LES INÉGALITÉS SCOLAIRES D'ORIGINES SOCIALE ET ETHNO-CULTURELLE :

une possible amplification ?

Why have Inequalities in 15-year-old Cognitive Skills Increased so much in France ?

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Résumé

Les Enquêtes PISA de l'OCDE sont souvent mobilisées pour produire des comparaisons internationales des performances des élèves et de leur évolution dans le temps. En comparant les cycles 2000 et 2009 – focalisés sur les capacités en compréhension de l'écrit (ou lecture) – on observe un fort accroissement des inégalités de performances des élèves de 15 ans scolarisés en France. La dispersion des compétences des élèves a cru de 30 % en France tandis qu'elle a diminué de 3 % dans la moyenne des pays de l'OCDE. Cette plus grande variabilité des performances est due à une forte baisse du niveau des élèves faibles alors que les résultats des meilleurs varient peu.

Entre ces deux générations d'élèves, l'École et la société françaises ont connu des évolutions. Notre étude cherche à évaluer dans quelle mesure la hausse des inégalités résulte d'effets de composition – c'est-à-dire, de modifications de la population d'élèves, en lien ou non avec l'évolution de la société – ou d'effets du système éducatif. Alors que la part d'élèves inscrits dans le privé et son fonctionnement général a peu évolué dans les deux dernières décennies, l'École a connu deux changements majeurs sur la période : une baisse importante du redoublement et des extensions successives du zonage de la politique d'éducation prioritaire.

Comme l'augmentation des inégalités est générée par la baisse des compétences des élèves les plus faibles, nous avons tenté d'analyser l'écart entre les scores de performances des élèves de 2000 et de 2009, en tout point de la distribution des scores. L'idée générale est de comparer les élèves de 15 ans en 2009 avec les élèves de 15 ans en 2000, et de distinguer les écarts de performances dus aux différences de caractéristiques entre les deux générations d'élèves, de ceux dus à la différence d'effets de ces caractéristiques sur les performances. Par exemple, nous avons cherché à identifier l'écart de score dû à la baisse du nombre d'élèves ayant redoublé entre 2000 et 2009, de l'écart dû au changement dans l'effet du redoublement entre 2000 et 2009.

On attribue ainsi les écarts de performances entre élèves à des variations de leurs caractéristiques – c'est l'*effet expliqué* ou *effet de composition* – et à des différences d'effet ou de rendement de ces caractéristiques, qui constituent l'*effet non-expliqué* ou l'*effet de rendement*. Le premier terme évalue dans quelle mesure les élèves de 2000 auraient obtenu un score moyen différent, s'ils avaient eu les caractéristiques individuelles, familiales et scolaires des élèves de 2009, tout en progressant dans le système éducatif qu'ils ont bel et bien connu (c'est-à-dire tout en maintenant identiques les rendements de leur caractéristiques).Le second terme représente les variations de score liées à des différences dans la qualité des systèmes éducatifs qu'ont connus les cohortes de 2000 et 2009 dans le cas où elles partageraient les mêmes caractéristiques en l'occurrence celles des élèves de 2009. Ce terme évalue dans quelle mesure les élèves de 2009 auraient obtenu un score moyen différent, s'ils avaient connu la qualité du système éducatif de 2000, tout en conservant leurs propres caractéristiques. Les "effets de rendement" de la décomposition peuvent s'interpréter soit comme des effets

du système éducatif, soit comme des changements dans l'investissement de certaines catégories d'élèves dans leurs apprentissages. Ainsi, si le rendement du redoublement diminue entre 2000 et 2009, c'est peut-être qu'avoir redoublé est moins efficace pour remédier aux difficultés des élèves en 2009 qu'en 2000, ou que les redoublants de 2009 n'ont pas la même façon de travailler ni le même niveau d'investissement que les redoublants de 2000. Enfin, l'absence de mesures de compétences passées des élèves nous empêche d'identifier un lien de causalité entre les changements de politiques éducatives et l'évolution des compétences des élèves. Il faut donc bien se garder d'interpréter nos résultats de manière causale.

Analyser le recul du niveau moyen des élèves

Les résultats de nos premières analyses montrent que les effets des caractéristiques des élèves ont évolué entre 2000 et 2009. Ainsi, être une fille est positivement lié aux performances en lecture aux deux dates, mais de façon plus marquée en 2009. L'origine migratoire des élèves est négativement associée aux performances des élèves mais de façon moins prononcée en 2009 qu'en 2000. En revanche, parler une autre langue à la maison que le français semble avoir un effet négatif plus important en 2009 qu'en 2000. Plus l'origine sociale de l'élève est élevée, plus ses performances sont élevées, mais en moyenne, cette association est moins importante en 2009 qu'en 2000. Les pratiques de lecture sont beaucoup plus fortement liées aux performances en 2009 qu'en 2000. Seule l'intensité de la lecture hebdomadaire semble moins influente en 2009 qu'en 2000. Concernant le système scolaire, être dans un cursus professionnel, être encore au collège à 15 ans, ou être scolarisé dans un établissement d'éducation prioritaire, sont négativement liés aux performances en lecture, et ce, davantage en 2009 qu'en 2000. Enfin, être dans un établissement privé est associé à de meilleures performances en lecture, et ce d'autant plus en 2009 qu'en 2000.

La décomposition de l'écart de performances moyennes indique d'une part que les caractéristiques des élèves et de leur environnement éducatif étaient plus favorables en 2000 qu'en 2009 (*effet de composition*, et d'autre part que le système éducatif était plus efficace en 2000 qu'en 2009 (*effet de rendement*). Le premier résultat est dû en particulier à une part plus importante d'élèves d'origine socioéconomique défavorisée, d'élèves passant peu de temps à lire pour le plaisir et, dans une moindre mesure, à une hausse du nombre d'élèves d'origine étrangère et d'élèves appartenant à des établissements ciblés par la politique d'éducation prioritaire. Le second est principalement expliqué par la contribution fortement négative du statut socioéconomique, suggérant que les élèves moins favorisés tendent à être encore plus pénalisés par leur statut en 2009 qu'ils ne l'étaient en 2000. L'effet de plus en plus négatif du fait d'avoir redoublé ou d'être dans la voie professionnelle fait plus que compenser la baisse du redoublement et induit un effet globalement négatif. Ce résultat semble indiquer que les processus de sélection (redoublement et orientation) étaient moins pénalisants en matière de performances en 2000 qu'en 2009. L'effet de composition négatif de l'extension de l'éducation prioritaire est renforcé, ce qui suggère une moindre efficacité de cette politique en 2009 qu'en 2000.

Les résultats de nos décompositions montrent ainsi que les élèves de 15 ans en 2009 ont des profils sociaux et scolaires moins favorables du point de vue des compétences en compréhension de l'écrit que leurs homologues de 2000. Nos résultats suggèrent toutefois que les évolutions des compétences des élèves proviennent également d'effets de rendement, c'est-à-dire de changements dans le fonctionnement du système éducatif et/ou dans l'implication de certaines catégories d'élèves dans les apprentissages. En particulier, compte tenu des effets de composition, le système éducatif qu'ont connu les élèves âgés de 15 ans en 2009 semble renforcer le poids de l'origine sociale par rapport à celui qu'ont connu les élèves âgés de 15 ans en 2000.

Analyser les évolutions dans les compétences de tous les élèves

Nous sommes très intéressées à analyser les changements dans les compétences des élèves de différents niveaux, et en particulier des moins bons élèves. Nous avons donc réalisé le même exercice de décomposition de l'écart de performances, pas seulement pour la moyenne mais pour toute la distribution des scores. Cette méthode permet d'apprécier si les effets de composition et de rendement sont plus ou moins prononcés parmi les élèves les plus faibles, ou encore parmi les plus forts. Nos résultats indiquent que l'effet de composition est particulièrement prégnant pour les élèves les plus faibles : une part importante de la baisse du niveau des plus faibles s'explique par de plus grandes différences dans les profils de ces élèves entre 2000 et 2009. Pour les autres élèves, l'évolution des performances due à l'effet de composition est assez stable et toujours négative. En revanche, l'effet de rendement est différent selon qu'on s'intéresse aux élèves faibles ou aux élèves forts. Pour les premiers, l'effet de rendement de leurs caractéristiques est négatif : les caractéristiques des élèves faibles sont devenues plus pénalisantes du point de vue des apprentissages. Pour les seconds, l'effet de rendement est positif : les caractéristiques des élèves forts sont donc devenues en 2009 encore plus favorables aux apprentissages qu'elles ne l'étaient en 2000.

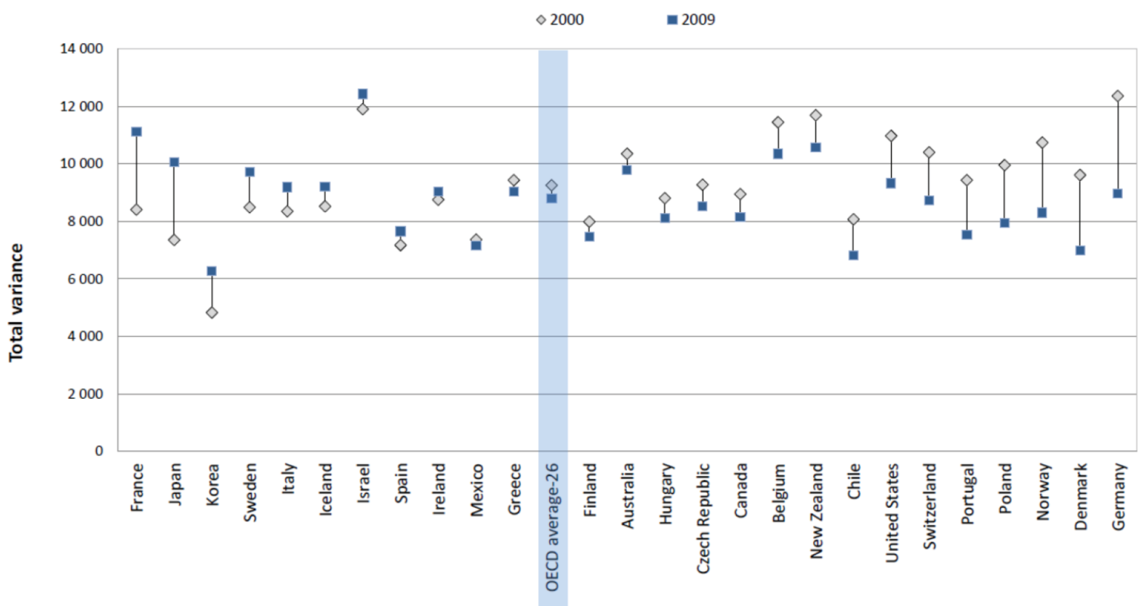
Les analyses montrent que parmi l'ensemble des caractéristiques personnelles, familiales et scolaires des élèves étudiées, l'origine socioéconomique est la variable qui explique le plus l'évolution des performances. L'effet de composition correspondant est significativement négatif et similaire pour tous les élèves, ce qui suggère que les ressources socio-culturelles se sont amoindries chez tous les élèves, quel que soit leur niveau. En revanche, l'effet de rendement varie largement suivant les compétences des élèves : il est négatif pour les élèves les plus faibles et positif pour les élèves les plus compétents. Ce résultat suggère que les inégalités scolaires d'origine socioéconomique et culturelle ont augmenté entre 2000 et 2009.

Deux politiques éducatives semblent contribuer à l'augmentation du nombre d'élèves en difficulté : la politique d'éducation prioritaire et les récentes pratiques d'orientation des élèves. Pour la première, nous trouvons que l'effet de composition et l'effet de rendement sont négatifs pour les élèves les plus faibles. Nous pensons que l'extension numérique de l'éducation prioritaire et la dilution de ses moyens a répandu les effets négatifs liés à la labellisation "éducation prioritaire" tout en diminuant les effets positifs liés aux ressources pédagogiques attribuées aux établissements. Cependant, comme la politique d'éducation prioritaire concerne plutôt des collèges que des lycées, la contribution négative de l'éducation prioritaire que nous trouvons vaut surtout pour les élèves du collège, c'est-à-dire pour les élèves redoublants. Concernant les pratiques d'orientation, nous avons trouvé que le rendement associé au programme d'études est encore plus négatif pour les élèves de 2009 que pour ceux de 2000. Cela peut être dû à un effet de sélection : les élèves de PISA 2009 qui ont redoublé malgré les recommandations en vigueur ont probablement un niveau scolaire moyen initial plus faible que celui des élèves redoublants de PISA 2000. Mais, dans le même temps, une orientation dans l'enseignement professionnel plutôt qu'au lycée général et technologique s'avère moins rentable qu'avant pour ce qui concerne les compétences des élèves. Finalement, l'effet de rendement négatif des programmes d'études compense largement l'effet de composition positif lié à la diminution de la part de redoublants. Les changements dans les pratiques d'orientation ne semblent donc pas avoir été profitables aux élèves redoublants ni aux élèves promus dans l'enseignement professionnel. Nous avons de bonnes raisons de penser que la baisse du redoublement n'a pas entraîné les effets escomptés.

1 Introduction

As reading literacy is the primary focus of the Programme for International Student Assessment (PISA) in 2000 and in 2009, the publication of PISA 2009 outcomes has paved the way for particularly sharp comparisons of countries' performances in reading over the 2000 decade. France comes out as an interesting case : it is the OECD country with the largest absolute change in performance variance. Whereas the average variation in student reading performance has decreased by 3% between 2000 and 2009 across OECD countries on average (OECD, 010b), it has increased by more than 30% in France (see Figure 1).

Figure 1 – Change in the variation in student performance in reading between 2000 and 2009



Other European countries, namely Sweden, Italy, Iceland and Spain, also experienced a significant increase in performance dispersion but that increase did not exceed 15%. Just as in Sweden, performance variation in France increased due to a decline in the performance of low-achieving students, while the score of the highest-achieving students remained roughly the same. The rise in performance variation is consequently associated with a decline, although moderate, in the overall reading performance of 15-year-old students between 2000 and 2009 in France. Identifying the sources of change in France's reading performances can help policy makers design effective policies to overcome inequalities in learning opportunities and declining overall performance. Can the rise in performance inequalities across the 2000 decade be explained by changing characteristics of students or is it mainly due to a decrease in the quality of the French educational system ?

How has the French educational system evolved over the last two decades ? Since PISA tests assess students' achievement around the end of compulsory schooling, it is worth considering any change which could have affected students' learning conditions from the age of 6 and their entry to primary school. The PISA 2000 cohort was born in year 1984 and entered primary school in 1990, whereas the PISA 2009 cohort was born nine years later in 1993 and entered primary school in 1999. We should consequently pay particular attention to the main changes which have occurred in the French educational system between 1990 and 2009. We reviewed the possible variations in the main organizational dimensions (Jonsson and Erikson, 2000; Le Donné, 2014) of the French educational system. The reinforcement of the plan attributed catchment areas to schools implemented from 1997 until 2007 has barely affected the allocation of students across schools and a fortiori students' learning conditions (Van Zanten and Obin, 2008). The size and the operating principles of the private paying sector have remained roughly the same across the last two decades (MEN, 1998, 2009). However, two institutional shifts deserve to be examined in depth : a decline of grade repetition [1] and successive extensions of areas targeted for special help in education.

The decline in the practice of grade repetition in France has been motivated by two factors. First, past international large-scale surveys, such as TIMSS [2], PIRLS [3] and more recently PISA, brought out France, together with Luxembourg, Spain, Portugal, Belgium and the Netherlands, as a country with high rates of grade repetition (OECD, 2004, 010a). Second, past research in education in France pointed out the lack of both efficiency and equity in the practice of grade repetition (Grisay, 1993; Levasseur and Seibel, 1985; Gary-Bobo et al., 2014; Cosnefroy and Rocher, 2004). A change in students sorting practices has consequently been implemented since the beginning of the 1990s. To our knowledge, while short and long-term effects of grade repetition on students' achievement have been considerably examined (see Jimerson et al. (2006)) for a meta-analysis), there has not been any assessment of the decline in grade repetition over the last years in France. The question still arises yet as to how the more frequent promotion of students from one grade to the next has affected student cognitive enhancement. For those students who would have been retained in the past but who have instead been promoted to the next grades, we expect that this promotion has been positive for their cognitive development. Indeed, those students do not experience the stigma generally associated with grade repetition (Jackson, 1975; Reynolds, 1992) and, if their proficiency level is sufficient, they might benefit from a more demanding and advantageous schooling environment. However, the recent promotion of those students might also have negative effects on the performances of students who are always promoted, regardless of grade repetition practices. Studies about the change from a selective educational system to a comprehensive unified system in the United Kingdom concluded that the performances of high-achieving students have been weakened by the new presence of low-achieving peers within the unified general track (Galindo-Rueda and Vignoles, 2007; Manning and Pischke, 2006). By contrast, studies assessing comprehensive experiments in Europe and in the United States rather show that the positive effects of the reform for low-achieving students exceed the negative effects for high-achieving students (Gamoran, 1996; Figlio and Page, 2002; Palme and Meghir, 2005; Maurin, 2007; Pekkarinen et al., 2009; Jakubowski et al., 2010). As regards students who are still retained, they may suffer from a higher stigma in a context of declining grade repetition practices : it might restrain their cognitive development even more than before. Overall, we expect the decline in grade repetition to have affected student performance distribution.

1. This practice consists in retaining one more year in the same grade a student whose school performances are not high enough.
2. Trends in International Mathematics and Sciences Study.
3. Progress in International Reading Literacy Study.

The French educational system has experienced a second major change : successive expansions of areas targeted for special help. Many OECD countries, such as the United States, the United Kingdom, Portugal and Belgium, have adopted compensatory education programs that channel supplementary teaching resources to disadvantaged schools (Bénabou et al., 2009). The program "Zones d'Education Prioritaires" (Priority Education Zones, henceforth ZEP) was launched in 1982 in France : it provides selected schools (mostly primary and middle schools but also few high schools with high concentrations of disadvantaged students who have low levels of educational achievement) with additional funds, smaller class size and more teaching hours. Originally meant to be temporary, the program was instead maintained in the initially targeted areas and it was then successively extended to other areas. The share of lower-secondary students enrolled in schools targeted for special help amounts to 10% in 1982, 14.3% in 1997 and to about 20% in 2009 (MEN, 1998, 2009). Despite this extension, the average socioeconomic composition of ZEP schools has remained unchanted. Past studies show mixed effects regarding the ZEP policy. First the ZEP program has resulted in smaller class sizes and in more teaching hours (Bénabou et al., 2009; Merle, 2012). However the ZEP policy also triggered negative signaling effects. The ZEP status might have signaled low probability of educational success to students enrolled in targeted schools and it might have weakened student learning motivations (Merle, 2012). But, above all, the ZEP status had negative consequences on educational professionals. Despite financial incentives created to attract teachers, ZEP schools have experienced sharper teacher shortfall, higher turn-over rates, more temporary and delayed teacher affectations, and higher shares of less-experienced teachers (Bénabou et al., 2009). The negative signaling effects of the ZEP policy may have offset any positive effects related to smaller class sizes and more teaching hours. In addition, within the French education community, some researchers have argued that the ZEP expansion has actually led to a dilution of the amount of extra resources directed to selected schools (Maurin, 2004; Merle, 2012). We believe that this might have contributed to increase in the total number of low-achieving students in France.

Performance distribution moves between 2000 and 2009 may not only be due to changes in the production process of education in France but also to changes in students' background. French demographic studies document an increase in the share of students whose parents are immigrants and who speak a language other than French at home (Prioux and Barbieri, 2012). These students may have more difficulties at school than students with native parents and could contribute to the general decrease in performance of French students in reading. Studies also report an increase in the share of single-parent families (Chardon et al., 2008). This could be detrimental to students performances for two reasons. First this could pose a problem because of the important role of family composition in student's achievement (Sassler et al., 2013). Second, as most single-parent families are single-mother families with low educational background and small resources, the rise in the share of single-mother families may lead to a decline in the average socio-economic background of children which has also an important role in student's achievement.

This evidence motivates a decomposition analysis. Based on the investigation of French PISA 2000 and 2009 datasets, we quantify the contribution of different factors to mean and quantile scores differential. We apply the semi-parametric decomposition methods proposed by Firpo et al. (2007, 2009). In a robustness check, we also use the reweighed decomposition method proposed by Di Nardo et al. (1996) to account for the potential bias generated by the linear specification. The decomposition results show that 15-year-old students in France in 2009 might have less favorable characteristics than their counterparts in 2000, and that, except higher-achieving students, they experience lower returns to school's institutional characteristics than their counterparts in 2000. In fact most of the downward shift of low- and middle-achievers' performances seem related to the declining quality of the French educational system rather than to shifts in students' composition. Our findings first suggest that the increasingly negative effect of grade repetition outweighs the positive evolution in students' composition due to the decline in grade repetition. Secondly, the extension of areas targeted for special help and a lower efficiency in regards to the implementation of this policy have contributed to the decline in the reading performances of the lowest-achieving students.

In interpreting these findings, it is important to keep in mind the descriptive nature of our analysis. The decomposition method is a descriptive approach, where observed outcomes for one group are used to construct counterfactual scenarios for another group. In constructing these scenarios, we abstract from potentially important partial equilibrium considerations (e.g. selection into a priority education area or into grade repetition) and general equilibrium conditions (e.g. simultaneous determination of education practice and education returns). As a result, we are reluctant to give the decomposition a strict causal interpretation, and prefer to think of it as providing a first order approximation of the contribution of different factors to the rise in the inequality of student performances.

The paper is organized as follows. Section II introduces PISA 2000 and 2009 datasets and the variables selected for temporal comparisons. Section II describes the Oaxaca-Blinder and Firpo-Fortin-Lemieux decomposition techniques. Decomposition results and robustness checks are presented in Section III. Section IV summarizes and discusses our main findings and their political implications.

II French PISA 2000 and 2009 data

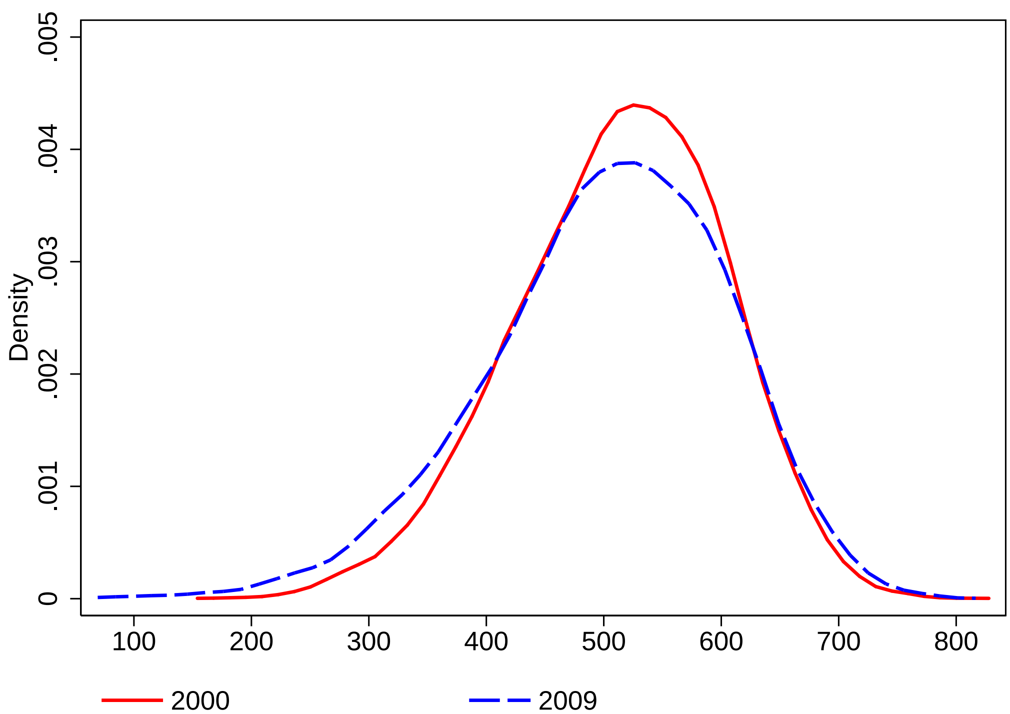
The design of the Programme for International Student Assessment (PISA) does not only enable international comparisons of countries in terms of their learning outcomes, it also allows temporal comparisons of students' performances within countries. Conducted every 3 years since 2000, each PISA survey provides an in-depth assessment of one of three core domains (considered the major domain) among reading, mathematics and science. The PISA cycle started in 2000 with reading literacy as the major subject area. After a complete rotation of the three domains of assessment, reading is again the primary focus of PISA in 2009. For the first time since PISA was launched, it is possible to obtain detailed comparison of how student performance in the major domain has changed [4]. One should also keep in mind that PISA does not test French or any national curriculum in reading but the ability of students to understand, use and reflect on written texts in order to achieve their goals, acquire new knowledge and participate in society (Schleicher et al., 1999).

Reading performances in 2000 and 2009 are directly comparable across time : The PISA 2000 average

4. 41 out of the 130 PISA reading items used in the PISA 2009 reading test were taken from the PISA 2000 assessment (OECD, 010b).

score across 28 OECD countries was set at 500 and the standard deviation at 100, establishing the scale against which reading performance in PISA 2009 is compared (OECD, 010b)[5]. France's average score in reading has substantially decreased over the 2000 decade by approximately 10 points (10% of the OECD standard deviation) : it amounts to 505 points in 2000 and only 496 points in 2009[6]. The decline in reading average performance results mainly from an increasing share of low-achieving students, although the share of high-achieving students has also slightly extended as well (see Figure 2). The performance dispersion is consequently larger in 2009 than in 2000 (the standard deviation equals 105.5 score points in 2009 and only 91.7. in 2000).

Figure 2 – Reading score density in 2000 and 2009

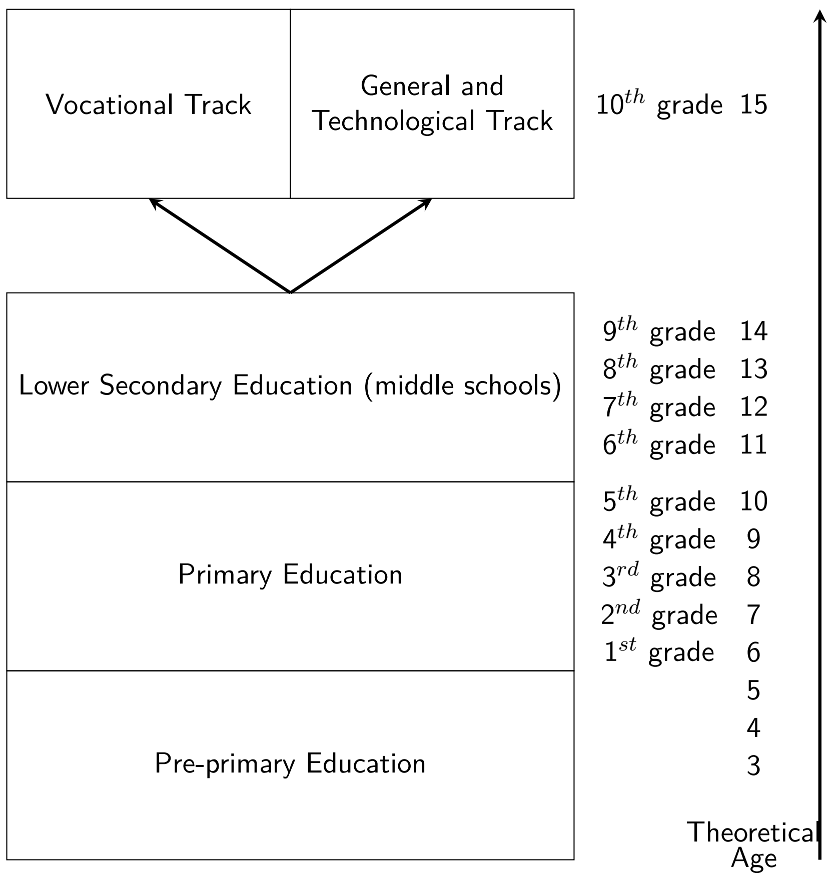


The sampling design used for PISA assessments is a two-stage stratified sample with the first-stage units consisting of schools having 15-year-old students and the second-stage units being students (Wu and Adams, 2002). PISA surveys target a nationally representative sample of students regardless of the type of educational institutions in which they are enrolled, in the spring of the civil year they turn 16. We describe the French school system in Figure 3. Primary and lower-secondary education form a comprehensive system : from the age of 6, students are enrolled in primary schools which constitue five grade levels, and then from the age of 11, they go to unified "*collèges*" (i.e. where all students follow the same curriculum) for the next four grade levels. At the end of middle school, students are separated into two main tracks : either into the general and technological track which delivers the "*baccalauréat*" and prepares students for

5. The PISA 2009 OECD average is 496 in 2009, while the reading performance scale remained unchanged.
6. The results reported in Table 3 and Table 4 are slightly different than the ones reported in OECD publications, since we computed them using PISA samples cleaned from missing values for the variables introduced in our decomposition analyses.

academically-oriented tertiary education, or into the vocational track which delivers vocational qualifications and possibly a vocational "*baccalauréat*". Generally speaking, 15-year-old students who repeated a grade are enrolled in high school, either in the general or vocational track, while 15-year-old students who have repeated at least one grade are still enrolled in middle school. It is thus important to bear in mind that a sampling of 15-year-old students at a school cannot be considered as representative of students enrolled in the same grade level in that school. This is particularly true for students enrolled in the sampled middle schools because such students have repeated at least one year of school and tend to greatly differ from their 14-year-old peers when it comes to their social characteristics and past schooling outcomes.

Figure 3 – French school system



We believe that PISA data are particularly appealing for conducting our research as they gather a very wide range of information on student's family and learning environment. In addition, we fortunately enriched the French PISA data with an additional key variable, the school's belonging to a ZEP program (through the intermediary of the Evaluation, Forecasting and Performance Department (DEPP) of the French Ministry of National Education). Table 1 provides descriptive statistics on the samples of students assessed in 2000 and 2009. It shows to what extent the population composition changes between 2000 and 2009. The handling of missing values for variables listed in the table resulted in a sample of 3965 students in 176 schools for year 2000 and of 3698 students in 168 schools in 2009. Observations are weighted with PISA final student weights.

Among the personal and familial characteristics of students that are known to play a major role in students' schooling achievement, we select PISA variables which are common to PISA 2000 and 2009 datasets and which are highly comparable across time : student's month of birth, gender and migration status (coded with the help of three dummy variables : "both parents are born abroad", "one parent is born abroad", and "language other than French spoken at home"). The share of students who usually speak a language other than French with their family has increased by 2% between 2000 and 2009. [7] We also consider three indicators of student socioeconomic background : Parents' highest international socioeconomic index (HISEI) [8] which takes values between 0 and 74 ; mother's and father's job status each coded with four dummy variables (working full time, working part time, not working but looking for a job, other) ; number of books at home [9] gathered into four categories (0-10 ; 11-100 ; 101-500 ; more than 500 books). The average socioeconomic index has decreased by 1.3 points in 9 years of time : This might be due to the increasing share of 15-year-old students living in single-parent and in migrant families ; however, we cannot exclude it to be due to sampling bias [10]. The average number of books at home has decreased as well, in accordance with the digital development. A general decline in students' reading activities and appetite towards reading is also observed.

Changes in performance distribution can also be due to changes in the education production process in France. Thus we take into changes in students' educational experiences. The fall in grade repetition has necessarily modified the allocation of 15-year-old students into the different grades and tracks available in the French educational system. It has led to a significant decline in the share of 15-year-old students enrolled in middle school and to an increase in the shares of 15-year-old students enrolled in high school, in the general or vocational tracks. Student's school track in the French educational system is coded with the help of dummy variables which describe a complete set of exclusive events : Being enrolled in the general track of high school, in the vocational track of high school or in middle school. Since 15-year-old students enrolled in middle school who have never repeated a grade are very rare (these students are generally recently arrived migrants), the fact that a 15-year-old student is enrolled in middle school is a very good proxy for past repetition [11]. As expected, the share of students enrolled in lower-secondary education, that is to say, the share of students who have repeated a grade has decreased by approximately 6 percentage point, but still remains high in 2009 (32.6%, see Table 1). Mechanically the shares of students enrolled in vocational and in general upper-secondary education have respectively increased by 1% and 5% respectively. As regards priority education zones, PISA data clearly shows that the program has been extended : in 2000 only 5.4%

7. This is consistent with changes observed by Prioux and Barbieri (2012) in migrant population size from French yearly censuses.

8. The International Socioeconomic Index has been built by Ganzeboom et al. (1992). It assigns to each occupational category a value that is the weighted average of education and income of that occupational category. It originally takes values between 16 and 90 but we rescaled it from 0 to 74 for decomposition purposes.

9. Cultural possessions such as books reflect both cultural and financial resources available in the household and are known to have a strong effect on student achievement (Van de Werfhorst and Mijs, 2010).

10. Unfortunately we have serious concerns about the temporal comparability of variables related to student's family structure. The question statement related to student's home composition in 2000 is ambiguous and has probably led to an underestimation of single-parent families in 2000.

11. In 2000, students have not been interrogated about their past grade retention(s). In 2009, the share of students declaring having repeated a grade once in the past is about 1% greater than the share of students enrolled in lower-secondary education. One advantage for considering student's enrollment in lower-secondary education instead of student's declaration of grade repetition is that it allows avoiding any desirability bias.

of 15-year-old students are enrolled in ZEP schools, versus 7.8% in 2009. As expected, the relative sizes of the public and the private sectors have remained roughly the same across the 2000 decade.

Tableau 1 – Descriptive statistics

	2000		2009	
Month of birth	5,50	*0,05*	5,67	*0,06*
Girl	52,04	*0,81*	51,82	*0,84*
Single-parent family	8,78	*0,28*	12,39	*0,33*
Immigration background				
Both parents born abroad	10,74	*0,50*	11,08	*0,53*
One parent born abroad	12,75	*0,54*	12,58	*0,55*
Language most often spoken at home is not French	4,05	*0,32*	5,95	*0,40*
Socioeconomic background				
Parents' HISEI	32,88	*0,27*	31,62	*0,28*
$<$ 11 books	10,97	*0,31*	12,66	*0,33*
11-100 books	43,59	*0,80*	47,37	*0,84*
101-500 books	36,55	*0,78*	32,20	*0,78*
$>$ 500 books	8,89	*0,46*	7,77	*0,44*
Mother works full-time	51,78	*0,50*	59,29	*0,39*
Father works full-time	85,25	*0,37*	84,24	*0,38*
Mother works part-time	18,07	*0,62*	18,85	*0,66*
Father works part-time	4,54	*0,33*	7,42	*0,45*
Mother looks for a job	5,94	*0,38*	5,74	*0,40*
Father looks for a job	3,20	*0,28*	3,80	*0,32*
Mother inactive	24,21	*0,69*	16,12	*0,62*
Father inactive	7,01	*0,41*	4,54	*0,35*
Class size	27,46	*5,58*	27,38	*6,50*
School track				
Lower-secondary education	38,57	*0,77*	32,55	*0,80*
Vocational upper-secondary education	7,79	*0,44*	8,71	*0,50*
General upper-secondary education	53,67	*0,50*	58,73	*0,49*
Special Education Zone	5,42	*0,37*	7,80	*0,46*
Private sector	22,41	*0,68*	21,97	*0,69*
Practice of reading				
Reading is a hobby	32,53	*0,76*	31,30	*0,78*
Like to talk about one's reading	38,29	*0,78*	44,12	*0,83*
Reading is hard	32,70	*0,75*	38,46	*0,82*
Reading is a waste of time	22,01	*0,67*	24,70	*0,73*
Does not read for enjoyment	28,33	*0,72*	36,84	*0,78*
Read less than 30 minutes a week for enjoyment	27,51	*0,72*	31,79	*0,78*
Read less than 60 minutes a week for enjoyment	28,71	*0,73*	17,08	*0,63*
Read less than 120 minutes a week for enjoyment	10,31	*0,49*	10,05	*0,50*
Read more than 120 minutes a week for enjoyment	3,04	*0,28*	3,75	*0,31*
Number of schools	**176**		**168**	
Number of students	**3965**		**3698**	

Decomposition techniques

We analyze changes in students' test scores by using decomposition techniques of mean and quantile scores differentials [a]. Decomposition methods assign differences in test scores either to differences in students' and schools' characteristics over time (explained variation) or to changes in returns to those characteristics in terms of tests scores, *i.e.* in the quality of the educational system (unexplained variation). the 'composition effect') measures the scores that the 2009 cohort of students would have received if they instead had the characteristics of the 2000 cohort of student but their own 'return' on these characteristics. The unexplained part (also called the 'return effect') measures the scores that the 2000 cohort of students would have received if they had kept their own personal characteristics but instead experienced the same production process of schooling (i.e. the same transformation of inputs into educational performance) as those in the 2009 cohort.

In interpreting these findings, it is important to keep in mind the descriptive nature of our analysis. The decomposition method is a descriptive approach, where observed outcomes for one group are used to construct counterfactual scenarios for another group. In constructing these scenarios, we abstract from potentially important partial equilibrium considerations (e.g. selection into special a priority education area or into grade retentionrepetition) and general equilibrium conditions (e.g. simultaneous determination of education practice and education returns). As a result, we are reluctant to give the decomposition a strict causal interpretation, but and preferrather to think of it as providing a first order approximation of the contribution of different factors to the rise in the inequality of student performances.

a. Decomposition methods developed by Oaxaca (1973) and Blinder (1973) have already been applied to PISA data to study score differences between countries (Ammermueller, 2008) and between different dates in a same country (Barrera-Osorio et al., 2011; Gigena et al., 2011).

III Results

1 Analyzing the decline in the average performance

Before examining the changes in the whole performance distribution, we first look at the decline in the average performance in France between 2000 and 2009. To help analyze decomposition results, we successively show all the ingredients for the Oaxaca-Blinder decomposition : we comment on students' average characteristics (Table 1) and display linear regression coefficients in Table 2. In the estimated linear model, we set the reference individual to a male student who has two native-born parents and a father working full-time or not at all [12] and who is enrolled in general upper-secondary education in a public high school that does not belong to a priority education zone. The reference individual has a low socioeconomic status, no more than 10 books at home, and never reads for enjoyment. Between 2000 and 2009, the average performance of the reference individual has increased by 5 points at Pisa test.

12. We first set the reference individual to a student whose parents both work full time, but we found that only the status of the father seemed to have a significant impact on performance in 2000 and 2009.

Linear regression results show several differences in returns associated with students' social characteristics, *i.e.* in the educational value of students' social endowments. All other things being equal, girls are found to outperform boys in reading even more in 2009 (+18.4) than in 2000 (+11.1). Whereas the return associated with a high parents' socioeconomic status has slightly decreased, the returns associated with a large number of volumes of books at home have considerably increased. It seems that the French educational system values the humanities (in the classical sense) even more than before despite digital development (Baudelot and Establet, 2009). Interestingly enough, the penalty associated with an immigrant background has decreased over time, but the penalty related to speaking a language other than French at home has increased.

Turning to returns associated with student's educational characteristics, we find that being repeating a grade and thus remaining in lower-secondary school (rather than continuing on to general upper-secondary education) is even more detrimental to students in 2009 (-86.9 points) than in 2000 (-81.8). This might result of a lower efficiency across time when it comes to the practice of grade repetition across time but it could also be due to a selection bias. PISA 2009 students who have repeated a grade, despite official recommendations aimed at reducing grade repetition, might be less proficient than their counterparts in PISA 2000. Interestingly, returns associated with being enrolled in vocational upper-secondary education are also much more negative in 2009 (-82.0) than in 2000 (-64.0). Students from the 2009 cohort who would have repeated a grade if they had been a part of the 2000 cohort are probably less able than the students who would have continued on to the vocational track in either year. This might explain part of the decreasing return of vocational education. This might also suggest that these students may not have received any particular benefit from their promotion and/or that other students actually suffered because of it. Lastly, the returns associated with being enrolled in a school targeted for priority education are more negative in 2009 (-38.9) than in 2000 (-18.2). Given that we control for students characteristics, this might suggest that the ZEP policy is less efficient in 2009 than it was in 2000.

Tableau 2 – Linear regressions of students' performances in reading

	2000		2009	
Month of birth	**-0,89**	*0,30*	-0,04	*0,34*
Girl	**11,14**	*2,14*	**18,40**	*2,40*
Immigration Background				
Both parents born in France	*Ref.*		*Ref.*	
Both parents born abroad	**-19,14**	*3,88*	**-10,30**	*4,28*
One parent born abroad	**-6,88**	*3,17*	**-9,54**	*3,46*
Language most often spoken at home is not French	**-9,79**	*5,85*	**-16,50**	*5,95*
Socioeconomic background				
Parents' HISEI	**0,66**	*0,07*	**0,53**	*0,07*
$<$ 100 books	*Ref.*		*Ref.*	
11-100 books	**31,25**	*3,68*	**18,83**	*4,22*
101-500 books	**41,82**	*3,89*	**37,13**	*4,71*
$>$ 500 books	**43,46**	*5,14*	**54,79**	*5,87*
Father works part-time	**-26,19**	*5,26*	**-21,35**	*5,10*
School track				
General Upper-secondary education	*Ref.*		*Ref.*	
Lower-secondary education	**-81,75**	*2,41*	**-86,93**	*3,02*
Vocational upper-secondary education	**-64,03**	*4,17*	**-82,03**	*4,58*
Special Education Zone	**-18,18**	*5,51*	**-38,88**	*5,46*
Private Sector	**5,06**	*2,48*	**8,68**	*2,81*
Reading Practice				
Reading is a hobby	2,72	*2,76*	**8,54**	*3,36*
Like to talk about one's reading	3,01	*2,42*	**11,40**	*2,84*
Reading is hard	**-12,23**	*2,48*	**-18,33**	*2,81*
Reading is a waste of time	-3,73	*2,93*	**-15,26**	*3,42*
Not reading for enjoyment	*Ref.*		*Ref.*	
Read less than 30 minutes a week	**19,03**	*2,95*	**9,57**	*3,20*
Read less than 60 minutes a week	**20,08**	*3,33*	**17,33**	*4,25*
Read less than 120 minutes a week	**27,44**	*4,58*	**16,14**	*5,45*
Read more than 120 minutes a week	**19,33**	*7,89*	**15,83**	*6,70*
Intercept	**487,79**	*5,23*	**493,28**	*5,94*
R^2	**48,85**		**53.92**	

We now turn to the Oaxaca-Blinder decomposition results (see Table 3). The total gap between the average reading scores of students from the 2000 cohort and those from the 2009 cohort amounts to -8.4 points. The decrease in the average performance can be considered as moderate change since it represents approximately 10% of the international standard deviation. The total composition effect accounts for -4.5 points in the total gap, meaning that student's social and educational characteristics in 2000 were actually more advantageous than in 2009. The overall return effect accounts for -3.9 points. This means that the production process of schooling was more efficient in 2000 than in 2009. The detailed decomposition provides us with more information. The negative composition effect is driven by increasing shares of students with a disadvantaged socioeconomic background (-2.8) or an immigrant background (-0.3), spending little time reading for enjoyment (-2.4), and enrolling in a school targeted for priority education (-0.9). The negative return effect is mainly driven by student socioeconomic background (-10.4), suggesting that underprivileged students tend to be even less proficient than they used to be. New sorting practices (-3.3) and the change in the priority education program (-1.2) also contribute to the overall negative unexplained part. The increasingly negative effects of grade repetition and of vocational education (compared to general education) (-3.3) outweigh the positive composition effect of a decline in grade repetition (+2.1). Nevertheless, The overall effect of these policies is negative, suggesting that, on average, sorting policies in 2000 were more efficient than in 2009. Regarding priority education zones, the negative composition effect due to the extension of the program (-0.9) is reinforced by the negative return effect (-1.1) which suggests a lower efficiency of the policy across time.

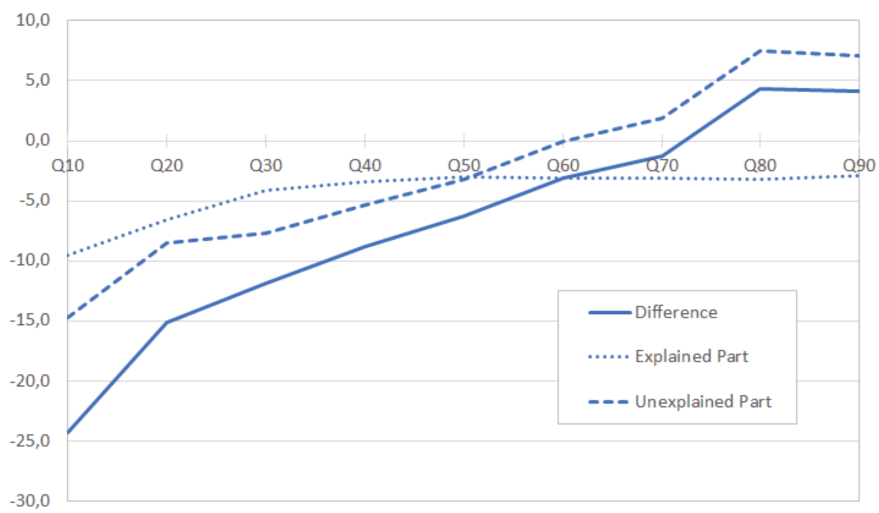
Tableau 3 – Decomposition results

	Explained Part		Unexplained Part	
Month of birth	-0,01	*0,06*	4,67	*2,51*
Girl	-0,04	*0,21*	**3,78**	*1,67*
Immigration Background	**-0,33**	*0,18*	0,34	*0,88*
Socioeconomic background	**-2,80**	*0,52*	**-10,44**	*5,66*
School track	**2,08**	*1,00*	**-3,32**	*1,61*
Special Education Zone	**-0,92**	*0,26*	**-1,12**	*0,43*
Private Sector	-0,04	*0,09*	0,81	*0,84*
Reading Practice	**-2,44**	*0,71*	-4,09	*3,85*
Intercept			5,49	*7,91*
Total Effect	**-4,50**	*1,76*	**-3,88**	*1,64*
Total Gap	**-8,38**	*2,19*		

2 Analyzing shifts in the whole performance distribution

So far we have only considered the temporal difference in the average scores. As we are mainly interested in the rise of educational inequality and in the share of low-achievers, however, we also performed a decomposition along the entire score distribution, and in particular along its lower part. Figure 4 displays the reading score gap between 2000 and 2009 for each decile (solid line). The gap is declining along the deciles of the performance distribution. While it amounts to -24.3 points for the lowest performing 10 of percent students, it equals +4.2 points for the highest performing decile. Performance inequalities are indeed larger in 2009 than in 2000. The overall difference is broken down into two components- the composition effect and the return effect. The composition effect explains a substantial part of the total gap all along the performance distribution. It is more negative for the lowest two deciles of the performance distribution, and it is quite stable otherwise (at around -3 points) otherwise. This means that student characteristics have deteriorated for all students, irrespective of their proficiency level, but they have deteriorated even more among the lowest performing 20 percent. The return effect represents the difference between the distributions that is due only to differences in the quality of the educational system, given the characteristics of students in 2000. It increases almost linearly over the distribution : It is negative along the lowest half of the performance distribution and positive for the highest two deciles. The production process of schooling in 2009 is clearly less efficient for the lowest achieving students in 2009 than it was in 2000, and slightly more efficient for high proficient students. This suggests that the French educational system has become more elitist overtime. All in all, the decline in the performance of low-achieving students seems more related to a change in the quality of the education system or in these students' motivation to learn rather than to a change in their characteristics.

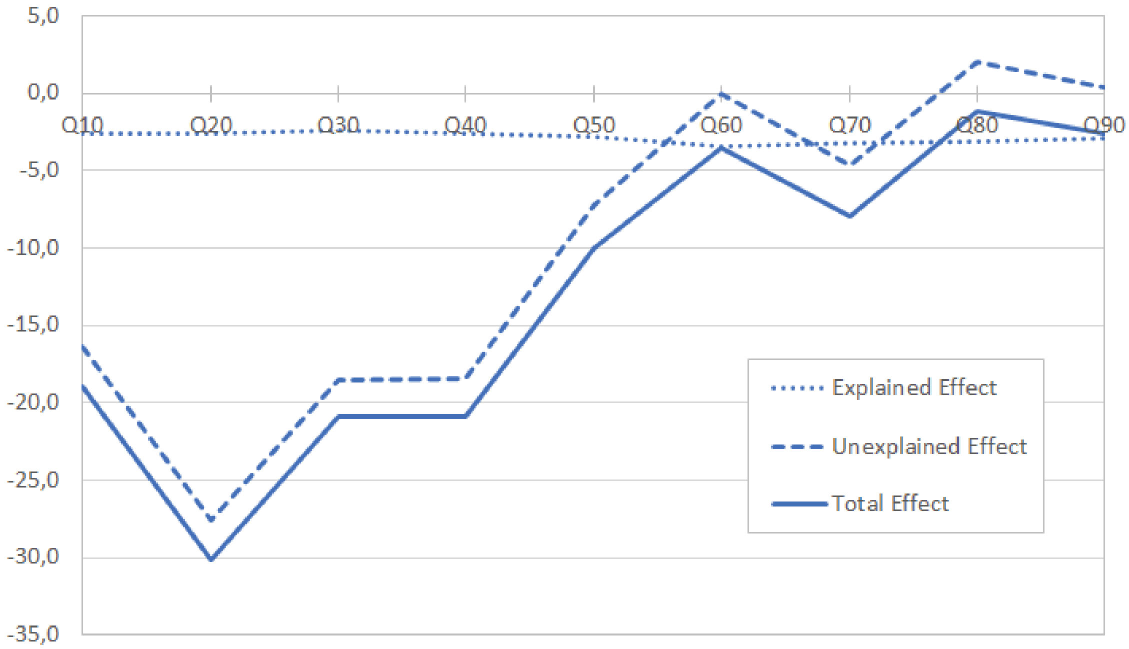
Figure 4 – Decomposition by decile



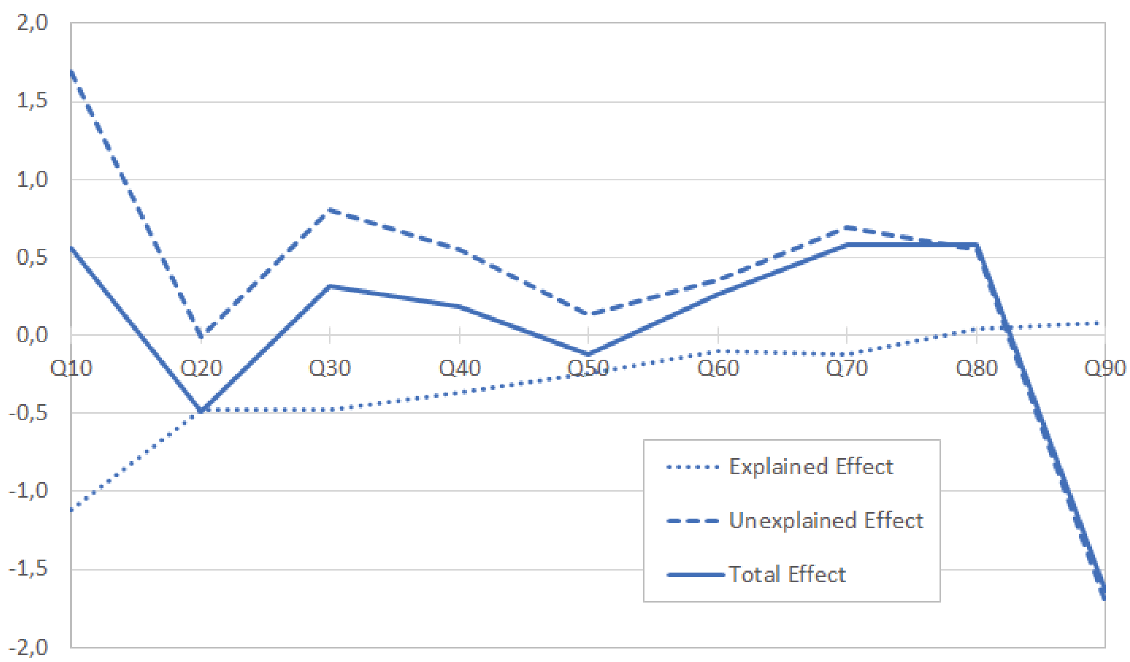
We now look at the detailed decomposition (complete results of the detailed quantile decomposition are displayed in Table 4). We successively analyze the impact of the factors which contribute the most to explain gaps between score deciles including socioeconomic background and migration status as well as students' school track and education area.

Students' sociocultural background is the most important characteristic when it comes to explaining the evolution of their scores (see figure 5). It contributes 19 points to the decline in the score of the 10 percent lowest-achieving students compare to less than 2 points to the score of the 10 percent highest-achieving students. The corresponding composition effect is significantly negative and similar for all students (with an average value of -2.8), which suggests that family sociocultural resources have decreased for all students, regardless of their level of performance. The return effect however, varies a lot with student's performance level and is negative for low-achieving students, close to zero for average students and positive for the most proficient students. This result confirms that sociocultural inequalities are greater between students in the 2009 cohort than between students in the 2000 cohort. The total contribution of students' migration status to the performance evolution appears relatively small, if not insignificant. The composition effect is slightly more negative for the less able students than for the others (see figure 5). This comes from the rise in the share of students who do not speak French at home and who have on average more difficulties at school than other students. However, the return effect is more positive for less able students than for more able students. A positive return effect among the less able, derived from better returns to schooling for children of immigrants, compensates for a negative composition effect.

Figure 5 – Effect of the socio-demographic characteristics on reading performance by decile in 2000 and in 2009



(a) Socio-demographic characteristics

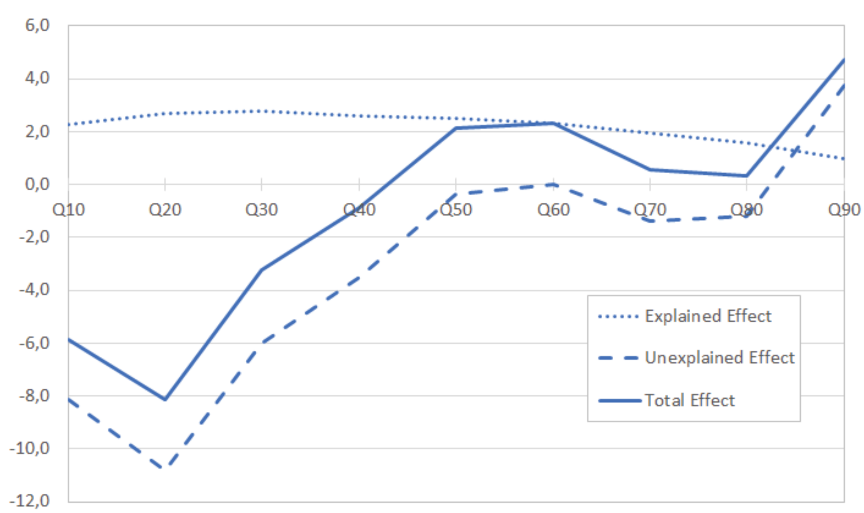


(b) Migration status

Finally, we focus on the two dimensions of the organisation of the French educational system which have changed the most over the past decade - the practice of grade repetition and priority education policy. Figure 6 shows the total effect attributed to student school track in the overall score gap and its components. The composition effect is positive and quite stable along the performance distribution, because of the decline in grade repetition. However, the return effect of having experienced grade repetition or following the vocational education track is negative for almost all students and in particular for the lowest deciles of the performance distribution. The positive effect of grade repetition found for the highest performing 10 percent of the students might proceed from the fact that socially advantaged students and high achievers might use grade repetition to increase their chances of being admitted in the general track (Duru-Bellat et al., 1993; Kloosterman and de Graaf, 2010). Apart from that, grade repetition and vocational education seem to be less efficient in 2009 than in 2000, relative to a general secondary education. In sum, the total contribution of sorting policies to the decline in low-achieving performances is considerable.

Figure 7 shows the total effect of priority education zones and its components. Both the composition and return effects are particularly negative for the lowest two deciles of the performance distribution : In other words, the total effect of the policy is particularly negative for the targeted students ! The extension of the policy has probably firstly spread the negative effects related to the ZEP status and secondly led to diluting the resources allocated to disadvantaged schools. Changes in the dimension and the efficiency of the ZEP policy have led to a substantial rise in the intake of low-achievers.

Figure 6 – School track effect on reading performance by decile in 2000 and in 2009



Finally, our decomposition analysis shows that the rise in performance inequality between 2000 and 2009 is largely due to return effects - that is to changes in the quality of the educational system. We see also that students' characteristics have changed. While this explains part of the overall decline in student performance, it does not adequately explain the rise in inequality. In addition, two shifts in educational policies seem to have contributed to the decline in the score of the lowest performing 20 percent : the change in sorting practices with the decline in grade repetition and the extension of the priority education policy.

Figure 7 – Special Education Zones effect on reading performance by decile in 2000 and in 2009

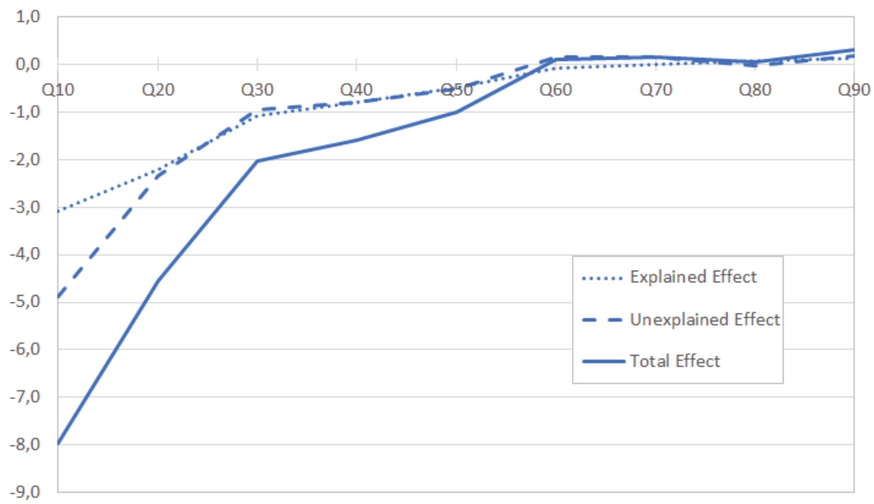


Tableau 4 – Quantile decomposition without reweighting

	Q10		Q20		Q30		Q40		Q50		Q60		Q70		Q80		Q90	
Prediction 2009	**374,50**	3,01	**426,08**	3,36	**461,14**	2,51	**489,93**	2,17	**514,03**	2,20	**539,23**	1,86	**565,34**	1,80	**594,50**	2,16	**627,15**	2,02
Prediction 2000	**398,78**	2,65	**441,22**	2,13	**473,04**	2,30	**498,71**	2,06	**520,31**	1,69	**542,36**	1,95	**566,59**	1,78	**590,21**	1,89	**622,97**	2,13
Difference	**-24,28**	4,03	**-15,15**	3,84	**-11,90**	3,32	**-8,78**	2,99	**-6,28**	2,70	-3,12	2,76	-1,24	2,58	**4,29**	2,94	**4,18**	2,99
Explained																		
Month of birth	-0,16	0,16	-0,19	0,15	0,03	0,10	0,06	0,10	0,02	0,09	0,03	0,09	0,08	0,10	0,07	0,10	-0,01	0,12
Girl	-0,07	0,36	-0,06	0,34	-0,05	0,27	-0,03	0,15	-0,04	0,20	-0,03	0,18	-0,04	0,20	-0,03	0,15	-0,02	0,12
Immigration background	**-1,12**	0,55	-0,48	0,39	**-0,48**	0,30	-0,37	0,26	-0,25	0,22	-0,10	0,18	-0,12	0,17	0,04	0,15	0,08	0,16
Socioeconomic background	**-2,58**	0,89	**-2,57**	0,64	**-2,37**	0,60	**-2,56**	0,52	**-2,78**	0,55	**-3,48**	0,60	**-3,25**	0,67	**-3,16**	0,80	**-2,96**	0,73
School degree and track	**2,26**	1,24	**2,70**	1,35	**2,78**	1,39	**2,61**	1,32	**2,52**	1,20	**2,31**	1,16	**1,94**	0,86	**1,55**	0,74	**0,96**	0,49
Specialized Education	**-3,10**	0,92	**-2,22**	0,56	**-1,08**	0,34	**-0,80**	0,23	**-0,49**	0,16	-0,07	0,12	-0,01	0,11	0,07	0,10	0,12	0,09
Private sector	0,00	0,08	-0,02	0,07	-0,02	0,07	-0,04	0,10	-0,01	0,04	-0,05	0,11	-0,04	0,09	-0,04	0,10	-0,07	0,19
Lecture Practice	**-4,79**	1,39	**-3,79**	1,13	**-2,97**	0,96	**-2,31**	0,96	**-2,01**	0,94	**-1,74**	0,92	**-1,69**	0,93	**-1,74**	0,90	-0,98	1,06
Total	**-9,55**	2,69	**-6,62**	2,39	**-4,17**	2,46	**-3,44**	2,17	-3,04	2,07	-3,12	2,01	**-3,12**	1,70	**-3,23**	1,69	**-2,88**	1,46
Unexplained																		
Month of birth	4,39	6,07	1,75	5,06	**8,14**	4,02	**8,79**	3,97	5,11	3,82	4,87	3,79	3,55	3,78	4,90	3,82	4,32	4,65
Girl	4,76	4,61	4,77	3,29	**5,26**	2,98	1,78	2,56	**5,19**	2,53	**6,66**	2,17	4,35	2,41	2,18	2,62	0,73	3,02
Immigration background	1,69	2,40	-0,01	1,79	0,80	1,59	0,55	1,40	0,13	1,22	0,36	1,25	0,70	1,34	0,55	1,29	**-1,71**	1,35
Socioeconomic background	-16,39	20,45	**-27,55**	13,91	**-18,51**	10,58	**-18,39**	8,77	-7,19	7,47	-0,01	7,16	-4,66	6,73	1,97	6,72	0,39	6,36
School degree and track	**-8,13**	4,46	**-10,83**	4,48	**-6,03**	3,59	-3,50	3,43	-0,38	3,19	0,00	2,94	-1,40	2,45	-1,21	2,35	3,74	2,09
Specialized Education	**-4,88**	1,56	**-2,33**	0,96	-0,96	0,76	-0,80	0,55	-0,52	0,44	0,16	0,39	0,15	0,30	-0,02	0,28	0,18	0,24
Private sector	-2,32	2,14	-0,67	1,60	-0,94	1,36	0,93	1,43	-0,35	1,25	1,61	1,26	**2,12**	1,28	1,54	1,43	**2,84**	1,61
Lecture Practice	-13,97	11,52	**-23,19**	8,11	-4,24	6,36	4,87	5,55	2,07	5,54	1,16	5,72	5,60	5,24	3,70	5,39	-1,82	4,96
Intercept	20,12	27,17	**49,54**	18,30	8,74	13,86	0,42	12,28	-7,28	11,87	**-14,81**	10,53	-8,52	10,53	-6,09	10,98	-1,61	10,38
Total	**-14,73**	3,68	**-8,53**	3,73	**-7,73**	2,81	**-5,34**	2,38	-3,24	2,36	-0,01	2,31	1,88	2,31	**7,52**	2,49	**7,06**	3,04

Standard errors are computed with boostrap (200 replications)

3 Reweighting regression

In this section, we try to account for the potential bias generated by the linear specification. Up until now, we have assumed a linear specification for the schooling process, that is $Y_T = X_T\beta_T$ (in the case of the decomposition of the mean). If this specification is not correct, our estimators of counterfactual distributions of the scores such as $X_0\hat{\beta}_1$ and $X_1\hat{\beta}_0$ may be biased and may depend on the distributions of the covariates in 2000 and in 2009. To limit this bias, we use the reweighed decomposition method proposed by Di Nardo et al. (1996) and Firpo et al. (2007) to build counterfactual distributions of the scores of individuals in 2000 if they had the characteristics of the individuals of 2009. We describe this method more thoroughly in Appendix Annexe B. We show the results in Table .1. Our main conclusions remain valid.

4 Additional remarks on the change in student well-being at school

So far, we sought to assess the extent to which the rise in performance inequalities in France has been a consequence of changes in student characteristics and in the quality of the education system. We cannot exclude the possibility, however, that this could be the result of changes in students' motivation to engage in learning. In this section, we considered students' attitudes towards school which we did not include in our prior analyses because of an endogeneity problem. Three variables collected by PISA seem to be of particular interesthere : (1) fair treatment or whether or not students report being treated fairly by their teachers ; (2) not working or whether or not the school environment keeps students from being able to work on their lessons ; (3) not listening or whether or not students report not listening to what their teachers tell them. Table 5 shows how students' attitudes have changed between 2000 and 2009. On average, more students from the 2009 cohort feel that their teachers treat them fairly compared to those from the 2000 (+17%). However the increase is much higher among the 25% highest-achieving students (+23%) than among the 25% lowest-achieving students (+5%). Second, more students report having disorderly classrooms in 2009 than in 2000. Whereas the share of those students among the highest achieving quarter of students has increased by 4%, it has increased by 12% among the lowest achieving quarter of students. Finally more and more students report not listening to what the teacher says, although this is equally true for low- and high-achieving students.

Tableau 5 – Evolution of attitude toward school

	Year	Fair treatment(%)	Not working (%)	Not listening (%)
All	2000	70.79	14.35	27.14
	2009	87.95	22.71	34.78
<q25	2000	71.39	18.60	26.79
	2009	76.68	30.48	34.92
>q75	2000	69.39	14.57	28.43
	2009	92.91	18.44	35.73

To observe how students' attitudes are correlated with their sociodemographic and educational characteristics, we regressed each of the three attitude dummies separately (Table 6). Students who have repeated a grade and who are enrolled in the vocational track are more likely to report that they are not treated fairly by their teachers in 2009 than in 2000 (the regression coefficient is negative and significant in 2009) and that they often experience undisciplined classrooms. It seems that changes in student sorting practices are contemporaneous of less conducive school climates and weaker engagement in learning from students in the less prestigious tracks of the French school system.

Tableau 6 – Attitudes toward school

VARIABLES	Fair treatment		Not listening		Not working	
	2000	2009	2000	2009	2000	2009
Girl	0.0433***	0.0684***	-0.0262*	-0.0655***	-0.0330***	-0.0433***
	(0.0142)	(0.0104)	(0.0142)	(0.0157)	(0.0110)	(0.0137)
Both parents born abroad	-0.0386	-0.0437**	-0.0115	0.0421	0.0621***	0.0325
	(0.0264)	(0.0190)	(0.0263)	(0.0289)	(0.0205)	(0.0252)
One parent born abroad	-0.0304	-0.0513***	0.0273	0.0200	0.0133	0.0449**
	(0.0216)	(0.0157)	(0.0215)	(0.0239)	(0.0167)	(0.0208)
Language most spoken at home is not french	-0.0879**	-0.0297	-0.00230	0.0210	-0.0411	0.0207
	(0.0401)	(0.0244)	(0.0400)	(0.0371)	(0.0311)	(0.0323)
Parent's HISEI	0.000219	0.000216	0.000915**	0.000402	0.000195	-0.000300
	(0.000450)	(0.000325)	(0.000449)	(0.000493)	(0.000349)	(0.000430)
Lower-secondary education	-0.0249	-0.108***	-0.00320	-0.00470	0.0153	0.0592***
	(0.0160)	(0.0122)	(0.0160)	(0.0186)	(0.0124)	(0.0162)
Vocational upper-secondary education	0.0205	-0.0476**	0.0479*	0.0495*	0.0574***	0.0899***
	(0.0278)	(0.0191)	(0.0277)	(0.0290)	(0.0215)	(0.0253)
Special Education Zone	-0.00887	-0.00233	-0.0651*	-0.0289	-0.0184	0.0280
	(0.0336)	(0.0217)	(0.0334)	(0.0330)	(0.0260)	(0.0287)
Private sector	0.00619	-0.00223	-0.0611***	-0.0117	-0.0511***	-0.00393
	(0.0174)	(0.0126)	(0.0174)	(0.0191)	(0.0135)	(0.0167)
Constant	0.713***	0.895***	0.268***	0.360***	0.146***	0.216***
	(0.0218)	(0.0150)	(0.0217)	(0.0229)	(0.0169)	(0.0199)
Observations	3,965	3,698	3,965	3,698	3,965	3,698
R-squared	0.008	0.048	0.007	0.007	0.011	0.015

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

IV Discussion

PISA data show that inequalities in French student performances have increased between 2000 and 2009. Our study aims at assessing the extent to which the rise in inequalities can be attributed to changes in the socio-economic composition of students versus changes in education policies. Since the rise in inequalities is due to the decline in low-achievers performances, we analysed the change in PISA test scores by using distributional decompositions and in particular quantile decompositions. We assigned the change in test scores either to differences in students' and schools' characteristics over time (explained variation) or to changes in returns to those characteristics in terms of tests scores *i.e.* in educational system quality (unexplained variation). Our decomposition results show that, student backgrounds have deteriorated across time and that this deterioration is more marked among low-achieving students than in the rest of the student population. More importantly, low-achieving students experience lower return in terms of cognitive performance while high-achieving students experience higher returns. Our findings provide some descriptive evidence that increasing inequalities in 15-year-old cognitive skills in France are mainly related to changes in the quality of the education system.

Results of the detailed decomposition identify several possible sources for these changes. The rise in the variation of student performance is partly due to a rise in social inequalities : A disadvantaged socio-economic background has become even more penalizing to learning in 2009 than in 2000. In addition, two educational policies seem to explain a large part of the rise in the share of low-achieving students. Changes in sorting practices and in special education policy explain most of the decline in the score of the 20 percent lowest performers.

As regards priority education zones, we find that both the composition and return effects are negative for low-achievers. We believe that the extension of the policy has spread the negative signaling effects of the ZEP status and diminished the positive effects of channeled resources because of resources dilution. Since the ZEP policy mostly concerns middle schools (85% of the ZEP students in PISA data) rather than high schools, the negative contribution of the ZEP policy that we find mainly applies to middle school students, that is to students having repeated a grade before the age of 15. It would be interesting to check with another data source to see if our findings hold for ZEP students who have not repeated a grade.

Examining the contribution of sorting practices more thoroughly, we find that the returns associated with grade repetition are more negative for students 15-year-old students in 2009 than in 2000. This could be due to a selection effect : PISA 2009 students who have repeated a grade despite of grade repetition restrictions are probably less proficient on average than the PISA 2000 students who have repeated a grade. At the same time, however, the return to being enrolled in the vocational track has also become more negative over time. In all, the negative return effect of students' school track outweighs the positive evolution, on average, of student composition due to the decline in grade repetition. This suggests that new sorting practices were beneficial neither to retained students nor to promoted students. In order to take this conclusion a step further and say that they were detrimental, we would require a way to measure students ? past performance at different times in their schooling trajectory. In any case, we have good reasons to think that the decline in grade repetition has not triggered the expected effects. In this respect it seems that the aim of reducing grade repetition has not been associated with another way of managing schooling heterogeneity within classes and in particular of managing students coping with learning difficulties, which could explain the relative failure of this policy.

It is important to keep in mind that our analysis remains primarily descriptive in nature. Nevertheless, it provides a first order approximation of the contribution of different factors to the recent rise in inequalities in reading performances among 15 year old students. Our results suggest that major French education policies targeting disadvantaged students such as grade repetition and priority education programs, are ineffective, if not counterproductive, and changes to these programs have even had harmful effects on those they seek to support. These first striking results call for more extensive studies.

Appendix

Annexe A Decomposition technics

A The Oaxaca-Blinder decomposition of the mean

We want to decompose the difference in the mean of test score between 2000 and 2009. Let Y denote the test score and T the year of the evaluation with $T = 0$ in 2000 and $T = 1$ in 2009. We observe K characteristics $X^1, ..., X^K$ which have an impact on Y and we postulate a linear model for Y. Then, we have for each individual i, the following relation

$$Y_{T_i} = \beta_T^0 + \sum_{k=1}^{K} X_i^k \beta_{T_i}^k + \varepsilon_{T_i},\ T = 0, 1,$$

where we assume conditionally independent errors ($\mathbb{E}(\varepsilon|X) = 0$). The overall gap $\Delta_O = \mathbb{E}(Y|T = 1) - \mathbb{E}(Y|T = 0)$ can be decomposed as follows

$$\begin{aligned}
\Delta_O &= \mathbb{E}(Y|T = 1) - \mathbb{E}(Y|T = 0) \\
&= \mathbb{E}(\mathbb{E}(Y|X)|T = 1) - \mathbb{E}(\mathbb{E}(Y|X)|T = 0) \\
&= \underbrace{(\beta_1^0 - \beta_0^0) + \sum_{k=1}^{K} \mathbb{E}(X^k|T = 1)(\beta_1^k - \beta_0^k)}_{\Delta_R} + \underbrace{\sum_{k=1}^{K} (\mathbb{E}(X^k|T = 1) - \mathbb{E}(X^k|T = 0))\beta_0^k}_{\Delta_X}.
\end{aligned}$$

Δ_R is the "return effect" or the "unexplained part" which reflects differences in the returns of certain characteristics. Δ_X is the "composition effect" or the "explained part" which reflects differences in the distribution of the characteristics between the two years. We will also consider a detailed decomposition where the effects Δ_X and Δ_R are rewritten as the respective sums of the K contributions $\Delta_{X,k}$ and $\Delta_{R,k}$ for each covariate k, where $\Delta_{R,k} = \mathbb{E}(X^k|T = 1)(\beta_1^k - \beta_0^k)$ and $\Delta_{X,k} = (\mathbb{E}(X^k|T = 1) - \mathbb{E}(X^k|T = 0))\beta_0^k$. The interpretation of the element $\Delta_{R,k}$ depends on the choice of the reference group for the covariate X_k. We cannot disentangle within the return effect the part which comes from a change in the return of the variable k and that which comes from a change in the return of the reference variable.

The case of the mean is simple because we can use the law of conditional expectations. When comparing means, we compare $\mathbb{E}(Y|T = 1)$ with $\mathbb{E}(Y|T = 0)$ and equivalently $\mathbb{E}(\mathbb{E}(Y|X)|T = 1)$ with $\mathbb{E}(\mathbb{E}(Y|X)|T = 0)$. While comparing quantiles, this equivalence does not hold anymore. We will use the RIF-regression approach developed in Firpo et al. (2007, 2009) to compute partial effects of changes in distribution of covariates on a given functional of the distribution $Y_t|T$. The outline of the method is to provide a linear approximation to a non-linear functional of the distribution. That approximation method allows one to apply the law of iterated expectations to the distributional statistic of interest and thus to compute approximate partial effects of a single covariate on the functional being approximated.

B Quantile decomposition with RIF-regressions

Let ν be the distributional statistic of a distribution function F we are interested in (which can be quantiles, variance, Gini index, etc.). We use a RIF (Recentered Influence Function) function whose main property is that its expectation yields the original ν.

$$\int RIF(y;\nu)dF(y) = \nu.$$

Letting $\nu_T = \nu(F_T), T = 0,1$ we can therefore write the distributional statistics ν_T as an expectation : $\nu_T = \mathbb{E}[RIF(y_T;\nu_T)|T]$. Using the law of iterated expectations, the distributional statistics can also be expressed in terms of expectations of the conditional recentered influence functions.

$$\nu_T = \int \mathbb{E}(RIF(y,\nu)|X = x, T)dF_{X_T}(x)$$

Then assuming that $\mathbb{E}(RIF(y_T,\nu)|X = x, T)$ is linear in X such that

$$\mathbb{E}(RIF(y_T,\nu)|X = x, T) = x\gamma_T^\nu,$$

we have

$$\nu_T = \int x\gamma_T^\nu dF_{X_T}(x) = \mathbb{E}(X|T)\gamma_T^\nu,$$

then the difference between distributional statistics in $T = 0$ and $T = 1$ can be decomposed as

$$\begin{aligned}
\Delta_O^\nu &= \nu_1 - \nu_0 \\
&= \int \mathbb{E}(RIF(y_1,\nu_1)|X = x, T = 1)dF_{X_1}(x) - \int \mathbb{E}(RIF(y_0,\nu_0)|X = x, T = 0)dF_{X_0}(x) \\
&= \underbrace{\mathbb{E}(X|T = 1)(\gamma_1^\nu - \gamma_0^\nu)}_{\Delta_R^\nu} + \underbrace{(\mathbb{E}(X|T = 1) - \mathbb{E}(X|T = 0))\,\gamma_0^\nu}_{\Delta_X^\nu}.
\end{aligned} \tag{1}$$

We obtain an expression similar to the classical Oaxaca-Blinder decomposition. However, here, the coefficients γ are the coefficients of the RIF functions and will be estimated with linear regressions of the RIF functions over the covariates[13]. The RIF-regressions of the τ-th quantile of the distribution q_t is $RIF(y,q_\tau) = q_\tau + (\tau - \mathbb{1}(y \le q_\tau))/f(q_\tau)$ which gives

13. However, the difference $\gamma_1^\nu - \gamma_0^\nu$ may be contaminated by differences in the distribution of X between the two groups. In a robustness check, we use a re-weighted approach proposed by Di Nardo et al. (1996) to estimate this potential bias and we find very similar results whether or not we re-weight the samples.

$$\mathbb{E}(RIF(Y,q_\tau)|X=x) = q_\tau - \frac{1-\tau}{f(q_\tau)} + \frac{Pr(Y>q_\tau|X=x)}{f(q_\tau)}.$$

To compute the estimated RIF function, we first estimate $\hat{q}_\tau$ using its sample analog in the data. Second, we estimate the density at the sample quantile $\hat{f}(\hat{q}_\tau)$ using Kernel estimation. Then we regress the obtained RIF regressions on the covariate to get the OLS estimates $\hat{\gamma}_0^\nu$ and $\hat{\gamma}_1^\nu$ [14].

It is important to note that decomposition methods are related to public policy evaluation methods : It is tempting to interprete the "unexplained part" as a "treatment effect" (Firpo et al., 2011), in particular as an effect of the educative system. Despite this interesting parallel, we won't assume such an interpretation as "returns effects" can either be interpreted as effects of the school systems or changes in the investment of some groups of students in their learning.

Annexe B Reweighted RIF-regressions

Principle

Let us denote Y_0 the average score in 2000, Y_1 the average score in 2009 and Y^C the counterfactual average score in 2009 if the students of 2009 were evaluated in 2000. Then $\Delta_R = Y_1 - Y^C$ is the return effect, it measures how much students would have performed differently if they experienced the learning conditions of the 2000 cohort with their own characteristics of 2009. The composition effect is then $\Delta_X = Y^C - Y_0$ which measures how much students in 2009 would score differently if they had the characteristics of the students in 2000 given their estimated returns. We have $\Delta_0 = (Y_1 - Y^C) + (Y^C - Y_0) = \Delta_R + \Delta_X$. So with an estimate of the counterfactual Y^C, one can compute the decomposition. This is a general point that holds for all decompositions, and not only for the mean. The identification of the return effect Δ_R requires some assumptions presented in Firpo et al. (2007) and Firpo et al. (2011) : Overlapping support and ignorability. In our setting, it seems reasonable to think that these assumptions hold. First, there are no observable characteristics which are specific to one sample. Second, the assumption that conditionally on observables, the unobservables are independent of the sample is weaker than the usual conditional independence assumption. Unobservables characteristics (such as student's motivation or effort) can be correlated with the observable characteristics (such as social background) as long as the correlation is the same in 2000 and in 2009.
In this subsection we are interested in computing the counterfactual Y^C. Let ν be the distributional statistic of a distribution function F we are interested in. We denote F_{Y_T} the distribution function of Y in year T where $T=0$ in 2000 and $T=1$ in 2009. We denote $F_{Y_0^C}$ the counterfactual distribution function which corresponds to the distribution function of scores in group 0 if individuals of group 0 had the characteristics of group 1.

14. We make the assumption that $Pr(Y>q_\tau|X=x)$ is linear in X and we regress the RIF functions on the observable characteristics (OLS-RIF method). We could also estimate $Pr(Y>q_\tau|X=x)$ with a logit model (RIF-Logit method) or Non-Parametrically (RIF-NP method). The three methods are compared in Firpo et al. (2009) and yield very similar results.

Proposition (Identification of the aggregate composition)

Under the assumptions of a simple counterfactual, overlapping support and ignorability, for every distributional statistic ν, the overall ν-score gap, Δ_O^ν can be written as

$$\Delta_O^\nu = \Delta_R^\nu + \Delta_X^\nu$$

where

(i) The return effect term $\Delta_R^\nu = \nu(F_{Y_1}) - \nu(F_{Y_0^C, X=X_1|T_1})$ solely reflects difference between the production process of schooling in $T = 1$ and $T = 0$.

(ii) The composition effect term $\Delta_X^\nu = \nu(F_{Y_0^C, X=X_1|T_1}) - \nu(F_{Y_0})$ solely reflects the effect of differences in the distribution of characteristics (observable (X) and unobservable (ε)) between the two groups.

There are three reasons why scores can be different between group 0 and group 1 : the score setting can be different in $T = 1$ and $T = 0$, the distributions of X can be different or the distributions of ε are different. The ignorability assumption only states that conditional on X, the distribution of ε is the same in both groups. So once we control for differences between the X's in the two groups, we also control for differences in the ε's.

Constructing a counterfactual distribution with reweighting

The distribution of Y_T is defined using the law of iterated probabilities, that is after we integrate over the observed characteristics we obtain

$$F_{Y_T}(y) = \int F_{Y_T|X_T}(y|X = x).dF_{X_T}(x),\ T = 0, 1.$$

We can construct the counterfactual distribution as follows

$$F_{Y_0^C}(y) = \int F_{Y_0|X_0}(y|X = x).dF_{X_1}(x).$$

The idea is to integrate group 0's conditional distribution of Y given X over group 1's distribution of X. We follow the reweigthing approach of Di Nardo et al. (1996). They compute a reweighting factor $\Psi(X) = \frac{dF_{X_1}(X)}{dF_{X_0}(X)}$ to obtain

$$F_{Y_0^C}(y) = \int F_{Y_0|X_0}(y|X)\Psi(X)dF_{X_0}(x)$$

Let $p = Pr(T = 1)$ and $p(x) = Pr(T = 1|X = x)$. The reweighting factor can be written

$$\Psi(X) = \frac{Pr(X|T = 1)}{Pr(X|T = 0)} = \frac{Pr(T = 1|X)/Pr(T = 1)}{Pr(T = 0|X)/Pr(T = 0)} = \left(\frac{p(X)}{1 - p(X)}\right)\left(\frac{1 - p}{p}\right)$$

We use the RIF-regressions for the detailed decomposition. Letting $\nu_T = \nu(F_T)$ and $\nu_C = \nu(F_C)$, we can therefore write the distributional statistics ν_0, ν_1, and ν_C as expectations : $\nu_T = \mathbb{E}[RIF(y_T; \nu_T)|T]$, and $\nu_C = E[RIF(y_0; \nu_C)|T = 1]$. Then we obtain

$$
\begin{aligned}
\Delta_R^\nu &= \nu_1 - \nu_C \\
&= \int \mathbb{E}(RIF(y_1,\nu_1)|X=x,T=1)dF_{X_1}(x) - \int \mathbb{E}(RIF(y_0,\nu_C)|X=x,T=1)dF_{X_1}(x) \\
&= \mathbb{E}(X|T=1)(\gamma_1^\nu - \gamma_C^\nu),
\end{aligned}
$$

$$
\begin{aligned}
\Delta_X^\nu &= \nu_C - \nu_0 \\
&= \int \mathbb{E}(RIF(y_0,\nu_C)|X=x,T=1)dF_{X_1}(x) - \int \mathbb{E}(RIF(y_0,\nu_0)|X=x,T=0)dF_{X_0}(x) \\
&= \mathbb{E}(X|T=1)\gamma_C^\nu - \mathbb{E}(X|T=0)\gamma_0^\nu
\end{aligned}
$$

and

$$
\Delta_O^\nu = \underbrace{\mathbb{E}(X|T=1)(\gamma_1^\nu - \gamma_C^\nu)}_{\Delta_R^\nu} + \underbrace{\mathbb{E}(X|T=1)\gamma_C^\nu - \mathbb{E}(X|T=0)\gamma_0^\nu}_{\Delta_X^\nu}.
$$

One difference with the Oaxaca-Blinder decomposition is that the coefficient γ_C^ν (the regression coefficient when the group 0 data is reweighted to have the same X distribution as the group 1) is used instead of γ_0^ν (the unadjusted coefficient for group 0). The reason for using γ_C^ν instead of γ_0^ν is that the difference $\gamma_1^\nu - \gamma_C^\nu$ solely reflects differences between the returns structures while the difference $\gamma_1^\nu - \gamma_0^\nu$ may be contaminated by differences in the distribution of X between the two groups. If the linear approximation is correct then $\gamma_C^\nu = \gamma_0^\nu$, and we obtain the usual Oaxaca-Blinder decomposition.

Estimation

We need to estimate the different decomposition elements that we have just introduced : ν_1, ν_0, ν_C, γ_1, γ_0 and γ_C. For ν_1, ν_0, γ_1 and γ_0, the estimation is very standard because the distributions F_1 and F_0 are directly identified from data on (Y,T,X). The distributional statistics ν can be estimated using their sample analog in the data, while the γ's are estimated using ordinary least square methods. However, to estimate ν_C and γ_C, we need to estimate the weighting function $\psi(X)$. The estimation strategy proceeds in three steps : first we estimate the weights, then the distributional statistics, and finally the estimates of the RIF-regressions. We apply the setting to the quantile distributions. To estimate the weight, we estimate the reweighting factor as

$$
\hat{\psi}(X) = \left(\frac{1-\hat{p}}{\hat{p}}\right)\left(\frac{\hat{p}(X)}{1-\hat{p}(X)}\right),
$$

where $\hat{p}(.)$ is an estimator of the true probability of being in group 1 given X and is estimated with a probit model. We multiply the sample weights by the reweighting factor to obtain the final weights and run the regressions. We estimate ν_0, ν_1 and ν_C using their sample analog. We compute the distributional statistics $\hat{\nu_T} = \nu(\hat{F}_T)$ and $\hat{\nu_C} = \nu(\hat{F}_C)$ directly from the observations (with appropriated weights). Then, we can compute the return and the composition effects as $\hat{\Delta}_R^\nu = \hat{\nu_1} - \hat{\nu_C}$ and $\hat{\Delta}_X^\nu = \hat{\nu_C} - \hat{\nu_0}$.

Tableau .1 – Model A with reweighting

	Q10		Q20		Q30		Q40		Q50		Q60		Q70		Q80		Q90	
Prediction 2009	**-394,34**	2,60	**-438,60**	1,99	**-470,81**	2,15	**-496,77**	1,90	**-518,78**	1,42	**-541,35**	1,62	**-565,12**	1,82	**-589,03**	1,91	**-621,55**	2,01
Prediction 2000	**-369,44**	3,54	**-419,87**	2,92	**-456,43**	2,13	**-486,45**	1,96	**-510,40**	2,00	**-536,91**	2,06	**-563,36**	1,70	**-592,46**	2,18	**-626,02**	2,16
Difference	**-24,89**	4,46	**-18,73**	3,27	**-14,38**	3,14	**-10,31**	2,87	**-8,38**	2,39	**-4,44**	2,63	-1,76	2,40	3,43	2,87	**4,47**	3,06
Explained																		
Month of birth	2,47	4,62	1,87	4,04	0,37	3,46	-0,85	3,39	0,92	3,02	1,08	3,50	1,40	3,13	3,01	3,17	0,70	3,56
Girl	0,23	3,14	3,55	3,00	0,31	2,89	-2,19	2,75	**-4,34**	2,44	-1,97	2,03	-2,58	2,17	-0,13	2,22	-1,59	3,37
Immigration background	**2,83**	1,82	**3,57**	1,61	**3,48**	1,46	1,94	1,81	**3,36**	1,52	**1,36**	0,97	0,87	1,02	0,73	1,13	1,09	1,55
Socioeconomic background	-19,83	13,38	-10,21	11,25	-3,84	8,47	-12,10	9,24	**-12,85**	7,71	2,57	5,62	0,88	4,93	-0,33	4,31	-1,24	5,57
School degree and track	0,45	2,89	2,59	2,93	1,91	3,24	**6,01**	4,43	**7,72**	4,21	3,61	3,49	1,93	2,95	2,80	2,77	2,14	2,47
Specialized Education	-0,30	1,41	**-1,78**	1,08	**-1,94**	0,90	**-1,70**	0,60	**-1,19**	0,47	-0,33	0,35	-0,03	0,26	-0,15	0,23	0,28	0,22
Private sector	2,08	1,80	2,34	1,64	**2,85**	1,40	**3,50**	1,09	**2,51**	1,10	-0,87	0,96	-0,05	0,96	-1,14	1,12	-0,63	1,19
Lecture Practice	-12,44	7,86	-10,49	5,76	-8,16	5,75	**-8,44**	5,21	-3,40	5,36	-2,34	4,06	3,67	4,47	3,67	4,63	2,57	5,40
Total	-2,37	2,73	**-4,64**	2,62	-2,63	3,00	-1,95	3,58	-0,20	2,51	-2,54	2,42	-3,03	2,14	-2,48	2,02	**-4,49**	2,49
Unexplained																		
Month of birth	3,24	6,45	2,35	4,95	5,86	4,19	**9,24**	3,94	**5,82**	3,35	2,43	3,69	3,19	3,69	0,90	3,70	3,23	4,23
Girl	5,41	4,11	-0,75	3,62	2,86	3,06	3,63	3,07	**7,73**	2,78	**7,84**	2,14	**5,74**	2,38	1,89	2,43	2,42	3,28
Immigration background	-0,27	2,63	**-5,12**	1,91	**-3,12**	1,60	-1,86	1,68	**-3,92**	1,60	-1,25	1,16	-0,94	1,17	-0,61	1,24	-2,19	1,70
Socioeconomic background	1,07	16,69	-13,95	12,99	-11,11	9,27	-4,77	9,79	2,97	8,20	**-8,34**	6,12	-5,32	5,18	1,39	4,89	0,18	5,17
School degree and track	**-5,28**	3,63	**-11,02**	3,98	**-6,22**	3,64	**-8,85**	4,58	-8,38	4,36	-3,11	3,32	-3,49	2,22	-3,74	2,23	1,56	1,92
Specialized Education	**-7,36**	2,32	**-3,05**	1,53	-0,67	1,05	0,18	0,68	0,47	0,50	0,29	0,45	0,53	0,43	0,46	0,37	0,08	0,30
Private sector	**-3,19**	2,38	**-3,10**	1,94	**-3,28**	1,51	**-2,66**	1,25	**-2,68**	1,14	**2,05**	1,05	**2,01**	0,97	**2,15**	1,10	**3,26**	1,28
Lecture Practice	-1,44	10,71	**-13,45**	7,67	3,95	6,07	**12,52**	5,16	6,06	5,32	4,03	4,56	-1,68	5,10	-0,81	5,41	-4,23	5,39
Intercept	-14,73	23,37	**33,98**	18,00	-0,02	14,05	**-15,80**	12,27	**-16,26**	10,65	-5,84	9,62	1,24	9,13	4,27	9,61	4,64	10,11
Total	**-22,53**	3,93	**-14,09**	3,05	**-11,75**	2,65	**-8,37**	3,19	**-8,18**	2,27	-1,90	2,15	1,27	1,85	**5,90**	2,25	**8,95**	2,42

Standard errors are computed with boostrap (200 replications)

Bibliographie

Ammermueller, A. (2008). Pisa : What makes the difference ? In *The Economics of Education and Training*, pp. 241–265. Springer.

Barrera-Osorio, F., V. Garcia-Moreno, H. Patrinos, and E. E. Porta (2011). Using the oaxaca-blinder decomposition technique to analyze learning outcomes changes over time : an application to indonesia's results in pisa mathematics. *World Bank Policy Research Working Paper Series, Vol*.

Baudelot, C. and R. Establet (2009). L'élitisme républicain. *Paris : Seuil*.

Bénabou, R., F. Kramarz, and C. Prost (2009). The french zones d'éducation prioritaire : Much ado about nothing ? *Economics of Education Review 28*(3), 345–356.

Blinder, A. (1973). Wage discrimination : reduced form and structural estimates. *Journal of Human resources*, 436–455.

Chardon, O., F. Daguet, and É. Vivas (2008). Les familles monoparentales. des difficultés à travailler et à se loger. *Insee première 1195*.

Cosnefroy, O. and T. Rocher (2004). Le redoublement au cours de la scolarité obligatoire : nouvelles analyses, mêmes constats. *Éducation & formations* (70), 73.

Di Nardo, J., N. Fortin, and T. Lemieux (1996). Labor market institutions and the distribution of wages 1973-1992 : a semiparametric approach. *Econometrica 64*.

Duru-Bellat, M., J.-P. Jarousse, and A. Mingat (1993). Les scolarités de la maternelle au lycée. étapes et processus dans la production des inégalités sociales. *Revue française de sociologie 34*(1), 43–60.

Figlio, D. and M. Page (2002). School choice and the distributional effects of ability tracking : does separation increase inequality ? *Journal of Urban Economics 51*(3), 497–514.

Firpo, S., N. Fortin, and T. Lemieux (2007). Decomposing wage distributions using recentered influence function regressions. *University of British Columbia (June)*.

Firpo, S., N. Fortin, and T. Lemieux (2009). Unconditional quantile regressions. *Econometrica 77*(3), 953–973.

Firpo, S., N. Fortin, and T. Lemieux (2011). Decomposition methods in economics. *Handbook of labor economics 4*, 1–102.

Galindo-Rueda, F. and A. Vignoles (2007). The heterogeneous effect of selection in u.k secondary schools. *Schools and the equal opportunity problem*, 103–128.

Gamoran, A. (1996). Curriculum standardization and equality of opportunity in scottish secondary education : 1984-90. *Sociology of Education*, 1–21.

Ganzeboom, H., P. De Graaf, and D. Treiman (1992). A standard international socio-economic index of occupational status. *Social science research 21*(1), 1–56.

Gary-Bobo, R., M. Goussé, and J.-M. Robin (2014). Grade retention and unobserved heterogeneity. Technical report, cemmap working paper, Centre for Microdata Methods and Practice.

Gigena, M., M. Vera, R. Giuliodori, and H. Gertel (2011). Exploring the gap difference in 2000-2009 pisa test scores between argentina, chile and mexico. *Regional and Sectoral Economic Studies 11*(3).

Grisay, A. (1993). *Le fonctionnement des collèges et ses effets sur les élèves de sixième et de cinquième*. Université de Liège and Ministère de l'éducation nationale (1993-1995). Direction de l'évaluation et de la prospective. France.

Jackson, G. (1975). The research evidence on the effects of grade retention. *Review of Educational Research*, 613–635.

Jakubowski, M., H. A. Patrinos, E. E. Porta, and J. Wisniewski (2010). The impact of the 1999 education reform in poland.

Jimerson, S., S. Pletcher, K. Graydon, B. Schnurr, A. Nickerson, and D. Kundert (2006). Beyond grade retention and social promotion : Promoting the social and academic competence of students. *Psychology in the Schools 43*(1), 85–97.

Jonsson, J. and R. Erikson (2000). Understanding educational inequality : the swedish experience. *L'Année sociologique 50*(2), 345–382.

Kloosterman, R. and P. de Graaf (2010). Non-promotion or enrolment in a lower track ? the influence of social background on choices in secondary education for three cohorts of dutch pupils. *Oxford Review of Education 36*(3), 363–384.

Le Donné, N. (2014). European variations in socioeconomic inequalities in students' cognitive achievement : The role of educational policies. *European Sociological Review*, jcu040.

Levasseur, J. and C. Seibel (1985). les apprentissages instrumentaux et le passage du cours préparatoire au cours élémentaire. *Education et Formations* (83).

Manning, A. and J. S. Pischke (2006). *Comprehensive versus Selective Schooling in England and Wales : What Do We Know ? CEE DP 66.* ERIC.

Maurin, É. (2004). *Le ghetto français : enquête sur le séparatisme social*. Seuil.

Maurin, É. (2007). La nouvelle question scolaire. *Les bénéfices de la démocratisation, Paris, Le Seuil*.

MEN (1998). Repères et références statistiques sur les enseignements, la formation et la recherche.

MEN (2009). Repères et références statistiques sur les enseignements, la formation et la recherche.

Merle, P. (2012). *La ségrégation scolaire*. Découverte.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International economic review*, 693–709.

OECD (2004). Pisa 2003 key findings. what makes a school system perform ? seeing school system through the prism of pisa.

OECD (2010a). Pisa 2009 key findings. what makes a school successful ?, vol.4.

OECD (2010b). Pisa 2009 key findings. learning trends : Changes in student performance since 2000, vol.5.

Palme, M. and C. Meghir (2005). Assessing the effects of schooling on wages using a social experiment. *American Economic Review 95*(1), 414.

Pekkarinen, T., R. Uusitalo, and S. Kerr (2009). School tracking and intergenerational income mobility : Evidence from the finnish comprehensive school reform. *Journal of Public Economics 93*(7), 965–973.

Prioux, F. and M. Barbieri (2012). L'évolution démographique récente en france : une mortalité relativement faible aux grands âges. *Population (00324663) 67*(4).

Reynolds, A. (1992). Grade retention and school adjustment : An explanatory analysis. *Educational Evaluation and Policy Analysis 14*(2), 101–121.

Sassler, S., K. Williams, F. R. Addo, A. Frech, and E. Cooksey (2013). Family structure and high school graduation : how children born to unmarried mothers fare. *Genus 69*(2).

Schleicher, A. et al. (1999). *Measuring student knowledge and skills : a new framework for assessment*. OECD Publishing.

Van de Werfhorst, H. and J. Mijs (2010). Achievement inequality and the institutional structure of educational systems : A comparative perspective. *Annual Review of Sociology 36*, 407–428.

Van Zanten, A. and J.-P. Obin (2008). *La carte scolaire*. Presses universitaires de France.

Wu, M. and R. Adams (2002). Pisa 2000 technical report.