# Understanding and measuring inequality in Higher Education

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Higher education has always been part of the global human rights framework put forward by the international community. It is expressly mentioned in article 26 of the Universal declaration of Human Rights, and in article 13 of the International Covenant on Economic, Social and Cultural Rights. The latter in particular states that "Higher education shall be made equally accessible to all, on the basis of capacity, by every appropriate means, and in particular by the progressive introduction of free education". Yet, except for the implicit gender equity aspect mentioned in goal 3 of the Millennium Development Goals, higher education has never been part of the development agenda.

The upcoming post-2015 global development agenda might change this trend. Within the most recent proposals higher education is mentioned explicitly in at least two of them. The Open Working Group (OWG) for Sustainable Development Goals includes higher education under its proposed goal 4, in target 4.3; "By 2030, ensure equal access for all women and men to affordable quality technical, vocational and tertiary education, including university". The Muscat Agreement reflecting the views of the EFA community is actually more ambiguous on the matter but still mentions tertiary education in its Target 4: "By 2030, at least x% of youth and y% of adults have the knowledge and skills for decent work and life through technical and vocational, upper secondary and tertiary education and training, with particular attention to gender equality and the most marginalised".

Under the current settings, the focus of the international community is defined as follows:
-Explicit mention of access, cost, quality and gender equality
-Implicit extension to other drivers of exclusion such as location, ethnicity, disability etc. ("all women and men" and "…and the most marginalised").

The Technical Advisory Group of the EFA Steering Committee in its most recent draft proposes to use gross enrolment ratios (GER) at the tertiary level and the parity index (ratio) or the range for gender and wealth (inter-quintile range and inter-quintile ratio) as measures of equity (Post-2015 Education Indicators Technical Advisory Group of the EFA Steering Committee, 2014).

This short memo proposes a rapid review of the equity issue at the higher education level and of the indicators that could potentially be used to regularly monitor it on a cross-comparable scale. It highlights the shortcomings of the current propositions and proposes further guidance for coming up with a monitoring framework on equity in tertiary education for the post-2015 education targets.

## I Inequality and educational stratification at the higher education level

While the world has witnessed impressive gains in tertiary education there are serious concerns about leaving further behind the groups that are already marginalized. Undeniably, higher education supports economic growth and human development, and the rapid expansion of higher education systems has had positive effects in every country. However, with the premium associated to tertiary education becoming higher and higher, those who won't be able to benefit from it will be left behind and will not be able to reap the fruits of their fast growing economy. Inequity in education happens at every level of the education cycle. Nevertheless, it can be shown that in a large number of countries, equity issues are now generated in higher levels of education. For instance, it is shown that the bulk of wealth-related inequalities in educational opportunities in middle-income Asian countries such as Viet Nam, Indonesia or the Philippines is generated after students complete secondary education (UNESCO Institute for Statistics, 2014).

Unequal opportunities in tertiary education take different forms; these include inequality in access, in progression and completion but also in the type of institution in which students are able to enrol. Countries might experience these various forms of inequalities depending on the stage of development of their higher education system. Initial phases of expansion of HE systems are often accompanied with increasing diversification, with the private sector compensating for the demand not satisfied by public institutions. Later stages also include differentiation, often reserving first-tiers institutions to an elite as expansion potentially creates opportunities of diminished value and higher education systems become stratified by quality tiers (Neubauer & Tanaka, 2011; Santiago, Tremblay, Basri, & Amal, 2008; Shavit, Arum, & Gamoran, 2007). So while on the one hand expansion of higher education definitely brings prospects for further education to a large share of students who wouldn't have had such otherwise, on the other hand access to first-tiers or high quality higher education institutions might remain limited to the most affluent or specific population groups hence maintaining a certain level of inequalities at the entrance of the labour market and in the society in general (Duru-Bellat, 2012).

Current post-2015 proposals partly answer these considerations and reflect the increasing attention given to higher education by the international community. For instance, the Asian Development Bank has recently recognized the need for a more balanced "expansion of access to higher education with greater attention to equity and the need to raise quality" (Asian Development Bank, 2011) as one of the four overarching challenges faced by higher education systems across Asia.

Inequality in higher education has usually the same drivers than other education levels albeit perhaps with a stronger predominance of socio-economic status and gender in the literature. The seminal comparative study on stratification in higher education by Shavit, Arum and Gamoran (Shavit et al., 2007) for instance highlights the importance of father's class, parental education, gender, location and ethnicity (however, the study only looks at advanced economies), other determinants such as income/wealth, caste, religion and language are also cited very often (Neubauer & Tanaka, 2011). One dimension that has not been discussed much at the international level and on a comparative basis is the issue of disability.

Finally, another concern that would need to be taken into account in the measurement framework is the increasing share of private education and its potential effects on equity. Privatisation of education is becoming an issue in particular at the higher education level where privatisation is growing faster than at any level (United Nations, 2014). It is highlighted that "demand-absorbing institutions represent[…] mostly lower-level and lower-quality institutions [that] cater to the surging demands for education, many of them acting much like for-profit organizations with "loosened government regulations" or "in a regulatory vacuum"" (ibid p.12). Lack of oversight and quality control mechanisms is widespread in developing countries and private education becomes a black box in which it is difficult for governments but also for parents to identify practices adverse to students.

## II Quantifying inequality in higher education for the post-2015 education agenda

Developing an international measurement framework to look at inequality in higher education (or any education level) is not straightforward. Inequality in education in general has been studied using various conceptual and quantitative frameworks. In sociological research for instance, researchers have used the *linear regression model of educational attainment* as the unique approach until the end of the 1970s. Later on, following the needs to overcome shortcomings of the previous model (failure to extract the 'pure' association between social origins and education, misrepresentation of the educational career) researchers proposed the *sequential logistic regression model of educational transitions*. The model finally enabled to isolate a 'pure' measure of the effect of social origin albeit only on each school transition within the education system separately. However, as the effect of social origins can vary over time in different proportions for the different school transitions, the question of the final outcome as regards temporal dynamics in the intrinsic association between highest educational level attained and social origins remained. Over recent years sociologists have focused on this question, using unconditional rather than conditional analyses as well as taking advantage of recent progress in *log-linear* and *log-multiplicative modelling* and availability of large samples (Vallet, 2006). These historical debates will be echoed later in this paper as they reflect some of the questioning around what might constitute a good comparative measure of equity in higher education.

To quantify implies above all to agree upon conventions of quantification that will enable common and agreed understanding of the actual measurement. Thus measurement comes only once these conventions have been agreed upon and quantification includes two steps: to convene upon and to measure (Desrosières, 2014), this is precisely what is being proposed in the TAG paper even though, strangely, only for the learning outcomes section.

*Inequality of opportunities in higher education, the indicator conundrum*

Current trends are geared towards the notion of equality of educational opportunity (as opposed to equality of outcomes for instance). And while it might be debatable in lower levels of education to aim for equality of educational opportunity instead of equality of outcomes, the notion seems fairly fit for the higher education level.

The definition of EEO taken here is that the chances of success (access, progression, completion, access to first-tier higher education institutions) do not depend on circumstances that are beyond the control of an individual. The empirical selection of what constitutes a circumstance beyond the control of an individual being of course the crux of the issue. Statistically, this implies the absence of a relationship between the variable of interest (access to higher education for instance) and the circumstance (say wealth). In short, the distribution of the outcome should not depend on the distribution of circumstances if equality of opportunity prevails.

EEO or rather its complement, inequality of educational opportunity (IEO), has been measured in several ways and has also been at the center of several methodological debates in the past. From the literature, a number of indicators have been proposed[1]. It has to be noted, however, that few of them have been used to measure IEO in higher education. Each indicator proposed has advantages and drawbacks and the final choice of the indicator (or the set of indicators) will have consequences on the conclusions drawn from the analysis. This can be illustrated[2] in a simplified way using data from Salmi and Bassett in their recent article on equity in tertiary education (Salmi & Bassett, 2014).

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[1] A good review of these indicators can be found by looking at two papers; the first one is by B. d'Hombres (d'Hombres, 2010) and the second one by O. Hellevik (Hellevik, 1997).
[2] The demonstration that follows is inspired by a paper published by J.-C. Combessie in France (Combessie, 2004).

Salmi and Basset use data from Chile to demonstrate p368 that "a country can make impressive progress in terms of increased opportunities for low-income students even as the gap between the richest quintile and the poorest quintile grows larger". The data are reproduced in table 1 below.

**Table 1: Different measures of IEO, different conclusions**

|  | 1990 | 2009 |
|---|---|---|
| **Participation rates in tertiary education by wealth quintiles** |  |  |
| Poorest | 4.5 | 19.9 |
| Q2 | 7.4 | 26.9 |
| Q3 | 12.1 | 32.8 |
| Q4 | 22.1 | 47.6 |
| Richest | 39.7 | 82 |
| **Measures of Inequality of educational Opportunity** |  |  |
| INTER-QUINTILE RANGE | 35.2 | 62.1 |
| INTER-QUINTILE RANGE RATIO *(chance of participation)* | 8.8 | 4.1 |
| INTER-QUINTILE RANGE RATIO *(risk of exclusion)* | 1.6 | 4.5 |
| INTER-QUINTILE ODD RATIO | 14.0 | 18.3 |
| CONCENTRATION INDEX* | 0.40 | 0.28 |

*The concentration index has been estimated based on equal weight for students from each quintile
Note: the upper-part of the table is extracted from Salmi and Basset (2014), the lower-part of the table presents authors' calculations.

The data tell us that participation rates in 1990 were at 4.5% among students from the poorest quintile and 39.7% for their peers from the richest quintile. What the authors call "the gap" is the distance between levels of participation of the richest and the poorest, or the inter-quintile range, here 35.2 percentage points. The same indicator takes the value of 62.1 in the next period, it has indeed increased. Can we say then that IEO has increased? If we consider the inter-quintile range as our measure of IEO, then surely we can say that IEO has increased between the two years, it almost doubled. Salmi and Basset later in their paper recommend using the inter-quintile ratio, also discussed by the TAG and widely used. The indicator provides a different picture. According to the inter-quintile ratio, IEO has actually been divided by two and went from an eight-fold difference to a four-fold difference between participation rates. That is, participation rates among students from the richest quintile were 8 times higher than for their counterparts from the poorest households in 1990, and they went down to be 4 times higher 'only' in 2009 (table 1). It has been shown, however, that the ratio is not a consistent measure of IEO. In particular, if one takes the level of exclusion instead of the level of participation the indicator will provide different results. Assuming, for the sake of the demonstration, that participation rates (PR) are net (i.e. only for the relevant age group) then exclusion rates (ER) would be equal to: ER = 100 – PR. This gives the following results: 95.5% of risk exclusion for students from the poorest quintile and 60.3% for students from the richest quintile in 1990. The inter-quintile ratio for the rate of exclusion is 1.6 in 1990 and 4.5 in 2009. It turns out that inequality in the chance of participation decreases while at the same time inequality in the risk of exclusion increases.

Odds ratios (OR) should usually be preferred to simple ratios, for several reasons. Odds ratios measure IEO as a ratio of chances of realizing outcome vs not realizing it; it is different from a comparison of actual levels of an outcome. To come back to our example, the poorest 20% have a participation rate of 4.5% and consequently an exclusion rate of 95.5%. Their odds of participating in tertiary education vs being excluded from tertiary education are 4.5/95.5= 0.047. Their counterparts from the richest 20% will have an odds of 39.7/60.3=0.658. Indeed, both groups have a bigger risk of not attending higher education than attending higher education, the odds are lower than 1. The odds ratio is a comparison of these two odds, OR=0.658/0.047=14. Odds of attending tertiary education vs not attending tertiary education are 14 times higher for students from the richest households in 1990. In effect, this indicator is truly comparing chances and not comparing levels. What about the evolution of IEO between the two periods? Calculating OR for 2009 actually indicates that IEO has increased between 1990 and 2009. Back to square one. Conclusions drawn from the use of OR actually confirm the increase in IEO observed with the inter-quintile range and contradicted by the inter-quintile ratio.

One quality often highlighted is that odds ratios are margin-insensitive measures. In the context of a contingency table that cross-classifies a criterion variable – for instance, social class or parental education – with an education variable – for instance, access vs non access to higher education – margin-insensitive measures are based on the odds ratio that captures the association between both variables independently of changes in the marginal totals. More precisely, the odds ratio is invariant under multiplications of row frequencies and/or column frequencies by non-zero constants that change the marginal totals. Such a property allows the comparison of the 'pure' or intrinsic strength of the statistical association between tables that correspond to either a society at two points in time, or two societies, that differ in terms of the stage of the educational expansion. Another attractive feature of the odds ratio is its relationship to the logistic scale that allows the comparison of rates or proportions over the entire range from (nearly) 0% to (nearly) 100%; in particular, contrary to the range statistic and the ratio statistic, the odds ratio is not affected by floor and ceiling effects related to proportions close to 0 or 100.

However, one question remains here. As with earlier struggles of sociologists, OR only allow concluding about IEO between two categories. What about the total amount of IEO? What if IEO between the richest and the second richest has decreased? Can we conclude about the total variation of IEO? Indicators looking at the total amount of IEO have been the topic of other discussions but among economists. Those have historically used IEO as a dependent variable in their economic models or attempted at quantifying IEO at the macro level instead of looking at particular groups.

The last indicator presented in table 1 derives from this tradition and provides elements of answer. The concentration index (CI) is the general case of the widely used and known Gini index (and the concentration curve is the generalization of the Lorenz curve). On the contrary to OR, the concentration index (CI) is a margin-sensitive measure. It is affected by variations in the marginal totals, i.e. here the general provision of higher education. It can, however, provide a global measure of IEO (d' Hombres, 2010; Hellevik, 1997). The CI (and the concentration curve) has been used for years in the health sector as the standard to look at socioeconomic inequalities but rarely applied to education[3] although particularly fit to discuss IEO linked to socioeconomic status. The CI quantifies the differences between the cumulative distribution of a criterion variable – for instance, social class – and the cumulative distribution of an outcome in the corresponding groups – for instance, access to higher education. While the indicator has its own shortcomings and fixes (Térouanne, 1995) it remains a good measure to look at IEO in higher education and is appropriate for cross-country comparison as well as country specific studies when the 'circumstance' is an ordinal variable (d'Hombres, 2010). The CI is comprised between [-1;1], and, by convention, a value of -1 signifies that the outcome is entirely concentrated in the hands of the poorest while a positive higher index value implies that educational opportunities tend to favour young people from richer households.

Back to the Salmi and Basset example, using the concentration index actually shows that the total IEO has actually decreased in Chile between 1990 and 2009. Again, the conclusion changes, IEO has decreased. This, however, is not necessarily in contradiction with the previous conclusion reached with OR. IEO between the richest and the poorest can increase while there's a global reduction of IEO in the country, i.e. most previously underrepresented groups have improved their relative situation, and the CI is affected by the increase in the general provision of higher education while the OR is not.

*Indicators' desirable properties and conditionality*

In the last section we have used only a small subset of the indicators used in the literature. Surely the conclusions would keep on changing should we attempt to go through all of them. Broadly speaking, indicators to measure IEO can be divided into three categories. First category includes indicators that only measure the total amount of IEO generated without reflecting which groups are disadvantaged (Gini, Theil, D-Index, Population attributable risk) while the second category of indicators illustrates the amount of IEO that exists between two preselected groups (Range, Ratio, Odds Ratio). The third category enables to look at the amount of IEO associated with a particular dimension and explicits the direction of the relationship but with little potential for identifying groups (Regression coefficient, Concentration Index, Correlation coefficient).

A key conceptual question, with obvious methodological consequences, for comparison over time or across countries is as follows. Should the measurement of IEO in higher education only reveal the degree of inequality between different groups – based on, notably, gender, social class or socioeconomic status, parental education, immigrant or native background, urban or rural background, etc.? Or should it be also affected by the overall degree of distribution of the outcome in the society? As explained above, sociological research has tended to analyse inequality in allocation per se, while economic research went for the latter. We defend the view that, in the context of a policy-oriented approach, both perspectives are relevant and useful, with the 'allocation only' perspective addressing the issue of inequality of educational opportunity while the 'distribution and allocation' perspective addresses the issue of inequality of distributional outcome. In a more methodological framework, the former perspective orients towards margin-insensitive measures while the latter corresponds to margin-sensitive measures.

When considering both access and completion, statistics based on both unconditional and conditional analyses are needed (Shavit et al., 2007). Unconditional analyses are based on the total population (or the total population of a given cohort), i.e. regardless of whether or not the individuals are in a position to enter (or to complete) higher education. That is to say, the analysis is not restricted to the set of individuals who completed secondary education (for the analysis of entrance) or entered higher education (for the analysis of completion). A strength of the unconditional approach is that results can be unambiguously compared over time or across countries, but a weakness is that these results may simultaneously reflect what occurred within higher education and what occurred in previous stages of the educational system.

By contrast, conditional analyses only consider the sub-population 'at risk', i.e. the set of individuals eligible to enter (for the analysis of access) and the set of individuals who entered higher education (for the analysis of completion). A strength of the conditional approach is its ability to reveal what actually occurs in the higher education system (Duru-Bellat, 2012), but a weakness is that its results may be difficult to compare as a consequence of the issue of unobserved heterogeneity. By definition,

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[3] A recent UIS report uses the concentration index to look at IEO in higher education in comparison to other levels of education (UNESCO Institute for Statistics, 2014).

the analysis of progress within higher education is only a conditional analysis with the population 'at risk' being composed of those individuals who entered higher education.

Lastly, indicators have various properties and not all indicators will exhibit the desired properties. A reference list of desirable properties can be found in a recent background paper for the World Bank (d'Hombres, 2010). They come from economic research on inequality in income distribution but most will apply to IEO as well:

-Principle of transfers (Pigou-Dalton condition): A transfer of the outcome variable from a wealthier group to a poorer will result in a reduction in the indicator of disparity, assuming that the outcome of other groups remains unchanged and the transfer is not large enough to reverse any group's relative position.

-Scale independence (or mean independence): if the value of the outcome doubles (or varies in similar proportions) for each of the equity groups, the value associated with the inequality indicator does not change (This is particularly important in economics to deal with inflation but could potentially apply to measures of quality).

-Boundness of the indicator: the interpretation of the value assigned to the inequality indicator is easier if there's an upper bound and a lower bound.

Additional criteria that can be found throughout the literature include:

-Population size independence: if the size of the population changes the measure doesn't change.

-Decomposability: the inequality indicator may be broken down by population groups or in other dimensions.

-Statistical testability: one should be able to test for the significance of changes in the index over time.

## III Review of data sources and data gaps

*Variables and dimensions of interest*
The indicator in itself is of little help if the variable of interest is not carefully selected. For instance, while the focus of the OWG is clearly on access to higher education, using the gross enrolment ratio (GER) as the variable of interest is not the best way to illustrate access. GERs can at best be used as a measure of capacity of an education system but it is difficult to deduce accurate conclusions regarding access. That said, measuring the chances of entering tertiary education is not necessarily easy from administrative variables. A couple of proposals can be made here. Instead of using the GER, the following indicators could be used: gross intake rate (GIR) in tertiary education, maximum age specific enrolment rate (MaxASER) and transition rate (TR) between upper-secondary and tertiary education (for conditional analysis). Both the GIR and the MaxASER would be better indicators to discuss access at the tertiary level than the GER.

From household surveys or censuses, indicators such as the share of individuals age 20 to 24 who have ever accessed tertiary education would be a good indicator, the age group is sufficiently old to account for late entrance and sufficiently young to be policy relevant. Transition rates between upper-secondary and tertiary education can also be calculated from HH surveys and census in most cases.

As to which dimension should be looked at, gender-based inequalities can be monitored both with administrative data and household surveys. Other dimensions of exclusion such as wealth, location and ethnicity will have to be explored with household surveys and census data.

*Data sources*
Basically the measurement of inequality of educational opportunities in higher education can rely on sensibly the same data sources than other education levels (at least for access and completion).

Data collected by the UIS will enable to calculate ranges, ratios and odds ratios for access to tertiary education by gender. Micro data found in household surveys such as DHS (http://www.dhsprogram.com/) and MICS (http://www.childinfo.org/mics.html) enable the calculation of most indicators used in the literature. However, developed countries usually don't participate in these surveys. In addition, samples become very small after two disaggregation levels and marginal groups and difficult regions are often excluded from the survey sample. Census data, such as the data available on IPUMS (https://international.ipums.org/international/) might provide a good additional source for developed countries but also developing countries. One important drawback from the use of censuses and household surveys to a lesser extent is that the frequency of the update will suffer.

*Data limitations*
It was noted in earlier comparative studies on higher education that the systematic absence of data does not allow for a comprehensive analysis of access and equity in higher education (Clancy & Goastellec, 2007). This is still the case and one might wonder whether the focus on access only is not partly data driven.

Current proposals for the post-2015 development agenda are limited to access while it is well established that important inequalities are generated throughout the course of the tertiary education cycle. Hence, similarly to Salmi and Basset, we defend the view that statistics should ideally cover access to higher education, progress within higher education, and completion of higher education. The issue of differentiation should also be addressed, by distinguishing for instance between first-tier

institutions and the others as it is shown that differentiation in access to higher education institutions (HEI) of different quality is an issue notably in developed countries.

The latter in particular will be difficult to tackle. At the moment there is no internationally comparable data on this issue. As equity in higher education should also consider equity of access to first-tier HEI it will be important in the future to develop international data collections that take this issue into account. Under an equality of opportunity framework, access to first-tier HEI should not remain limited to children from the most affluent households or from specific groups. So in the same order of idea that taking into account access only and omitting to look at progression and completion is misleading, not looking at the type of institutions will prevent to provide a full picture of the equity issue at the tertiary level.

## IV Conclusion

In summary, this short paper highlights that the choice of the indicator is not without important consequences vis-à-vis the monitoring of equity in higher education for the post-2015 agenda. Both cross-country and over time comparisons will be impacted. We defend the idea that current proposals at political (the targets) and technical (the indicator proposed to monitor the targets) levels would deserve to be improved. The current set of indicators should be more aligned with the concept highlighted in the targets (access) and odds ratios and the concentration index have our preference for monitoring equity (IEO) in higher education. Gross enrolment ratios are not a good measure of access to tertiary education and should probably be switched with the gross intake ratio into tertiary education or the maximum age specific enrolment rate for the tertiary school age population. In addition, the transition rate between upper-secondary education and tertiary education should be added to enable conditional analysis. Odds ratios are more consistent than simple ratios which have been disqualified in current sociological research and the concentration index has been highlighted, in particular in the field of health but also in education, as being particularly fit to provide an estimation of wealth-related inequalities. In addition to being more coherent both indicators are simple conceptually and easy to calculate with existing data. Finally, a number of data challenges remain for the monitoring to be comprehensive and effective. In particular, it is not possible yet to tackle the issue of differentiation hence preventing to draw a full picture of inequality of opportunities in access to higher education, especially in developed countries.

## References

Clancy, P., & Goastellec, L. (2007). Exploring Access and Equity in Higher Education: Policy and Performance in a Comparative Perspective. *Higher Education Quarterly*, *61*(2), 136–154.

Combessie, J.-C. (2004). Trente ans de comparaison de l'inégalité des chances: quand la méthode retenue conditionne la conclusion. *Courrier Des Statistiques*, (112).

Desrosières, A. (2014). *Prouver et Gouverner. Une Analyse politique des statistiques publiques.* Paris, France: La Découverte.

D' Hombres, B. (2010). *Inequality in tertiary education systems: which metric should we use for measuring and benchmarking?* (Background paper for World Bank "Equity of access and success in tertiary education" study). World Bank.

Duru-Bellat, M. (2012). Appréhender les inégalités dans l'enseignement supérieur: spécificité des processus, spécificité des mesures? In *Inégalités sociales et enseignement supérieur* (De Boeck.). Brussels, Belgium.

Hellevik, O. (1997). Class Inequality and Egalitarian Reform. *Acta Sociologica*, *40*, 377–398.

Neubauer, D., & Tanaka, Y. (2011). *Access, Equity and Capacity in Asia-Pacific Higher Education*. New York, NY, USA: Palgrave Macmillan.

Post-2015 Education Indicators Technical Advisory Group of the EFA Steering Committee. (2014). Towards Indicators for a post-2015 education framework.

Salmi, J., & Bassett, R. M. (2014). The equity imperative in tertiary education: Promoting fairness and efficiency. *International Review of Education*.

Santiago, P., Tremblay, K., Basri, E., & Amal, E. (2008). *Tertiary Education for the Knowledge Society. Special features: Equity, Innovation, Labour Market, Internationalisation.* (No. Volume 2). OECD.

Shavit, Y., Arum, R., & Gamoran, A. (2007). *Stratification in Higher Education. A Comparative Study.* Stanford, California: Stanford University Press.

Térouanne, E. (1995). Distortion entre deux distributions d'une variable nominale. *Mathématiques et Sciences Humaines*, *131*, 29–38.

UNESCO Institute for Statistics. (2014). *Higher Education in Asia: Expanding Out, Expanding Up. The rise of graduate education and university research*. Montreal, Canada. Retrieved from

United Nations. (2014). Right to education. Note by the Secretary General.

Vallet, L.-A. (2006). *What can we do to improve the education of children from disadvantaged backgrounds?.* in SÁNCHEZ SORONDO M., MALINVAUD E. and LÉNA P. (eds), *Globalization and Education. Proceedings of the Joint Working Group of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences, 16-17 November 2005, Casina Pio IV*, Berlin, New York, de Gruyter, pp. 127-155.