The Relative Risk-Percentage Equity Index:
Measuring Equity in Reading Achievement Across PIRLS 2006 Countries

Kathleen L. Trong
TIMSS & PIRLS International Study Center
Boston College
trong@bc.edu

Abstract

This research used data from PIRLS 2006 to explore an approach to measuring equity in reading achievement internationally at the fourth grade. Relative risk ratios were selected as a measurement approach and were used to create a composite measure, the Relative Risk-Percentage (RRP) Equity Index, to compare equity in reading achievement across countries. This index was used to present the likelihood of scoring below the PIRLS 2006 Low International Benchmark for student groups that were traditionally at risk for low reading achievement compared to other students. The 'at risk' student groups that were the focus of this study included those with low parental education, who spoke a language other than the language of instruction, who attended urban or rural schools, and who were boys. To complement the RRP Equity Index results, the relative likelihood of students scoring within the lower 20 percent of their country's reading achievement distribution was also presented. Overall, having parents with less than secondary education and not speaking the language of the test before starting school were associated with inequity in reading achievement in the largest number of PIRLS 2006 countries.

Keywords: equity, relative risk, literacy, PIRLS, reading achievement

Introduction

Equity is an important issue in education today, and is the focus of much educational policy and research in the United States and around the world (United States Department of Education, 2002; World Conference on Educational for All, 1990). Within this realm, ensuring that all students have the opportunity to learn to read is considered particularly important (Commission of the European Countries, 2008). The value of basic literacy skills to a students' success in school and later in life cannot be underestimated, and the consequences of not learning how to read at an early age are grim (Berlin & Sum, 1988).

Building on these ideas, this research used PIRLS 2006 data to explore an approach to measuring equity in reading achievement internationally. PIRLS 2006 measured reading comprehension at the fourth grade in a diverse group of 40 countries (listed in Table 1) with a comprehensive and valid assessment[1]. Using these well-respected international data, the overarching purpose of this research was to examine educational equity across the PIRLS 2006 countries based on the likelihood of certain groups of students having a disproportionately high risk of being low achievers in reading. By the fourth grade, it is important for students to be able to use reading for learning, and identifying students lacking essential reading skills is the first step in providing them the assistance necessary to be successful in school.

[Take in Table 1 about here]

[1] For more information about the PIRLS 2006 assessment, please see the *PIRLS 2006 Assessment Framework and Specifications (*Mullis, Kennedy, Martin & Sainsbury, 2006).

Defining Equity in Education

There are a myriad of ways to define and measure equity in education, reflecting the complexity and intricacy of the educational process and its inputs and outputs. For the purposes of this research, Berne & Stiefel's (1984) concept of horizontal equity was selected as a way to view equity. That is, equity would exist when students were equally likely to demonstrate basic skills in reading, regardless of their background. However, if fourth grade students with particular background characteristics were more likely to have low reading achievement than students without those characteristics, this was considered an indication of inequity.

Defining Low Reading Achievement

The PIRLS 2006 Low International Benchmark was chosen as the threshold of low reading achievement, meaning that students who scored *below* this point on the PIRLS scale were considered very low reading achievers. Of the four PIRLS Benchmarks, students at the Low International Benchmark displayed the fewest literacy skills. These students were able to recognize clearly stated details and make simple inferences from a text, but did not demonstrate the higher-level skills such as identifying central events or advanced skills such as integrating across the text or evaluating a text. Therefore, students who were *not* able to demonstrate even the basic reading skills of the Low International Benchmark by the fourth grade were considered at serious risk of not learning how to read.

However, in some countries a very high or low percentage of students fell below the Low International Benchmark. In these cases, defining low achievement as scoring below this international threshold is not useful in identifying equity issues within their national context. Therefore, a national threshold of low achievement was also considered, which was defined as scoring below the 20th percentile within each country.

Methods

Relative Risk Ratios

The approach to equity used in this research was operationalized through the use of relative risk analyses. More specifically, relative risk ratios were used to compute whether there was an unequal likelihood of low reading achievement associated with particular student background characteristics.

Relative risk ratios (RR) are traditionally used in epidemiological research to explore the relationship between background characteristics and a health outcome[2]. They have been considered the "gold standard among measures of association for many years" in this field (Benichou & Palta, 2005, p. 113). A common example is the relationship between smoking cigarettes (vs. not smoking) and being diagnosed with cancer (vs. not having cancer). When applied to PIRLS data, this becomes the relationship between having a particular background characteristic such as being male (vs. female) and scoring below a particular threshold on the PIRLS assessment (vs. scoring at or above that threshold). Using these dichotomous factors, RR is calculated in the following way.

[2] Please note that relative risk ratios are sometimes referred to in the literature as prevalence ratios when applied to cross-sectional data.

$$RR = \frac{P_1}{P_0}$$

In this equation, P_1 is the percentage of the total group of students with a particular characteristic who are low achievers and P_0 is the percentage of the total group of students without this characteristic who are low achievers. The resulting ratio expresses the strength of the relationship between these two variables. If there is no relationship, then the RR is 1, indicating that students with the characteristic are just as likely as their peers to be low achievers. Numbers greater than 1 indicate an increased risk of having low achievement, and numbers between 0 and 1 indicate a lesser risk.

Results

Relative risk ratios were used as the foundation from which to develop an approach to measuring equity across countries in PIRLS 2006. This approach included a presentation of Global Relative Risk (GRR) and the Relative Risk-Percentage (RRP) Equity Index for each PIRLS 2006 country.

Global Relative Risk (GRR)

Table 2 shows the percentage of students within each country who did not reach the Low International Benchmark—the students who were the focus of this research. In some countries, the majority of students were unable to demonstrate the basic reading skills associated with the Low International Benchmark. However, in most (29) PIRLS countries, only a small number (less than 10 percent) of students failed to meet this point on the PIRLS achievement scale.

Table 2 also shows the Global Relative Risk (GRR) of performing below the PIRLS 2006 Low International Benchmark. In some countries, even if there was little inequity between student groups, all students may be at an increased risk of illiteracy in comparison to their peers in other countries simply by virtue of the many challenges facing the country's educational system. In this sense, the national context itself was considered a risk factor for low reading achievement at the fourth grade.

[Take in Table 2 about here]

The GRR estimated the relative risk of fourth grade students in a particular country scoring below the Low International Benchmark in comparison to students in all other PIRLS countries. When applied in this context, the relative risk ratio expresses the strength of the relationship between living in a particular country (vs. living in any other country) and scoring below the Low International Benchmark (vs. scoring at or above the benchmark). For example, a GRR of two meant students in a particular country were twice as likely as students in other countries to fall below the PIRLS 2006 Low International Benchmark. Recalling the health applications of relative risk, if one were told that he was twice as likely as people in other countries to have cancer, this would cause great concern. In many ways, not learning how to read at a young age can have similarly grim consequences if nothing is done to remedy the situation.

For this reason, countries with a GRR value of at least 2 were highlighted as having a Moderate level of relative risk, and those with a GRR value of 3 or more were categorized as Severe. These cutpoints were chosen because of the face validity associated with the risk levels. Any fourth grade student who is 3 times as likely as other students at the same level of schooling to be lacking basic literacy skills is most likely in a dire situation regarding future success in school if some assistance is not

provided. Similarly, GRR values of at least 2 but less than 3 were categorized as a Moderate level of risk compared to other countries, because students in these countries were twice as likely as other fourth grade students to have low reading achievement.

When the GRR values were calculated for the PIRLS countries, there were nine countries where students had a significantly higher risk of scoring below the PIRLS 2006 Low International Benchmark compared to students in other countries. Of the countries with relative risk levels significantly greater than 1, students in South Africa (GRR = 6.3), Morocco (GRR = 6.0), Kuwait (GRR = 5.7), Qatar (GRR = 5.3), Indonesia (GRR = 3.5), and Iran (GRR = 3.0) were categorized with a Severe Risk of having poor reading skills as compared to other countries. Trinidad and Tobago (GRR = 2.7) and the Republic of Macedonia (GRR = 2.6) performed slightly better in a global context, though their students were still at a comparatively Moderate Risk of low reading achievement. These risk categories were noted in all subsequent results tables, so that the overall Global Relative Risk of very low reading achievement could be considered alongside the within-country risk for particular student groups.

Relative Risk-Percentage (RRP) Equity Index

Relative risk ratios were chosen for these analyses because they suit the purposes of this research. However, as with any analysis technique, they do have some limitations. While the relative risk is a useful indicator of the relationship between a student characteristic and low achievement, it does not provide information about the size of the group at risk. This is a limitation, as the severity of the problem and the policy implications for addressing equity issues may vary greatly depending upon the size of the student group in question. To address this limitation of the relative risk ratios, a composite index was created to take into account the proportion of the student population with a particular risk factor, called the Relative Risk-Percentage (RRP) Equity Index.

The RRP Equity Index values were computed by weighting the relative risk ratio by the percentage of students possessing the characteristic of interest in the following way, where *P* is the percentage of students in the overall population with the characteristic of interest.

$$RRP = (RR - 1)(P)$$

Weighting the relative risk in this manner allowed consideration of situations in which a small proportion of students was at a high risk of low reading achievement as differentiated from those in which a substantial proportion of students had a slightly elevated risk of low reading achievement. Because the RRP takes into account the size of the ‘at risk’ group (e.g., the percentage of students attending rural schools), comparisons between countries or different groups within a country were more informative than comparisons based on only the RR. This weighted number was not intended to replace the relative risk ratio—it was merely meant to provide further context to aid in interpretation.

Relative Risk-Percentage (RRP) Equity Index Categories

To complement the RRP Equity Index values with descriptive information about the degree of inequity existing in each country, categories were created for the RRP Equity Index values based on judgments of the most serious scenarios of inequity in reading achievement that impacted the largest number of students. Cutpoints were created for both the range of relative risk ratios and for the size of the ‘at risk’ group, while also maintaining a manageable number of categories.

The criteria for the relative risk dimension of the RRP Equity Index categories were identical to those used for Global Relative Risk, and were chosen for similar reasons. Relative risk ratios of 3 or

higher were considered Severe and relative risk ratios of 2 to less than 3 were labeled as Moderate Risk. When considering the second dimension of the RRP Equity Index, the percentage of students in the 'at risk' group, 50 percent (or higher) of students with the risk factor was classified as a 'high' percentage. Combining these two dimensions, four categories were created for classifying the results of the RRP Equity Index.

- SRP indicates a severe level of risk (relative risk ratio >=3) and a high percentage of students in the 'at risk' group (>= 50 percent). This was considered the most critical inequity scenario.

- SR indicates a severe level of risk (relative risk ratio >=3), but without a high percentage of students in the 'at risk' group (< 50 percent).

- MRP indicates a moderate level of risk (relative risk ratio >=2 and < 3) and a high percentage of students in the 'at risk' group (>= 50 percent).

- MR indicates a moderate level of risk (relative risk ratio >=2 and < 3), but without a high percentage of students in the 'at risk' group (< 50 percent).

The relationship between the RRP Equity Index values and the RRP Index categories is shown graphically in Table 3.

These categories are intended to give a descriptive sense of the extent of the inequity for particular student groups in each country to complement the information provided by the RRP Equity Index values. However, within each of these categories the RRP Equity Index values are a useful way to indicate the magnitude of inequity in reading achievement. Therefore, RRP Equity Index values were used to sort and compare countries within each of these categories, but are best considered in conjunction with the component parts of the index.

[Take in Table 3 about here]

RRP Equity Index Results for Students Whose Parents Have Less than Secondary Education

Table 4 presents the RRP Equity Index results across the 40 PIRLS 2006 countries for fourth grade students whose parents had less than secondary education. The large number of shaded countries indicates that there was inequity for low achievement in reading associated with this student characteristic in a substantial number of countries. In fact, the RRP Equity Index results showed more disparity associated with this 'at risk' characteristic than any other considered in this study.

[Take in Table 4 about here]

The first column in the table contains the category and value for the RRP Equity Index. For the equity analyses conducted for students with parents with low levels of education, 20 of the PIRLS 2006 countries fell into the SR category. The SR category indicates an RR of at least 3 but less than 50 percent of the students in the 'at risk' group. This means that in all 20 countries students whose parents had less than secondary education were at least three times more likely to be low achievers in reading than their classmates with better-educated parents.

Germany had a particularly high RRP Equity Index value (270) because German fourth grade students with poorly educated parents were nearly nine times more likely than their classmates to fall

below the PIRLS 2006 Low International Benchmark, and these students comprised more than a third (36%) of the population. Hungary and Poland also had values greater than 100, followed by Romania and Spain (91 and 84, respectively).

Iran was categorized as MRP despite an RRP Equity Index value greater than 100, because the relative risk (2.8) for students whose parents had less than secondary education did not quite meet the criteria of 3 for being categorized as Severe. However, Iranian fourth grade students whose parents had less than secondary education were nearly at three times the risk of having low reading achievement and Iran was one of the few countries with a large percentage of students in the 'at risk' group. Nearly two-thirds (65%) of the fourth grade students (well over the 50% cutoff) in Iran had parents with less than secondary education. Four other countries were categorized as MR including Moldova, Macedonia, France, and Scotland. This indicates RRs of at least 2 but lower than 3, meaning that students in the 'at risk' group were at least twice as likely as their peers to be lacking fundamental reading skills. For these four countries, the size of the 'at risk' group varied considerably from almost half in Moldova (44%), to about one-fourth in Macedonia (24%), to smaller percentages in France and Scotland (13-15%).

Looking across the various columns in Table 4, from the second column showing the percentage of students in each country below the PIRLS 2006 Low International Benchmark it can be seen that there was not any particular relationship across countries between this percentage and those students having parents with less than secondary education being more or less likely than their classmates to be below the Low Benchmark. In general, the Severe Risk countries had comparatively few students below the Low Benchmark. With 15 to 16 percent, Romania and Israel had the highest percentages and the rest of the countries had from 2 to 8 percent.

The third column shows the percentage of students in the 'at risk' group for each country. There was an enormous range across the countries in the percentage of students whose parents had less than secondary education, but the size of this percentage was not necessarily an indicator of inequity. Morocco had the highest percentage of students (79%) whose parents had less than secondary education, followed by Iran and Indonesia (65-66%) and then Moldova, South Africa, and Luxembourg (41-44%).

The percentage of students in each country achieving below the PIRLS 2006 Low International Benchmark in the 'at risk' group is shown in the fourth column. If there was equity of reading achievement for this group, the percentage of students below the Low Benchmark whose parents had less than a secondary education would be equivalent to the percentage of students in the country as a whole whose parents had less than secondary education (shown in previous column). That is, students whose parents had less than secondary education would be distributed across the range of reading achievement in the same proportions as the rest of the students in the country. The extent to which students whose parents had less than a secondary education were overrepresented in a country's percentage of students below the Low Benchmark indicates inequity for this group. The relative risk ratio results, shown in column five, are a way of quantifying the degree of inequity associated with students in the 'at risk' group being more likely than their peers to lack essential reading skills by the fourth grade. RR results significantly greater than 1 (at the .05 level) are designated with the up arrow.

The last two columns in Table 4, columns six and seven, contain the results for relative risk analyses that used the national 20th percentile as the threshold for low reading achievement in each country. For these analyses, students in some countries were better or worse readers than students in other countries. However, for equity to exist across countries, it needs to exist within countries so that no particular student groups are overrepresented among the poorest readers.

Thus, column six presents the percentage of students below the 20th percentile whose parents have less than secondary education. Parallel to the previous discussion about the percentages of 'at risk'

students below the Low International Benchmark, the degree to which the percentage of 'at risk' students below the 20th percentile exceeds the percentage of students whose parents had less secondary education in the country as whole indicates the degree of inequity for that group in being overrepresented among the country's lowest achievers in reading. The RR results shown in the last column (seven) are a way of quantifying the degree of inequity within each country for students whose parents had less than secondary education being among the poorest readers in their country.

The RR results associated with fourth grade students whose parents had less than secondary education being more likely than their peers to be among a country's lowest achievers in reading show that every PIRLS 2006 country had some degree of inequity for this group of students. The RR was at least 2 in many countries and significantly greater than 1 in every country except Georgia. The extent of the inequity varied across countries, with the RR results ranging from a high of 4.6 in the Slovak Republic to a low of 1.6 in Hong Kong SAR. Countries with RR's of 4 or higher where students whose parents had less than secondary education were four times more likely than their peers to be among the country's poorest readers included the Slovak Republic, Israel, Iran, and Macedonia.

RRP Equity Index Results for Students Who Did Not Speak the Language of the Test Before Starting School

Table 5 presents the RRP Equity Index results for students who did not speak the language of the test before starting school. The PIRLS 2006 countries, if at all possible, assessed students in their language of instruction. Thus, in most cases, it can be assumed that if students did not speak the language of the test before starting school, they also did not speak the language of instruction.

[Take in Table 5 about here]

The percentage of students who did not speak the language of the test before starting school (third column) varied considerably from country to country. Although many countries had less than 10 percent of their students in the 'at risk' category, the underlying causes of differences between students' mother tongue and the language of testing vary dramatically from centuries of cultural heritage to yesterday's wave of immigration.

In the chapters written for the *PIRLS 2006 Encyclopedia* (Kennedy, Mullis, Martin, & Trong, 2007), each country provided information about the official languages spoken in the country and the policies concerning the language of instruction for fourth grade students. For example, Luxembourg had the largest percentage of students (67%) who did not speak the language of the test before starting school, because students speak Luxembourgish at home and during the initial years of schooling. In the third grade, they begin instruction in German and were tested in German for PIRLS (at the fifth grade).

Table 5 shows 13 shaded countries, indicating that students who did not speak the language of the test before starting school were at least twice as likely as their classmates to be below the PIRLS 2006 Low International Benchmark. Nine countries were in the SR category, including Austria, the French speaking part of Belgium, Germany, Sweden, the Slovak Republic, Chinese Taipei, England, Norway, and Slovenia. The relative risk ratios for these fourth grade students ranged from 3 through 5.5. The remaining four shaded countries were in the MR category (RRs of 2 up to 3), including New Zealand, the United States, Scotland, and Denmark.

The highest RRP Equity Index value (29) was in Austria, which had 7 percent of its students in the 'at risk' group, and they were five times more likely than their classmates to have reading skills below the PIRLS 2006 Low International Benchmark. The 4 percent of 'at risk' students in the Slovak Republic

also were five times as likely as their classmates to have extremely poor reading skills (although this statistic had a relatively large standard error and was not significant).

Besides the 13 shaded countries, the relative risk ratio was significantly greater than one in an additional 10 countries. Among these countries, although Iran missed the cutoff for the MR categorization, it had a relatively high RRP Equity Index value (21) for this 'at risk' group and has a very different pattern from the 13 countries in the MR or SR categories. Compared to those countries, Iran had a substantially greater percentage of students (25%) who did not speak the language of the test before starting school and a somewhat lower RR of 1.8.

Looking at the results for the students below the 20th percentile of reading achievement within each country, the RR for students who did not speak the language of the test before starting school being more likely than their peers to be among a country's lowest readers was significantly greater than one in most of the countries. However, these relative risk ratios were generally moderate, ranging from 1.4 to 2.9. In general, the results for the lowest 20 percent of students reflect the findings from analyses of the students below the PIRLS 2006 Low International Benchmark.

RRP Equity Index Results for Students Who Did Not Always Speak the Language of the Test at Home

Table 6 presents the RRP Equity Index results for students who reported that they did not always speak the language of the test at home. In PIRLS 2001 and 2006, the relationship between speaking a second language at home and reading achievement varied substantially across countries (Mullis et al., 2007; Mullis et al., 2003). While students who always spoke the language of the test had higher achievement on average internationally, there were several multilingual countries (e.g., Hong Kong SAR, South Africa) where fourth grade students who sometimes spoke a different language at home had the highest PIRLS scores.

[Take in Table 6 about here]

The percentage of students who did not always speak the language of the test at home fluctuated from country to country. As the third column of Table 6 shows, the size of this 'at risk' group ranged from 15 percent in Georgia to nearly all students (97%) in Luxembourg. Similar to patterns found in the previous exhibit, which focused on students who did not speak the language of the test before starting school, countries with one dominant language, such as Denmark and Norway (19-20%), tended to have fewer students in this 'at risk' category than countries with multiple prominent languages, such as Luxembourg, Singapore, and Kuwait (74-97%). In many of these multilingual countries, it seems logical that a large proportion of students would speak a language different from the one used in school because instruction is usually not provided in students' mother tongue.

There were four countries where students with this characteristic were at Severe or Moderate Risk of performing below the Low International Benchmark (Austria, the Slovak Republic, Bulgaria, and Germany), meaning that these student were at least twice as likely to have low reading achievement as students who always spoke the language of the test at home. Within each of these countries, roughly one quarter (25-30%) of fourth grade students were in the 'at risk' group. In the three countries in the MR category (the Slovak Republic, Bulgaria, and Germany), students with this risk factor comprised around half of the students below the PIRLS 2006 Low International Benchmark. This resulted in relative risk ratios between 2.2 and 2.5, though results in Germany were not statistically significant.

In Austria, which was the only country with a RR greater than 3, students who did not always speak the language of the test at home made up 63 percent of those with poor reading skills, resulting in a RR of 4.8 and an RRP value (101) more than double that found in any other country. Austria also had the highest RRP value for students who did not speak the language of the test before starting school (shown in Table 5), demonstrating the close relationship between these two risk factors for low reading achievement.

In the countries where students who did not always speak the language of the test at home were at least twice as likely as other students to have low reading achievement, there tended to be one language dominantly used in education. This was also the case in the five other countries with RR values significantly greater than 1 for this 'at risk' group, including Iran, the French speaking part of Belgium, England, New Zealand, and Norway. Of the eight countries with significant relative risk ratios, only three administered the PIRLS 2006 assessment in more than one language (the Slovak Republic, New Zealand, and Norway). In each of these countries the second language of administration was intended for a small minority group. In the Slovak Republic, for example, most students are educated in Slovak but there are some regions where instruction is provided in a minority language, primarily Hungarian (Lukackova & Obrancova, 2007). Therefore, a Hungarian version of the assessment was provided in these regions.

Signifying the culturally-specific role of language in education, there were also eight countries where fourth grade students who did not always speak the language of the test at home were *less* likely to have low reading achievement than their classmates who always spoke the language of the test. These countries included Chinese Taipei, Indonesia, Israel, Kuwait, Macedonia, Moldova, Qatar, and South Africa. In many of these countries, a substantial percentage of the student population spoke a second language and multiple languages were often a part of the culture and education system.

Focusing on the RR results as an equity indicator using the national 20th percentile as the threshold for low reading achievement, fourth grade students who did not always speak the language of the test at home had a significantly greater risk of low reading achievement in 18 of the PIRLS countries. In general, the level of risk in these countries was fairly moderate, ranging from 1.2 in Canada to 2.4 in Germany. There were also eight countries where multilingual students had an RR significantly less than 1, consistent with the patterns seen for the Low International Benchmark.

RRP Equity Index Results for Students Attending Rural Schools

Table 7 presents the RRP Equity Index results for students attending rural schools. As one would expect given the diverse group of countries that participated in PIRLS 2006, the third column of Table 7 shows that the proportion of students attending rural schools varied substantially across countries. While only three percent of students in Qatar attended rural schools, nearly three-fourths (74%) of the fourth grade students in Indonesia did.

[Take in Table 7 about here]

Seven countries are shaded in this exhibit, indicating that students in these countries attending rural schools had a Moderate or Severe Risk of lacking basic reading skills relative to their peers. Fourth grade rural students in the Slovak Republic and Israel were three times as likely as students in other schools to be very low reading achievers, placing them in the SR category. Rural students in Romania, Bulgaria, Iran, Hungary, and Macedonia were in the MR category (though the RR values in Bulgaria and Hungary were not statistically significant), meaning they were at least twice as likely as their peers to be in danger of illiteracy. Substantial numbers of students were in danger of this inequity in each of these shaded countries—at least 25 percent of fourth grade students were learning in rural communities, reaching nearly half (48%) in Romania.

The highest RRP Equity Index value (78) for this risk factor was in the Slovak Republic, where 40 percent of students attended rural schools and they were three times as likely as their peers to lack the reading skills at the Low International Benchmark. Romania followed closely behind the Slovak Republic, with an RRP Equity Index value of 74. Though the RR value (2.6) in Romania was below the cutpoint required for the SR category, the large percentage (48) of students in the 'at risk' group resulted in a substantial RRP value.

There was an RR value significantly greater than 1 for rural students in 13 of the PIRLS countries, though the level of risk in eight of these countries was fairly small (below 2). Despite being below the RR cutoff for inclusion in the MR category, several countries had RRP Equity Index values equal to or higher than countries that were in the Moderate Risk category. These countries included Indonesia (RRP = 58), Moldova (RRP = 47), and Poland (RRP = 33). In each of these countries, the relatively high RRP Equity Index values were the result of large percentages of students attending rural schools, in conjunction with RR values close to 2. Indonesia stands out in particular with a higher percentage (78) of rural students than any other country.

Focusing on the national threshold of low reading achievement, the national 20th percentile, trends generally followed those found when the Low International Benchmark was used. Rural students were significantly more likely than urban or suburban students to be at the bottom of their country's achievement distribution in 21 of the PIRLS countries. Included in this group were several countries for which results were not produced for the Low International Benchmark because so few students (less than two percent) scored below the threshold, including Italy, Latvia, Lithuania, and the Russian Federation. Though the RR results were moderate in most cases, rural students in eight countries had at least twice the likelihood of having reading scores in the bottom 20 percent of their country's distribution compared to their peers.

RRP Equity Index Results for Students Attending Urban Schools

While rural students are more disadvantaged and at greater risk of low reading achievement than those in urban or suburban areas in many parts of the world, this differs from country to country. In some countries, students in large, urban centers tend to be disproportionately underprivileged. Table 8 presents the RRP Equity Index results for fourth grade students attending urban schools in the PIRLS 2006 countries. The few shaded countries indicate that, by and large, there was little inequity associated with this student characteristic in most PIRLS countries. However, for the several countries where urban students were at risk of low reading achievement compared to rural or suburban students, the level of inequity was substantial.

[Take in Table 8 about here]

Urban students were at least twice as likely as other students to score below the PIRLS 2006 Low International Benchmark in three of the PIRLS countries—Germany, England, and Austria. These were also the only three countries with RR values significantly greater than one. There are several similarities across these countries. First, they all have high reading achievement on average, with few students (7% or less) lacking the skills associated with the Low International Benchmark. In addition, each of these countries had a considerable number (30-50%) of students attending urban schools. Contextually, there is also a pattern, as all of these countries are located in Western Europe, highly developed, and have one primary language. However, the level of inequity in reading outcomes for urban students varied within this group.

Germany is highlighted as the only country in the Severe Risk category and has an extreme RRP value (219) and very high relative risk ratio (6.9)—more than double the values in any other country.

Urban students in England and Austria, the two countries in the MR category, had much lower levels of risk than those found in Germany. While the RRs were still substantial (2.7 and 2.1, respectively), they were less than half of the German RR value. This disparity in results seems unusual given the many similarities of these three countries. However, other research has also found that immigrant students in Germany (many of which attend urban schools) not only have low performance in reading, but that their performance is lower than that of comparative immigrant groups in other countries (Mannitz, 2004).

Results using the national 20th percentile as the threshold of low reading achievement were similar to those for the Low International Benchmark. In the majority (24) of the PIRLS 2006 countries, urban students were significantly less likely than rural or suburban students to score at the bottom of their country's achievement distribution. Urban students in six countries had a significantly greater risk than their peers of being in the bottom 20 percent of the country's reading achievement distribution. The level of risk in these countries was fairly low, with a maximum RR value of 2.1 in England. The other countries with RR results significantly greater than 1included Germany, Austria, Canada, the United States, and the Netherlands. Similar to the patterns observed earlier, all of these countries are well developed economically and had high overall achievement on the PIRLS 2006 reading assessment.

RRP Equity Index Results for Boys

Table 9 presents the RRP Equity Index results for fourth grade boys in the PIRLS 2006 countries. In recent years, there has been an increasingly prominent gender gap in reading, with boys demonstrating fewer reading skills than girls. PIRLS 2001 and 2006 found that girls had significantly higher reading achievement than boys in nearly all countries (Mullis et al., 2007, Mullis et al., 2003).

[Take in Table 9 about here]

Unlike other risk factors focused on in this research, the percentage of students in the 'at risk' group varied little across the PIRLS 2006 countries since gender is generally evenly distributed. All countries had a fourth grade student population that was between 48 and 53 percent male. For this reason, the RRP values in Table 9, which are a composite of the relative risk ratio and the percentage of students in the 'at risk' group, rely primarily on the relative risk ratio. Higher RRP values for this risk factor generally indicate that boys were at greater risk of very low reading achievement relative to girls in that country. In 25 of the PIRLS 2006 countries, boys were more likely than girls to lack the reading skills associated with the Low International Benchmark.

Table 9 has several countries (seven) in the MRP category, indicating that boys were at least twice as likely as girls to score below the Low International Benchmark and they comprised at least 50 percent of fourth grade students in those countries. These countries included Singapore, New Zealand, Slovenia, Canada, Austria, Iceland, and Chinese Taipei. The RR values in these countries were fairly low with little variation, ranging from 2.0 to 2.2. Despite these relatively low levels of risk, the RRP values in these countries were substantial (ranging from 48 to 63) because of the high percentage of students in the 'at risk' group.

Turning to the relative risk results that utilized the national 20^{th} percentile as the threshold for low reading achievement, similar patterns emerged. Boys were at a significant risk of low reading achievement compared to girls in the nearly all (35) of PIRLS 2006 countries. However, the level of risk was below 2 in most countries.

Summary of Relative Risk-Percentage Equity Index Results Across Countries

Table 10 summarizes the RRP Equity Index results for low reading achievement across countries for all of the student characteristics that were examined. The countries in this table are arranged in descending order according to the percentage of fourth grade students who scored below the PIRLS 2006 Low International Benchmark, the threshold of low reading achievement that was primarily used in this research.

For the countries listed at the top of Table 10 (South Africa through Indonesia), roughly half or more of the fourth grade students were unable to reach the Low International Benchmark. In these countries, such a large percentage of students fell below the threshold used to define low reading achievement that individual student characteristics were not as strongly related to low achievement as was found in other countries. Instead, the country itself was more of a risk factor for poor achievement in PIRLS 2006, as indicated by the Severe Global Relative Risk (GRR) categorizations for all of these countries.

[Take in Table 10 about here]

However, for the bulk of the PIRLS 2006 countries in the middle of the table (generally Iran through Sweden), substantial inequities in reading achievement emerged using the RRP Equity Index for at least one of the student characteristics examined in this research, meaning that countries have at least one shaded cell. These are countries where the majority of students were able to demonstrate the basic reading skills associated with the Low International Benchmark, while a subset of students (2-40%) did not meet this threshold. Therefore, the RRP Equity Index's use of the Low International Benchmark as an achievement cutpoint was useful in identifying the relative risk of belonging to this low-achieving subgroup associated with particular student characteristics for these countries.

Some countries did have student groups classified as being at Moderate or Severe Risk more frequently than others, with Austria categorized as having a Moderate or Severe Risk for five of the six risk factors examined. These five student groups were at least twice as likely as other students in Austria to lack the basic reading skills associated with the Low International Benchmark. Some may view this as a minor issue, given that few students (2%) overall in Austria fell below this reading achievement threshold in PIRLS 2006. However, there were other countries with similar levels of overall achievement (e.g., Canada, Sweden) that did not have inequity in literacy outcomes to this extent. Within these five characteristics that were associated with poor reading achievement in Austria, the highest RRP value (101) was for students who did not always speak the language of the test at home.

In some countries, there was little inequity in low reading achievement for the risk factors examined. However, it is important to keep in mind that this research examined a limited number of student characteristics, and that there are other characteristics that would be important to consider in particular countries. In the United States, for example, it would be important to examine equity in reading achievement for different racial or socioeconomic groups. Also, the United States did not have data available for parental education (because it did not administer the parent questionnaire).

For countries at the bottom of Table 10 (Italy through the Netherlands), nearly all students (more than 98%) possessed basic reading skills. In these cases, there were too few students below the Low International Benchmark to compute meaningful RRP Equity Index results. Where there were too many or too few low achieving students to provide optimal information about equity in reading outcomes, the national threshold of low reading achievement (bottom 20%) was a particularly important complement to the RRP Equity Index.

Conclusions

The development of an equity measurement approach that can be used to make comparisons between student groups and across countries can be considered a contribution to the existing body of literature concerning measuring equity in education. The approach used in this research may be particularly useful for policymakers and the research community because it was developed using the PIRLS 2006 international database. No study besides PIRLS provides such high quality and comparable data collected at a single point in time across such a wide range of countries for reading at the primary level. In addition to the quality assurance that using such renowned data lent to this research, the extensive information available in the PIRLS 2006 international database may also encourage future research to further explore equity issues that were revealed by this dissertation. Similarly, the fact that PIRLS is a trend study that collects data every five years presents unparalleled future opportunities to examine equity in reading achievement internationally at the fourth grade over time.

Such unique information is relevant to a number of policy initiatives around the world. Equity in education is often cited as an important goal, but can be difficult to measure quantitatively. These analyses showed that PIRLS 2006 is a potential vehicle for presenting achievement equity in a quantitative manner, and could be used to measure progress towards equity goals.

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Table 1 PIRLS 2006 Participants

Austria	Indonesia	Poland
Belgium (Flemish)[1]	Iran, Islamic Rep. of	Qatar
Belgium (French)	Israel	Romania
Bulgaria	Italy	Russian Federation
Canada[2]	Kuwait	Scotland
Chinese Taipei	Latvia	Singapore
Denmark	Lithuania	Slovak Republic
England	Luxembourg	Slovenia
France	Macedonia, Rep. of	South Africa
Georgia	Moldova, Rep. of	Spain
Germany	Morocco	Sweden
Hong Kong SAR	Netherlands	Trinidad and Tobago
Hungary	New Zealand	United States
Iceland	Norway	

[1] Because Belgium has two educational systems, French and Flemish Belgium participated separately in PIRLS and were treated separately in this study, resulting in 41 participants total.

[2] In PIRLS 2006, the five Canadian provinces of Alberta, British Columbia, Ontario, Quebec, and Nova Scotia worked with IEA procedurally and financially so that they could be reported separately but not collectively as a country in the PIRLS 2006 International Report. However, because these provinces represent 88 percent of the student population in Canada, the data for Canada have been combined for the purposes of this research.

Table 2 Global Relative Risk (GRR) of Students in Each Country Scoring Below the PIRLS 2006 Low International Benchmark

	Country	Percentage of Students Below Low Benchmark (400)	GRR of Scoring Below the Low Benchmark Compared to Students in Other Countries	
■	South Africa	78 (1.6)	6.3 (0.1)	h
■	Morocco	74 (2.0)	6.0 (0.2)	h
■	Kuwait	72 (1.2)	5.7 (0.1)	h
■	Qatar	67 (0.7)	5.3 (0.1)	h
■	Indonesia	46 (2.1)	3.5 (0.2)	h
■	Iran, Islamic Rep. of	40 (1.6)	3.0 (0.1)	h
□	Trinidad and Tobago	36 (2.1)	2.7 (0.1)	h
□	Macedonia, Rep. of	34 (1.6)	2.6 (0.1)	h
2a	Georgia	18 (1.3)	1.3 (0.1)	h
	Romania	16 (1.8)	1.2 (0.1)	
2b	Israel	15 (1.2)	1.1 (0.1)	
	Moldova	9 (0.9)	0.6 (0.1)	i
‡	Norway	8 (0.8)	0.6 (0.1)	i
	New Zealand	8 (0.6)	0.6 (0.0)	i
	Belgium (French)	8 (0.7)	0.6 (0.1)	i
	England	7 (1.0)	0.5 (0.1)	i
†	Scotland	7 (0.8)	0.5 (0.0)	i
	Poland	7 (0.7)	0.5 (0.0)	i
	Iceland	7 (0.8)	0.5 (0.0)	i
	Spain	6 (0.8)	0.5 (0.1)	i
	Slovak Republic	6 (0.9)	0.4 (0.1)	i
	Slovenia	6 (0.5)	0.4 (0.0)	i
2a	Bulgaria	5 (1.0)	0.4 (0.1)	i
	France	4 (0.4)	0.3 (0.0)	i
†2a	United States	4 (0.6)	0.3 (0.0)	i
2a	Denmark	4 (0.4)	0.3 (0.0)	i
	Singapore	3 (0.4)	0.2 (0.0)	i
	Chinese Taipei	3 (0.4)	0.2 (0.0)	i
	Germany	3 (0.3)	0.2 (0.0)	i
	Hungary	3 (0.5)	0.2 (0.0)	i
	Austria	2 (0.4)	0.2 (0.0)	i
2a	Canada	2 (0.2)	0.2 (0.0)	i
	Sweden	2 (0.5)	0.1 (0.0)	i
	Italy	2 (0.4)	0.1 (0.0)	i
	Latvia	2 (0.4)	0.1 (0.0)	i
2a	Russian Federation	2 (0.5)	0.1 (0.0)	i
	Lithuania	1 (0.3)	0.1 (0.0)	i
	Luxembourg	1 (0.3)	0.1 (0.0)	i
	Hong Kong SAR	1 (0.2)	0.1 (0.0)	i
†2a	Belgium (Flemish)	1 (0.2)	0.1 (0.0)	i
†	Netherlands	1 (0.3)	0.0 (0.0)	i

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

Table 3 Relative Risk-Percentage (RRP) Equity Index Categories

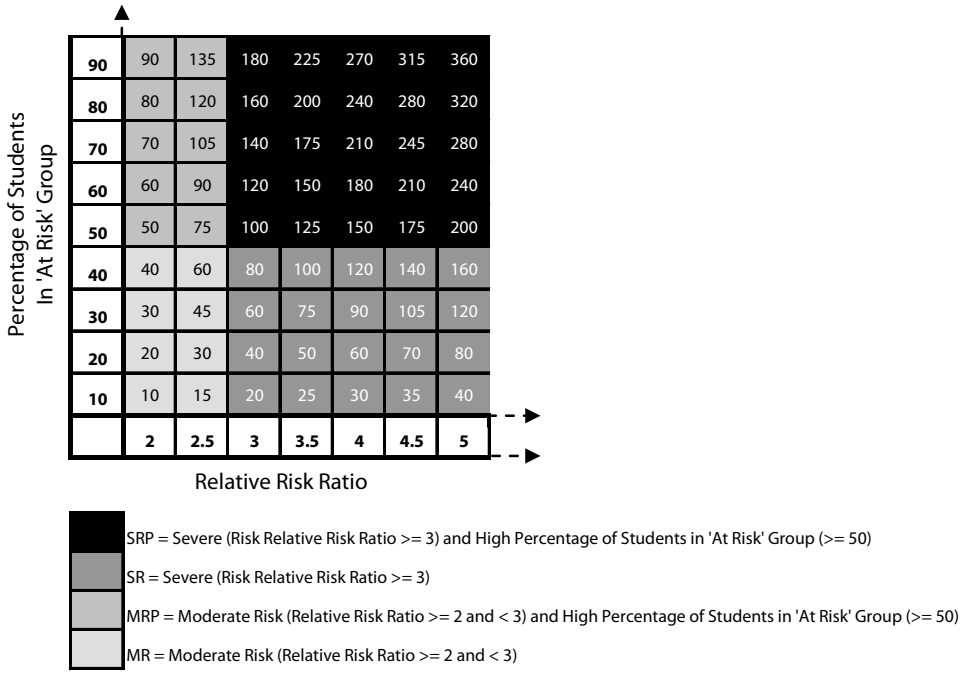

Table 4 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students Whose Parents Have Less than Secondary Education

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Whose Parents Have Less than Secondary Education	Percentage of Students Below Low Benchmark Whose Parents Have Less than Secondary Education	RR of Low Achievement Internationally for Students Whose Parents Have Less than Secondary Education	Percentage of Students Below the 20th Percentile Nationally Whose Parents Have Less than Secondary Education	RR of Low Achievement Nationally for Students Whose Parents Have Less than Secondary Education
		Category	Value						
	Germany	SR	270	3 (0.3)	36 (1.3)	82 (4.9)	8.6 (2.7) h	62 (2.3)	2.9 (0.3) h
	Hungary	SR	121	3 (0.5)	13 (1.5)	60 (8.5)	10.6 (4.0) h	35 (4.1)	3.7 (0.4) h
	Poland	SR	107	7 (0.7)	39 (1.2)	70 (3.3)	3.8 (0.6) h	64 (2.1)	2.8 (0.2) h
	Romania	SR	91	16 (1.8)	29 (2.1)	63 (3.7)	4.1 (0.6) h	59 (3.5)	3.5 (0.4) h
	Spain	SR	84	6 (0.8)	31 (1.6)	62 (6.0)	3.7 (0.9) h	53 (3.3)	2.6 (0.3) h
	Slovak Republic	SR	67	6 (0.9)	6 (0.8)	44 (8.0)	12.3 (2.8) h	23 (3.7)	4.6 (0.4) h
	England	SR	62	7 (1.0)	18 (1.3)	49 (6.6)	4.5 (1.2) h	41 (3.7)	3.3 (0.5) h
	Singapore	SR	62	3 (0.4)	19 (0.8)	50 (4.0)	4.3 (0.7) h	38 (1.5)	2.7 (0.2) h
2a	Bulgaria	SR	48	5 (1.0)	20 (2.1)	46 (5.8)	3.4 (0.8) h	39 (4.5)	2.3 (0.3) h
2b	Israel	SR	46	15 (1.2)	11 (1.1)	39 (4.2)	5.0 (0.7) h	36 (3.6)	4.5 (0.5) h
	Belgium (French)	SR	46	8 (0.7)	19 (1.2)	44 (3.7)	3.4 (0.5) h	36 (2.5)	2.4 (0.2) h
	New Zealand	SR	34	8 (0.6)	10 (0.7)	32 (4.4)	4.4 (0.8) h	24 (2.3)	2.8 (0.3) h
	Sweden	SR	29	2 (0.5)	7 (0.7)	28 (8.5)	5.2 (2.1)	16 (2.1)	2.6 (0.3) h
2a	Denmark	SR	24	4 (0.4)	11 (0.8)	28 (5.2)	3.2 (0.8) h	22 (2.1)	2.3 (0.2) h
	Iceland	SR	23	7 (0.8)	11 (0.5)	28 (3.5)	3.1 (0.5) h	21 (1.6)	2.2 (0.2) h
	Slovenia	SR	22	6 (0.5)	6 (0.5)	23 (2.8)	4.6 (0.7) h	15 (1.4)	2.8 (0.2) h
	Austria	SR	21	2 (0.4)	5 (0.4)	21 (4.1)	5.4 (1.3) h	13 (1.3)	3.0 (0.3) h
	Chinese Taipei	SR	16	3 (0.4)	5 (0.8)	39 (4.4)	4.4 (0.8) h	26 (1.6)	2.3 (0.2) h
2a	Canada	SR	12	2 (0.2)	5 (0.5)	15 (3.9)	3.4 (1.0) h	9 (1.0)	1.9 (0.2) h
‡	Norway	SR	8	8 (0.8)	4 (0.4)	11 (2.2)	3.1 (0.6) h	9 (1.5)	2.5 (0.3) h
■	Iran, Islamic Rep. of	MRP	119	40 (1.6)	65 (2.0)	85 (1.3)	2.8 (0.2) h	90 (1.4)	4.2 (0.6) h
	Moldova	MR	52	9 (0.9)	44 (1.5)	63 (3.8)	2.2 (0.4) h	58 (2.6)	1.8 (0.2) h
□	Macedonia, Rep. of	MR	45	34 (1.6)	24 (1.3)	47 (2.1)	2.9 (0.2) h	55 (2.5)	4.0 (0.4) h
	France	MR	23	4 (0.4)	13 (0.9)	29 (4.6)	2.7 (0.6) h	25 (2.1)	2.2 (0.2) h
†	Scotland	MR	19	7 (0.8)	15 (1.3)	28 (6.3)	2.3 (0.7)	28 (4.2)	2.2 (0.4) h
■	Indonesia		60	46 (2.1)	66 (1.9)	79 (1.8)	1.9 (0.1) h	84 (2.1)	2.7 (0.3) h
■	Morocco		34	74 (2.0)	79 (1.2)	84 (1.2)	1.4 (0.1) h	89 (2.0)	2.3 (0.4) h
□	Trinidad and Tobago		23	36 (2.1)	26 (1.3)	40 (2.0)	1.9 (0.1) h	45 (2.6)	2.3 (0.2) h
■	South Africa		18	78 (1.6)	41 (1.4)	50 (1.2)	1.4 (0.1) h	57 (1.9)	1.9 (0.1) h
■	Qatar		8	67 (0.7)	23 (0.6)	29 (0.8)	1.3 (0.0) h	39 (1.7)	2.1 (0.1) h
■	Kuwait		4	72 (1.2)	19 (1.1)	22 (1.3)	1.2 (0.0)	28 (2.3)	1.7 (0.2) h
2a	Georgia		3	18 (1.3)	4 (0.9)	7 (1.8)	1.7 (0.5)	7 (1.6)	1.7 (0.4)
†2a	Belgium (Flemish)	~	~	1 (0.2)	12 (0.8)	~ ~	~ ~	27 (2.0)	2.8 (0.2) h
	Hong Kong SAR	~	~	1 (0.2)	34 (1.6)	~ ~	~ ~	45 (2.5)	1.6 (0.1) h
	Italy	~	~	2 (0.4)	34 (1.4)	~ ~	~ ~	53 (2.8)	2.2 (0.2) h
	Latvia	~	~	2 (0.4)	5 (0.6)	~ ~	~ ~	10 (1.9)	2.1 (0.3) h
	Lithuania	~	~	1 (0.3)	3 (0.4)	~ ~	~ ~	6 (1.0)	1.9 (0.3) h
	Luxembourg	~	~	1 (0.3)	44 (0.7)	~ ~	~ ~	69 (1.7)	2.9 (0.2) h
†	Netherlands	~	~	1 (0.3)	16 (1.0)	~ ~	~ ~	30 (2.7)	2.2 (0.2) h
2a	Russian Federation	~	~	2 (0.5)	5 (0.5)	~ ~	~ ~	13 (1.8)	3.1 (0.3) h
†2a	United States	-	-	4 (0.6)	- -	- -	- - -	- -	- - -

SRP = Severe Risk (Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe Risk (Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

- Indicates data not available

~ Indicates insufficient data to report results

■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

Table 5 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students Who Did Not Speak the Language of the Test Before Starting School

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Who Did Not Speak the Language of the Test Before Starting School	Percentage of Students Below Low Benchmark Who Did Not Speak the Language of the Test Before Starting School	RR of Low Achievement Internationally for Students Who Did Not Speak the Language of the Test Before Starting School		Percentage of Students Below the 20th Percentile Nationally Who Did Not Speak the Language of the Test Before Starting School	RR of Low Achievement Nationally for Students Who Did Not Speak the Language of the Test Before Starting School	
		Category	Value								
	Austria	SR	29	2 (0.4)	7 (0.6)	27 (3.9)	5.5 (1.0)	h	16 (1.5)	2.8 (0.2)	h
	Belgium (French)	SR	24	8 (0.7)	6 (0.5)	13 (2.1)	4.8 (1.2)	h	12 (1.2)	2.8 (0.3)	h
	Germany	SR	19	3 (0.3)	5 (0.5)	20 (4.1)	4.8 (1.2)	h	13 (1.7)	2.8 (0.3)	h
	Sweden	SR	19	2 (0.5)	5 (0.6)	21 (5.8)	4.6 (1.5)	h	11 (1.5)	2.1 (0.2)	h
	Slovak Republic	SR	19	6 (0.9)	4 (1.1)	20 (8.8)	5.3 (2.3)		12 (3.5)	2.9 (0.5)	h
	Chinese Taipei	SR	18	3 (0.4)	5 (0.4)	20 (3.8)	4.4 (1.0)	h	11 (1.3)	2.1 (0.2)	h
	England	SR	14	7 (1.0)	6 (0.9)	18 (3.5)	3.2 (0.6)	h	14 (2.2)	2.4 (0.3)	h
‡	Norway	SR	10	8 (0.8)	5 (1.1)	14 (3.5)	3.1 (0.6)	h	9 (1.9)	2.0 (0.3)	h
	Slovenia	SR	7	6 (0.5)	2 (0.3)	9 (1.9)	4.4 (0.8)	h	6 (0.8)	2.7 (0.3)	h
	New Zealand	MR	12	8 (0.6)	8 (0.5)	18 (1.9)	2.5 (0.3)	h	14 (1.1)	1.9 (0.2)	h
†2a	United States	MR	7	4 (0.6)	6 (0.5)	12 (3.4)	2.1 (0.6)		11 (1.2)	1.8 (0.2)	h
†	Scotland	MR	7	7 (0.8)	4 (0.5)	10 (2.9)	2.7 (0.8)	h	7 (1.5)	1.8 (0.3)	h
2a	Denmark	MR	5	4 (0.4)	4 (0.5)	9 (2.8)	2.4 (0.8)		7 (1.2)	1.8 (0.2)	h
■	Iran, Islamic Rep. of		21	40 (1.6)	25 (1.8)	38 (2.9)	1.8 (0.1)	h	46 (3.9)	2.5 (0.3)	h
	Spain		11	6 (0.8)	13 (1.0)	21 (3.7)	1.9 (0.4)	h	18 (2.0)	1.5 (0.2)	h
	Singapore		11	3 (0.4)	16 (0.5)	24 (3.0)	1.7 (0.3)	h	22 (1.2)	1.5 (0.1)	h
2a	Bulgaria		8	5 (1.0)	11 (1.7)	17 (4.5)	1.8 (0.5)		18 (3.2)	1.8 (0.3)	h
	Iceland		6	7 (0.8)	6 (0.4)	11 (2.2)	1.9 (0.4)	h	10 (1.2)	1.6 (0.2)	h
	Romania		5	16 (1.8)	7 (1.4)	11 (3.0)	1.8 (0.4)		11 (2.6)	1.7 (0.3)	h
2b	Israel		5	15 (1.2)	6 (0.5)	10 (1.5)	1.8 (0.3)	h	9 (1.1)	1.6 (0.2)	h
■	Morocco		4	74 (2.0)	19 (2.0)	21 (2.5)	1.2 (0.1)	h	27 (6.2)	1.5 (0.4)	
2a	Canada		3	2 (0.2)	11 (0.6)	14 (2.8)	1.3 (0.3)		14 (1.1)	1.4 (0.1)	h
	France		3	4 (0.4)	4 (0.4)	7 (1.8)	1.6 (0.5)		6 (0.9)	1.6 (0.2)	h
■	South Africa		2	78 (1.6)	19 (1.0)	21 (1.1)	1.1 (0.0)	h	26 (1.8)	1.5 (0.1)	h
2a	Georgia		2	18 (1.3)	5 (1.5)	6 (1.2)	1.4 (0.5)		6 (1.1)	1.4 (0.5)	
■	Qatar		1	67 (0.7)	7 (0.3)	15 (0.7)	1.2 (0.0)	h	13 (0.9)	2.0 (0.1)	h
□	Macedonia, Rep. of		1	34 (1.6)	3 (0.6)	5 (1.0)	1.4 (0.2)		5 (1.1)	1.4 (0.3)	
□	Trinidad and Tobago		1	36 (2.1)	12 (1.2)	15 (1.9)	1.1 (0.1)		16 (2.6)	1.4 (0.2)	h
	Moldova		1	9 (0.9)	6 (1.0)	6 (2.5)	1.1 (0.4)		6 (1.9)	1.2 (0.3)	
■	Kuwait			72 (1.2)	51 (2.2)	48 (2.4)	0.9 (0.0)	i	45 (3.2)	0.8 (0.1)	i
■	Indonesia			46 (2.1)	23 (1.7)	22 (2.2)	0.9 (0.1)		23 (2.8)	1.0 (0.1)	
†2a	Belgium (Flemish)	~	~	1 (0.2)	7 (0.8)	~ ~	~ ~		12 (1.8)	1.8 (0.2)	h
	Hong Kong SAR	~	~	1 (0.2)	4 (0.3)	~ ~	~ ~		6 (1.0)	1.5 (0.2)	h
	Hungary	~	~	3 (0.5)	2 (0.2)	~ ~	~ ~		3 (0.7)	2.1 (0.4)	h
	Italy	~	~	2 (0.4)	3 (0.3)	~ ~	~ ~		5 (0.9)	1.6 (0.3)	h
	Latvia	~	~	2 (0.4)	2 (0.4)	~ ~	~ ~		4 (0.9)	2.3 (0.4)	h
	Lithuania	~	~	1 (0.3)	2 (0.3)	~ ~	~ ~		3 (0.6)	1.6 (0.3)	h
	Luxembourg	~	~	1 (0.3)	67 (0.6)	~ ~	~ ~		77 (1.3)	1.6 (0.1)	h
†	Netherlands	~	~	1 (0.3)	3 (0.6)	~ ~	~ ~		5 (1.2)	1.9 (0.3)	h
	Poland	~	~	7 (0.7)	1 (0.2)	~ ~	~ ~		1 (0.4)	1.6 (0.4)	
2a	Russian Federation	~	~	2 (0.5)	6 (1.0)	~ ~	~ ~		11 (2.6)	1.9 (0.4)	h

SRP = Severe Risk (Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe Risk (Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

- Indicates data not available

~ Indicates insufficient data to report results

■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

Table 6 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students Who Do Not Always Speak the Language of the Test at Home

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Who Do Not Always Speak the Language of the Test at Home	Percentage of Students Below Low Benchmark Who Do Not Always Speak the Language of the Test at Home	RR of Low Achievement Internationally for Students Who Do Not Always Speak the Language of the Test at Home		Percentage of Students Below the 20th Percentile Nationally Who Do Not Always Speak the Language of the Test at Home		RR of Low Achievement Nationally for Students Who Do Not Always Speak the Language of the Test at Home	
		Category	Value									
	Austria	SR	101	2 (0.4)	26 (1.3)	63 (6.3)	4.8 (1.3)	h	44 (2.6)		2.2 (0.2)	h
	Slovak Republic	MR	43	6 (0.9)	29 (1.6)	50 (7.1)	2.5 (0.6)	h	36 (3.7)		1.4 (0.2)	h
2a	Bulgaria	MR	37	5 (1.0)	30 (2.2)	49 (5.8)	2.2 (0.5)	h	43 (3.8)		1.8 (0.2)	h
	Germany	MR	35	3 (0.3)	27 (1.0)	45 (9.7)	2.3 (1.0)		47 (2.2)		2.4 (0.2)	h
■	Iran, Islamic Rep. of		32	40 (1.6)	47 (2.2)	60 (3.1)	1.7 (0.1)	h	67 (3.8)		2.3 (0.3)	h
	Belgium (French)		26	8 (0.7)	34 (1.3)	48 (3.9)	1.8 (0.2)	h	43 (2.8)		1.5 (0.1)	h
	Sweden		21	2 (0.5)	25 (1.4)	38 (8.2)	1.8 (0.6)		35 (3.5)		1.6 (0.2)	h
	England		20	7 (1.0)	26 (1.6)	38 (5.3)	1.8 (0.3)	h	33 (3.9)		1.4 (0.2)	h
	New Zealand		16	8 (0.6)	26 (0.9)	36 (3.1)	1.6 (0.2)	h	35 (1.8)		1.5 (0.1)	h
‡	Norway		15	8 (0.8)	20 (0.9)	31 (3.9)	1.8 (0.3)	h	24 (2.3)		1.3 (0.1)	h
	France		13	4 (0.4)	35 (1.2)	42 (4.2)	1.4 (0.2)		42 (2.1)		1.4 (0.1)	h
2a	Denmark		11	4 (0.4)	19 (1.1)	26 (5.3)	1.6 (0.4)		24 (2.2)		1.4 (0.1)	h
	Romania		5	16 (1.8)	19 (1.6)	23 (5.3)	1.3 (0.3)		20 (4.4)		1.1 (0.2)	
†2a	United States		5	4 (0.6)	29 (1.4)	32 (4.2)	1.2 (0.2)		35 (2.2)		1.4 (0.1)	h
■	Morocco		2	74 (2.0)	51 (2.9)	51 (3.3)	1.0 (0.1)		60 (5.7)		1.5 (0.2)	
	Spain		2	6 (0.8)	40 (1.3)	41 (4.4)	1.0 (0.2)		43 (2.6)		1.2 (0.1)	
2a	Canada		1	2 (0.2)	36 (1.0)	37 (4.1)	1.0 (0.2)		40 (1.6)		1.2 (0.1)	h
	Iceland			7 (0.8)	36 (0.9)	36 (3.4)	1.0 (0.1)		35 (1.8)		0.9 (0.1)	
□	Trinidad and Tobago			36 (2.1)	23 (1.3)	23 (2.3)	1.0 (0.1)		24 (3.0)		1.1 (0.1)	
2a	Georgia			18 (1.3)	15 (1.5)	10 (2.4)	0.8 (0.2)		13 (2.2)		0.8 (0.2)	i
■	Qatar			67 (0.7)	39 (0.7)	37 (0.8)	0.9 (0.0)	i	42 (1.6)		1.2 (0.1)	h
†	Scotland			7 (0.8)	20 (1.0)	17 (3.9)	0.8 (0.2)		18 (2.1)		0.9 (0.1)	
	Poland			7 (0.7)	15 (0.6)	11 (2.2)	0.7 (0.2)		11 (1.2)		0.7 (0.1)	i
	Hungary			3 (0.5)	25 (1.2)	21 (9.5)	0.8 (0.4)		26 (2.7)		1.1 (0.1)	
■	South Africa			78 (1.6)	38 (1.2)	34 (1.2)	0.8 (0.0)	i	33 (2.1)		0.8 (0.1)	i
□	Macedonia, Rep. of			34 (1.6)	17 (1.2)	10 (1.6)	0.6 (0.1)	i	9 (1.9)		0.5 (0.1)	i
	Moldova			9 (0.9)	26 (1.1)	19 (3.0)	0.7 (0.1)	i	21 (2.2)		0.7 (0.1)	i
■	Kuwait			72 (1.2)	74 (1.5)	72 (1.7)	0.9 (0.0)	i	76 (2.7)		0.9 (0.1)	
■	Indonesia			46 (2.1)	62 (2.0)	56 (2.5)	0.8 (0.1)	i	52 (3.5)		0.7 (0.1)	i
2b	Israel			15 (1.2)	43 (1.1)	34 (3.5)	0.7 (0.1)	i	37 (3.1)		0.8 (0.1)	i
	Singapore			3 (0.4)	79 (0.7)	76 (3.4)	0.8 (0.1)		84 (1.2)		1.4 (0.1)	h
	Chinese Taipei			3 (0.4)	64 (0.8)	40 (4.1)	0.4 (0.1)	i	53 (1.8)		0.6 (0.0)	i
†2a	Belgium (Flemish)	~	~	1 (0.2)	23 (1.3)	~ ~	~ ~		40 (3.2)		2.2 (0.2)	h
	Hong Kong SAR	~	~	1 (0.2)	35 (0.8)	~ ~	~ ~		29 (1.7)		0.8 (0.1)	i
	Italy	~	~	2 (0.4)	29 (1.2)	~ ~	~ ~		33 (2.6)		1.2 (0.1)	
	Latvia	~	~	2 (0.4)	31 (1.4)	~ ~	~ ~		34 (3.6)		1.2 (0.2)	
	Lithuania	~	~	1 (0.3)	21 (1.0)	~ ~	~ ~		20 (2.0)		1.0 (0.1)	
	Luxembourg	~	~	1 (0.3)	97 (0.2)	~ ~	~ ~		98 (0.5)		1.3 (0.3)	
†	Netherlands	~	~	1 (0.3)	24 (1.2)	~ ~	~ ~		35 (2.9)		1.7 (0.1)	h
2a	Russian Federation	~	~	2 (0.5)	18 (1.1)	~ ~	~ ~		20 (3.0)		1.1 (0.2)	
	Slovenia	-	-	6 (0.5)	- -	- -	- -	-	- -		- -	-

SRP = Severe (Risk Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe (Risk Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

- Indicates data not available

~ Indicates insufficient data to report results

■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

Table 7 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students Attending Rural Schools

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Attending Rural Schools	Percentage of Students Below Low Benchmark Attending Rural Schools	RR of Low Achievement Internationally for Students Attending Rural Schools	Percentage of Students Below the 20th Percentile Nationally Attending Rural Schools	RR of Low Achievement Nationally for Students Attending Rural Schools
		Category	Value						
	Slovak Republic	SR	78	6 (0.9)	40 (3.3)	66 (7.9)	3.0 (0.9) h	55 (4.9)	1.8 (0.2) h
2b	Israel	SR	65	15 (1.2)	33 (3.8)	60 (8.0)	3.0 (0.8) h	57 (7.0)	2.7 (0.6) h
	Romania	MR	74	16 (1.8)	48 (2.4)	70 (5.3)	2.6 (0.6) h	68 (4.9)	2.3 (0.5) h
2a	Bulgaria	MR	43	5 (1.0)	24 (2.5)	47 (9.6)	2.8 (1.0)	35 (5.5)	1.7 (0.3) h
■	Iran, Islamic Rep. of	MR	34	40 (1.6)	35 (2.8)	52 (3.8)	2.0 (0.2) h	61 (4.8)	2.9 (0.4) h
	Hungary	MR	34	3 (0.5)	31 (1.8)	49 (10.2)	2.1 (0.9)	44 (4.2)	1.7 (0.3) h
□	Macedonia, Rep. of	MR	33	34 (1.6)	31 (2.6)	48 (4.7)	2.0 (0.3) h	51 (5.7)	2.3 (0.4) h
■	Indonesia		58	46 (2.1)	74 (2.9)	84 (2.7)	1.8 (0.2) h	87 (2.9)	2.3 (0.5) h
	Moldova		47	9 (0.9)	65 (2.5)	76 (4.7)	1.7 (0.4)	74 (3.9)	1.5 (0.2) h
	Poland		33	7 (0.7)	43 (1.9)	58 (4.5)	1.8 (0.3) h	53 (3.2)	1.5 (0.1) h
2a	Georgia		31	18 (1.3)	43 (2.6)	56 (4.4)	1.7 (0.3) h	56 (4.1)	1.7 (0.2) h
■	South Africa		29	78 (1.6)	62 (2.0)	71 (2.3)	1.5 (0.1) h	81 (2.5)	2.6 (0.3) h
‡	Norway		16	8 (0.8)	50 (4.2)	57 (5.6)	1.3 (0.2)	55 (4.5)	1.2 (0.1)
	Spain		15	6 (0.8)	21 (3.4)	32 (8.2)	1.7 (0.6)	27 (5.0)	1.4 (0.2)
□	Trinidad and Tobago		14	36 (2.1)	32 (3.0)	40 (4.6)	1.4 (0.2) h	42 (5.8)	1.6 (0.3) h
†2a	United States		14	4 (0.6)	25 (2.7)	34 (6.7)	1.5 (0.4)	27 (4.2)	1.1 (0.2)
2a	Denmark		12	4 (0.4)	37 (3.9)	44 (7.4)	1.3 (0.3)	42 (4.6)	1.2 (0.1)
■	Morocco		11	74 (2.0)	45 (3.7)	50 (4.2)	1.2 (0.1) h	65 (7.3)	2.3 (0.5) h
	Slovenia		5	6 (0.5)	27 (3.7)	31 (5.6)	1.2 (0.2)	32 (4.5)	1.3 (0.1) h
2a	Canada		5	2 (0.2)	18 (1.7)	22 (3.5)	1.3 (0.2)	22 (2.2)	1.2 (0.1) h
	Iceland		2	7 (0.8)	29 (0.4)	30 (3.2)	1.1 (0.2)	31 (1.7)	1.1 (0.1)
■	Kuwait		1	72 (1.2)	14 (3.0)	15 (3.2)	1.1 (0.0) h	16 (4.5)	1.2 (0.2)
■	Qatar			67 (0.7)	3 (0.0)	3 (0.1)	1.2 (0.1) h	5 (0.5)	1.7 (0.2) h
	New Zealand			8 (0.6)	22 (2.4)	21 (4.5)	1.0 (0.2)	21 (3.3)	1.0 (0.1)
	Sweden			2 (0.5)	19 (2.8)	17 (8.6)	0.9 (0.5)	16 (3.3)	0.8 (0.2)
†	Scotland			7 (0.8)	31 (4.3)	24 (6.5)	0.7 (0.2)	30 (5.9)	1.0 (0.2)
	England			7 (1.0)	19 (3.6)	8 (3.0)	0.4 (0.1) i	9 (2.6)	0.4 (0.1) i
	Belgium (French)			8 (0.7)	33 (3.9)	22 (5.5)	0.6 (0.1) i	24 (4.4)	0.7 (0.1) i
	France			4 (0.4)	41 (3.9)	31 (5.9)	0.7 (0.2) i	38 (4.5)	0.9 (0.1)
	Austria			2 (0.4)	48 (3.7)	32 (6.9)	0.5 (0.1) i	39 (4.4)	0.7 (0.1) i
	Germany			3 (0.3)	43 (4.0)	13 (3.6)	0.2 (0.1) i	32 (3.9)	0.6 (0.1) i
†2a	Belgium (Flemish)	~	~	1 (0.2)	42 (4.8)	~ ~	~ ~	37 (5.1)	0.8 (0.1) i
	Hong Kong SAR	~	~	1 (0.2)	5 (1.9)	~ ~	~ ~	8 (3.0)	1.8 (0.4)
	Italy	~	~	2 (0.4)	15 (3.1)	~ ~	~ ~	22 (5.2)	1.7 (0.3) h
	Latvia	~	~	2 (0.4)	27 (1.7)	~ ~	~ ~	39 (3.9)	1.7 (0.2) h
	Lithuania	~	~	1 (0.3)	26 (2.1)	~ ~	~ ~	39 (3.6)	1.8 (0.2) h
†	Netherlands	~	~	1 (0.3)	42 (3.5)	~ ~	~ ~	41 (4.4)	1.0 (0.1)
2a	Russian Federation	~	~	2 (0.5)	31 (2.2)	~ ~	~ ~	55 (3.7)	2.7 (0.3) h
	Luxembourg	-	-	1 (0.3)	- -	- -	- -	- -	- -
	Chinese Taipei	-	-	3 (0.4)	- -	- -	- -	- -	- - -
	Singapore	-	-	3 (0.4)	- -	- -	- -	- -	- -

SRP = Severe (Risk Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe (Risk Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

- Indicates data not available

~ Indicates insufficient data to report results

■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

Table 8 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students Attending Urban Schools

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Attending Urban Schools	Percentage of Students Below Low Benchmark Attending Urban Schools	RR of Low Achievement Internationally for Students Attending Urban Schools		Percentage of Students Below the 20th Percentile Nationally Attending Urban Schools	RR of Low Achievement Nationally for Students Attending Urban Schools	
		Category	Value								
	Germany	SR	219	3 (0.3)	37 (3.3)	79 (4.6)	6.9 (1.9)	h	51 (4.0)	1.8 (0.2)	h
	England	MR	79	7 (1.0)	46 (4.4)	70 (6.5)	2.7 (0.8)	h	65 (5.3)	2.1 (0.3)	h
	Austria	MR	36	2 (0.4)	31 (3.4)	49 (6.9)	2.1 (0.5)	h	40 (4.4)	1.5 (0.2)	h
	Belgium (French)		29	8 (0.7)	47 (4.0)	59 (7.1)	1.6 (0.4)		54 (5.9)	1.3 (0.2)	
†	Scotland		20	7 (0.8)	32 (3.9)	43 (7.5)	1.6 (0.4)		39 (6.0)	1.4 (0.2)	
2a	Canada		20	2 (0.2)	48 (2.9)	56 (4.9)	1.4 (0.2)		51 (3.3)	1.1 (0.1)	h
†2a	United States		12	4 (0.6)	28 (3.5)	35 (6.1)	1.4 (0.3)		36 (4.2)	1.5 (0.2)	h
2a	Denmark		5	4 (0.4)	33 (4.0)	36 (7.8)	1.1 (0.3)		35 (5.1)	1.1 (0.1)	
	Sweden		3	2 (0.5)	27 (4.1)	29 (8.3)	1.1 (0.4)		27 (5.0)	1.0 (0.1)	
	France			4 (0.4)	34 (4.0)	34 (7.5)	1.0 (0.3)		35 (5.3)	1.0 (0.1)	
‡	Norway			8 (0.8)	20 (3.6)	18 (4.0)	0.9 (0.2)		18 (3.6)	0.9 (0.1)	
	New Zealand			8 (0.6)	40 (3.2)	38 (5.2)	0.9 (0.2)		38 (4.0)	0.9 (0.1)	
	Slovenia			6 (0.5)	36 (4.2)	34 (5.9)	0.9 (0.2)		31 (4.4)	0.8 (0.1)	i
■	South Africa			78 (1.6)	17 (1.8)	15 (1.7)	0.8 (0.1)	i	10 (1.7)	0.5 (0.1)	i
■	Kuwait			72 (1.2)	26 (3.6)	23 (3.6)	0.9 (0.0)	i	18 (3.8)	0.6 (0.1)	i
■	Indonesia			46 (2.1)	12 (2.2)	6 (1.7)	0.5 (0.1)	i	4 (1.7)	0.3 (0.1)	i
□	Trinidad and Tobago			36 (2.1)	19 (2.6)	13 (3.2)	0.6 (0.1)	i	11 (3.5)	0.6 (0.2)	i
■	Morocco			74 (2.0)	37 (3.3)	32 (3.4)	0.8 (0.0)	i	19 (4.1)	0.4 (0.1)	i
	Iceland			7 (0.8)	34 (0.4)	27 (3.1)	0.7 (0.1)	i	29 (1.8)	0.8 (0.1)	i
■	Qatar			67 (0.7)	65 (0.3)	61 (0.5)	0.9 (0.0)	i	56 (1.3)	0.7 (0.0)	i
	Hungary			3 (0.5)	28 (2.2)	17 (8.8)	0.5 (0.3)		21 (4.7)	0.7 (0.2)	i
	Moldova			9 (0.9)	29 (2.4)	17 (3.4)	0.5 (0.1)	i	19 (2.8)	0.6 (0.1)	i
2a	Georgia			18 (1.3)	42 (3.6)	28 (4.0)	0.5 (0.1)	i	28 (3.9)	0.5 (0.1)	i
	Poland			7 (0.7)	52 (2.1)	40 (4.4)	0.6 (0.1)	i	44 (3.1)	0.7 (0.1)	i
■	Iran, Islamic Rep. of			40 (1.6)	50 (2.9)	32 (3.4)	0.5 (0.0)	i	25 (3.8)	0.3 (0.0)	i
□	Macedonia, Rep. of			34 (1.6)	51 (3.7)	33 (4.0)	0.5 (0.1)	i	30 (4.6)	0.4 (0.1)	i
	Romania			16 (1.8)	47 (2.2)	26 (5.0)	0.4 (0.1)	i	28 (4.5)	0.4 (0.1)	i
	Spain			6 (0.8)	58 (4.3)	41 (7.7)	0.5 (0.1)	i	45 (5.7)	0.6 (0.1)	i
2b	Israel			15 (1.2)	49 (3.9)	26 (6.4)	0.4 (0.1)	i	29 (5.8)	0.4 (0.1)	i
	Slovak Republic			6 (0.9)	52 (3.0)	30 (7.3)	0.4 (0.1)	i	39 (4.3)	0.6 (0.1)	i
2a	Bulgaria			5 (1.0)	70 (3.0)	49 (9.5)	0.4 (0.1)	i	60 (5.8)	0.6 (0.1)	i
†2a	Belgium (Flemish)	~	~	1 (0.2)	21 (3.6)	~ ~	~ ~		26 (5.0)	1.3 (0.2)	
	Hong Kong SAR	~	~	1 (0.2)	58 (4.4)	~ ~	~ ~		46 (6.1)	0.6 (0.1)	i
	Italy	~	~	2 (0.4)	70 (3.6)	~ ~	~ ~		64 (5.3)	0.7 (0.1)	i
	Latvia	~	~	2 (0.4)	70 (0.7)	~ ~	~ ~		58 (3.4)	0.6 (0.1)	i
	Lithuania	~	~	1 (0.3)	72 (2.3)	~ ~	~ ~		59 (3.6)	0.6 (0.0)	i
†	Netherlands	~	~	1 (0.3)	26 (4.0)	~ ~	~ ~		34 (5.2)	1.5 (0.2)	h
2a	Russian Federation	~	~	2 (0.5)	63 (2.0)	~ ~	~ ~		39 (3.1)	0.4 (0.0)	i
	Chinese Taipei	-	-	3 (0.4)	- -	- -	- -	-	- -	- -	-
	Luxembourg	-	-	1 (0.3)	- -	- -	- -	-	- -	- -	-
	Singapore	-	-	3 (0.4)	- -	- -	- -	-	- -	- -	-

SRP = Severe (Risk Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe (Risk Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

i Indicates risk signficantly less than 1

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.7 of *PIRLS 2006 International Report*).

‡ Nearly satisfying guidelines for sample participation rates after replacement schools were included (see Exhibit A.7of *PIRLS 2006 International Report*).

2a National Defined Population covers less than 95% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

2b National Defined Population covers less than 80% of National Desired Population (see Exhibit A.4 of *PIRLS 2006 International Report*).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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■ Severe GRR (Relative Risk Ratio >=3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

□ Moderate GRR (Relative Risk Ratio >=2 and < 3 for students in this country performing below Low Benchmark, as compared to other PIRLS countries)

Table 9 RRP Equity Index for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Boys

	Country	RRP Equity Index		Percentage of Students Below Low Benchmark	Percentage of Students Who Are Boys	Percentage of Students Below Low Benchmark Who Are Boys	RR of Low Achievement Internationally for Boys		Percentage of Students Below the 20th Percentile Nationally Who Are Boys	RR of Low Achievement Nationally for Boys	
		Category	Value								
	Singapore	MRP	63	3 (0.4)	52 (0.6)	70 (2.9)	2.2 (0.3)	h	61 (1.6)	1.4 (0.1)	h
	New Zealand	MRP	58	8 (0.6)	51 (1.0)	69 (2.3)	2.1 (0.2)	h	63 (1.5)	1.7 (0.1)	h
	Slovenia	MRP	52	6 (0.5)	52 (0.7)	68 (2.8)	2.0 (0.2)	h	63 (1.7)	1.6 (0.1)	h
2a	Canada	MRP	52	2 (0.2)	51 (0.6)	67 (3.6)	2.0 (0.3)	h	58 (1.2)	1.3 (0.1)	h
	Austria	MRP	50	2 (0.4)	51 (0.7)	67 (4.9)	2.0 (0.4)	h	56 (1.8)	1.2 (0.1)	h
	Iceland	MRP	50	7 (0.8)	50 (0.9)	67 (3.2)	2.0 (0.3)	h	62 (1.9)	1.6 (0.1)	h
	Chinese Taipei	MRP	48	3 (0.4)	51 (0.5)	68 (3.7)	2.0 (0.3)	h	60 (1.5)	1.4 (0.1)	h
†	Scotland		45	7 (0.8)	49 (1.0)	65 (3.4)	1.9 (0.3)	h	58 (2.6)	1.4 (0.1)	h
2a	Bulgaria		45	5 (1.0)	51 (1.0)	66 (5.2)	1.9 (0.4)	h	59 (2.7)	1.4 (0.1)	h
†2a	United States		40	4 (0.6)	49 (0.8)	64 (4.0)	1.8 (0.3)	h	56 (2.1)	1.3 (0.1)	h
‡	Norway		38	8 (0.8)	51 (1.1)	64 (3.4)	1.8 (0.2)	h	61 (2.3)	1.5 (0.1)	h
	France		34	4 (0.4)	51 (0.7)	64 (3.8)	1.7 (0.3)	h	58 (1.8)	1.3 (0.1)	h
	Poland		30	7 (0.7)	49 (0.8)	60 (3.4)	1.6 (0.2)	h	57 (1.9)	1.4 (0.1)	h
	Moldova		26	9 (0.9)	50 (1.0)	60 (3.0)	1.5 (0.2)	h	58 (1.7)	1.4 (0.1)	h
	Sweden		24	2 (0.5)	52 (1.1)	61 (7.5)	1.5 (0.5)		62 (2.1)	1.5 (0.1)	h
2a	Georgia		23	18 (1.3)	52 (1.0)	61 (2.3)	1.4 (0.1)	h	60 (2.2)	1.4 (0.1)	h
2a	Denmark		22	4 (0.4)	49 (0.9)	58 (5.7)	1.5 (0.3)		54 (2.4)	1.2 (0.1)	h
□	Trinidad and Tobago		20	36 (2.1)	50 (1.7)	59 (1.8)	1.4 (0.1)	h	63 (2.1)	1.7 (0.1)	h
	Belgium (French)		16	8 (0.7)	50 (0.7)	57 (3.0)	1.3 (0.2)	h	54 (1.7)	1.1 (0.1)	h
■	Kuwait		16	72 (1.2)	50 (2.1)	57 (2.2)	1.3 (0.0)	h	74 (2.7)	2.8 (0.3)	h
2b	Israel		15	15 (1.2)	52 (1.2)	58 (2.2)	1.3 (0.1)	h	58 (2.0)	1.3 (0.1)	h
	Slovak Republic		14	6 (0.9)	51 (0.8)	57 (3.9)	1.3 (0.2)		59 (2.0)	1.4 (0.1)	h
	Romania		14	16 (1.8)	52 (1.0)	58 (2.4)	1.3 (0.1)	h	59 (2.2)	1.3 (0.1)	h
□	Macedonia, Rep. of		13	34 (1.6)	51 (0.7)	57 (1.4)	1.3 (0.1)	h	58 (2.0)	1.3 (0.1)	h
■	Indonesia		13	46 (2.1)	51 (0.9)	56 (1.4)	1.3 (0.1)	h	61 (2.1)	1.5 (0.1)	h
	Hungary		12	3 (0.5)	50 (0.9)	55 (5.6)	1.2 (0.3)		53 (2.2)	1.1 (0.1)	
■	Qatar		11	67 (0.7)	50 (0.2)	55 (0.5)	1.2 (0.0)	h	66 (1.2)	1.9 (0.1)	h
	England		9	7 (1.0)	50 (0.8)	54 (2.9)	1.2 (0.1)		57 (1.7)	1.3 (0.1)	h
■	Iran, Islamic Rep. of		7	40 (1.6)	54 (1.1)	57 (2.3)	1.1 (0.1)		59 (3.0)	1.2 (0.1)	
■	South Africa		4	78 (1.6)	48 (0.6)	50 (0.7)	1.1 (0.0)	h	60 (1.4)	1.6 (0.1)	h
■	Morocco		4	74 (2.0)	53 (1.0)	54 (1.3)	1.1 (0.0)	h	59 (2.7)	1.3 (0.1)	h
	Spain		4	6 (0.8)	51 (1.1)	52 (3.6)	1.1 (0.1)		54 (2.1)	1.1 (0.1)	
	Germany		2	3 (0.3)	51 (0.7)	51 (5.8)	1.0 (0.2)		52 (2.2)	1.1 (0.1)	
†2a	Belgium (Flemish)	~	~	1 (0.2)	50 (0.9)	~ ~	~ ~		56 (1.9)	1.3 (0.1)	h
	Hong Kong SAR	~	~	1 (0.2)	51 (1.3)	~ ~	~ ~		58 (1.7)	1.3 (0.1)	h
	Italy	~	~	2 (0.4)	52 (0.8)	~ ~	~ ~		55 (2.0)	1.2 (0.1)	
	Latvia	~	~	2 (0.4)	52 (1.0)	~ ~	~ ~		64 (2.3)	1.6 (0.1)	h
	Lithuania	~	~	1 (0.3)	51 (0.9)	~ ~	~ ~		62 (2.0)	1.6 (0.1)	h
	Luxembourg	~	~	1 (0.3)	51 (0.7)	~ ~	~ ~		52 (1.5)	1.0 (0.1)	
†	Netherlands	~	~	1 (0.3)	49 (0.8)	~ ~	~ ~		54 (1.9)	1.2 (0.1)	h
2a	Russian Federation	~	~	2 (0.5)	49 (0.9)	~ ~	~ ~		58 (1.9)	1.4 (0.1)	h

SRP = Severe (Risk Relative Risk Ratio >= 3) and High Percentage of Students in 'At Risk' Group (>= 50)

SR = Severe (Risk Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

MR = Moderate Risk (Relative Risk Ratio >= 2 and < 3)

h Indicates risk signficantly greater than 1

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Table 10 Summary of RRP Equity Index Results for Low Reading Achievement Internationally in PIRLS 2006 Countries for Fourth Grade Students

	Country	Percentage of Students Below Low Benchmark	RRP Equity Index Results for Students											
			With Parents with Less than Secondary Education		Who Didn't Speak the Language of the Test Before Starting School		Who Don't Always Speak the Language of the Test at Home		Attending Rural Schools		Attending Urban Schools		Who are Male	
■	South Africa	78 (1.6)		18		2				29				4
■	Morocco	74 (2.0)		34		4		2		11				4
■	Kuwait	72 (1.2)		4						1				16
■	Qatar	67 (0.7)		8		1								11
■	Indonesia	46 (2.1)		60						58				13
■	Iran, Islamic Rep. of	40 (1.6)	MRP	119		21		32	MR	34				7
□	Trinidad and Tobago	36 (2.1)		23		1				14				20
□	Macedonia, Rep. of	34 (1.6)	MR	45		1			MR	33				13
2a	Georgia	18 (1.3)		3		2				31				23
	Romania	16 (1.8)	SR	91		5		5	MR	74				14
2b	Israel	15 (1.2)	SR	46		5			SR	65				15
	Moldova	9 (0.9)	MR	52		1				47				26
‡	Norway	8 (0.8)	SR	8	SR	10		15		16				38
	New Zealand	8 (0.6)	SR	34	MR	12		16					MRP	58
	Belgium (French)	8 (0.7)	SR	46	SR	24		26				29		16
	England	7 (1.0)	SR	62	SR	14		20			MR	79		9
†	Scotland	7 (0.8)	MR	19	MR	7						20		45
	Poland	7 (0.7)	SR	107	~	~				33				30
	Iceland	7 (0.8)	SR	23		6				2			MRP	50
	Spain	6 (0.8)	SR	84		11		2		15				4
	Slovak Republic	6 (0.9)	SR	67	SR	19	MR	43	SR	78				14
	Slovenia	6 (0.5)	SR	22	SR	7	-	-		5			MRP	52
2a	Bulgaria	5 (1.0)	SR	48		8	MR	37	MR	43				45
	France	4 (0.4)	MR	23		3		13						34
†2a	United States	4 (0.6)	-	-	MR	7		5		14		12		40
2a	Denmark	4 (0.4)	SR	24	MR	5		11		12		5		22
	Singapore	3 (0.4)	SR	62		11			-	-	-	-	MRP	63
	Chinese Taipei	3 (0.4)	SR	16	SR	18			-	-	-	-	MRP	48
	Germany	3 (0.3)	SR	270	SR	19	MR	35			SR	219		2
	Hungary	3 (0.5)	SR	121	~	~			MR	34				12
	Austria	2 (0.4)	SR	21	SR	29	SR	101			MR	36	MRP	50
2a	Canada	2 (0.2)	SR	12		3		1		5		20	MRP	52
	Sweden	2 (0.5)	SR	29	SR	19		21				3		24
	Italy	2 (0.4)	~	~	~	~	~	~	~	~	~	~	~	~
	Latvia	2 (0.4)	~	~	~	~	~	~	~	~	~	~	~	~
2a	Russian Federation	2 (0.5)	~	~	~	~	~	~	~	~	~	~	~	~
	Lithuania	1 (0.3)	~	~	~	~	~	~	~	~	~	~	~	~
	Luxembourg	1 (0.3)	~	~	~	~	~	~	-	-	-	-	~	~
	Hong Kong SAR	1 (0.2)	~	~	~	~	~	~	~	~	~	~	~	~
†2a	Belgium (Flemish)	1 (0.2)	~	~	~	~	~	~	~	~	~	~	~	~
†	Netherlands	1 (0.3)	~	~	~	~	~	~	~	~	~	~	~	~

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SR = Severe (Risk Relative Risk Ratio >= 3)

MRP = Moderate Risk (Relative Risk Ratio >= 2 and < 3) and High Percentage of Students in 'At Risk' Group (>= 50)

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