because women's earnings account for only a small proportion of total family income. Their results indicate that in the UK women's earnings are in fact an important and growing component of family income. The majority of the growth in the share of women's earnings occurs as a result of changing family labour structures; women's earnings are playing an increasingly important role in keeping their families out of poverty.

A separate part of the discussion is related to single mothers. Harkness *et al.* (1999) show that in the UK there has been no improvement for single women with children during the 1990s. Lone parents' rates of employment have fallen, and earnings form a smaller component of family income than a decade ago. McKeever and Wolfinger (2010) find that in the US never-married mothers remain impoverished. However, in contrast to the situation in the UK, their income growth over these years was modest despite substantial gains in education, employment, and other individual characteristics generally associated with prosperity.

3.4. Earnings dispersion and labour productivity

According to a variety of theories the wage distribution both within and between firms can have important effects on labour productivity. On the one hand, the 'tournament' models (Lazear and Rosen 1981) stress the positive influence of wage inequality within a firm on the workers' effort. This will increase the equilibrium effort and lead to a positive relationship between wage dispersion and productivity. The opposite relationship between intra-firm wage dispersion and firm performance is found in theories stressing fairness and cooperation between co-workers. Akerlof and Yellen (1990) argue that individual effort is reduced if the wage is regarded as unfair. A similar argument based on cohesiveness is found in Levine (1991). As discussed by e.g. Prendergast (1996) and Eriksson (1999), many results from the empirical literature on issues related to the wage structure within firms are consistent with different theories. When studying this issue it is important to acknowledge the two-way causality between productivity and wages. On the one hand the wage is (obviously) related to productivity, both on the individual and the firm level, but on the other hand, as the theories above suggest, wage dispersion affects productivity. Due to a lack of appropriate data, many early studies have relied on economy-wide inequality indicators or made use of 'self-constructed' instruments for firm performance (Lallemand *et*



al. 2004). There are now a few studies available that use matched employer-employee data in order to study the general relationship between within-firm pay inequality and firm performance, using the longitudinally observed matches between workers and firms to address these simultaneity problems. Lallemand *et al.* (2004) use linked employer-employee data for Belgium and find a positive and significant relationship between intra-firm wage dispersion and profits per capita, even when controlling for individual and firm characteristics. Similarly, Heyman (2005), using linked-employer-employee data for Sweden, finds a positive and significant effect of intra-firm wage dispersion on profits and average pay for white-collar workers.

As Alsop and Teal (2004) suggest, the relationship between earnings dispersion and productivity is highly related to the relationship between income inequality and economic growth, which is discussed in Section 4.2. They investigate this relationship empirically for 19 developed and 62 developing countries and find a positive relationship from inequality to growth. The bulk of this effect operates through an effect on productivity. Rogers and Vernon (2002) give a twist to this finding by separating the inequality at the top from the inequality at the bottom of the distribution. Using data on Canada, Finland, France, UK, Japan, Norway, Sweden, USA and West Germany they find that a higher wage dispersion above the median (P90/P50 ratio) is associated with higher rates of productivity growth whilst, in contrast, higher wage dispersion below the median (P50/P10) is associated with lower rates of productivity growth.

Another twist to this discussion is presented by Blackburn and Bloom (1987), who distinguish between earnings dispersion and income inequality. Using data on the US they find little empirical evidence of an association between technological change and earnings inequality since the late 1960s. In contrast, evidence is found of a positive association between technological change and family income inequality, which likely reflects the effect of technological change on the size, structure, and labour-supply behaviour of American families.

A significant part of the literature dealing with income distribution in the U.S. suggests that the growing disparity between earnings is a consequence of the dynamics of technological change and that this behaviour is the factor explaining the increasing inequality of income between households. This explanation of the “skill-biased technological change” argues that technological change has caused a critical change in the demand of labour, producing a strong growth of the best-paid and most skilled jobs (with a higher level of education and professional training), at the expense of the less skilled and low wage jobs. This change would be the main cause of the increasing wage inequality among the employees and, consequently, of the greater gap among the households’ money income. However, according to Manso (2006) changes in labour productivity are not the main cause of the increase in earnings’ inequality, and as we have shown in section 2.1.2 this earnings’ inequality is not the only reason for the increase in household income inequality.





4. Taxation, income sources and inequality

Virginia Maestri

4.1. Introduction

Governments have basically two ways to affect inequality: taxation and regulation. While the latter is supposed to have an impact on pre-tax inequality, the former allows correcting the market distribution of income and wealth. Moreover, taxation is a double instrument, as it is a source of government spending on both in-kind and cash transfers. Together with taxation, employee and employer social security contributions constitute the basis for provisions such as pensions and unemployment benefits. With regard to government social programmes, OECD countries are generally characterised as either Bismarkian or Beveridgean, with either a piggy-bank objective (redistribution over the lifecycle) or a Robin Hood motive (redistribution between rich and poor) (*Growing Unequal?*). Concerning taxation, countries are generally ranked according to the degree of progressivity of their tax system, while less attention is devoted to the extent of re-ranking resulting from taxes and benefits. Even if the aim of social security contributions is playing the role of piggy bank it involves issues of progressivity. Taxes differ by their nature and source, and can be distinguished as follows:

- personal income tax (on earnings)
- corporate tax (on profits)
- personal capital tax (on property, financial wealth, and inheritance)
- indirect taxes: VAT, GST, excise duty (on consumption), transaction taxes
- environmental tax

Obviously, income taxation is a major source of redistribution of income between high and low earners. In most countries the income tax code is progressive, which means that tax rates are higher for higher incomes. Beyond the personal income tax rates, the effective overall tax burden depends on tax deductions, indirect taxes, payroll and social security contributions, corporate and capital taxes, environmental taxes and tax evasion. On top of this, the extent to which income inequality is reduced as a result of taxation depends not only on the degree of tax progressivity, as is commonly believed, but also on the average tax rate (Kakwani 1976). Finally, taxes have

an effect on pre-tax income and the capital distribution through behavioural responses of taxpayers, and obviously also on the post-tax income and capital distribution (Poterba 2007).

This chapter focuses on the relationship between inequality and taxation and on the progressive effect of different taxes and their income base. In Section 3.1 we briefly introduce some issues that relate to income taxation and, in particular, to tax deductible expenditures, payroll taxes and social security contributions. Since analyses of the progressivity of taxes are disproportionately concentrating on the effect that a single tax may have on an incomplete measure of income, the subsequent sections give an overview of the redistributive and economic effects of other taxes considering a wider tax base. In particular, Section 3.2 provides some empirical evidence about indirect taxes, Section 3.3 about property taxes, Section 3.4 about corporate taxation, and Section 3.5, shortly, about environmental taxes. Section 3.6 discusses evidence on the simultaneous examination of multiple taxes on the progressivity of the tax code and on a more comprehensive measure of income. Finally, Section 3.7 looks at the other redistributive tool of government: social benefits, while Section 3.8 presents some evidence on the evasion of taxes. Section 3.9 concludes the chapter with some considerations about non-tax revenues.

4.2. Income taxes

The most obvious example of how governments succeed in reducing inequality in the market distribution of incomes is with the help of income taxation. Indeed, income taxes are overwhelmingly progressive internationally being at the least proportional in a few ex-communist countries. However, the degree of progressivity of earnings taxation differs massively between countries.

A possible measure of tax progressivity is the concentration coefficient of household taxes, which is calculated as the Gini index of the share of taxes paid on individuals ranked by their equivalised disposable income. According to this measure taxes are the least progressive in Nordic countries and most progressive in Anglo-Saxon countries, Italy, the Netherlands, the Czech Republic and Germany. A normalisation of this concentration coefficient of taxes to market income inequality (measured by the GINI coefficient) shows that Ireland has the most progressive system, while Switzerland has the lowest. The share of taxes paid by the richest decile is the highest in US. However, there exists a negative relationship between the degree of progressivity and the level of government spending, that also has further redistributive effects. When ranking people by their market income, the tax and transfer system reduces inequality by one-third, on average, for 24 OECD countries. When ranking them according to their post-tax/transfer income, the tax and benefit system reduces inequality by more than one-fourth, due

to re-ranking. Over time, from the mid-1990s to mid-2000s, redistribution has grown in some countries⁶⁶ (Italy, Germany and Czech Republic) whereas it has fallen in others (Nordic countries, Ireland, Canada and US) and in some it has remained stable (Netherlands) (*Growing Unequal?*). However, a major shortcoming of this approach is that it excludes other relevant taxes and sources of income, that, if included, could change the extent of redistribution achieved by a country.

Furthermore, the drastic reduction in the number of income brackets and in the rate of taxation of top incomes is one of the causes of increasing inequality (Fitoussi and Saraceno 2010) (compare also Subsection 2.1.5). Besides the evolution of top income taxation, the role of tax-deductible expenditures may alter the effect of the statutory tax rate.

4.2.1. Tax-deductible expenditures

The progressivity of earnings taxation differs massively between countries. Eyeballing the official tax rates across the income deciles in various countries may give a distorted picture of the real effect of earnings taxation as the *effective* tax rates differ from the formal rates because of tax deductibles.

One important departure from the progressivity of income taxation is created by the mortgage-interest tax relief, common to many OECD countries, and another by the deductibility of property taxes for income taxation such as in the US. The (full or partial) deduction of mortgage-interest payments from income taxes is known to be regressive: the rich receive a greater share of mortgage-interest tax relief than the poor and such relief increases their income by a greater proportion than the poor (Matsaganis and Flevotomou 2007). In a study of five European countries (Netherlands, Sweden, Finland, Italy, Greece) Matsaganis and Flevotomou (2007) find the tax relief to be most regressive in the Netherlands followed by Greece, and the least in Sweden. A tax-revenue-neutral shift from the current system of mortgage tax relief and housing benefits to a universal (tenure-neutral) housing transfer would appreciably reduce income inequality as measured by the Gini index: by 4.1% in the Netherlands and 1.8% in Sweden, while for Finland, Greece and Italy the effect would be marginal. The greater tax advantage for home-owners with outstanding mortgage at the top of the income distribution together with the housing benefits for the poorest percentiles raises some concerns about a squeezing of the middle of the distribution where gains from housing-related income transfers are shown to be smaller, for instance in the Netherlands (see Table 3 in Matsaganis and Flevotomou 2007). On the revenue side, the abolition of the mortgage-interest tax relief would increase income-tax revenues by a non-negligible amount: for the US Poterba and Sinai (2008) find an increase by \$ 62 billion, even taking into account behavioural responses in portfolio composition. The rationale behind the

⁶⁶ This may partly reflect greater market income inequality.

favourable treatment of home-ownership with respect to renting seems to be the ownership's positive externalities, but evidence from the US shows that the mortgage-interest tax deduction is not necessarily a useful tool for influencing the home-ownership rate (Glaeser and Shapiro 2003).

4.2.2. Payroll taxes and social security contributions

Pickety and Saez (2007) and Poterba (2007) provide evidence of the extent to which the effective progressivity of the US tax system actually differs from the raw tax rates. Poterba (2007) splits up the effective income, payroll and total tax rates for households in various income strata in the US and shows that effective payroll tax rates are regressive, with a lower rate for households in the top fifth of the income distribution than for those in lower quintiles. The bottom quintile in some years actually faces higher effective rates than the top quintile. This pattern is the result of the earnings cap for Social Security taxes. This means that in fact the payroll tax system does not redistribute income from high to low earners. It may do so the other way around and thus contribute to income inequality – if compared to a system fully based on progressive income taxation. However, this is an empirical issue as the actual role depends on actual social insurance benefits paid - e.g., less paid workers may use these more frequently and on average receive more than they contribute.

Using Belgian data and tax system, a revenue-neutral shift from employee social security contributions to indirect taxes is shown to be regressive because, even if social security contributions are much less progressive than income taxes, they are not as regressive as indirect taxes. This applies especially to the lower deciles which have high expenditures on heavily taxed goods such as tobacco, and to the oldest people, who do not pay social security contributions (Decoster *et al.* 2006).

4.3. Indirect taxes

The last years have seen a resurgence of the interest taken in consumption taxes. Moreover, the ratio of revenues from all consumption taxes to the final consumption expenditure of households in most EU countries has been trending upward since 2001 (Eurostat 2009); in particular, taxes on energy, tobacco and alcohol make up one-fourth of consumption taxes. Though, from 1965 to 2004, for 30 OECD countries the share of consumption taxes in total tax revenues decreased, on average, from 37% to 30%, it increased by more than 1% as a share of GDP (Warren 2008). Over the same time span, there has been a change in the mix of consumption taxes: taxes on specific goods such as petroleum decreased from 22% to 11% at the expense of an increase in general consumption taxation from 15% to 19% (Warren 2008). Indirect taxes are generally independent of the income capacity of con-



sumers but are differentiated according to the type of consumption good (necessity, luxury, etc.). Lower-income groups spend a larger share of their budget on consumption, so that even a flat structure of taxes leads to regressive results. The degree of progressivity of consumption taxes is generally analysed by imputing expenditures derived from expenditure surveys into income survey data for use by microsimulation models aimed at examining the burden of consumption taxes. In some cases national aggregates are used to impute consumption expenditures. The most common assumption is that consumption taxes fall entirely on consumers. Warren (2008) reports empirical studies that show that the burden of consumption taxation for the lowest decile is generally two times higher than for the top decile:

- for the UK in 2005–2006 it is 2.1 times higher; changes in consumption taxes increased inequality between 1997 and 2000;
- for Australia the ratio is 1.9; in another study the impact of GST and excise duty (by using tax aggregates) is four times higher;
- for Canada in 2000 the ratio for people earning less than 20000\$ with respect to those earning more than 100000\$ is 1.7 but, when including the GST credit, the ratio is only slightly higher;
- for Ireland around the year 2000 the ratio of bottom to top decile was around 2, for VAT and excise taxes;
- for the US excise and custom duties are four times higher for the bottom than for the top quintile, however the pressure at the bottom has started to decline since the 1980s; for the non-elderly the ratio is 2.7;
- finally by using income and expenditure data to allocate national aggregates of income and taxes makes consumption taxes impact more on the middle than at the bottom or top of the distribution;
- by considering equal decile-specific ratios of expenditure to income across countries, all consumption tax rates turn out to be regressive even at the top and the P90/P10 ratio is higher for disposable income than for income after tax and transfers;

In addition, the EUROMOD study by O'Donoghues *et al.* (2004) shows that the average ratio for 12 European countries ratio between the bottom and the top decile is 3 for consumption taxes and 4 for excise duties. If measured by the Kakwani index, Belgium has the least regressive VAT, followed by Sweden, and also the least excise duties, followed by the Netherlands, whereas Portuguese VAT is most regressive, followed by Finland, as are French excise duties, followed by Portugal.

However for Belgium in 2001 another study (Decoster *et al.* 2006) shows that they are more regressive.⁶⁷

Indeed, Decoster *et al.* (2006) show that Belgian expenditures for rent, food and tobacco are higher at the bottom decile of equivalent income, while expenditures for leisure and durables are higher at the top decile, by respectively: 1.6, 1.6, 4.6, 0.6 and 0.5 times. Thus, the omission of consumption taxes leads to an over-estimation of the progressivity of the tax code.

Simulations of changes in consumption taxation are provided by the literature in comparison with different counterfactual benchmarks. As income taxes are generally progressive, an equal-revenue shift from income taxes to a mix between income and consumption taxes increases the Gini index on disposable income by about 9% (Warren 2008). If in-kind benefits were entirely funded by consumption taxes their progressive effect would nearly counter-balance the regressive effect of consumption taxes (Warren 2008).

4.4. Property tax

As for property tax, the first thing to understand is whether it is a tax on the consumption side or the investment side of this particular good. People at the top of the income distribution have a higher ratio of capital (including housing) with respect to total income and a lower ratio of housing versus non-housing expenditure. In the H–M model capital is fixed and perfectly mobile: an increase in the property tax generates an outflow of capital from the housing to the non-housing sector and increases the price of housing services with respect to non-housing services (“excise effect”). Thus, a property tax is progressive as a tax on capital and regressive at the same time because of its “excise effect”, that redistributes income from housing consumers to non-housing consumers. However if one considers the importance of the rental market, in particular for people at the bottom of the distribution (as also shown by Decoster *et al.* 2006), one may wonder what the effect of property tax is if its burden is shifted from landlords to tenants. His calibrations of this shift show that:

- allocation of the property tax burden on the distribution of capital income is progressive only for the top 20% of household and regressive at the lower end;
- allocation of the property tax burden on the distribution of capital income plus “excise effect” shows a more pronounced U-shape at the bottom end;
- allocation of owner-occupied tax by capital income and rental housing tax on tenants is regressive for 95% of households and progressive just for the top 5%;
- allocation of the property tax burden in line with housing expenditure is regressive all over;

⁶⁷ Imputed expenditures in O’Donoghue et al. (2004) are simulated as they are not available in the underlying EUROMOD data. The resulting imputed expenditures are quite different from official estimates for some countries.



- (equal-yield) allocation of property tax in line with income distribution is progressive.

The recommendation for avoiding the U-shaped pattern of a property tax (regressive at the bottom) would be to allow for a tax-exempt basis (according to the incidence of housing expenditures at the bottom). Further, a fuller taxation of capital income (including housing) under the individual income tax or a personal tax would lead to more progressive results (Musgrave 1974).

4.5. Corporate taxation

The same reasoning holds for corporate taxation: as a tax on capital its effect is expected to be progressive, however its burden can be easily shifted from employers to workers. For instance, by using data on companies located in nine European countries, Arulampalam *et al.* (2009) show that a 1\$ increase in corporate taxation reduces wages by 0.75\$. Moreover, corporate taxation may affect the cost of equity financing with respect to borrowing, for example when deductions for interest payments are allowed (Auerbach *et al.* 2000) with possible further consequences for the economic stability of firms, which in turn affects workers.

High corporate taxation involves lower investment, lower capital per-worker, lower productivity and hence lower wages. In the attempt to avoid such a spiral, pushed by tax competition and the absence of corporate tax harmonization (in particular within the EU), governments of the most developed countries have lowered their statutory corporate tax rates during the 1980s and 1990s (Auerbach *et al.* 2000; Bond *et al.* 2000). Nonetheless, revenues from corporate tax have increased, as a share of both GDP and total tax revenues, thanks to a larger corporate tax base and an increase in the profitability of companies (Auerbach *et al.* 2000; Bond *et al.* 2000). On the other hand, the lowering of corporate taxation shifts the burden of taxation from capital income to wages and is identified as one of the causes of increasing income inequality over the last three decades (e.g., Fitoussi and Saraceno 2010). Taxation on personal and corporate capital may also have behavioural consequences: a lower tax on capital stimulates tax reporting behaviour. Indeed, when Norway reduced both personal and corporate capital tax and set them at equal level (from 41% to 28% and from 39% to 28%, respectively) in 1992, the effect was an increase in the share of dividends in the top decile. However, by using a Hicksian income definition (that includes imputed returns from capital) Fjaerli and Aaberge (1999) show that the traditional income definition underestimates shareholders' income and hence inequality due to dividends (of top deciles).

4.6. Environmental tax

In recent years there has been increasing debate about the potential for shifting the incidence of the tax system away from a variety of economic goods [...] and towards environmental bads [...]. (Johnstone and Alavalapati 1998).

They find a regressive effect of residential energy and agriculture environmental taxes. On the other hand, they do not find a regressive effect of road transport environmental taxes, which they explain with the higher level of car ownership for rich households.

4.7. A comprehensive analysis of taxation

A pitfall of many analyses of tax progressivity is that they consider each tax separately. However, even if each individual type of tax is progressive on its relevant tax base, when the shares of the relevant income sources are not the same across income groups the overall effect of taxation may be less progressive than expected. More precisely, a complete analysis of taxation should consider as many taxes as possible and a comprehensive measure of economic well-being. As to the first, Piketty and Saez (2007) consider all sources of market income reported on income tax returns: wages, salaries, stock-options, pensions, self-employment income, business income, dividends, interests, rents (and realized capital gains)⁶⁸ and then calculate the average tax rate of each source for each income group, the average (pre-tax) income of each group and finally the share of total income of each group before and after tax. The overall tax system seems progressive, but much less in 2004 than it was in the 1960s, at a time that taxes were higher for the lowest percentiles, lower for middle to 95% percentiles of the income distribution and higher at the top 5%. Tax progressivity declined in all three countries considered: the US, UK and France and they attribute this to a rise in payroll taxes⁶⁹, to a decline in estate taxation in the US and UK (while France introduced a wealth tax in the 1980s), to the shift from capital to labour income (as for executive compensations) that makes corporate and capital taxation less effective nowadays, and to a decline in top marginal individual tax rates. It should be observed that the majority of gains from wealth are never realized, as for imputed rent for homeowners.

However, a more comprehensive measure of economic well-being does not support their conclusion that income from labour is increasing relative to income from capital. This is a major shortcoming of many studies of inequality as they mainly consider income from labour. Indeed, labour income does account for two-thirds of total income, but for the richest most of the income comes from wealth. Smeeding (2010) includes in the income from

68 No imputed rent for homeowners, no exclusion of interest payments on mortgage/debt.

69 Regressive because of cap, however Decoster et al. (2006) says social security contributions are still progressive.

labour also income from wealth, as a more comprehensive measure of household well-being. He uses triennial data of the Survey of Consumer Finances (SCF) for the US from 1989 to 2009 (projection) and calculates the well-being as in Fjaeri and Aalberge (1999): earnings plus net transfers plus capital gains and royalties, minus (reported) interest, rent and dividend which are replaced (= plus) by imputed returns to all forms of net worth (MCI). To calculate the implicit return on various assets he uses two techniques: application of a short term (3 years) average rate of return to 22 specific asset/debt types in each year on the one hand and the long-run 30 years average returns over the entire period (1977–2007) on the other. Using the comprehensive measure of well-being increases the level of inequality in comparison with a traditional definition of income: with the shift from SCF income to MCI mean income increases by 31% and median income by 16%. The biggest changes come from stock, imputed rent, business assets. Considering median-related inequality measures (P99/P50, P95/P50, P90/P50) the ratio still increases when going from SCF income to MCI. The use of MCI increases income at the top (indeed the gap between SCF income and MCI is more evident for P99/P50, P95/P50); adding housing wealth produces little change in the P99/P50 and P95/P50 ratio but accounts for the bulk of the change at the median; the P10/P50 ratio is the same under SCF income and MCI. The percentage gains from adding wealth in MCI are even greater in after-tax terms at the highest income levels, though after-tax inequality in MCI is lower than pre-tax. Considering a more comprehensive measure of economic well-being is not a minor issue: indeed the OECD report shows that wealth inequality as measured by the Gini coefficient is higher among income-poor people compared to the rest of the population and also that wealth inequality in general is higher than income inequality in general.

4.8. Cash and in-kind benefits

The inclusion of cash benefits (old age pensions, unemployment, housing and disability benefits, etc.) has been considered in OECD's *Growing Unequal?* and is found to reduce the level of inequality. The important kind of government transfer for reducing inequality is represented by in-kind benefits, such as education, health and housing.

There are different methods to impute monetary values to these three in-kind benefits. As for education, generally each student in public education is assigned the average public spending per student at the relevant educational level and then this amount is assumed to be shared by all household members (*Growing Unequal?*; Paulus *et al.* 2009). For health benefits there are four main approaches:

- *actual consumption*, where the imputation of monetary values make e.g. sick and elderly people better off;

- *insurance value approach*: virtual insurance value of coverage for each person based on specific characteristics;
- *insurance-based plus adjusted equivalence scale*, that corrects for differences in health care needs between individuals;
- *risk-related insurance values*: each individual is attributed average per capita spending accruing to each corresponding age group (Paulus *et al.* 2009).

The implicit subsidy associated with social housing is estimated as the difference between the (estimated) market rent of a similar dwelling and the rent effectively paid (*Growing Unequal?*; Paulus *et al.* 2009).

The OECD's *Growing Unequal?* report (2008) concludes that the lowering effect of publicly-provided services on the level of inequality (as measured by the Gini index) is around 1/2 of that achieved by cash benefits and household taxes and that this result is quite uniform across countries, though considering inter-quintile share ratios leads to more cross-country variability in the size of this effect. The inclusion of in-kind benefits does not significantly change the ranking of countries (*Growing Unequal?*; Paulus *et al.* 2009). The income share ratio between the bottom and the top quintile is found to be reduced by 1.3 points⁷⁰, on average for the OECD countries, with the highest reduction for the US, Portugal and Spain and the lowest for Finland and Denmark (*Growing Unequal?*). However, some countries where the role of in-kind benefits is limited, compensate for this with a larger role of cash benefits and vice-versa. Of the different in-kind benefits, public health spending has the largest inequality-reducing effect, followed by education, while housing subsidies are found to have only a small effect (*Growing Unequal?*; Paulus *et al.* 2009).

However, when considering the actual use of health care in comparison with the insurance-value approach⁷¹, inequality (as measured by inter-quintile share ratio) rises in four countries, namely Denmark, Finland, Netherlands and Italy, due in particular to hospital expenditures (*Growing Unequal?* 237). As to the imputation of expenditures on education the reduction in inequality (as measured by inter-quintile share ratio) is driven by primary and secondary education, while the effect of tertiary education is negligible and even negative in a few countries (Belgium, Ireland, Spain and Portugal) (*Growing Unequal?* 239).

70 By using estimates based on individual records, with aggregate data (based on deciles) the point reduction is 1.8 (OECD *Growing Unequal?* 2008).

71 See definition of Paulus *et al.* (2009) whether it corresponds to what OECD *Growing Unequal?* calls insurance value approach.



4.9. Tax evasion

Another aspect worth considering is that of tax evasion. In a panel of 29 European countries from 2000 to 2003, evasion of personal income tax, excise tax and social security contributions is found to be positively correlated with income inequality (Holzner 2006). Bloomquist (2003) finds the same results with US data from 1947 to 1999 on income tax evasion: an increase of one point in the Gini coefficient increases a proxy of tax evasion by 0.24 percentage points.⁷²

In addition, the individual position in the income distribution seems to affect the probability of tax evasion. The Cox Paradox portrays a situation in which the highest and lowest income taxpayers have greater opportunities to evade, whereas middle-income taxpayers find this harder (Bloomquist 2003). The consequences of the Cox Paradox for inequality depend on the relative extent of tax evasion of the top and bottom income groups.

On the other hand, by considering three high-featuring evasion countries (Greece, Hungary and Italy) Matsaganis *et al.* (2010) find that for Greece and Hungary the lowest and top deciles have indeed higher level of under-reporting of income than the deciles in the middle. Nonetheless, under-reporting in Italy is higher only for the two top deciles and in all three countries under-reporting is higher and disproportionately higher for the top decile, the top 1% and 0.1% percentiles. As a consequence, the effect of tax evasion increases income inequality in all three countries by a minimum of 3.5% in Greece and a maximum of 5.5% in Italy if using the Gini coefficient. and by a minimum of 9.2% in Greece and a maximum of 24% in Hungary if using the Theil index⁷³ (Matsaganis *et al.* 2010). Furthermore, the distribution of tax evasion by income groups in these three countries implies a reduction in the degree of tax progressivity by 10%–16.1% and by 23.5%–40% (for Italy), as measured by the Kakwani and Reynold–Smolensky indexes respectively (Matsaganis *et al.* 2010).

More importantly, most microsimulation models do not consider behavioural responses to changes in the tax system. However, for the reason already mentioned these should be taken into account in the evaluation of the degree of progressivity of the tax system. For a treatment of the conceptual and technical aspects of ignoring tax evasion in microsimulation models, in particular for EUROMOD, see Flevotomou and Matsaganis (2009).

72 The proxy of tax evasion in Bloomquist (2003) is measured as the difference between the Bureau of Economic Analysis estimate of gross income and the taxpayers' reported gross income. This measure is only a proxy of tax evasion as it also includes legitimate non-filers (individuals with income below a certain threshold).

73 As for the cautions in interpreting the possible under/over-estimation of these results see Matsaganis *et al.* (2010).

4.10. Non-tax revenues

Although taxes represent the bulk of governments' revenues, non-tax revenues also contribute to financing governments' expenditures⁷⁴ (Revenues Statistics, OECD pag. 269). Non-tax revenues seem to represent around 10% of tax-revenues for most OECD countries (Revenues Statistics, OECD). The sources of non-tax revenues are: property incomes (owned by the government), sales of goods and services (including administrative fees for driving license, passport, court fees, radio and television broadcasting, etc.), fines, penalties and forfeits, miscellaneous and unidentified revenues, other social contribution and grants. Non-tax revenues also include fees in connection with education, health care, transport, housing and urban renewal (Tax Foundation). Already back in 1968 the Tax Foundation was noting that non-tax revenues in the US were growing, especially at local level, and gaining appeal in a context of critical burdens of taxation (Non-tax Revenues, Tax Foundation). The study of the progressivity of non-tax revenues is not common. Nonetheless, decentralization of taxation and the high level of tax burdens could stimulate the growth of non-tax revenues.

74 Data on non-tax revenues are collected by the IMF in the Government Finance Statistics Yearbook.



5. Macroeconomics and inequality

Virginia Maestri and VeruskaOppedisano

5.1. Introduction

In addition to institutional factors, the pattern of inequality may be affected by macroeconomic dynamics. In a long-run perspective of economic growth, the evolution of inequality may follow (e.g. the Kuznets curve). In a short-run perspective, inequality may be affected by the business cycle and by the volatility of the growth process. The relationship between fluctuations in GDP and inequality runs through two main channels: unemployment and inflation. Furthermore, the effect of macroeconomic variables may differ according to the source of inequality considered: hourly wage, hours of work and earnings, income, consumption and wealth inequality. In this review of the literature Heathcote *et al.* (2009) and Maitre *et al.* (2010) consider hourly wage inequality, Barlevy and Tsiddon (2006) consider a mixture of hourly, weekly and annual wages (with 2000 hours of work); Breen and Garcia-Penalosa (1999); Deininger and Squire (1998); Krueger *et al.* (2009); Heathcote *et al.* (2009); Lundberg and Squire (2003); Parker (1999) and Hoover *et al.* (2009) consider income inequality, finally the studies reported in Krueger *et al.* (2009) consider also hours of work, consumption and wealth inequality.

The effect of macroeconomic factors can differ for different income groups. In the majority of the studies considered here inequality is analysed as measured by the Gini index (Breen and Garcia-Penalosa 1999; Deininger and Squire 1998; Krueger *et al.* 2009; Heathcote *et al.* 2009; Hoover *et al.* 2009; Lundberg and Squire 2003; Parker 1999) and/or by a quintile share approach (Breen and Garcia-Penalosa 1999; Deininger and Squire 1998; Parker 1999) or by quintile mean income (Hoover *et al.* 2009). Some studies use income decile ratios (Krueger *et al.* 2009; Heathcote *et al.* 2009; Maitre *et al.* 2010) and the variance of logs (Krueger *et al.* 2009; Heathcote *et al.* 2009). As for the unit of measurement, the standard is to use household equivalised income, unless wage, hours of work or earnings inequality are considered where the unit is the individual.

Deininger and Squire (1998) and Lundberg and Squire (2003) analyse time-series of multiple countries based on the famous World Bank Deininger and Squire database on inequality; Breen and Garcia-Penalosa (1999) use the same data though they only consider the Gini coefficient in 1990; Barlevy and Tsiddon (2006), Heathcote *et al.* (2009), Hoover *et al.* , (2009) and Parker (1999) (both for his analysis and, mostly, for his review) use time-series

data for the US; Maitre *et al.* (2010) consider Irish data; finally Krueger *et al.* (2009) summarizes the studies of a project⁷⁵ based on time-series data for the US, Canada, UK, Germany, Italy, Spain, Sweden, Russia and Mexico.

Below we present some considerations about the empirical study of macroeconomic factors and inequality. Section 4.1 introduces the two-way relationship between growth and inequality, Section 4.2 presents some studies about the effect of business cycles on different sources of inequality, and Section 4.3 makes some suggestions concerning the more general relationship between economic stability and inequality.

5.2. Data availability for the study of macroeconomics and inequality

The main problem in studying the relationship between growth, business cycles or volatility and inequality is that time-series of inequality indexes are scant. Quarterly macroeconomic indicators such as GDP, unemployment and inflation are easily available⁷⁶ and go quite back in time, but that is not the case for inequality indexes. The earliest date for which cross-country series of inequality indexes are available is around the 1950s. However, one may wonder whether surveys at the time cover the same population as they do now. Second, these series are often not continuous, as in the World Bank database WIID⁷⁷. Unfortunately, concerning these problems Eurostat surveys cannot help for calculating a proper series of inequality indexes. Both the ECHP and EU-SILC surveys cover only a few years and the LFS does not include income data across Europe. However, national surveys or national tax records may provide longer series. Thus, there is a trade-off between possible longer time series of inequality indexes and cross-country (comparable) coverage. If the researcher opts for an international overview, he has to rely on available indexes (most often Gini) and lose a better overview on inequality (e.g. decile ratios). Furthermore, available indexes measure mostly income inequality and prevent an analysis of business cycles on other sources of inequality (e.g. wealth).

5.3. (Long-run) growth and inequality

In a classical paper Kuznets (1955) suggests that income inequality (as measured by the Gini index) may follow an inverse-U pattern: inequality rises during the first phases of the urbanization and industrialization process and then declines when more workers join the high-productivity sector. However, the Kuznets hypothesis was based on a cross-country evidence, with the inverse-U peak corresponding to (middle income / high inequality) Latin-American countries. Analyses based on panel data allow to control for country-specific effects and cross-country

⁷⁵ Special issue “Cross sectional facts for macroeconomists” of the Review of Economic Dynamics.

⁷⁶ See for instance OECD Main Economic Indicators.

⁷⁷ The SWIID provides continuous series of inequality indexes where missing data have been imputed.



differences in the relationship between GDP per capita and inequality. Indeed, Deininger and Squire (1998) find that the Kuznets hypothesis is supported by the data only for a few countries, it is actually a real U relationship for few others, while for most countries the association between GDP per capita and inequality is not significant.

Further, the effect of growth on inequality may be mediated by changes in institutional factors that accompany the process of growth. Kanbur (in Atkinson and Bourguignon 2000) recognizes that the Kuznetian literature minimizes the role of policy in the relationship between distribution and development and suggests that, e.g., the East Asian Tigers' growth with equity was accompanied by an expansion of universal education.

During the initial boom years of Ireland (1994–2001) the P90/P10 ratio of hourly wage inequality decreased from 4.8 to 3.6⁷⁸, though it started to increase slowly after 2000 until 2007 (Maitre *et al.*). The P50/P10 ratio fell from 2 to 1.7 between 2000 and 2001. The decline in wage inequality was accompanied by a decline in the returns to education and experience until 2000. Maitre *et al.* (2010) interpret this results as driven by institutional factors associated with the Irish boom years. In 2000 a minimum wage was introduced in Ireland. Whereas the decline in returns to education (and thus in wage inequality) may be explained by the highly skilled immigration of workers attracted by the Celtic Tiger's rapid growth (Maitre *et al.* 2010). Though net migration of Ireland increased after 2000, growth started to be gradually based on domestic demand (in particular for the construction sector) rather than on exports as in the first phase (Maitre *et al.* 2010), an additional factor that could help explaining the changing patterns of wage inequality.

The relationship between growth and inequality does not simply and smoothly run from the first to the second. For instance, growth and inequality may be jointly determined. Lundberg and Squire (2003) find that education, inflation and land distribution are simultaneously favourable for both growth and income inequality, while civil liberties and openness have different effects on growth and inequality respectively. Furthermore, the relationship between growth and inequality may be mutual and self-reinforcing. For a rich and detailed review of the effects of inequality on growth and a summary of the conclusions of this literature according to the underlying micro foundations, see the Voitchosvky (forthcoming). In a recent paper, Fitoussi and Saraceno (2010) argue that the current financial crisis is rooted in the social disequilibria that grew in the last three decades. The increased income inequality has meant a redistribution from households with a high propensity to consume to households with a low propensity to consume, triggering a fall in aggregate demand. A growth sustained by private indebtedness, as experienced by the US and some European countries (UK, Spain) has not proven successful, nor have EMU fiscal and

78 Calculation of Maitre *et al.* (2010) based on Living in Ireland Survey (the Irish component of ECHP) until 2001, discontinuous as it was replaced by EU-SILC in 2003.

monetary policies (Fitoussi and Saraceno 2010). They conclude that *to avoid that the social disequilibria nurture again the financial one, the trend towards increasing inequalities should be reversed.*

5.4. Inequality and saving propensity

Nonetheless, the relationship between consumption and its counterpart, saving, is more complex. Many economists of previous generations used both theory and empirics to assess whether people with high incomes save more than those with low incomes.

The historical growth literature and more recent neoclassical consumption theory point out various channels through which income inequality can affect personal saving:

- the functional distribution of income;
- the personal distribution of income;
- implications of bequest, precautionary saving and borrowing constraints for distribution and saving;
- indirect effects of the distribution on saving.

The link between the functional distribution of income and saving (and growth) is at the heart of the neo-Keynesian growth models of Lewis (1954) and Kaldor (1957). A standard prediction of growth models is that higher savings are necessary for higher growth in endogenous growth models. The neo-Keynesian growth models assume from the outset that workers and capitalists have different saving behaviour. They argue that most saving comes from the profits of the entrepreneurs, who save a high fraction of their incomes, while other groups in the economy save less or spend what they earn.

Recent neoclassical consumption theories generate links between the personal income distribution and aggregate saving without relying on an exogenous distinction between savers and non-savers. These links might be the results of bequest motives, precautionary saving or borrowing constraints. In a life cycle model, that includes dynastic motives, the desire to perpetuate the family line and/or the family business, richer and wealthier people may want to accumulate to bequeath. In such a framework, bequests drive saving (Kotlikoff and Summers 1981 /1988). Another link between distribution and saving works through precautionary saving. Consumers with low assets tend to compress consumption if they believe there is some risk that borrow constraints may bind in the future, so that their marginal propensity to save is higher than that of those consumers holding large asset stocks (Carroll and Kimball /1996). Binding borrowing constraints interact with precautionary saving because the inability to borrow when times are bad provides an additional motive for accumulating assets when times are good



(Deaton 1991). Thus, redistribution toward the poor would depress aggregate saving. If precautionary motives and borrowing constraints affect mostly poorer households, redistribution from richer to poorer lowers aggregate saving rates in the short run. However, given that the poor face greater uncertainty, are more risk-averse, or have more limited access to risk diversification than the rich have, a transfer from the latter to the former would lead to higher aggregate saving.

Most of these mechanisms suggest positive direct effects of income inequality on overall personal saving. However, recent political-economy research brings out negative indirect links from inequality (through investment, growth, and public saving) to aggregate saving. One line of argument is that a highly unequal distribution of income and wealth causes social tensions and political instability; the result is lower investment in response to increased uncertainty, along with adverse consequences for productivity and thus growth (Alesina and Perotti 1996; Perotti 1996). From the point of view of saving, the implication is that if saving is positively dependent on growth, then higher inequality will depress saving. In addition, income inequality affects the demand for fiscal redistribution: in a more unequal society, there is greater demand for redistribution and therefore higher taxation, lower returns to investments in physical and human capital, and less investment and growth (Bertola 1993; Alesina and Rodrik 1994; Persson and Tabellini 1994). As before, redistribution is expected to lower aggregate savings.

Taken together, these two strands of the literature, neoclassical consumption theory and political economic theories, imply that the overall impact of inequality on aggregate saving is ambiguous and empirics might help identifying the relation. Most of the empirical literature on the links between functional income inequality or personal income inequality and personal saving based on cross-section micro data suggest a positive relation between them. One of the earliest empirical studies that consider the link between saving and income in the upper income group, was conducted by Kuznets (1953). Using different sources of data for the USA over 1929–1950, his analysis finds that the saving-income ratio is increasing with income, but at a decreasing rate. Along this line, Houthakker (1961), Kelley and Williamson (1968), Williamson (1968) and Gupta (1970) find some evidence that the propensity to save from non-labour income exceeds that from labour income.

Among empirical studies of personal income inequality, Blinder (1975), using US time-series data for 1949–1970, finds that higher inequality appears to raise aggregate consumption (and thus to lower saving), although the estimated effect is in general statistically insignificant. Menchik and David (1983) estimate separate consumption equations by income class to test directly whether the elasticity of bequests to lifetime resources is larger or smaller for the rich than for other income groups. They find that the marginal propensity to bequeath is unambiguously higher for the wealthy, so that higher inequality leads to higher lifetime aggregate saving. Analogously, Altonji and

Villanueva (2003) show that the marginal propensity to spend on bequest and/or on inter-vivo transfer is increasing with permanent income. Using data from household surveys, Dynan *et al.* (2004) find evidence that high-income US households not only save a larger fraction of their permanent income than poorer households do, but also have a higher propensity to save.

Evidence from macro studies, however, is less clear-cut. Early contributions by Della Valle and Oguchi (1976) and Musgrove (1980), using cross-country data on both industrial and developing countries, find no statistically significant effect of the income distribution on saving. The exceptions are the OECD countries in the study by Della Valle and Oguchi, for which they find some evidence that increased inequality may increase saving. In turn, Lim (1980) finds that inequality tends to raise aggregate saving rates in a cross-section sample of developing countries, but his coefficient estimates are significant only in some subsamples. Venieris and Gupta (1986) use aggregate data for 49 countries to draw inferences about the average saving propensities of different incomes. Their results suggest that poorer households have the lowest saving propensities, while the highest propensity relates to the middle-income group. Hence, redistribution against the rich may raise or lower the aggregate saving ratio depending on whether the favoured group is the middle class or the poor, respectively. Sahota (1993), using data on 65 industrial and developing countries for the year 1975, reports a positive but imprecise effect of the Gini coefficient on the ratio of gross domestic saving (GDS) to gross domestic product (GDP).

More recently, Cook (1995) presents estimates of the impact of various inequality measures on the GDS/GDP ratio in 49 LDCs. Using decade averages for the 1970s, he finds a positive and significant effect of inequality on saving, which appears robust to some changes in specification and to the choice of alternative indicators of income inequality. Hong (1995) reports econometric results on the effect of the share of the top 20% income group on GDS/GDP ratios in cross-country samples of 56 to 64 developing and industrial countries, using 1960–1985 averages for each country. He finds that the income share of the top 20% of the population has a positive effect on saving rates. Lastly, Edwards (1996) estimates private saving equations using panel data for developing and OECD countries for the years 1970–1992. He finds that the effect of income inequality on private saving might be statistically significant or not according to the set of controls included. Schmidt–Hellbel and Serven (2000), on the contrary, conclude that the link between inequality and saving is not significant empirically. They replicate several papers' methodologies using alternative saving specifications, alternative inequality and saving measures, newer, better, and larger databases and conducting estimations jointly and separately for industrialized and developing countries. In contrast, Smith (2001), using the Deininger and Squire (1996) high-quality sample on income distribution, reports a positive effect of inequality on private savings. His analysis further examines two hypotheses why

higher inequality may increase private saving rates: subsistence consumption and credit market imperfections. Whilst no support is found for arguments that are based upon subsistence considerations, there is evidence that the positive effect of income inequality on private saving depends upon measures of financial market development.

In summary, most empirical studies based on micro household data find evidence of a positive effect of income concentration on household saving. For studies based on cross-country aggregate data, the results are more mixed, although some do find a positive impact of income inequality on total saving. Reconciling these conflicting results is difficult, because most cross-country studies rely on measures of inequality and saving of questionable quality that are not always comparable.

A possible extension of the existing literature concerns the role of human capital investments on saving. As suggested by Becker (1975), relative returns to human capital and physical capital might lead people with heterogeneous income levels to invest differently in human and physical capital accumulation. However, since human capital expenditures are considered as consumption in standard national accounting, the measured saving rates do not account for human capital accumulation, which might differ between rich and poor. Following this reasoning, Galor and Moav (2004) propose a theory of inequality, aggregate savings and capital accumulation. In an economy characterized by capital-skill complementarity, the effect of inequality on growth depends on the relative return to human and physical capital. Inequality is beneficial for economic growth in economies in which the return to human capital relative to the return to physical capital is low. However, in later stages of development, as physical capital accumulates, the complementarity between capital and skills increases the rate of return to human capital. In this stage, equality is beneficial for economic growth as the aggregate return to investment in human capital is maximized if investment in human capital is widely spread among individuals in society. More recently, Chanda (2008) observes that in the presence of increasing return to education parents find it more profitable to invest in their children's education rather than leave bequests, suggesting that there might be a substitution effect between saving rates and educational expenditures.

5.5. Business cycles and inequality

Business cycles are supposed to affect the income and wealth distributions, contributing to drive the dynamics of inequality. For the interwar years evidence on the pure business cycle effect – thus apart from the trend – is clear: income inequality followed an anti-cyclical pattern: upper income groups made strong relative gains during the Depression. However, for post-war years results are mixed: some find the anti-cyclical pattern, some do not support it (Parker 1999). In particular, recessions generally increase income inequality, as they raise unemployment

and increase the dispersion of hours worked (Krueger *et al.* 2009). The reason is that household earnings are pro-cyclical at each percentile, but business cycle fluctuations are much more severe at the bottom of the distribution (Heathcote *et al.* 2009). At the same time, however, lower efforts have been devoted to study the peculiarities of the effects of expansions and recessions on inequality. Expansions may not always be sufficient to compensate for the surge in inequalities caused by previous recessions. Indeed, during booms the returns to education are expected to increase and, subsequently, inequality is expected to increase too. Heathcote *et al.* (2009) notice that income inequality widens during recessions and remains quite stable during expansions. The asymmetric behaviour of business cycle on inequality is empirically tested with US data and confirmed by Hoover *et al.* (2009). Gains and losses associated with the business cycle are not uniform along the income distribution (Hoover *et al.* 2009).

As inflation is generally found to be pro-cyclical and unemployment to be counter-cyclical, it is worth considering the cyclical effects that these macroeconomic variables may have on inequality. The relationship between the cyclical components of unemployment and inflation, in Parker's (1999) review and analysis, takes two forms: a summary measure approach (Gini index) and a quintile share approach, controlling for a time trend for income growth or inequality and for other additional controls (GDP per capita, political dummies, government spending, unionization, demographics, etc.). The cyclical effect of unemployment does increase income inequality: the income share of the top quintile increases with respect to the share of the lowest quintile (Parker 1999). The inflation channel may affect the inequality of (disposable, as we think) income via:

- the cost of living, as different income groups may have different bundles;
- a wealth effect, as inflation redistributes net worth from the highest and lowest income groups to the middle and upper-middle groups;
- a tax effect, as taxpayers move to higher tax brackets because of the increase in nominal income;
- an income sources effect: though incomes are generally indexed, there is a lag in the adjustment, so there is a redistribution towards earners who can adjust more rapidly to inflation.

Overall, the evidence supports a modest inverse relationship between inflation and inequality (Parker 1999). The lowest quintile tends to benefit more from inflation, while for the top results are more mixed. However in many studies the coefficients of the cyclical variable are not significant.

Most of the studies about inequality focus on income inequality. However, the effect of business cycles on other sources of inequality may not be the same. Business cycles do not necessarily affect wage inequality. Besides, wage inequality provides a partial picture: since low skilled workers are disproportionately laid off during recessions, their earnings may not need to be reduced. Labour market institutions may prevent wages to adjust

to business cycles. Krueger *et al.* (2009) find smaller counter-cyclical effect of business cycles on consumption inequality, due to the life-span smoothing of consumption. Another reason is the smaller counter-cyclical pattern of disposable income inequality, thanks to automatic stabilizers. Indeed, the cross-country variability in the relationship between cycles and consumption inequality reflects the cross-country variability of automatic stabilizers (Krueger *et al.* 2009). Business cycles may also directly affect wealth inequality, as they also affect asset prices (i.e. housing and stocks) and wealth accumulation. However, Krueger *et al.* (2009), based on studies with Italian and Swedish data, report no effect of business cycles on wealth inequality.

Barlevy and Tsiddon (2006) “challenge” the empirical findings that associate recessions with increasing inequality. They argue that most studies focus on a period of long-run increase in inequality (from the 1950s, for instance in US) and argue, instead, that downturns amplify long-run trends in (wage) inequality. Barlevy and Tsiddon (2006) base their descriptive evidence on selected data compiled by economists writing about the Great Depression and archives of economic historians on aggregate wages in a few occupations⁷⁹, from which they distinguish between skilled and unskilled workers, and show that recessions between the 1920s and the 1950s decreased wage inequality. Nonetheless, wage ratios between skilled and unskilled occupations *do not necessarily imply an overall compression of wage inequality, let alone a reduction in top wage shares* (Piketty and Saez 2007, pag. 161 top incomes). Indeed, Piketty and Saez (2007) by using corporation tax returns for the US show that high middle class fractiles benefited in relative terms from the Depression. The issue of whether wage compression did occur during the interwar is still open. Barlevy and Tsiddon (2006) follow the same reasoning for top-income inequality during the inter-war period. Although also Piketty (2007) (top incomes over the 20th century) shows that during the interwar period top income inequality was on a downward trend, he explains this as a result of capital shocks and attributes the decline to the fall of capital income rather than to a fall in top wages.

5.6. Economic stability and (income) inequality

Besides the trend and cycles of GDP also the stability of GDP growth may affect the level of inequality. Breen and Garcia-Penalosa (1999) consider the standard deviation of the annual growth rate of real per capita GDP over the period 1960–1990 in relation to the (country) level of inequality in 1990. They use the World Bank secondary data on inequality constructed by Deininger and Squire (1996 version) for 80 developed, developing and new industrializing countries. Results from a regression of the Gini coefficient on volatility plus other controls (GDP, regional dummies, educational attainment, etc.) show that volatility is associated with a higher level (of cross-country) in-

⁷⁹ (Self-employed) physicians, associate professors, NY clerks, skilled workers in building sector, railroad clerks, public school teachers and skilled manufacturing workers.

equality, though for very high levels of volatility the relationship is no more significant. In particular, volatility increases the income share of the 5th quintile and reduces the income share of the middle class (3rd and 2nd quintile).

Although cross-country evidence, as in Breen and Garcia–Penalosa (1999), may suffer from the difficulty of taking into account country-specific effects and cross-country (unobservable) differences, the work of Breen and Garcia–Penalosa (1999) suggests that macroeconomic stability may be important not only for efficiency reasons, but also for distributional concerns.



6. Social Impacts of Inequality

Tony Fahey, Abigail McKnight, Michelle Norris, Brian Nolan, Christopher Whelan and Nessa Winston

6.1. Introduction

When rising inequalities in earnings and household incomes and an increasing fracturing of employment into “good” versus “bad” jobs occur, they may have deep-seated social impacts, at the individual, household and societal level. A remarkably wide range of potential negative social impacts of such inequalities have been advanced in research and have featured in broader societal and policy-related debates. These include increases in poverty and deprivation, in stress and unhappiness, in gender inequalities, in family breakdown and teenage pregnancy, in childhood disadvantage and educational failure, in health inequalities, in crime and disorder, in social immobility, and in polarisation and increasing fragmentation between communities, ethnic groups, regions and social classes. All of these feature, for example, in the influential recent study *The Spirit Level* by Wilkinson and Pickett (2009) which has been particularly influential in fuelling debate.

This brief review thus has to cover a very broad field, drawing on a variety of disciplinary perspectives. Its core aim is to delineate the current state of knowledge about the key channels of influence and the causal relationships via which such social impacts could arise. As well as providing an organising framework for the review, this will play a key role in focusing the research to be carried out under the programme. It takes into account that while changes in the distribution of earnings and of jobs have their immediate effects on the individuals concerned, many of the hypothesised social effects have also to be seen from a household perspective. Increasing economic inequalities between individuals, driven primarily by market forces and with education and the labour market as key arenas, may be compounded by what is happening at the household level, with a cumulation of advantages or disadvantages leading to growing polarisation and feeding through to a variety of societal effects.

We review in turn the potential impact of increasing inequalities on

- Poverty, deprivation and social “risks”;
- Gender and the family;
- Health and health inequalities;
- Housing;
- Crime and disorder;
- Social mobility;
- Social cohesion.

6.2. Poverty, deprivation and social “risks”

The relationship between income inequality and poverty has been the subject of considerable research, bringing out first that the nature of that relationship depends on the way poverty is conceptualised and measured. While the broadly relative nature of poverty is widely accepted in European research and discourse, the reference standard to be used in assessing poverty remains both critical and unresolved. The most common practice in comparative European research is to employ income thresholds set as a proportion of mean or median income, for example 50% or 60% of the median; comparative studies using this approach go back to OECD (1976), Smeeding *et al.* (1988), O’Higgins and Jenkins (1990) and Atkinson, Rainwater and Smeeding (1995), with more recent examples including Jäntti and Danziger (2000), Fritzell and Ritakallio (2004), Förster and d’Ercole (2005), Marlier, Atkinson, Cantillon and Nolan (2006) and the OECD’s (2008) study *Growing Unequal*. The EU’s “Laeken” portfolio of social inclusion indicators also include measures constructed in this way (see for example Atkinson, Cantillon, Marlier and Nolan 2002), and these have been analysed in a variety of EU studies and reports (recent examples include Ward, Lelkes, Sutherland and Toth 2009, European Commission 2010).

On this basis, higher or increasing income inequality need not necessarily be associated with more poverty – the top of the distribution could be doing better at the expense of the middle, with the relative incomes of those towards the bottom unaffected. In practice, there is a reasonably high cross-sectional correlation among EU or OECD countries between the level of income inequality and such measures of relative income poverty, although the poverty rates of countries with a similar level of income inequality still vary significantly (see for example Nolan and Marx 2009). This variation is more pronounced if one looks at specific subgroups of the population: the incidence of relative poverty among the elderly, for example, may be much more strongly related to the country’s pension coverage and generosity than to overall inequality. Similarly, increases in income inequality may not



always be accompanied by increases in the overall level of poverty or in poverty for specific sub-groups. OECD (2008) shows that from the mid-1980s to the mid-2000s the poverty headcount using a 50% of median threshold increased in two-thirds of the OECD countries, in most of which inequality was also rising. Income poverty among the elderly generally fell, while poverty among young adults and families with children increased. Increasing market-income poverty was the key driver from the mid-1980s to the mid-1990s, whereas from the mid-1990s to the mid-2000s the declining effect of household taxes and public transfers was key. It is also noteworthy that using a higher poverty threshold of 60% of the median – more often the primary focus of attention in an EU context, bringing out the importance of analysis of the sensitivity of the results to both how poverty and inequality are measured.

The relationship between economic growth, employment and poverty has also been the focus of attention. Voitchovsky's (2008) review of the extensive literature on inequality and growth brings out the range of causal channels at work, the theoretical uncertainty about how the net effect of growth on inequality when all these are taken into account, and the importance of distinguishing between what is going on towards the top versus the bottom of the income distribution. Employment is clearly a key determinant of poverty risk at individual and household level: poverty rates among jobless individuals and families are much higher than those among working persons/families, though the scale of the difference varies a good deal across countries (see for example Nolan 2007). Countries with a higher employment rate for people of working age thus tend to have lower poverty rates for those of working age, although again with a wide variation across countries (and household joblessness and poverty are only weakly correlated - see Marlier et al 2007). However, this does not mean that work is not sufficient to avoid poverty: a substantial proportion of the poor people are in households with some earnings, due to a combination of low hours worked during the year and/or low wages (OECD 2008; Andress and Lohmann 2008; European Foundation 2007). Employment growth does not then always affect the distribution of work across households in such a way as to reduce poverty. For the period from the mid-1980s to the mid-1990s, for example, Burniaux *et al.* (1998) show that the top performing countries in terms of employment growth actually saw relative poverty rates for the working aged population rise (see also Marx 2007). Marlier *et al.* (2007) show that among EU-15 countries recording employment growth from 1994 to 2000, poverty fell for 6, was unchanged for 5, and rose for 3. Again, social transfers play a key role: policies to improve incentives to work may reduce the adequacy of benefits for those who fail to benefit from employment growth. Declines in the proportion of workless households then contribute to lower levels of pre-transfer poverty, but offset by lower poverty-reducing effectiveness of transfers (see for example Förster and d'Ercole 2006).

Relative income poverty measures of this sort are often questioned on the basis that they are in fact measures of inequality, and that comparing relative poverty levels across countries or over time does not take into account differences in the standards of living involved. “Anchored” poverty measures, using a relative threshold in a base year held constant in real terms in later years, are sometimes used as a complement in comparative research, and are included among the EU’s social inclusion indicators. OECD (2008) documents that even countries where relative income poverty increased between the mid-1990s and mid-2000s saw significant reductions in such an anchored poverty measure. Similarly, Marlier *et al.* (2007) show that EU countries which had employment growth from 1997 to 2000 all saw such anchored poverty rates fall or at worst remain stable.

Another major preoccupation in the recent research literature has been with the limitations of income measures as the (sole) basis for measuring poverty. Significant efforts have been made to broaden the measure of financial resources to reflect assets, housing, and non-cash service provision (see for example OECD 2008 Ch. 9 and 10), and to capture the dynamics of income over time (for comparative studies see Duncan *et al.* 1993; OECD 2001; Whelan *et al.* 2003; Fouarge and Layte 2005; and Valletta 2004). Attention has also increasingly focused on broadening the scope of information employed beyond income to make use on non-monetary indicators of deprivation and develop multi-dimensional approaches to measuring and understanding poverty (see for example overviews in Nolan and Whelan 2007 2010, and Boarini and d’Ercole 2006, and OECD 2008, Ch. 7). Measures of material deprivation are now included among the indicators in the EU’s social inclusion portfolio, (on their development and use see Atkinson *et al.* 2002; Marlier *et al.* 2007; Nolan and Whelan 2010; Whelan and Maître 2010, Guio 2006, Guio *et al.* 2009). A variety of sophisticated analytic strategies have been employed to explore how best to use such multidimensional information, including latent class analysis (De Wilde 2004, Grusky and Weeden 2007, Moisisio 2004, Whelan and Maître 2005 a & b), structural equation modelling (Carle *et al.* 2009, Tomlinson *et al.* 2008), item response theory (Capellari and Jenkins 2007) and self-organizing maps (Pisati *et al.* 2009, Whelan *et al.* 2010).

Finally, an emerging theme in recent literature and debates has been the extent to which exposure to risk and uncertainty is becoming individualised, and the related issue of “new” versus “old” social risks (Taylor-Gooby 2004; D’Addio and Whiteford 2007, Whelan and Maitre 2008), whereby globalisation and European economic integration are seen to present fresh challenges to long-standing welfare state. Social policy interventions traditionally covered well-defined risks relating to short-term unemployment, active age disability and insufficiency of resources in childhood and old age. “New” risks, it is argued, are less structured but tend to affect specific sub-groups at particular life stages most keenly, in particular younger people entering the labour market and at the stage of



family building. They involve both work and family and extend demand for state intervention into areas of life that had been seen as private. Vandecasteele (2010) and Whelan and Maitre (2008) bring out that structural causes of inequality must be seen as integrated with the life course, rather than opposed to it, consistent with Walker's (1994 1998) emphasis on the need to take into account both life course events and structural factors (Walker 1994 1998; Leisering and Walker 1998). This links in to research on the persistence of income poverty and deprivation over time, (see for example the comparative studies by Breen and Moisisio 2004; Whelan and Maitre 2006 2008) and to efforts to empirically capture the notion of economic vulnerability, defined as insecurity and exposure to risk and shock (see Whelan and Maître (2010a, b).

6.3. Gender and the family

6.3.1. Gender and economic inequality

The gender pay gap, and more generally the differences between men and women in labour force participation and rewards, have been the topic of a very extensive research literature going back many years, with improving sources of data and increasing technical sophistication. The review by Gregory (2009) describes the expansion across OECD countries in women's labour force participation since 1970 and the patterns of occupational concentration that have accompanied it, how the gender pay gap has been studied, and the main factors which appear to be at work. Gregory (2009), the *Oxford economic Papers Special Issue on Women and Wages* April 2009, and the meta-analysis by Weichselbaumer and Winter-Ebmer, (2005) each include an extensive set of references to the empirical literature which will not be reproduced here. It is worth highlighting in particular the potential of improved data such as matched employer-employee data (see for example Bayard *et al* 2003), the recent focus on studying gender pay gaps vary across different earnings levels rather than simply concentrating on the mean gap (see for example Albrecht, Björklund and Vroman 2003; Arulampalam *et al* 2007), and how much can be learned from a comparative perspective on the gender pay gap (see for example Blau and Kahn 2003). At EU level the gender pay gap is an important social indicator (see for example the Commission's annual *Report on Equality Between Men and Women*) and significant efforts have been made in recent years to improve the quality and consistency of the underlying data employed.

The changing extent and nature of labour-force participation and how it is rewarded for women versus men may have an important role in understanding recent trends in overall earnings dispersion. However, the relationship between the gender pay gap and overall earnings dispersion is a complex one. Increasing inequalities in earn-

ings and growing proportions of bad jobs may further disadvantage women, with for example a disproportionate number in part-time and insecure employment (see for example Lucifora, McKnight and Salverda 2005; Connolly and Gregory 2009), but increasing earnings inequality could go also with declining gender gaps. While this has been touched on in a number of studies (including OECD 2009), how they most often interact empirically and what drives cross-country variation in this respect has not been pinned down. While the impact of increasing women's participation on family or household income inequality has been more intensively studied (see e.g. Pencavel 2006; Devereux 2004), this has mostly been for the USA rather than European countries (though see Ozcan and Esping-Andersen 2008).

The household context provides a key context for women's labour force participation, with children and child-care a major influence, as documented in many empirical studies (see for example Del Boca et al 2009). Changing gender roles and their implications have been receiving attention in recent research. The long-term implications for women's economic position has also been a focus of research, with some suggesting that increased labour market attachment and earnings mobility have improved women's lifetime earnings (see for example Dickens and McKnight 2008).

6.3.2. Family structure and social inequality

There has been considerable research in recent years on the impact of changing family structures on social inequality and vice versa. Patterns of family formation and breakdown may be a response not only to the general economic climate but also to increasing earnings and job inequalities. Two aspects of family change standing out – the rise in lone parenthood and a possible increase in assortative mating. It is well-established that in the majority of developed countries today the household type with the lowest relative incomes and highest risk of poverty is the lone parent household. In the EU-27 as a whole, 34 per cent of lone parent families are at risk of poverty, compared to 25 per cent of single persons and 25 per cent of large two-parent families (those with three or more children) (Eurostat 2010, p. 43). The pattern is more extreme in the United States, where almost three-quarters of children in lone-parent families are poor and they account for half of all children in poverty (Mather 2010). Since large-scale lone parenthood emerged only in the latter decades of the twentieth century, it is to be expected that the rise of lone parenthood should be looked to as a significant influence on trends in inequality and poverty. In the United States, there is broad consensus that such an influence has occurred and scholarly debate now focuses on how large it has been, how it has fluctuated over time and whether it has been counterbalanced by other developments within families such as the rise in education and the increased attachment of women to the labour market (McLanahan 2009; McLanahan and Perchevski 2008; Western *et al.* 2008). In Europe the situation is more varied



and lone parenthood is generally less common than it is in the United States. In a recent study of 13 EU countries, for example, the proportion of families with dependent children that were headed by lone parents ranged from 8 per cent in Spain to 24 per cent in the UK (Trifiletti 2007, p. 16). The significance of lone parenthood for patterns of poverty and inequality is likely to be equally varied.

The notion that trends in who marries whom, particularly along educational lines, might have contributed to rising social inequality has also received considerable attention. In some countries increasing educational homogamy has been observed which may contribute to increasing income inequalities among households (e.g. Smits, Ultee and Lammers 1998; Blossfeld and Timm 2003). If those with lower levels of education face poorer prospects in the job market this may make them less attractive as partners, and the costs of marital break-up are affected by labour-market position and prospects of the partners as well. Fertility, including pregnancy and child-bearing in teenage years, may also be affected by labour-market prospects (Sacerdote and Feyrer 2008; Pickett and Wilkinson 2007), but with very different patterns have been observed across countries for reasons not yet well-understood. A further effect at the lower end of the educational scale could arise from the association between low education and the risk of both unmarried parenthood and marital breakdown. That suggests that the less educated not only have less income to pool but also are less likely to pool it in a stable sustained way throughout the period of family formation. These trends, particularly when taken in conjunction with the associated effects of education on labour market attachment, have been pointed to by some as important contributors to ‘new inequalities’ in household living conditions and well-being which are said to have emerged in the latter decades of the twentieth century (Esping-Anderson 2009). However, empirical studies have given at best mixed support to this view: it has difficult to identify either robust trends in homogamy over time or substantial effects on inequality or poverty arising from those trends (Blossfeld 2009; Breen and Salazar 2008 2010). Thus assortative mating is of interest as a possible influence on social inequalities and has attracted considerable research attention on that account, but without clear confirmation so far that it is in fact a major factor.

One notable feature of the research literature on these topics is the narrow range of countries covered. The United States has attracted the largest share of research, with a smaller volume of work on other developed countries, much of it focused on northern Europe, and much less on countries such as the southern European countries and Ireland where aspects of family patterns such as lone parenthood may be distinctive. A second feature is its focus on partnership – on who marries whom and on whether parents of children live together or apart – as the aspect of family structure most likely to affect social inequality, with little reference to fertility and family size as possible influences (though there is of course a substantial literature on the role of institutions and policies in

influencing fertility, see for example Björklund 2005). This could risk overlooking the important new equality in family conditions which a decline of social differentials in fertility represents. Fertility rates have become remarkably uniform across social class and educational categories in developed societies (Skirbekk 2008; Fahey 2008; Cleland 2005; Castro Martin 1995), but there has been little attention to consequences of this equalisation for social inequalities in general. It is also important to understand whether lone parenthood tends to depress fertility, since weaknesses in partnership bonds may disincentivise further births and thus perhaps act as a counterbalancing mechanism when it comes to influences on social inequality. Finally, there remain national cases where the large family is still an issue from a poverty point of view, the risk of poverty being even higher for two-parent families with three children or more than it is for lone-parent families (Eurostat 2010). The implications of family size for disadvantage or vulnerability at a point in time, as well as for transmission of disadvantage, require further investigation in a harmonised comparative context.

6.4. Health and health inequalities

Health and health inequalities is the area where there has been a particularly intensive research focus on the potential impact of socio-economic inequalities, including increasing income inequality. There has been an enormous body of research, going back many years, on the socio-economic patterning of health status and health outcomes, including mortality/life expectancy. This developed very early in the UK, a research tradition that continues to be prominent there, with a series of seminal studies and official reports (see for example the Black Report 1980; Acheson 1998; Fox *et al.* 1985; Marmot 2005). Socio-economic health inequalities have also now been studied in depth in a wide range of other countries, and to some extent also in a comparative setting, although the difficulties in harmonising measures of the key socio-economic drivers and health outcomes across countries have hampered such cross-country analysis. The EU has also acknowledged the importance of health inequalities as a key aspect of social conditions, though efforts to develop suitable indicators at EU level have also had to face these harmonisation problems.

Significant collaborative European studies of inequalities in mortality and morbidity include several led by Mackenbach; the first related to socioeconomic status in western European countries during the 1980s (see Kunst and Mackenbach 1994 1995; Kunst *et al.* 1998), Kunst, Groenhouf and Mackenbach 1998), while a more extensive study covered 22 countries during the 1990s and early 2000s (Mackenbach *et al.* 2008). The latter included countries in eastern Europe and found much larger among-country variability in the magnitude of inequalities in mortality. It concluded that some variation may be attributable to socioeconomic differences in smoking, excessive



alcohol consumption, and access to health care. Cross-country variation in the magnitude of inequalities in self-assessed health displayed a different pattern, illustrating the difficulties in generalizing from specific measures of health to broader health inequalities.

While this long-standing research stream has included income as one aspect of socio-economic circumstances, the focus on income inequality has intensified in recent years and has been the subject of considerable debate (see for example Wilkinson and Pickett 2006; Wagstaff and Van Doorslaer 2000; Subramanian and Kawachi 2004; Gravelle 1998; Fritzell and Lundberg 1995). A particular useful review and discussion on the links between income inequality and health is provided by Leigh, Jencks and Smeeding (2009). Epidemiologists and social scientists have proposed and investigated numerous mechanisms by which income inequality might affect an individual's health. These relate first to the possible effects of the absolute level of income an individual or household is at; empirical studies such as Deaton (2006) and Leigh and Jencks (2007) suggest that there is such a relationship, but only up to a threshold level above which income has little or no further effect on health. Secondly, relative income position might matter, for various reasons including the stress potentially associated with a lower rather than a higher rank in the distribution, emphasised by Wilkinson (1997) and Wilkinson and Pickett (2009) (and see also the discussion and references in Marmot (2005). Finally, if levels of social spending, crime, or social capital varied with the level of inequality, these might have an impact on health through a variety of channels.

Wilkinson and Pickett (2009) argue strongly that countries or smaller spatial units with higher levels of income inequality tend to have poorer health outcomes. Their 2006 survey of the literature, drawing on a wide range of studies, concludes that a clear majority support that conclusion. However, Judge *et al.* (1998), Deaton (2003) and Lynch *et al.* (2004a) review the cross-country evidence and conclude that while the evidence is not conclusive, studies with better data and methods tend to observe a weak or non-existent relationship between inequality and health. In any case, the fact that inequality and health are likely to have common causes that are difficult to measure or capture means that the cross-sectional relationship may provide a biased estimate of how *changes* in inequality affect health. Leigh *et al.* (2009) seek to investigate this relationship directly with data from around 1980 to 2000 for a range of OECD countries; they find no significant relationship between various measures of changes in income inequality and changes in life expectancy or infant mortality. Similarly, over-time analyses for US states by Mellor and Milyo (2002), Deaton and Lubotsky (2006) and Lynch *et al.* (2004b) also find little or no relationship between changes in inequality and health/mortality. Hildenbrand and Van Kerm (2005) look at differences in income inequality and self-reported health across European regions over the period 1994-2001, and find a negative relationship although the estimated effect is very small.

Among the many different channels through which income inequality might potentially influence health outcomes, its impact on access to health services has evoked particular interest and has been the topic of in-depth research in many countries. Comparative research on this topic focused on EU countries has developed significantly, notably through the work of the ECuity research project/group (see Van Doorslaer, Wagstaff and Rutten 1993; Van Doorslaer *et al.* 1992; Van Doorslaer *et al.* 2000). In their study applying the methods developed in the course of this project, van Doorslaer and Masseria (2004) find that in the majority of the OECD countries studied, there is no evidence of inequity in the distribution of GP visits across income groups, with if anything a pro-poor distribution more common. However, the picture they find is very different with respect to consultations of a medical specialist, where in all the countries studied, controlling for need differences, the rich were significantly more likely to see a specialist than the poor. For inpatient care utilisation no clear pattern in terms of inequity emerged across countries, nor was it obvious how to account for the observed patterns in terms of different health system characteristics.

6.5. Wealth

Wealth is a very informative indicator as it tells us both a lot about past economic and social inequalities and also informs us about likely future inequalities. Consequently wealth needs to be studied both in its role as a driver for future inequality and as an impact. Families and individuals use wealth to purchase housing, medical and care services, education, large consumable durables, fund business ventures, to smooth fluctuations in income, etc. Wealth provides financial security which may also create a sense of psychological security. Wealth holding, therefore, can drive other inequalities which can be intra and intergenerational – health outcomes, education, income, and so on. And as wealth is essentially acquired through the excess of income over expenditure, bequests and inheritance (with changes in its value depending on the rates of return to the type of asset held) it is a reflection of past inequalities.

The extent to which individuals accumulate assets (for a given level of income) is affected by tastes and preferences and the state provision of assets (eg housing, pensions) or services (e.g. health, education). Where the state is the provider tax can be seen as a form of compulsory saving.

It has long been noted that savings rates have a strong lifecycle element. The lifecycle theory developed by Modigliani and Brumberg (1954) suggests that young people borrow to invest (in education etc) and then throughout their working lives gradually accumulate assets which reach a peak just before retirement. Assets are then gradually sold off (to the younger generation) to finance years of retirement. It is essentially a theory which ex-



plains how individuals use assets to smooth consumption over the lifecycle and how wealth is distributed from one generation to the next. The state can act to facilitate this redistribution in a number of ways and to various degrees.

There is clearly cause for concern when young people have lack of access to assets as they clearly play an important role in shaping individuals' life chances, both in economic and non-economic ways. If lack of access to assets prevents young people from: investing in human capital, securing decent living conditions, starting-up business ventures, instil a sense of well-being and security leading to 'better' long term outcomes, then inequalities are likely to widen further. This can lead to re-enforcing cycles of deprivation among the more vulnerable groups in societies; especially, households on low incomes with children, single parents, or workless households. There is a growing acceptance of the importance of assets above and beyond their pure monetary value and this has led to a number of innovative policies, both in the UK and elsewhere. Asset-based welfare, as it has become known, represents a small but radical shift from traditional forms of welfare provision which have typically taken the form of income-transfers and service provision. Advocates of asset-based approaches to welfare typically do not call for wholesale redistribution of assets but instead put forward policies which create the right environment for individuals (normally asset-poor) to accumulate assets. These have taken the form of small asset-transfers providing a base for individuals to build on or through matched saving schemes. One of the main promoters of this idea advocates asset accumulation, particularly amongst the more vulnerable income groups, purporting a broad range of attributes that constitute as assets including human, physical and social capital (Sherraden 1991).

Information on private wealth holding is generally derived from household surveys (some of which are specialist such as the Wealth and Asset Survey in the UK), administrative data on wealth taxes and estate tax and some research on the wealthiest has also made use of media compiled "rich lists" (see, for example, Atkinson 2006).

Wealth is more unequally distributed than earnings or income and is highly concentrated among the wealthiest households. Recent estimates suggest that the wealthiest 1% of families in the US hold over 30% of private wealth and the top 2% of adults hold 50% of the world's household wealth (Davies *et al.* 2007). The high concentration of wealth has implications for the choice of inequality measures and places high demands on surveys and data collection. In order to provide an accurate estimate of the shape of the top of the wealth distribution it is necessary to oversample the top end. A few surveys have higher coverage of wealthy households (such as the US Survey of Consumer Finance) while other surveys rely on re-weighting samples (but these are often based on a small number of wealthy households).

It has also been observed that the typical portfolio of wealth holdings vary across the distribution. Housing is the main component of household wealth but housing wealth makes up a smaller proportion of overall wealth among wealthier households. Cash and certain consumer durables (e.g. cars) make up a higher proportion of low wealth households portfolios and wealthy households are more likely to hold risky financial asset. Proportions held vary depending on share and house price fluctuations.

Cross country comparisons show that there exists considerable variation in the distribution of private wealth across developed nations. By any metric inequality in wealth is high but making comparisons across countries is fraught with difficulties (Davies and Shorrocks 2000). Not only are there differences in the coverage of the wealthiest households and response rates but there exist substantial differences in the range of assets covered (Wolff 2006). In addition, as noted above, differences in the public holding of assets and provision of related services needs to be understood in interpreting cross-country differences. The recent development of the Luxembourg Wealth Study provides considerable scope for comparable cross-country analysis (<http://www.lisproject.org/lwstechdoc.htm>). The LWS currently covers 10 countries and has a limited longitudinal element for a selection of these countries. It is understood that additional countries will be added to this database in the future and that the longitudinal element will be enhanced.

Historical series, where available, show a substantial decline in the concentration of wealth in the 20th Century across developed countries (see, *inter alia*, Ohlsson *et al.* 2006; Davies 2009). This long run historical decline in the concentration of wealth is no doubt due to a range of factors. There has been a greater diffusion in a variety of assets such as housing, consumer durables, pensions and stock ownership (directly and indirectly). There have also been changes in inheritance tax and changes in capital gains.

Atkinson (2006) focuses on the wealthiest groups in France, Germany, the UK and the USA to examine the concentration of wealth among them and how this has changed over time. He uses four non-survey information sources: journalists' lists, estate data, wealth tax data and investment income tax data. He defines the 'rich' and the 'super rich' relative to average income and finds very high concentrations of wealth among these groups. While differences in data sources and definitions makes it impossible to compare countries on a like for like basis broad contrasts can be drawn. In France, for which a longer run of data is available, he finds that the fraction of the population classified as rich fell after WW1 and that concentration of wealth among this group also fell and these falls continued into the period following WW2. In the UK there is some evidence of a decline in the concentration of wealth among the richest and falls in the proportion of the population classified as rich and super rich in the 1950s. This finding was not replicated in the other three countries examined where increases in concentration and the rich



proportion were found. In terms of the shape of the distribution among the rich and super rich, Atkinson shows that the Pareto distribution does not fit the data consistently well across countries and over time. Sierminska *et al.* (2006) similarly find sharp rises in wealth inequality in Italy during the 1990s which appear to be largely due to increased concentration of financial wealth.

The distribution of private wealth has to be understood in the context of household demographics. Wealth is not just accumulated and held by individuals but more usually by families. It is not normally possible or appropriate to estimate per capita wealth holdings from household survey data and the household is the more usual unit of analysis. However families/households are not identical. Methods of equivalisation are usually applied to household income data in an attempt to compare households on a like for like basis based on a notion of need. These typically adjust household income for the number of adults and dependent children living in the households. Comparing households/individuals on the basis of wealth holding is not so straightforward. Assets are often accumulated and held jointly by adults in a household but this is by no means always the case. While equivalising household income makes the sometimes unrealistic assumption that income is shared equally by household members it is generally believed that this assumption is even less realistic for intra household wealth distribution and depends on the asset portfolio with some types of assets more likely to be shared than others (likely to be true also for income). Atkinson and Harrison (1978) consider various weighting systems that can be applied.

The lifecycle dimension of savings and asset holdings plays an important role in understanding the distribution of wealth in a population. Not only in terms of the gross value of assets held but also in terms of the portfolio of assets held (housing, financial assets, debt, pensions etc).

Rather than trying to equivalise household wealth to allow comparison of wealth distributions in terms of say an inequality index either across time within a country or between countries more recent studies have sought to understand differences in the distribution of wealth by decomposing the distribution looking specifically at household demographics. Important demographic factors which contribute to the distribution of household wealth are changes/differences in life expectancy, single parent households, age of family formation, independent living in old age, age of leaving parental home. Gale and Pence (2006) examine the large increase in net worth in the US from 3.5 times GDP in 1990 to 4.2 times GDP in 2000 from a household distributional perspective. They found that this large increase was almost entirely enjoyed by older households. In addition, while asset ownership had become more diffuse, pension provision more widespread and large increases in capital gains over the 1990s it was the demographic characteristics of households that were more important in shaping the distribution of wealth within a generation rather than changes in wealth holding by demographic group. They found that the gap between

older and younger households in terms of demographic characteristics more favourable to higher asset holding increased over the 1990s (married, in good health, containing men who had completed postsecondary education).

This type of decomposition analysis has also been applied to comparisons in wealth distributions between countries. Bover (2010) compares the distribution of wealth in the US and Spain and demonstrates that differences in household structure can explain differences in the lower part of the wealth distribution but mask greater differences in the upper part of the distribution.

These findings bring out the importance of examining the whole distribution rather than focusing on simple measures of dispersion. This will be important in understanding how the large changes in earnings and income inequality and the role of the state in many developed countries over the last 30-40 years has impacted on the distribution of personal wealth.

6.6. Inter-generational mobility

There is by now an enormous research literature on intergenerational mobility, spanning disciplines including economics, sociology, psychology and medical sciences. Intergenerational associations between individual earnings (see reviews by Björklund and Jäntti 2009; Corak 2006; and OECD 2009), household income (e.g. Raum *et al* 2007), poverty and welfare reciprocity (Duncan *et al* 1998; Corcoran 2001; Sigle-Rushton 2004; Blanden and Gibbons 2006; Corak *et al* 2004), wealth (Charles and Hurst 2002; Bowles and Gintis 2002; Klevmarken 2004), social class (Erikson and Goldthorpe 1992; Breen 2004; Breen and Jonsson 2005), education (Dearden *et al.* 1997; Mulligan 1999; Esping-Andersen 2004; Hertz *et al* 2007; Breen *et al* 2009) and health (Blanden *et al* 2006; Erikson *et al.* 2005; Case and Paxson 2006) have all been the subject of substantial investigation, drawing on a variety of data sources and types including administrative data, cross-sectional surveys and cohort studies. The influence of childhood disadvantage on educational and labour market success has been the subject of much research and policy debate (see for example Blanden and Machin 2005; Heckman 2007; Currie 2001; Gregg and Machin 2000), and concern about the impact of increasing inequalities in household income and labour-market performance on the inter-generational transmission of poverty and advantage have come to the fore (d'Addio 2007).

Increasing Inequalities and Inter-generational Transmission of Poverty and Advantage

It is commonly assumed that higher/increasing income inequality will inevitably be associated with lower/falling intergenerational mobility, but both theory and empirical analysis suggests that the relationship is not so straightforward. OECD (2009) concludes that the evidence is suggestive of a consistent cross-country pattern of low



intergenerational mobility and high income inequality, but this was on the basis of comparison of income inequality in 2000 with inter-generational earnings elasticities around the same time, when it is inequality when the current working generation was growing up that is most relevant to many of the postulated channels of influence. Björklund and Jäntti (2009) show that the countries with the most equal distributions of income in the 1980s did tend to exhibit the greatest degree of mobility in terms of inter-generational earnings elasticities in the 2000s, but the fit is far from perfect, with some combining high mobility with above-average inequality. Looking at change over time, Hout (2003 2004) highlights the lack of correlation between social mobility (measured in terms of social class) and income equality as “The Inequality-Mobility Paradox”.

Mechanisms

The mechanisms potentially underlying the inequality-mobility relationship are many and varied, and some have received much more attention in theoretical and empirical research than others. Solon’s (2004) model, for example, highlights that a more unequal distribution of earnings and higher returns to education gives better-off parents a greater incentive to invest in their children’s human capital. Other theoretical models suggest quite different mechanisms and directions for the inequality-mobility relationship. Greater earnings and income inequality can for example impact on savings and the accumulation of financial assets and wealth, and the ability of the better-off to both invest in their children and transfer assets directly to them. An unequal distribution of wealth can be reinforced and perpetuated across the generations through positive assortative mating (where couples meet and match on the basis of, say, education, income or wealth, see for example Nakosteen and Zimmer 2001; Dalmia and Lawrence 2001 and Fernandez, Guner and Knowles 2005). A relatively new area of research on asset-based welfare policies has found some evidence that even relatively small amounts of assets can have positive impacts on a range of social outcomes (Bynner and Paxton 2001; McKnight and Namazie, forthcoming). In-depth comparison of mobility patterns across countries provides one way of distinguishing which channels are likely to be the most important. Jäntti *et al.* (2006), for example, show that patterns of mobility from the top parental income quintile are virtually identical in Scandinavia and in the UK and the USA, with the higher Scandinavian mobility rates being due to much greater mobility for children from families in the *lowest* income quintile. This suggests that it is not the impact of greater inequality in facilitating higher parental investment that plays the crucial role, but rather the impact of policies and institutions that succeed in strengthening the financial resources of the worst off.

Institutions, Policies and Intergenerational Mobility

In considering the relationship between inequality and social mobility, it is difficult to know whether lower inequality in and of itself helps to promote mobility, or whether the same institutions and policies that underpin lower inequality also influence mobility so that low inequality and high mobility are their joint outcome. The education, labour market, tax, and social protection policies which influence cross-sectional inequality may have a direct effect on mobility as well. Equalising opportunities is a central element in policies to reduce inequality, primarily pursued via access to education, and this has been the subject of a very substantial research literature on educational structures. This suggests, for example, that the abolition of early tracking and the introduction of comprehensive school systems helped promote intergenerational mobility in Sweden, Finland and Norway, primarily by boosting educational attainment among the least privileged; Blanden *et al.* (2005) argue that education reform in Britain which delayed tracking also produced a substantial increase in inter-generational mobility, primarily to the benefit of children from low income families. The extent to which other aspects of the welfare state such as social security, labour market regulation, healthcare, housing, and family policies can influence mobility has been less often studied. Focusing on social spending, for example, a comparison across US states by Mayer and Lopoo (2008) finds that high-spending states boast greater intergenerational mobility than low-spending ones, but the extent to which this represents a causal relationship remains unclear. As far as the design of social protection is concerned, an empirical comparison of cash support schemes in the USA and Sweden by Corak *et al.* (2004) suggested that passive programmes are more likely to promote the transmission of welfare dependency than are active ones.

6.7. Housing

Housing is both an important aspect of quality of life and, for many households, their main asset and form of wealth. Inequalities in earnings and income translate into inequalities in access housing, housing quality, and ability to accumulate assets in the form of housing. In selectively reviewing a very large literature, we focus in turn on home ownership, the quality of housing and local environment, and the potential impact of spatial concentration of the poor and disadvantaged.

6.7.1. Home ownership

Homeownership has become the majority form of housing provision in all but a handful of European countries over last half century (Atterhög 2006), but access to home ownership both reflects and can reinforce structural inequalities. Studies on the potential gains from home ownership compared to renting have focused on savings and



wealth accumulation; security for access to credit; a tradable asset which could be liquidated to free up income; and protection from contingencies especially in older age (Murie 1983; Kurz and Blossfeld 2004; Boelhouwer et al 2004; Ronald 2006). Some argue that the public policies driving growth in home ownership across western countries have heightened these potential gains for homeowners and increased the implications of homeownership for social inequality (Groves et al 2007: 210). Rather than such convergence, other research has emphasised cross-national differences in home ownership markets and in the experiences and benefits of home ownership, which may be linked to the extent to which governments view housing as complementary to or a substitute for social spending on state pensions or social care (Doling and Elsinga 2006; Doling and Ford 2003; Horsewood and Doling 2004).

Studies of inequality in access to home ownership have focused on socio-demographic characteristics such as age, income, class, and generation (Groves et al 2007; Murie 1983; Kurz and Blossfeld 2004), labour market position (Horsewood and Neuteboom 2006; Kurz and Blossfeld 2004); family status (Kurz and Blossfeld 2004; Masnick 2004; Lewin-Epstien et al 2004), ethnicity (Masnick 2004; Lewin-Epstien et al 2004), and region (Groves et al 2007; Fielding 1992). Kurz and Blossfeld (2004) conclude from their twelve-country review that class and income impact on the transition to home ownership even more for young adults today than for older generations, and that access to homeownership for those in lower socio-economic groups has deteriorated in most. The sustainability of the size of the home ownership sector in many countries has also been questioned (e.g. Horsewood and Doling 2004), a concern borne out by the impact of the financial and economic crisis.

As a result of contemporary housing policies and historical policy legacies, the former communist countries of Central and Eastern Europe (hereafter CEE) display distinctive patterns of housing inequality. Previously, there was state control over the production, consumption and allocation of most housing, the level of homeownership was relatively low and a large proportion of the housing stock was state owned. After 1989, market institutions were introduced in the housing sector and property rights reformed to provide for owner occupation, with much state owned housing transferred to local authorities or sold to tenants (Pinchler-Milanovich 2001), though not in an even fashion across CEE countries (Roberts 2003). The consequence is distinctive patterns of inequality in housing access, affordability and asset distribution. Housing standards are significantly poorer than in Western Europe (Norris and Shields 2007; Domanski 2007), while housing costs as a percentage of income have converged with the west (Norris and Domanski 2009). Holders of state housing tenancies prior to 1990 accessed home ownership at very little cost, but significant numbers lack the income to adequately maintain their dwellings (Mandiê 2010), whereas younger households' housing access is often problematic (Shinozaki 2005; Lux 2003).

6.7.2. The quality of housing and neighbourhood environments

Going beyond tenure, recent research has shown that housing quality or conditions are linked with a range of social outcomes including quality of life and well-being (Mulder 2007; Sirgy and Cornwell 2002), social status and access to jobs, school, amenities and social networks (Mulder 2007; Barresi et al 1984; Kozma and Stones 1983), and physical and mental health (Aylin *et al.* 2001; Collins 1986; Curwen 1991; Eurowinter group 1997; Evans 2003; Evans et al 2000). Housing conditions have been found to vary with a range of socio-economic factors such as income (Clark et al 2003; Deurloo et al 1987; Ioannides and Rosenthal 1994; Murie 1983); social class, family size, household composition, and position in the family cycle (Murie 1983). Owners are generally found to have better quality housing than renters and to be more satisfied with their housing situation (Dekker et al 2007; Kurz and Blossfeld 2004; Schlottman and Boehm 2008; Iwata and Yamaga 2008, Elsinga and Hoekstra (2005). Housing quality may increase over the life-cycle but is influenced by education, employment and household careers (Feijten and Mulder 2005). Norris and Shields (2007) find the better housing conditions in the ‘long standing’ northern EU member states, intermediate conditions in most of the remaining ‘old’ member states and poor conditions in many of the ‘new’ Central and Eastern European member states.

As well as housing “quality”, the quality of, and satisfaction with, the local environment have also been studied. Some research suggests that areas with an overwhelming proportion of owner occupied housing have the lowest incidence of neighbourhood problems, whereas areas dominated by social housing have more neighbourhood problems, followed by areas where social renting and owner occupation are both sizeable (Kearns and Mason 2007). Both social status and low incomes have been found to be strongly correlated with environmental risk in the home and neighbourhood (Braubach and Fairburn 2010). Regional variations in neighbourhood satisfaction have been highlighted in some studies (ODPM 2004; Murie 1983) as well as central city versus suburban location (Uyeki 2008; Lovejoy et al 2010). However, this research has mostly been concentrated on individual areas/countries and it would be hazardous to attempt to generalise from it.

6.7.3. Neighbourhood effects

Concern about the effects of concentration of poor households in specific geographical areas, often known as “neighbourhood effects”, produced a substantial body of research in the United States from the 1970s onwards (see Friederichs et al 2003) This focuses on poverty and unemployment; educational under-attainment; criminality and tolerance of criminality; family breakdown; and lone parenthood (Wilson 1987; Galster, et al 2007). While access to employment and to services may be restricted in such areas (Power and Munford 1999; Speak and Graham 2000; Dean and Hastings 2000), the more contentious debate has been about possible effects on behaviour

and norms (Friederichs and Blasius 2003; Kearns and Parkes 2003). Selection into and out of such areas, and data shortcomings, make these particularly hard to pin down (Brooks-Gunn *et al.* 1997; Haveman and Wolfe 1995; Musterd 2000). The relevance of US findings to western Europe has been challenged, since the extent of socio-spatial segregation in European cities is far less than in North America. More generous European state welfare and social housing provisions, coupled with more interventionist land use planning regimes, may also have had an ameliorating role (Atkinson and Kintrea 2001; Friederichs, *et al.* 2003). The distinctive nature of western European cities may have generated distinctive patterns of socio-spatial segregation and therefore neighbourhood effects (Crouch 1999; Häußermann and Haila 2005). However, research on socio-spatial segregation in Western Europe has to date focused on a relatively small number of cities and so it is difficult to generalise.

6.8. Social cohesion

A significant source of concern about increasing inequality in earnings and jobs has been that it may drive, or at least be associated with, polarisation and increasing fragmentation between communities, ethnic groups, regions and social classes within countries (e.g. Wilkinson 1996). Related questions of legitimacy particularly in an EU context have also been considered (Beck 2002; Heidenreich and Wunder 2008; Diamond 2006; Ferrera 2006). The relationship between inequality and crime and disorder, which may be seen as an aspect of social cohesion, has also received some attention (e.g. Blau and Blau 1982; Freeman 1996; Kawachi, Kennedy and Wilkinson 1999; Kelly 2000), but firm conclusions have been difficult to support.

6.8.1. Inequality and happiness

Increasing income inequality may impact on to the extent that people dislike inequality. The main empirical strategies to capture this have been: (i) asking individuals in questionnaires to report (directly or indirectly) their dislike for inequality or their taste for redistribution (e.g. Alesina and La Ferrara 2005); (ii) developing experiments in the laboratory that allow the researcher to derive individuals taste for equality from their behaviour in the lab (Dawes *et al.* 2007); and (iii) estimating the impact of regional inequality on individual self-reported satisfaction (Alesina, Di Tella and MacCulloch 2004; Schwarze and Harpfer 2007; and Senik and Grosfeld 2008). Studies of the dislike for inequality in large and representative population samples have found that inequality, usually measured as the gini coefficient in the region or country where the individual lives has (at least in Western countries) a negative effect on reported satisfaction or happiness: other things being equal, individuals in more unequal societies report on average a lower score in the satisfaction scale. The studies based on reported happiness have examined

whether inequality aversion was different in various countries with different (perceived) social mobility, whether it depended on the political views or income levels of the respondent, and whether it was different for pre- or post-government income.



7. Political and Cultural Impacts of Inequality

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7.1. Introduction

Rising income/wealth inequalities, and stable or declining educational inequalities, may have severe repercussions on outcomes in the sphere of politics and values. Social and political integration will need to be studied simultaneously across individuals and across countries. Country variations are important to study not only because countries differ in their distributions of earnings and education. More importantly, and more fundamentally, countries vary in terms of their institutional context, with a different labour market and educational institutional setup. Can country differences in the impact of relative position on participation and social trust be explained by the institutional structure of countries? Or, to put this question differently, is a particular institutional setup more successful for social inclusion of the wider population than another? For example, do wage-compressing institutions equalize participation beyond the labour market? Do educational systems that reduce early drop-out contribute to participation and trust among those at the bottom of the educational distribution? Does that affect participation and trust of those from less advantaged social and ethnic backgrounds, over-represented among early school drop-outs?

For topics to be addressed under WP5, we set ourselves three tasks: (1) understand the impact of changing educational and income/wealth inequalities on various forms of political and social participation; (2) understanding the relationship between changes in inequality and legitimacy, and (3) examine the impact of inequality and values studied under (1) and (2) on macroeconomic performance. In this review, we address the relevant literature and the state of the art in the field for each of these tasks consecutively.

7.2. Impact of inequalities on political and social participation

7.2.1. Political participation

While effects of individual resources on political participation have long been established, there is no knowledge of the effect of inequality on the structure and content of political participation. In particular, does an increase in inequality mobilise or de-mobilise citizens to participate in politics? Voting can be seen as the least unequal type of participation, and even voting is strongly conditioned by socio-economic position (Lijphart 1997), or by civic

resources (Verba *et al.* 1995). National level characteristics – such as compulsory voting, proportional voting system, number of parties... etc. – are also likely to affect participation. Thus it is also likely that inequality also has an effect on voter turnout, either through changing social norms (Lister 2007), through altered political agenda (Solt 2008) or through other channels (Paczynska 2005). It is thus likely that in societies with greater income or educational inequalities, we should observe polarisation of participation modes, where higher inequality will be associated with a larger divergence of participation.

The link between inequality and political participation is especially interesting if we consider that the link between the median voter and redistribution is thought to be well established (Meltzer and Richard 1981) and that it is recognized that political participation affects redistribution (Borck 2007). Since the higher status people are more likely to participate in elections (Lijphart 1997), the real median voter is more likely to prefer less redistribution than the median of the population; hence the (assumed but rarely shown) positive effect of inequality on the political demand for redistribution is mediated by political participation (Larcinese 2007). Thus, an analysis on the link between social inequality and political participation is not only interesting on its own right but also as part of a larger topic of governmental redistribution.

The question is, whether more homogeneous, less unequal societies also have higher voter turnout. The impact of national homogeneity (low level of social inequality) on voter turnout is unclear. The group-based model (e.g. Uhlaner 1989) argues that group or community level homogeneity increases political participation. On the other hand, logically, national level homogeneity (social equality) might decrease it: several homogeneous groups generate a heterogeneous society. If people benefit from joining or forming high-powered homogeneous groups and these groups start to battle for political resources (especially if the government only performs redistributive actions, as in the classic Meltzer and Richard (1981) model), it might increase the political participation, but also increase differences between groups and thus increase inequality (heterogeneity). Similarly, if constituencies are spatially segregated local level homogeneity might be equated with national heterogeneity.

Moreover, not only the effect of national level inequality on political participation is not straightforward but it is surely only one of the factors that matter. There are several factors that can also have an influence on level of voter turnout (see Geys 2006b for an extensive review; but also see Lijphart 1997; Blais 2006; Gallego 2007). The most obvious ones are, the already mentioned, socioeconomic factors, (such as individual characteristics (age, status, education, etc.) population size or population stability), political factors (the expected closeness of the election, the intensity of the campaign or the political fragmentation) or institutional factors (the electoral system,



compulsory voting, registration requirements), which all can interact and mediate the effects of inequality (or as argued above, their effect could be mediated by inequality).

In sum it is not clear whether social inequality would increase or decrease political participation, and what sort of interaction would be seen between inequality and all the possible confounding factors.

7.2.2. Social capital and trust

Previous research suggests that there is a positive association between people's material and social resources. That is, most social networks are highly social homophilous: "[t]he homophily principle structures network ties of every type, including marriage, friendship, work, advice, support, information transfer, exchange, co-membership, and other types of relationship. The result is that people's personal networks are homogeneous with regard to many sociodemographic, behavioural, and intrapersonal characteristics" (McPherson, Smith-Lovin, and Cook 2001: 415; Moore 1990). Homophily in social networks is also found with respect to education, occupation and social class. In other words, there is inequality in the distribution of social capital (Lin 2000).

For example, formal civic participation in groups and associations is often considered to be 'the middle class affair', while lower classes compensate with informal, social networks (Pichler and Wallace 2009 2007; Wallace and Pichler 2007). Educational attainment is also positively related to forms of social capital (Gesthuizen, Van der Meer, and Scheepers 2008). This relationship seems to hold for most social categories. Low social positions, especially in combination with high level of deprivation, undermines trust and cohesion, while sense of community and belonging is lower in low-income neighbourhoods (Ross, Mirowsky, and Pribesh 2001; Lancee and Dronkers 2010; Letki 2008).

The question is whether and to what extent forms of inequality at the country level affect the association between relevant social categories and people's social networks and trust. There is some evidence that the relation between one's position in society and social resources indeed differs across countries. Most research analyzing the cross-national variation of social capital relates this to the welfare state. Evidence for the effect of welfare structures⁸⁰ on trust and participation is mixed: on the one hand, social-democratic states have higher levels of trust and participation (Kääriäinen and Lehtonen 2006; Kumlin and Rothstein 2005; Scheepers, Te Grotenhuis, and Gelissen 2002), thus implying a positive relationship between the welfare state and social trust. Yet on the other hand, states with more developed welfare structures may 'crowd out' the need for interpersonal contacts and their spill-over effects, such as networks of trust, support and reciprocity (Letki 2006; Koster and Bruggeman 2008). However, the crowding out hypothesis finds only limited empirical support, both with respect to levels (Van der

⁸⁰ There is also literature that identifies regimes of social cohesion and social capital (Green, Janmaat, and Han 2009).

Meer, Scheepers, and Grotenhuis 2009; Van Oorschot and Arts 2005; Van Oorschot, Arts, and Gelissen 2006), as well as to inequality in social capital (Van Oorschot and Finsveen 2009).

There is some scarce evidence that country-level inequality results in differences in the social capital of individuals. Pichler and Wallace examine the relation between class and social capital, and find that the class differences in terms of social capital are magnified in countries with high levels of income inequality (Pichler and Wallace 2009). Furthermore, participation in social activities is significantly lower in communities in the US that are more unequal and more racially and ethnically fragmented (Alesina and La Ferrara 2000). Uslaner and Brown find for the US that the degree of inequality is a strong predictor for trust (Uslaner and Brown 2005). Also for Europe this has been found (Hooghe *et al.* 2009). Gesthuizen *et al.* (2008) conclude that educational expansion decreases educational differences in both formal and informal social capital.

In sum, it is not clear exactly how different types of inequality affect the relation between people's position in society and the social networks and social trust they possess. Moreover, virtually no research has been carried out analyzing the effect of over-time changes in measures of inequality on indicators of social networks and trust. Can country differences in the impact of relative position on participation and social trust be explained by the institutional structure of countries? Or, to put this question differently, is a particular institutional setup more successful for social inclusion of the wider population than another? Task one of the work package aims to contribute answering these questions.

7.3. Political legitimacy: Opinions related to inequality

Crucial to the broad consequences of inequality are political attitudes of citizens. How much do citizens perceive and disapprove of economic inequalities? To what extent does actual inequality translate into demands for government-imposed redistribution of income? And how much does domestic inequality affect attitudes about international inequality and redistribution, or about the legitimacy of global economic openness? Finally, how much does actual domestic inequality affect broad trust in government and political institutions? Such interrelated questions are central for modern democracies given the combination of increasing domestic inequalities and rising international economic and political engagement. Yet, the best scholarship addressing such questions generates only inconclusive or inconsistent answers that call out for development and adjudication.

How polities perceive actual inequalities in their midst is the most basic but also only modestly explored. Some studies of public opinion in the United States and other industrialized polities support the intuition that experiencing rising inequality levels, variously measured, tends to increase popular dissatisfaction with inequality

(Kluegel and Smith 1986). This is consistent with the relative deprivation theory, which asserts that people might dislike rising inequality even if their absolute income position does not change, since it might mean a deterioration of their relative position compared to their reference group (Senik 2009). Other theories and empirical studies support a sort of null hypothesis, that higher inequalities should not significantly increase sentiments that inequalities are too high or unacceptable. For instance, Hirschman (1973) and Ravallion and Lokshin (2000) have identified what has come to be known as a ‘Hirschmann tunnel effect’, where citizens perceive increasing inequalities as evidence that mobility is possible and may extend to their own or their children’s future. Broad cross-country differences in actual inequality, in any event, reveal more inconsistent relationships with perceptions about inequality, using multi-country survey instruments like the ISSP or ESS. For instance, pooling all countries together yields no significant relationship between actual inequality and perceptions that such is too high (Hadler 2005), but grouping countries by level of economic development and region reveals relationships closer to intuition that higher inequality within groups spurs concern over inequality (Lubker 2004). These findings leave a great many open questions, about over-time changes, statistical significance in multi-level modelling of (different measures of) national inequality conditions and individual sentiments.

Results of empirical studies generally show that individual social status and values do explain attitudes towards inequalities: lower status people and those sharing egalitarian values prefer lower inequality. Many studies investigate the effect of the socialist legacy on inequality attitudes. Cross-sectional comparisons show stronger preference for inequality in post-communist countries, which authors interpret as a lasting effect of egalitarian communist ideology (Delhey 1999, Verwiebe, R. and Wegener, B. 2000, Suhreke 2001, Redmond G. *et al.* 2002, Hadler 2005, Murthi and Tiongson 2008). There are fewer studies analysing change in attitudes towards inequalities. These studies show, that people in transition countries are willing to accept higher inequalities than before the fall of communism. Gijsberts (2002) concludes that after the transformation a convergence could be observed between state-socialist and market societies⁸¹. Kelley and Zagorski (2004) also expect convergence in attitudes in the long run, although in the short run they see considerable increase in accepted inequality in transition countries and Central-East Europeans accepting substantially more income inequality than most Westerners think right. Grosfeld and Senik (2010) also show decreasing inequality aversion during first years of transition in Poland, but they also show that increasing inequality decreases satisfaction in later years.

81 The convergence hypothesis is also put forward by Alesina and Fuchs-Schündeln (2007) in the case of preferences for redistribution and social policies. Saar (2008) also provides cohort analysis of inequality attitudes in Estonia.

Moving somewhat more downstream in political consequences, there is substantially more scholarship into consequences for attitudes towards redistribution and the welfare state. The intuitive consequence is that ex ante inequality ought to spur support for redistribution, and this is developed formally if implicitly in the Meltzer and Richard (1981) – where demand for redistribution should go up as median voter’s income goes down relative to mean income. Studies of how and whether such intuition holds true, however, draw different, competing conclusions. The majority of studies, particularly those focusing on aggregate-national patterns of inequality and demands for or actual redistribution, have found that rising (pre-transfer) inequality tends to have little or no effect on redistributive demands and policies (Bradley et al. 2003; Moene and Wallerstein 2001; Alesina and Angeleto 2005; Lübker 2004; Kenworthy and McCall 2008). The claim often made is that this lack of direct correlation is an artefact of how inequalities play out differently and perceived in varying ways across particular cultural and political settings. Alesina’s work, alone and with many co-authors, emphasizes the mediating role of attitudes about work and deservingness differentiating nations into cultures of inequality. In any event, there are some dissenting views that provide empirical evidence focused on individual redistributive attitudes, where ex ante inequalities appear to spur support for individual inequalities and to interact significantly negatively – all giving new support to the Meltzer and Richard intuition (Finseraas 2009). Given such dispute reflecting, in part, discrepancies that depend on level of data, further exploration is clearly needed of individual redistributive attitudes but in broader cross sections of countries and with some attention to over-time developments in both.

Other downstream political consequences of inequality are less obvious or intuitive, but clearly important to understanding how inequality changes global political life. Inequalities may change not only attitudes about national redistribution, but also about international redistribution. Indeed, there is a small literature suggesting that high national inequalities might preclude polities from caring about or wanting to do something about international inequalities through humanitarian assistance or other interventions (Noel and Therien 1995 2002). Equally important, scholarly studies of international political economy suggest that ex ante domestic inequalities might well fuel protectionist sentiments at the margin, highlighting the possibility that globalization backlash might be unintended consequences of inequalities, net of existing foreign economic policies (c.f. Sen 2002; Dalgin *et al.* 2004). Such implications, however, have only begun to be theorized and empirically clarified in these early explorations. Basic exploration of public opinion and policy-positioning on such issues as international assistance and foreign-economic policies will clarify inequality’s political-economic implications.



Finally, perhaps the broadest political implications of inequalities concern perceptions of political legitimacy or trust in government institutions. However high the stakes of this ultimate of political implications of inequality for democratic legitimacy may be, existing scholarship offers surprisingly few insights. The extraordinarily developed literature into voting behaviour and functioning of democratic institutions, particularly with respect to those in the United States, has given hitherto little attention to the role of economic inequalities, beyond long-running debates about pluralist versus more class- or elite-based conceptions of political participation and public control (c.f. Dahl 1961; Lindblom 1977; Mills 1956; Lowi 1964). More recent, important, scholarship has begun to consider implications for voter turnout and voting patterns in the functioning of democracy (Bartells 2008). And we have the beginnings of thinking about how inequalities affect broad trust in government (Rothstein and Uslaner 2005). But these existing studies remain limited in the scope of conditions of trust and legitimacy explored, or in their national or temporal reach – underlining the unmistakable conclusion that this area remains as unexplored as it is important.

7.4. Inequality, value systems, and country-level consequences

While the interplay of economic inequality and value systems is the subject matter of several disciplines, this review merely focuses on the contributions made by economists. Some of their works have put forward the impact of values on the extent and evolution of economic inequality. Within that group of works, a first line of research has dealt with the impact of values on the inequality of market incomes. In advanced economies, wages are the quantitatively most important source of primary income and wage dispersion is a major determinant of overall income inequality. Wages are often negotiated by trade unions and employers or employers' associations. Trade unions tend to compress pay differentials and reduce wage disparity. Hence, the extent of collective bargaining and the power of unions affect overall income inequality. As shown among others by Booth (1985), Naylor (1990) and Corneo (1997), values and social norms play an important role in this respect because they are crucial in order to overcome the free-rider problem of union membership. That problem arises because union-negotiated wages apply to members and non-members alike, whereas members only bear the costs of worker organization. Only if society attaches a considerable value to solidarity, do workers choose to pay the monetary costs of joining the union - so as to improve their reputation and maintain their self-esteem. Conversely, if sentiments of solidarity become weaker, trade unions lose members and both union coverage and union power vanish. A shift from solidarity to individualism can thus contribute to explain the observed increase in wage inequality. As suggested by e.g. Bebchuk and

Jesse (2004), such a shift in norms and values may also explain a substantial fraction of the abnormal surge of executive pay during the last decade, one that widely outstripped wage increases for ordinary workers.

A second line of research has dealt with the impact of value systems on post-fisc income inequality, the two being linked through the political process of income redistribution. A distinctive focus of papers including Corneo (2001), Fong (2001) and Alesina and Angeletos (2005) is on the role of fairness as a driver of voters' attitudes toward governmental redistribution. Those papers show that a larger value attached to fairness makes individuals more likely to support policies that are not aligned with their narrow economic self-interest. However, the final effect of a desire of fairness on the demand for redistribution is a priori ambiguous as it depends on individuals' beliefs about the formation of market incomes. For individuals who believe market incomes to be the result of hard work, a stronger emphasis on fairness tends to decrease their demand for redistribution; for individuals who believe market incomes to be driven by luck or other factors beyond one's control, a stronger emphasis on fairness tends to increase their demand for redistribution.

Another strand of literature has put forward the impact of economic inequality on values and value change. In particular, Lindbeck *et al.* (1999) and Lindbeck and Nyberg (2006) have argued that a reduction of income inequality by the government tends to erode the work ethic of the population, giving rise to long-term negative effects of the welfare state on macroeconomic performance. The main mechanism identified by this research is the effect of the welfare state on the incentive for parents to transmit a work ethic to their children. First, a large welfare state makes children relatively unimportant for parents as a source of material help in case the market income of parents is low. Second, a large welfare state makes parents individually less vulnerable to exploitation by opportunistic children, in case the market income of children is low. For both reasons a large welfare state is conducive to parents who do not have to care about instilling a work ethic in their children's minds. The rise of the welfare state may thus be responsible for both more economic equality and a decline in the value that people attach to work.



8. Policy and inequality

Ive Marx, Bea Cantillon, Olivier Pintelon, Natascha Van Mechelen, Tim Van Rie and Gerlinde Verbist

8.1. Introduction

The GINI project proposal lists a range of policy questions.

- Why should policy care about income inequality, apart from reasons of fairness and social justice? Is (rising) inequality problematic if we care about its impact on other outcomes we deem important: economic growth, health outcomes, social cohesion, democracy and political participation, equality of opportunity in education, intergenerational mobility?
- If there is a relationship between income inequality and other aspects of equality, is the redistribution of income (through regulation, or actual redistribution) a sensible and cost-effective strategy to achieve better (distributional) outcomes in terms of health, education, political participation etc.?
- Does rising economic inequality constrain the capacity for effective collective action and the scope of feasible/sustainable policy alternatives, especially in the social and economic sphere?
- If limiting income inequality, especially compressing the lower end of the income distribution, is desirable, be it in its own right or as a means to other ends, how is it then best done? What role can employment and social investment policies play in reducing inequalities, including poverty?
- How can policy respond in other ways, especially to address the root causes of economic and educational inequalities?

Attention to these questions runs through the entire GINI project and we aim to produce policy relevant output in several ways. First, policy variables will feature in the ‘drivers of inequality’ work package examining the factors behind changes in inequality. Second, the research to be carried out on income inequality, educational inequalities, social impacts and political/cultural impacts (i.e. within the other work packages) will in each case be developed to produce clear, concrete implications for policy in the wide range of areas to be covered. Reports for each of the GINI WPs will contain a ‘policy implications’ section. Third, the country reports will also cover policy changes and the implications thereof. Fourth, a policy section in the final report will draw out the larger implications in a coherent way.

The Policies work package (WP6), then, takes a further set of specific policy issues that are very important to address. That scope will necessarily be far more narrow. In Rawlsian vein, the focus will be on policies, particularly income policies, aimed at improving the plight of those least well off.

Consequently, this review will focus on a selection of policy relevant issues:

- Constraints imposed by rising economic inequality
- Traditional redistributive strategies:
 - universalism versus targeting in redistributive policies
 - minimum income protection policies
 - the redistributive impact of taxes
- New redistributive strategies
 - activation and work oriented policies
 - empowerment policies: the growing role of services
- Macro-level policies

8.2. Constraints imposed by rising economic inequality

The ‘Growing Unequal’ Report by the OECD (2008) finds that, across industrialized countries, income distributions have widened between the middle of the 1980s and early 2000s. Yet, the report highlights large and persistent differences between countries, both with regard to the level of inequality and its evolution. While inequality of disposable income increased strongly in some countries (notably Finland and New Zealand), others have witnessed a slight decrease (France, Spain, Ireland). In the majority of countries, the level of inequality remained broadly stable between the mid 1980s and early 2000s. Changes in the income distribution are attributed to three broad sets of factors. First, there are demographic evolutions, with changes in household composition in a key role. Second, a number of trends in the labour market contribute to changes in income inequality, notably a widening of earning differentials among full-time workers and the proliferation of temporary and part-time work. Finally, the role of government in redistributing income differs widely across OECD countries, and has been subject to changes over time.

There exists a strong association at the country level between the level of income inequality and the size of the welfare state, measured as social spending. We also know that there is a strong correlation between social spending and social outcomes, for example the level of relative-income poverty (Förster and Mira d’Ercole 2005; Nolan and Marx 2008). The association between redistribution and inequality is complex and in many respects



counter-intuitive. Lindert (2004) evokes the ‘Robin Hood Paradox’ “*in which redistribution from poor to rich is least present when and where it seems most needed*”.

The exact nature of this relationship is not yet well-understood. Generally speaking, there might be four kinds of causal explanations. First, the direction of causality may go from an extensive welfare state to a condensed waged distribution. This is the line followed by Beramendi Alvarez (2001), who has argued that second-order effects of social expenditure are a large part of the explanation of the ‘puzzle of egalitarianism’. First order effects of redistribution on inequality consist of direct income transfers from high-income to low-income households, through taxes, social security or social assistance. But second order effects are equally important: the higher taxes and transfers of large welfare states influence labour supply in such a way that a more condensed wage distribution results. High-wage earners substitute leisure for monetary income in response to taxes, while generous benefits reduce labour supply among those commanding low wages (through higher reservation wages). Moreover, these second order effects are highly contingent upon national institutions, particularly with regard to funding of the welfare state, the level of wage bargaining and fine details of institutional design.

Second, the causal mechanism between redistribution and inequality may run in the opposite direction. A highly unequal distribution of market incomes may make it politically and technically more difficult to redistribute income. McCarty and Pontusson (2009) review a number of political economy theories with regard to voter behaviour under different conditions of economic inequality. The so-called median voter models assume that changes in the income distribution lead to a shift in the preference of the median voter, or the ‘political middle’. Moene and Wallerstein (2001 2003) have argued under conditions of rising income inequality, the median voter has a preference for reduced expenditure on insurance and social spending. Empirical studies tend to support this model, as outlined above (Robin Hood Paradox).

However, Meltzer and Richard (1981) have formulated an opposing hypothesis, predicting that rising income inequality leads to a shift in preferences of the median voter, towards more redistribution. A recent paper by Corcoran and Evans (2010) provides empirical support for this thesis, analyzing the association between growing income inequality and support for public education in the US. It should be noted that in this case, support refers to in kind benefits (public education) rather than direct income transfers.

As McCarty and Pontusson (2009) show, the majoritarian assumption underlying the median voter models is not universally applicable. In many contexts, a vast number of parties (including trade unions, employers’ organisations) compete for political influence. The partisan politics theory assumes that, rather than moving all parties either to the left or the right, income inequality can cause polarization of the electorate. As the political spectrum

widens, the outcome depends largely on the extent to which low-income groups are mobilized, in terms of election turnout and union density. In turn, social security arrangements can strengthen trade unions, particularly in so-called Ghent countries where they are involved in the provision of unemployment benefits (Van Rie *et al.* 2011). Furthermore, the recent attention in the literature to insider-outsider conflicts and divergent interests within ‘Labour’ or ‘the Left’ are of key importance.

Third, causality between equality and redistribution may run in both directions, in a process of mutual reinforcement. This argument has been developed by Barth and Moene (2009) in a recent NBER paper. They argue that a more equal wage distribution leads to welfare generosity through a process of political competition. In turn, more income redistribution produces more equality. The authors hypothesize that this multiplier operates mainly through the bottom of the income distribution: the amplification occurs where wages at the bottom of the distribution are compressed, not where higher incomes are compressed. The hypothesis finds empirical support in their analyses on 18 OECD countries over the years 1976 to 2002.

Finally, an extensive welfare state as well as a limited degree of wage inequality may both be the results of a third variable. As Atkinson (2000) suggests, countries may be characterised by notions of equity that are widely shared within any society, but that differ across societies. A society in which the value of solidarity is widely shared may simultaneously support pay norms, collective agreements and adequate minimum wages, as well as quasi-universal and generous benefits.

8.3. Traditional redistributive strategies

8.3.1. Universalism versus targeting in redistributive policies

Universalism versus targeting is a classic theme in the income redistribution literature. In view of a renewed interest in targeting (e.g. Hartz reforms in Germany, child benefits in the UK) it seems relevant to revisit this issue (Van Mechelen, Nelson and Bahle; 2011, forthcoming). Important questions here include: Is there really such a shift towards more targeting? If so, what are its consequences for poverty alleviation, given the traditional assertion that universal welfare provisions are the best way to achieve social equality (Korpi and Palme 1998)? Finally, do Korpi and Palme’s findings hold in view of more recent evidence?

Conceptual clarity is essential when discussing universalism and targeting. As Van Oorschot (2002, p. 173) states, misunderstandings may easily arise. For instance, targeting is often equated with means-testing. However, targeting does not necessarily imply a means test, as other eligibility criteria (e.g. family composition) can be



established to channel benefits to specific groups (e.g. lone parents). By contrast, ‘universal’ benefits are aimed at broad segments of the (national) population. Still, it should be noted that universal benefits are rarely truly universal, as they often apply for instance a residency criterion, which can be more or less strict. Moreover, whether benefits are flat-rate or earnings-related, is a question that is closely linked but distinct from universality or targeting.

The traditional assertion is that universal welfare provisions are the best way to achieve social equality (Korpi and Palme 1998). Two sorts of arguments underpin this argument. First, there are technical considerations. Van Oorschot (2002) sums up the most important dysfunctions of means-testing. First, these include higher administrative costs. Establishing need or other relevant criteria require monitoring, whereas universal benefits allow for less complex eligibility procedures. Furthermore, means tested benefits are subject to higher non-take up, partly because of stigmatization issues. Finally, targeted benefits can give rise to poverty traps, where benefit recipients have little incentive to take up work because this would entail loss of benefits.

Second, political arguments are evoked in support of universalism: universal provisions are said to have greater political legitimacy and (consequently) to generate larger political support. This view is best captured in the so called ‘welfare backlash’-model: selective welfare provisions are said to provoke a popular backlash against welfare spending (Korpi 1980). As such, targeting would then restrain social expenditures, or provoke a displacement of public by private expenditure, leading to greater income inequality (Jäntti, Kangas and Ritakallio 1996). The traditional political argument for universal schemes is that they enjoy broader support across the population than schemes that are targeted specifically to certain categories (Korpi 1980). As a result, public social spending is stimulated resulting in lower income inequality and poverty.

Other studies concur. Moene and Wallerstein (2001) conclude that universal provisions provoke the largest political support because of the higher chance of middle class citizens to become a beneficiary. Some opinion based studies also confirm that universal welfare schemes enjoy broader support (Forma 1997; Kangas 1995). It is plausible however that public opinion is influenced by the institutional set-up of a welfare state and so the causality cannot be seen as running one way (see Larsen 2008). Also, one should not overestimate the effect of public opinion on social policy, as public policy is also influenced by resource mobilization, path dependence, political framing etc.

Does the ‘Paradox of Re-distribution’ (named after Korpi and Palme’s seminal paper) still hold? There is evidence in support. Corak, Lietz and Sutherland (2005) for example find that universal child related benefits – not those targeted at the poorest – provide better protection against poverty. Some recent studies, however, claim that the link between redistribution and universal provision has substantially weakened, or even reversed over time.

Kenworthy (2011) reproduces and updates Korpi and Palme's analyses, which related to the situation in 11 countries as of 1985. Kenworthy's findings confirm that countries with more universal benefits achieve more redistribution (measured in the size of redistributive policies in the budget) for the period 1980 to 1990. By 1995, the image becomes less clear. Data for 2000 and 2005 seem to indicate that there is no longer any association (either positive or negative) between the two variables. Evidently, the findings are based on a small number of cases (10 countries), which make them particularly sensitive to outliers. A trend towards more targeting in Denmark, in conjunction with an evolution towards more universal benefits in the US, is largely responsible for the shift in conclusions. Moreover, the new findings may be driven to some extent by the growing share of pensions in social spending. However, analyses on an alternative dataset, controlling for pensions and featuring a larger number of countries, suggest that as of the mid 2000s, universalism is negatively associated with redistribution. These preliminary results serve to highlight the continued relevance of this research topic.

8.3.2. Minimum income protection policies

Minimum income protection is arguably the most fundamental task for any welfare state. Three major trends have been identified with regard to social insurance and (means-tested) social assistance over the course of the previous thirty years. First, in a number of countries, cash benefits appear to have eroded, as they failed to keep up with general improvements in the standard of living, particularly during the 1990s. A second broad shift consists in a tendency towards shortening eligibility periods for insurance and a proliferation of means testing. This dual trend seems to serve the broad aim of restricting benefit receipt to the neediest members of the population. Third, in many countries, minimum income protection has increasingly become conditional upon participation in active labour market programmes and efforts to find work.

8.3.2.1. Benefit erosion

Over the course of previous decades, cash benefits in many countries have tended to lag behind wage developments. This applies to social insurance, as replacement rates for unemployment insurance in a number of countries have declined substantially between the middle of the 1980s and the end of the 1990s (Scruggs 2004; Starke and Obinger 2009). Montanari *et al.* (2008) have reported a further deterioration of unemployment insurance between 1990 and 2000. Moreover, they report an erosion of cash benefits in other branches of social security, namely old age pensions, sickness benefits and work accident insurance.



Pierson (1994) argued that social assistance benefits are less prone to retrenchment. First, he argues, their status as a last resort safety net would make them more resilient. Moreover, since benefits tend to be less generous and recipient volumes smaller, they would offer less scope for savings than insurance. Yet, Nelson (2007) concludes that over the course of the 1990s, social assistance benefits eroded slightly more strongly than social insurance benefits.

In a number of countries, the 2000s have brought a halt and even partial reversal of declining benefit replacement rates. In other countries, benefit rates have continued to erode, albeit at a slower pace than before. This observation applies both to social insurance and social assistance benefits. (Van Mechelen et al, forthcoming). The evolution of unemployment rates is a possible explanation, both for the benefit erosion during the 1990s (which was a period of rising unemployment in many countries) and the subsequent recovery during the 2000s. A key question is whether the rising unemployment rates since the economic and financial crisis of the late 2000s will translate into a deterioration of minimum income protection.

8.3.2.2. Expansion of means-testing

Many countries have significantly tightened the criteria for benefit eligibility. Benefit entitlement periods in social insurance, particularly the unemployment branch, have been shortened in a number of states. These measures are typically intended to reduce benefit receipt and long-term dependency. To a certain extent, however, these can result in increased case loads for social assistance. This occurs when insurance claimants who have come at the end of the entitlement are re-directed to the last resort safety net. Such evolutions entail a de facto proliferation of means testing, further contributing to an increased targeting of minimum income protection. In this respect, the United Kingdom (with the Job Seekers Allowance of 1996) and Germany (with the Hartz IV Reforms in 2005) represent two key cases.

8.3.2.3. Increasing conditionality

The third broad shift in welfare state reform consists of the ‘activation’ of benefit claimants in terms of behavioural requirements. Access to minimum income protection has increasingly become conditional upon job search and participation in active labour market programmes. These measures are considered as emblematic of a paradigm shift, from curative and essentially passive social policy to a more preventive and empowering approach, focused on skill development and investment. (Castles 2004; Hemerijck 2002; Taylor-Gooby 2004).

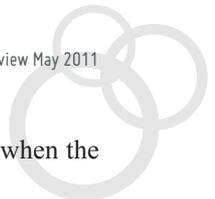
Yet, this paradigm shift may also contribute to a deterioration of income protection. In social assistance systems that already face problems of stigmatization and non-take up, (Fuchs 2009; Hernanz *et al.* 2004), work conditions represent additional barriers to benefit receipt. Since activation is becoming a frequent element of minimum income benefits, growing population groups may no longer have access even to the last-resort safety net of European welfare states (Cantillon 2010a).

Furthermore, other shifts seem to have occurred. First, there would appear to be a trend towards more in-kind support (energy vouchers, education vouchers, reduced rate public transport, communication etc.). Second, a shift may have occurred towards more (work) conditional and discretionary support: to motivate people to participate in these programs and to work. A third shift concerns more ‘social investment’ type support (‘empowerment’): training programmes, counselling services, subsidized employment; measures aimed at enabling self-reliance. Finally, in-work support would have become more widespread (in-work benefits, targeted reductions in social security contributions and taxes) to reward people when they move from benefit dependence.

The actual extent and reality of these trends remains unclear and requires further research. There is a need for more refined measures of minimum income protection and more broadly social policy impact assessments, perhaps based on social risk/ family type oriented approaches rather than a systems oriented approach (social assistance, unemployment insurance, pensions). One idea is to define relevant social risks, as they affect individuals/households in predefined conditions, and to see what social policy does not only in terms of income transfers provided (the combined impact of social assistance, social insurance, fiscal measures), but also looking at elements of (de facto) conditionality, sanctioning, empowerment/activation policies, with attention to phasing of measures.

8.3.3. The redistributive impact of taxes

It is well known that taxes have a considerable impact on final disposable household income, and hence income inequality. The principal objective of taxes is to raise revenue for the government. But apart from this revenue requirement, other functions are attributed to taxes, and one of these is the reduction of inequality. In this way, taxes can also be considered as an instrument in the framework of the Welfare State. Two guidelines for a tax system appear to have received wide acceptance from the perspective of social justice (Musgrave 1959). First, the principle of horizontal equity, which prescribes that equals should be treated equally (see Feldstein 1976; Atkinson 1980; Plotnick 1981 and 1982). Second, the principle of vertical equity, which states that unequals can be treated unequally, i.e. according to their different economic strength. This second principle justifies the progressivity of a tax system. The broader the shoulders, the more weight they should carry. The vertical equity requirement clearly implies the idea of redistribution in the sense of inequality reduction. The redistributive effect of taxes results basi-



cally from the progressivity and the level of taxes (Kakwani 1977). A tax system is called progressive when the proportion of income that is taken in tax increases with income, and it is regressive when the average rate decreases with rising income. The more progressive and the higher the tax level, the more redistributive a tax system is.

There is a wide variety among countries in the kind of taxes they levy (e.g. personal income taxes, social contributions, indirect taxes), as well as in the government levels that collect those taxes (e.g. national, regional, provincial, local). Roughly speaking, personal income taxes in most Western countries are progressive, whereas social contributions are in general closer to proportionality (for examples see e.g. OECD 2008, Immervoll *et al.* 2005; Verbist 2004). The evidence on indirect taxes rather points towards regressivity (see e.g. O' Donoghue *et al.* 2004; Decoster *et al.* 2009).

Various instruments in the tax system contribute to this redistributive effect, some of which are universal and others which are more selective. The rate structure can in most countries be considered as a universal instrument, whereas various types of tax advantages (allowances, deductions, credits and exemptions, for a description of these various measures (see e.g. OECD 1984 1996; Pfähler 1990) can be either universal or selective. Certain socially recognised needs are compensated for by granting a tax advantage, e.g. for the presence of children or for being handicapped (Pigou 1932; Titmuss 1969). In this way the taxman is also serving social policy goals. Adema and Ladaique (2009) have shown that it is important to incorporate these tax advantages, as well as the taxes levied on social benefits when internationally comparing countries in terms of their social efforts. Some countries also have used tax credits as important social policy instruments. A much studied example is the Earned Income Tax credit in the United States, which represented a paradigm shift in American social policy and produced some striking results, including a marked initial decline in poverty, especially among single-parent households (Hotz and Scholz 2003; Eissa and Hoynes 2004). The US experience prompted interest in negative income tax credits elsewhere, particularly in the UK which implemented and extended several schemes, culminating in the Working Tax Credit (WTC) of 2003 (Brewer *et al.* 2006). Also elsewhere in Europe, countries have initially sought to emulate policy solutions implemented in the US or Britain, most notably income tax credits, only to find these to be less suitable or difficult to implement (Bargain and Orsini 2007). Examples include the "Prime Pour l'Emploi" (PPE) in France, the "Employed Person's Tax Credit" in the Netherlands, and a "Low Wage Tax Credit" in Belgium (Marx and Verbist 2008).

Another experiment, that has received increasing attention over the past two decades concerns flat tax proposals and implementations. A flat tax is a tax based on only one marginal tax rate complemented with possibly a tax exempt minimum. The arguments of the proponents of this system basically relate to efficiency considerations, such as a positive effect on labour supply, simplified administration and less tax evasion (and hence more revenue) (see e.g. Paulus and Peichl 2008; Keen *et al.* 2006). It is actually practiced by around 25 à 30 countries worldwide, among them some EU countries (e.g. the Baltic States, the Slovak Republic and Romania; Keen *et al.* 2006). Paulus and Peichl (2008) have simulated the introduction of a flat tax in a number of West- and South-European countries, and conclude that a budget neutral flat tax reform will not basically solve the equity-efficiency trade-off.

8.4. New redistributive strategies

8.4.1. Activation and work oriented policies

Consistent with ‘active welfare state’/‘Third Way doctrines’ that came to prominence just over a decade ago, there has already been a shift in social policy away from passive income support: resources are increasingly channelled towards policies aimed at activating and empowering people for economic self-reliance. An increased policy emphasis on activation has become evident in many European countries, certainly at the level of rhetoric, and gauging by some indicators also in terms of actual policy (Barbier and Ludwig-Mayerhofer 2004). Dingeldey (2007) distinguishes activation efforts by two dimensions: workfare characteristics and enabling characteristics. Workfare characteristics relate to coercive and enforcing elements relating to work participation e.g. benefit cuts (level/duration), conditionality; work tests. Enabling characteristics refer to labour market services; job placement, training; childcare. Analyzing policy shifts in the UK, Denmark and Germany, Dingeldey concludes that on both dimensions countries have moved towards activation, yet that there is no convergence of policy mixes. Eichhorst and Konle-Seidl (2008) also find a general trend towards activation, as does Aurich (2009). It needs to be stressed here that all these studies build on mainly qualitative assessments on policy changes. The 2007 OECD Employment Outlook tentatively concludes, based on country questionnaires, that activation efforts have effectively intensified in a number of countries since the late 1990s. The reality is, however, that we still lack reliable indicators of actual activation intensity, mainly because implementation aspects are so difficult to measure (e.g. effective sanctioning or effective availability and take-up of training places, subsidized jobs etc.).



The idea that employment growth and poverty reduction are natural allies has become central to social policy in many countries, and also to EU social inclusion policy as it is being implemented within the framework of the Open Method of Coordination. The idea that there is a natural complementarity goes back to such doctrines as the Third Way and the Active Welfare State, in which work and social inclusion became seen as natural if not inseparable allies (Esping-Andersen *et al.* 2002; Giddens 2000; Kenworthy 2008; Visser and Hemerijck 1999). These doctrines have now evolved into more sophisticated and encompassing paradigms such as the ‘social investment state’ (Hemerijck and Van Kersbergen 2010). Work, however, maintains its pivotal role as the central medium of social inclusion.

Yet past experience shows that countries that have done well in terms of employment growth have not necessarily done well in terms of poverty; marked increases in employment rates have often gone accompanied with rising or stagnant poverty rates for the working aged population (OECD 2008).

There are two principal reasons why past job growth has not produced to poverty declines. First, job growth has not sufficiently benefited poor people; many new jobs have ended up with persons living in households where disposable income is already high up the income distribution (and this has had the added effect of pushing up the median income and hence relative poverty thresholds). Second, a job does not always pay enough to escape poverty; in-work poverty is a significant and in some countries growing problem.

Let us consider both factors in further detail. First, most at risk of poverty are persons living in workless households. They face the highest poverty rates by far and they also tend to experience the most severe financial hardship (including their dependent children). The concentration of non-employment within the same households may be due to many factors. A correlation between the employment statuses of household members may reflect a tendency for individuals who share common characteristics to live together. Since persons with fewer educational qualifications typically experience higher unemployment and non-employment rates, households whose members all have a low level of educational attainment are likely to be over-represented among workless households. Household members are usually looking for work in the same local labour market and a depressed labour market will have a common impact on them. The disincentive effects of tax and benefit systems can also play a role. It is often the case that if one household member receives a benefit, another is punished if he or she accepts a job. To escape this dependency trap, all members of the household must find a job simultaneously, which may be particularly hard if both partners have low educational attainment. This problem is potentially more severe in countries with extensive means-testing of welfare benefits based on family income (Gregg and Wadsworth 2001). In this light, it is not altogether surprising that employment growth has not tended to produce commensurate drops in workless household

rates. Job growth has in many countries resulted in more double or multi-earner households, but only to a more limited extent in a reduction of households without earners.

A second reason why employment growth did not result in less poverty is that a job may not pay enough to escape poverty. What poor jobless persons often require is not just a job, but a job that pays significantly more than their benefit. In the case of non-employed poor persons living in a household with already one earner the additional income required to escape financial poverty may be quite limited, for sole breadwinners the required income gain is often quite substantial. From an anti-poverty perspective, the issue is not just “making work pay” (i.e. tempting people to move out of dependency), but to make work pay sufficiently to make sure that a move from dependency to work also implies a move from poverty to an adequate living standard. The living standard of poor households with weak or no labour market attachment is often so far below the poverty threshold (especially in the case of single parents and child rich households) that it is quite possible that a job that pays the minimum wage, or even more, would not suffice to lift them from poverty.

Long regarded as predominantly if not exclusively an ‘Anglo-Saxon’ problem, linked to weak labour market regulation, decentralized wage setting and low replacement benefits, in-work poverty has now become an EU-wide concern. Recent comparative empirical studies confirm in-work poverty to be a pan-European problem (Andreß and Lohmann 2008; OECD 2008; European Foundation for the Improvement of Living and Working Conditions 2010). Workers in countries such as Germany, France, Sweden or Spain are as likely to be confronted with household financial poverty as those in Britain or Ireland. According to the SILC based EU Social Inclusion Indicators, the extent of in-work poverty in 2008 ranges from a low of 4-5 percent in countries like Belgium, Denmark, Finland and the Netherlands, up to 11-12 percent in Spain, Latvia, Poland and Portugal 14 percent in Greece. This implies that as many as a quarter to a third of working-age Europeans living in poverty are actually already in work. The findings are broadly confirmed by the 2008 OECD study *Growing Unequal*. In addition, this study found in-work poverty (relative to 50 per cent of median equivalent income) to have increased in a majority of countries from the mid-1990s to about 2005 (notably in Germany), be it with significant cross-country variation.

While the low paid still comprise a substantial proportion of the working poor, many - often a majority - of the working poor are not below conventional low pay thresholds (Nolan and Marx 2000). The core of the working poor consists of workers who are sole earners and have a family to support. Although single parents (lone mothers) are overrepresented, the majority of the working poor are traditional two adult/male breadwinner households with



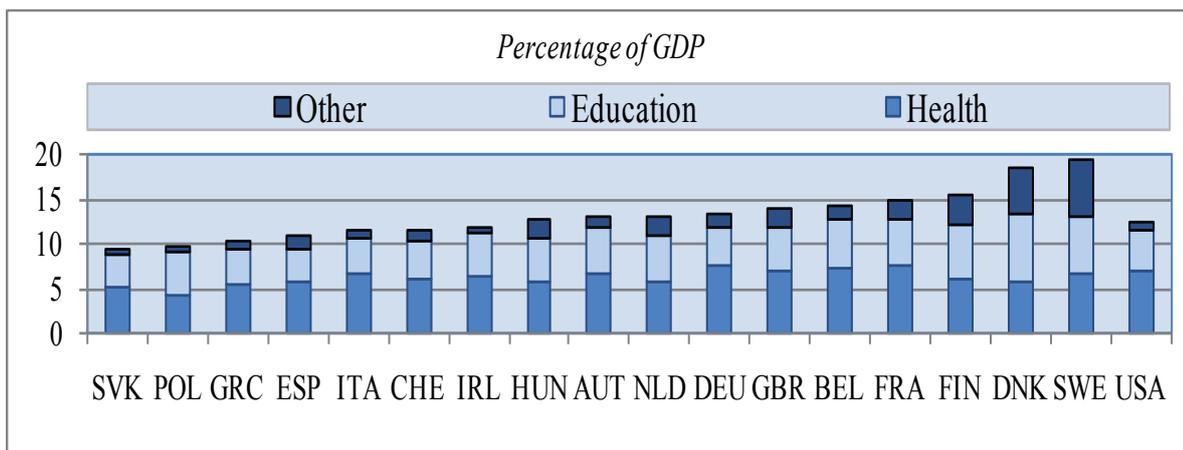
dependent children. Even a moderately well-paid job may not suffice to meet household income needs, depending on the extent of those needs and the other sources of income available to the household.

Having only one earner in the household has become a poverty risk in an era in which the average living standard, and hence the relative poverty threshold, is increasingly determined by the living standard of double-earner households. This helps to explain why in-work poverty is pervasive across Europe and the OECD, and why its extent does not simply reflect the size of the low-wage sector (Lohmann and Andreß 2008; Lohmann 2009). Since in-work poverty is strongly associated with single earnership, it is thus a problem associated with a multiplicity of institutional factors that affect household labour market participation patterns, particularly double and multi-earnership. Lohmann and Marx (2008), comparing the EU-15 countries, argue that these institutional factors – relating to decommodification and defamilisation - are most favourably aligned in the Nordic countries and least favourably in the South, while the institutional constellations in the Anglo-Saxon and Continental European countries have mixed and sometimes contradictory effects. The country differences in in-work poverty risks broadly fit this pattern. A multi-level model by Lohmann (2009) adds explanatory power, but again highlights the multi-causal nature of in-work poverty. Hence, in-work poverty has not lent itself to a simple and uniformly applicable analysis of policy failure. In-work poverty patterns are influenced by a broad range of factors, ranging from labour market institutions (wage decentralisation and coordination, minimum wages), over dual earner support arrangements (tax incentives, child care provisions) to the set-up of social security systems.

8.4.2. Empowerment policies: the growing role of services

A particularly relevant issue here is the growing role of services in welfare states. As Figure 1 shows, public social services in some European countries range between 10 to 20% of GDP. This makes services almost as important as cash transfers in social expenditures. In most countries the major services are education and health care, whereas in the Nordic countries ‘other services’ also make up an important share. Given their importance these services should not be neglected when studying the effect of the welfare state on inequality.

Figure 1. Composition of in-kind benefits in selected European countries and the US 2005



Note: the category “other” covers the following policy areas: old-age, survivors, incapacity, family, and other social policy areas, as classified in the OECD Social Expenditure database.
 Source: OECD Stat. Extracts (September 2010)

Studies that try to incorporate these services in the analysis of inequality point, however, to considerable methodological challenges (e.g. Marical *et al.* 2008; Paulus *et al.* 2010; Radner 1997). A first challenge concerns the valuation of these services. It is extremely difficult to estimate the monetary value of public services as there is no clear market transaction to rely upon for the price estimate as in the case of private commodities’ market (Atkinson 2005). Until now, a production cost approach is used as the most typical way to respond to this issue (Aaberge and Langørgen 2006; Marical *et al.* 2008; Paulus *et al.* 2010; Smeeding *et al.* 1993). This approach assumes that the monetary value of an in-kind benefit is equal to its production cost, which makes the treatment of in-kind transfers similar to cash transfers (Aaberge and Langørgen 2006). However, the production cost does not necessarily reflect the user’s value of the service. Moreover, in international comparisons, this valuation ignores differences across countries in the quality and efficiency in the provision of these services (Marical *et al.* 2008).

A second challenge relates to the allocation of the monetary value to the individuals. In the insurance approach, social budgets are distributed on the basis of merely demographic characteristics of households. This approach is arguably useful for overall cross-country comparisons, but it clearly fails to take due account of the social stratification of social risks. When looking at the distributional impact of social programmes, this is evidently crucial. The actual use approach is typically applied to allocate the monetary value of educational services (Antoninis and Tsakloglou 2001; Callan and Keane 2009; Garfinkel, Rainwater, and Smeeding 2006). This method is based on actual participation principle and implies that only individuals who are actually using services are defined as target population. A health care value, on the other hand, is typically assigned either by the actual consumption approach



or by the risk related insurance-value approach. Here, the insurance value is the amount to be paid by an individual so that the provider, such as government or employer, would have just enough revenue to cover the associated claims (Smeeding 1982). In practice, the assigned “value of premium” is often differentiated by risk groups and is often based on specific characteristics, such as age, sex, or even socio-economic position.

The third challenge relates to the needs adjustment, i.e. should the same equivalence scale be used for cash and non-cash incomes, thus assuming that the needs are the same in both cases. As several studies have pointed out, this is a very debatable assumption (see Radner 1997; Marical *et al.* 2008; Aaberge *et al.* 2010; Paulus *et al.* 2010). No agreement has been reached on this topic, though recently, some promising experiments have been put forward in the literature (Aaberge *et al.* 2010; Paulus *et al.* 2010). Most of the above mentioned studies investigate the effect on inequality of education and health care.

Further research should however consider the effect of the other policies, such childcare services and employment/activation services, which are of particular interest in the framework of empowerment. Childcare services are for instance aimed at facilitating labour market access to the labour market for adults with (young) children. The position of mothers in the labour market is clearly relevant, and, as it happens, this position appears to be strongly socially stratified. The lower the father’s social class, the lower the daughter’s educational level and participation in the labour market. This effect is reinforced by social homogamy: higher-skilled working women are often married to equally highly-skilled men and vice versa (Esping-Andersen 2009). Reflecting the interaction of gender segregation and class differentiation, public resources employed to facilitate the combination of work and family life (such as childcare or parental leave) tend therefore to flow to higher income groups, mainly double-income families with better educational backgrounds and a higher earnings capacity (Ghysels and Van Lancker 2010). Mothers (and fathers) with a low educational level make less use of formal child care because at least one of the parents is not working. This means that there is a Matthew effect active in the distribution of the budgets for childcare: they tend to flow more to skilled double income families in the higher income brackets (Merton 1968; Deleeck 1983).

An explorative study has looked at the effect of these services on inequality and poverty (Matsaganis and Verbist 2009) for five European countries. This study confirms that in most of these countries, the use (and hence the benefit) of these services tends to go towards middle or higher incomes; the effect on child poverty, however, turned out to be non-negligible. This type of analysis should be extended towards other countries. Also other policies merit further investigation, most notably employment services. Related to this is the question regarding the effectiveness of activation (and empowerment in general) policies in terms of stimulating and enabling self-reliance.

8.5. Macro-level policies

Bertola (2010) examines the influence of the Economic and Monetary Union on income distribution within the Euro zone. He identifies at least three channels through which the single currency can influence the income distribution within Member States. First, EMU imposes a number of macro-economic policy constraints. By joining the Euro zone, Member States transfer monetary competences to the European Central Bank, thereby excluding devaluations to counter economic shocks. Furthermore, the EMU imposes limits on national autonomy with regard to fiscal policy. Both the Maastricht criteria and the Stability and Growth Pact include rules concerning government budget and public debt. In theory, the effects of these policies on income distribution are ambiguous. Second, the Economic and Monetary Union was designed to foster the integration of the single market, through increased price transparency, clearer productivity signals and economies of scale. While these are expected to enhance efficiency, conflicting hypotheses have been formulated with regard to their distributional impact. Third, EMU may influence redistribution policy. Economic integration and the increased cross-national risk may strengthen the case for collective redistribution. Yet, integration and the drive for efficiency may also render these policies both less feasible (through cost competition) and less effective (through increased risk).

In his empirical analysis, Bertola (2010) finds evidence that countries that joined the Euro zone have implemented less generous social policy and faced higher inequality (compared to the period prior to EMU membership and compared to the EU15 countries that did not adopt the single currency). While many methodological caveats apply, the results suggest that monetary integration has reduced the viability of social policy, which in turn translated in higher income inequality. Bertola's results cover the period from 1995 until 2005. Given the economic and financial crisis of the late 2000s, this topic may well become more salient. Adaptations to the EMU are being discussed, with many of the policy options calling for stronger budgetary rigor.



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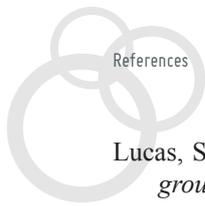
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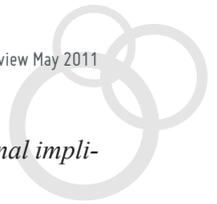
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Discussion Paper 9
 Brian Nolan, Ive Marx and Wiemer Salverda
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GINI State-of-the-Art Review

- 1** **Inequalities' Impacts**
 Brian Nolan, Ive Marx and Wiemer Salverda
 March 2011



Information on the GINI project

Aims

The core objective of GINI is to deliver important new answers to questions of great interest to European societies: What are the social, cultural and political impacts that increasing inequalities in income, wealth and education may have? For the answers, GINI combines an interdisciplinary analysis that draws on economics, sociology, political science and health studies, with improved methodologies, uniform measurement, wide country coverage, a clear policy dimension and broad dissemination.

Methodologically, GINI aims to:

- exploit differences between and within 29 countries in inequality levels and trends for understanding the impacts and teasing out implications for policy and institutions,
- elaborate on the effects of both individual distributional positions and aggregate inequalities, and
- allow for feedback from impacts to inequality in a two-way causality approach.
- The project operates in a framework of policy-oriented debate and international comparisons across all EU countries (except Cyprus and Malta), the USA, Japan, Canada and Australia.

Inequality Impacts and Analysis

Social impacts of inequality include educational access and achievement, individual employment opportunities and labour market behaviour, household joblessness, living standards and deprivation, family and household formation/breakdown, housing and intergenerational social mobility, individual health and life expectancy, and social cohesion versus polarisation. Underlying long-term trends, the economic cycle and the current financial and economic crisis will be incorporated. Politico-cultural impacts investigated are: Do increasing income/educational inequalities widen cultural and political ‘distances’, alienating people from politics, globalisation and European integration? Do they affect individuals’ participation and general social trust? Is acceptance of inequality and policies of redistribution affected by inequality itself? What effects do political systems (coalitions/winner-takes-all) have? Finally, it focuses on costs and benefits of policies limiting income inequality and its efficiency for mitigating other inequalities (health, housing, education and opportunity), and addresses the question what contributions policy making itself may have made to the growth of inequalities.

Support and Activities

The project receives EU research support to the amount of Euro 2.7 million. The work will result in four main reports and a final report, some 70 discussion papers and 29 country reports. The start of the project is 1 February 2010 for a three-year period. Detailed information can be found on the website.

www.gini-research.org





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