LUISS

Faculty of Political Sciences

Degree in Politics: Philosophy and Economics

Chair of Political Economy of Development

IMMIGRATION AND SKILLS: A COMPARATIVE ANALYSIS BETWEEN ITALY, GERMANY AND SWEDEN BASED ON PISA DATA

Supervisor:

Francesco Ferrante

Candidate:

Luna Laureti

Academic year 2023/2024

TABLE OF CONTENTS

1 INTRODUCTION

This thesis analyses the skills of immigrants in three very different European countries such as Germany, Italy and Sweden, and derives some conclusions in terms of efficacy of integration policies.

We shall consider as primary source the data collected through the Programme for International Student Assessment (PISA), which is a worldwide study conducted by the Organisation for Economic Co-operation and Development (OECD). The PISA assessment is designed to evaluate educational systems by testing the skills and knowledge of 15-year-old students in participating countries.

1.1 Context and Relevance of the Theme

The incorporation of foreigners and their descendants into host country schools can be very important for a good social integration of these students, with relevant effects on the future labour market of the host country. More generally, an effective integration can provoke a positive impact on their overall economic and societal well-being (OECD, 2015)[1]. The educational system, along with the migration history and the policy traditions of the host country, can play a crucial role in shaping the academic and social resilience of immigrant children (Bilgili et al., 2019)[2].

Through the PISA dataset it is possible to compare and analyse these dynamics considering student, school and parent questionnaires. This provides insights into the differences in student skills across countries, and it allows to assess the role of their families' socioeconomic background.

1.2 Objectives based on PISA datasets:

The present work aims at identifying the cross-country differences in educational performance of immigrant students in Italy, Germany and Sweden.

By conducting a comparative analysis, the study aims to uncover the underlying factors contributing to the disparities in academic outcomes between immigrant and native students across these three countries. Special emphasis will be placed on examining how different family backgrounds, educational systems and integration policies influence the performance of immigrant students within each national context.

1.3 Structure of the Thesis

The thesis is articulated in four chapters containing the complete tables of results stemming from the preliminary data analysis and terminates with the conclusions.

The theoretic background and research literature are presented in the first chapter. The section includes an historical prospective of European migration flows, along with a description of the characteristics of the present migratory waves. The focus is then shifted to Italy, Germany and Sweden migration history, migration management and education system. The choice of the three case studies is sustained by an introduction to the integration indexes MIPEX and MCP. Finally, the theoretic background and the reference studies will be presented.

The second chapter begins with an overview of the PISA program and proceeds with a description of the dataset structure and contents. The variables examined in the present study are listed and defined along with the methodological information on the data analysis.

The third section introduces the descriptive statistics that emerge from a comparative study of the presented variables. The research begins by evaluating the aggregate test scores for all European countries that take part to PISA and indicates the differences between natives and immigrants attainments. It then proceeds with a focus on the performance of Italy, Germany and Sweden including a comparative analysis of natives and immigrants considering their socioeconomic background, level of parental education and language spoken at home.

The last of the four chapters validates the hypotized impact of the students' migratory and family background on their acquired skills. This is done using multiple linear regressions to identify key correlations and explain cross-country differences.

The conclusions start with a summary of the results and follow with a description of the possible implications for policy evaluation, highlighting the potential ways to diminish the existing disparities and ensure better integration of migratory populations into their host countries. This thesis has the purpose to drive attention to these essential topics, which are likely to acquire increasing importance through the coming decades due to the decreasing population in Europe (EUROSTAT, 2023)[3] and climate crisis that will constitute the world's future challenges (IPCC, 2021)[4].

2 RESEARCH BACKGROUND

This chapter focuses on understanding the context of migration and education in Europe, with a particular focus on Italy, Germany, and Sweden. The chapter is structured into three main sections that delve into the historical, policy-related, and educational dimensions of migration in these countries.

The first section explores the history of European migration starting from the post-World War II era. It then branches into three subsections, each dedicated to the specific migratory histories of Italy, Germany, and Sweden.

The second paragraph addresses integration policies, introducing two key indicators: the Migrant Integration Policy Index (MIPEX) and the Multiculturalism Policy Index (MCP). The section further elaborates on the specific situations in Italy, Germany, and Sweden, analyzing how each country fares according to these indicators.

The third and last paragraph of this chapter focuses on the existing literature concerning PISA data and the migration background. It begins with a general overview of how educational outcomes among immigrant students have been analyzed using PISA data. Subsequently, the section delves into three subsections, each dedicated to Italy, Germany, and Sweden. These subsections review the key findings from the literature, highlighting the disparities in educational achievements between native and immigrant students, and discussing the factors that contribute to these differences.

2.1 Migratory History

Post-World War II Europe witnessed increased immigration due to many factors, including the shortage of labour force left by the death of a significant portion of the working class. This attracted people coming from abroad looking for a place to work (Kahanec and Zimmerman, 2009)[5].

During the 1950s and 1960s, European countries experienced economic booms, creating a demand for labor that could not be met domestically. This led to significant migration flows within Europe, characterized by a marked movement from Southern Europe and Turkey to the northern countries, alongside substantial immigration from North Africa (Lafleur and Stanek, 2018)[6].

Germany's economic miracle (Wirtschaftswunder) is a notable example, where the country recruited large numbers of Turkish workers to meet its labor needs (Goldenberg, 2021)[7].

Decolonization also played a crucial role in shaping immigration patterns. Former colonial powers such as France, the UK, and the Netherlands saw significant numbers of migrants from their ex-colonies. For instance, many Algerians moved to France, and people from India, Pakistan, and the Caribbean migrated to the UK (Bade, 2003)[8]. These migration flows were partly driven by existing ties and the relatively easier legal frameworks for migration from ex-colonies.

The 1970s oil crisis marked a turning point, leading to tighter immigration controls across Europe. Despite the introduction of stricter policies, immigration did not cease. Instead, it transformed itself from temporary labor migration to more permanent settlement, with migrants bringing their families to Europe (Castles et al., 2014)[9].

The end of the Cold War and the subsequent enlargement of the European Union further diversified migration patterns. The fall of the Iron Curtain allowed for significant East-West migration within Europe, with many people from Eastern European countries moving to the West in search of better economic opportunities. Germany, for example, received millions of ethnic Germans (Aussiedler) from Central and Eastern Europe during this period (Dietz, 2006)[10].

In recent decades, Southern European countries like Spain, Italy, and Greece have also become major destinations for immigrants. Spain, in particular, saw a dramatic increase in immigration from Latin America, North Africa, and Eastern Europe, driven by economic opportunities and, more recently, political instability in migrants' home countries (Ambrosini, 2013)[11].

2.1.1 Italy's Migratory History

Post-World War II, Italy was primarily a country of emigration, with millions of Italians moving to the Americas and Northern Europe. However, starting in the 1970s, Italy began transitioning into a destination country for immigrants, driven by its economic recovery and the need for labor in various sectors, particularly in agriculture, construction, and domestic work (Scotto, 2017)[12].

During the 1980s and 1990s, Italy saw increasing immigration from North Africa, particularly from Tunisia, Morocco, and Egypt, as well as from Albania and other Eastern European countries. The fall of communism in Eastern Europe and the conflicts in the Balkans led to significant migration flows towards Italy, as the country was geographically close and had a burgeoning economy (Camilli, 2018)[13].

The early 2000s marked another turning point, with Italy becoming one of the primary entry points for migrants and refugees crossing the Mediterranean, especially from sub-Saharan Africa, due to political instability and conflicts in their home countries. The enlargement of the European Union also contributed to increased migration from new member states, particularly Romania, which became a significant source of immigrants to Italy (Castles et al., 2014)[14].

In present times, Romanians represent the largest group, making up about 15% of the foreign population, followed by Albanians at 8% and Moroccans at a slightly lower percentage. Immigrants from Africa, particularly from Morocco, Tunisia, and Egypt, make up a significant portion of the newcomers, driven by both economic migration and the recent refugee influx across the Mediterranean. The influx of sub-Saharan Africans, although smaller in numbers, has been increasing. Overall, immigrants constitute about 10% of Italy's population (OECD, 2022)[15].

2.1.2 Germany's migratory history

In the aftermath of World War II, Germany faced a significant labor shortage due to the devastation caused by the war and the loss of millions of lives. To address this, the Federal Republic of Germany (West Germany) initiated several "Gastarbeiter" (guest worker) programs in the 1950s and 1960s, primarily with countries such as Italy, Greece, Turkey, and Yugoslavia. These agreements allowed for the temporary migration of workers to Germany to fill labor shortages in various industries, particularly in manufacturing and construction (BAMF, 2005)[16].

Initially, the idea was that these guest workers would return to their home countries after a few years. However, many of them ended up settling in Germany permanently, bringing their families with them. This led to the establishment of large immigrant communities (Castles et al., 2014)[17].

The fall of the Berlin Wall in 1989 and the subsequent reunification of Germany in 1990 marked another significant phase in Germany's migratory history. The reunification process brought about economic challenges, particularly in the former East Germany, leading to internal migration from east to west as people sought better economic opportunities.

Simultaneously, the collapse of the Eastern Bloc led to increased migration from Eastern Europe to Germany. Many ethnic Germans (Aussiedler) from countries such as Poland, Russia, and Romania moved to Germany, benefiting from laws that granted them citizenship based on their German ancestry (Dietz, 2006)[18].

In the 21st century, Germany has become a central destination for refugees, particularly during the European migrant crisis of 2015. In that year alone, Germany received over one million refugees and migrants, primarily from Syria, Afghanistan, and Iraq. Chancellor Angela Merkel's decision to open Germany's borders to these refugees was both praised and criticized, sparking a significant political and social debate within the country.

Germany hosts one of the largest immigrant populations in Europe, with approximately 24.3% of its residents having a migration background as of 2022 (DW, 2023)[19]. This includes individuals who either migrated to Germany themselves or were born to migrant parents. The Turkish community remains one of the largest, a legacy of the guest worker agreements in the 1960s and 1970s (Destatis, 2023)[20]. In addition, significant populations from Poland, Syria, Romania, and Afghanistan contribute to the country's diverse demographic landscape (DW, 2023)[21].

The most recent wave of immigration has been driven by the inflow of refugees from Ukraine, following the Russian invasion in February 2022. By the end of 2022, around 1.1 million Ukrainian refugees had arrived in Germany, making Ukrainians the largest group of new immigrants to the country in that year (Destatis, 2023)[22]. This influx has significantly influenced Germany's population dynamics, pushing the population to over 84 million, a record high (DW, 2023)[23].

2.1.3 Sweden’s migratory history

In the late 19th and early 20th centuries, Sweden was primarily a country of emigration, with significant numbers of Swedes leaving for North America, particularly the United States, in search of better economic opportunities. This trend continued until the early 1930s, when the effects of the Great Depression and improvements in Sweden's economy reduced the need for emigration (Dribe et al., 2023)[24].

After World War II, Sweden’s economic boom led to labor shortages, prompting the country to recruit foreign workers, similar to other Western European nations. From the 1950s to the 1970s, Sweden welcomed immigrants from Scandinavian and Southern European countries, including Finland, Estonia, Greece, and former Yugoslavia, primarily to support its burgeoning industrial sector (Westin, 2006)[25].

However, from the 1970s onwards, Sweden's immigration patterns shifted towards refugee and asylum-seeker arrivals. Conflicts in the Middle East, particularly in Iraq, Syria, and Afghanistan , have led to significant numbers of asylum seekers moving to Sweden (Westin, 2006)[26]. The collapse of Yugoslavia in the early 1990s caused another important inflow of immigrants from the Balkans.

Today the country has one of the highest per capita rates of asylum seekers in Europe, driven by its generous asylum policies and comprehensive welfare state (Di Iasio and Wahba, 2023)[27].

In 2022, roughly 20% of Sweden's inhabitants were born abroad. The main reason for the immigration was protection (European Commission, 2024)[28], in fact the 5 most common non-EU countries of birth were Syria, Iraq, Iran, Somalia and Afghanistan, accounting for more than a half million people.

2.2 Integration Policy

Integration policies across Europe are evaluated using several key indices, each offering a unique perspective on how well countries are supporting the inclusion of immigrants into their societies. The Multiculturalism Policy Index (MCP) and the Migrant Integration Policy Index (MIPEX) are prominent tools used to measure and compare integration efforts across Europe. These indices assess a range of factors, including cultural recognition, access to citizenship, labor market participation, and the effectiveness of anti-discrimination laws.

The MIPEX is organized by the Migration Policy Group (MPG) and the Barcelona Centre for International Affairs (CIDOB). It is especially comprehensive as it measures policies across eight domains: labor market mobility, family reunification, education, health, political participation, permanent residence, access to nationality, and anti-discrimination. According to MIPEX, countries that rank high, such as Sweden and Portugal, tend to have inclusive policies that view integration as a mutual process between immigrants and the host society. These countries generally provide equal rights and opportunities for immigrants, which helps to foster a sense of belonging and participation in public life (MIPEX, 2020)[29].

The MCP is a tool that evaluates the extent to which countries adopt and implement multicultural policies that recognize and accommodate cultural diversity. It was developed by Keith Banting and Will Kymlicka at Queen's University in Canada. It assesses policies across several dimensions, including: Support for Multicultural Education, Cultural Group Funding, Recognition of Cultural Holidays and Practices and Immigrant Political Representation. The MCP provides a comparative analysis of these dimensions across different countries, offering insights into how well countries are performing in terms of fostering multiculturalism and supporting immigrant communities (Queen's University, 2024)[30].

2.2.1 Italy's integration policies

Italy's integration policies are characterized by a mixed approach, often described as "temporary integration". According to MIPEX, Italy scores 58/100, against 49 of the MIPEX average. The country performs moderately well in areas like health and labor market mobility, where non-EU citizens can access basic employment and health services. In terms of education, although Italy's policies grant immigrants access to the compulsory years of school, there is a lack of targeted measures to ensure the success of foreign pupils. Additionally, they face considerable obstacles in acquiring the Italian nationality, due to language requirements and a highly discretionary naturalization process: this has recently made it even harder to acquire a permanent settlement permit (MIPEX, 2020)[31].

The MCP data reveals a moderate adoption of multicultural policies. Italy scored relatively low in earlier years, particularly in the 80s and 90s, with no formal recognition of multiculturalism in its legislation. By the 2000s Italy had made some progress scoring 1.5 on a scale from 0 to 8. However, the little efforts made by the government were mainly directed to economic integration, just to fulfill particular labor demands, and cultural differences are only acknowledged when favorable to the government (Queen's University, 2024)[32].

Up to the present-day, Italy's approach remains focused on "interculturalism" rather than full multiculturalism; in other words, it focuses on the absorption of different cultures into the existing system, instead of putting emphasis on integration as a two-way process. This strategy is reflected by the inhomogeneous implementation of efforts to create a comfortable multicultural environment in the Italian educational system, where the inclusion of second-generation immigrants, as well as issues related to diversity in general, have not been fully addressed. A study focusing on acculturation and school adjustment in six European countries, including Italy, highlights the importance of both maintaining ethnic cultural ties and integrating into the mainstream culture to enhance school belonging and academic success among immigrant youth (Maja K. Schachner et al., 2017)[33]. This study underscores the need for supportive multicultural policies that promote both cultural integration and the retention of ethnic identities as critical to improving educational outcomes for immigrant students.

In this context of neglect by the main state organs, NGOs play a fundamental role in the process of migrants' integration, especially in times of migration crisis and of right-wing conservative governments. Even in the context of mainstream media, the representation of ethnic diversity remains limited; this stimulates the creation of separate communication tools such as newspapers run by NGOs rather than being supported by public funds (Queen's University, 2024)[34].

2.2.2 Germany's integration policies

Germany hasn't changed much in its integration policies over the last decade, but it focused on improving their implementation. However, it has lost its position as one of the top 10 countries in the process: today it scores 58/100 according to the latest MIPEX data, exactly the same as Italy. German policies are particularly strong in areas such as political participation and labor market mobility. Some progress has been made in the domain of education, where support and materials for immigrant students' learning have been incremented. However, many challenges persist, especially concerning citizenship and permanent residence, because Germany maintains income and language requirements as well as severe restrictions on dual nationalities (MIPEX, 2019)[35].

The MCP shows significant progress for Germany over time. Starting from 0 in the 1980s, the country reached a score of 3 out of 8 in 2020, reflecting its official recognition as a country of immigration which implements policies promoting cultural diversity. A considerable effort has been devoted to teaching the mother tongues of immigrants in schools, which are now available in 11 of the 16 German states. This measure signifies a growing acknowledgment of the importance of cultural preservation, but it remains controversial because sometimes integration is disregarded, favoring instead the habit of treating those students as temporary immigrants.

Despite considerable advancements, many immigrants in Germany continue to enroll predominantly in vocational schools rather than academic secondary schools, which may limit their long-term socio-economic mobility. This trend underscores the importance of addressing educational disparities to ensure that immigrant students have equal opportunities to pursue higher education and careers. Access to education, however, remains restricted for those with a tolerated resident status and to undocumented migrants (Queen's University, 2024)[36].

2.2.3 Sweden's integration policies

Sweden is often regarded as a model for integration policies in Europe, consistently ranking among the top three countries for its comprehensive and inclusive approach to immigrant integration. According to MIPEX, the county scores an impressive 86/100, reflecting its strong support for immigrants across various domains, including labor market access, education, and anti-discrimination. However, it has lost one point from the last round of MIPEX as they introduced some economic restriction over family reunification. Sweden's policies are designed to treat immigrants as equals, offering nearly the same rights as Swedish citizens in areas like economic, social, and family life. This inclusive approach is evident in the widespread availability of language support programs, efforts to ensure equal access to education and health care, and the facilitation of political participation for non-EU citizens, who can vote and stand in local elections after three years of legal residence (MIPEX, 2020)[37].

The MCP also highlights Sweden's commitment to multiculturalism, has been evident since the 80s with major improvements until 2010 when the country scored 7 out of 8, indicating a strong embrace of policies that recognize and support cultural diversity. Since 1974 the Sweden mentions multiculturalism in its constitution which institutionalizes the fight against discrimination on any ground affecting the private person and the search for equal opportunities. Sweden has implemented comprehensive measures such as the promotion of mother tongue education, ethnic diversity in public media and the access of undocumented students to education.

The country's high scores in both MIPEX and MCP demonstrate its effective integration framework, which not only supports immigrants' socio-economic integration but also actively promotes the preservation of their cultural identities (Queen's University, 2024)[38].

2.3 Reference Studies on PISA and Children with a Migratory Background

Across Europe, PISA data has consistently shown that children with an immigrant background tend to underperform compared to native students, with gaps influenced by factors such as socio-economic status, language barriers, and the characteristics of the host country's education system. The performance of immigrant students varies widely across countries, underlining differences in national educational policies, social integration efforts, and level of support provided to these students. For example, countries with more inclusive educational policies tend to see smaller performance gaps between immigrant and native students (European Commission, 2015)[39].

The PISA dataset provides separate scores for three subject categories, namely reading, science and mathematics. According to the OECD report, socio-economic status and linguistic background are the predominant factors that explain the gap among migratory profiles for mathematics and reading results, also referred to as the "immigration gap". The socio-economic background alone accounts on average for more than 50% of the differential. After accounting for both of these factors, immigrant students either outperform their native peers, or they show no significant difference in most of the countries (OECD, 2022)[40].

2.3.1 Reference literature on PISA: the case of Italy

In the case of Italy, after accounting for the socio-economic status of the students, the performance gap between immigrant and native peers becomes negligible and after accounting for the language

background immigrants slightly outperform their native peers (OECD, 2023)[41]. Notably, while socio-economic factors impact the performance across all three subjects, the language spoken at home primarily affects reading and science scores. Additionally, the performance gap in mathematics is smaller compared to reading and science, underscoring the significant role of the language spoken at home over test outcomes. A recent study (Ferri et al., 2023)[42] found that the socio-economic level of the school is the most consistent predictor of performance disparities between native and foreign-born students in all the European countries examined in the study, such as Italy and Germany. In schools with a high socio-economic status the immigration gap tends to be more pronounced compared to schools with disadvantageous environments (Ferri et al., 2023)[43]. Moreover, school segregation exacerbates these disparities, as immigrant students are often concentrated in lower-performing schools, limiting their opportunities for upward mobility and academic success (Pivovarova and Powers, 2019)[44].

Among immigrant groups in Italy, Latin Americans find the biggest difficulties due to economic poverty and low cultural capital of the families, while south-east Asians, Arabic and sub-Saharan Africans tend to face many obstacles if they are first-generation immigrants, but they recover with their second-generation children. On the other hand, Eastern Europeans typically perform the best academically (Colombo, 2014)[45].

2.3.2 Reference literature on PISA: the case of Germany

Germany along with Sweden is among the seven countries with the largest performance gap in mathematics. In the case of Germany, socio-economic disadvantages account for more than a third of the differential and, after considering also the language spoken at home, the gap becomes not significant (OECD, 2023)[46]. Furthermore, the German education system's early tracking exacerbates these disparities, as immigrant students are more likely to be placed in lower academic tracks, limiting their future educational and career opportunities (Koehler & Schneider, 2019)[47]. School segregation, particularly in urban areas with high concentrations of immigrant populations, further entrenches these inequalities, as immigrant students are often clustered in underperforming schools with fewer resources (Morris-Lange et al, 2013)[48].

In Germany, the educational performance of immigrant students varies significantly across different ethnic groups. Eastern European immigrants tend to perform relatively well, particularly in mathematics, where their outcomes are often comparable to those of native Germans. In contrast, students from Turkish and Arab backgrounds, who constitute a large portion of the immigrant population, often face greater challenges, especially if they are first-generation immigrants (Gries et al., 2021)[49]. However, as with other countries, there is evidence that second-generation immigrants show significant improvement in educational outcomes, particularly when they are more integrated into German society and have access to better educational resources (Teltemann et al., 2018)[50]. Additionally, studies have found that African immigrants, especially those from sub-Saharan regions, face considerable obstacles in the German education system, often related to the socio-economic difficulties of their families (Adedeji et al, 2021)[51]. Despite these challenges, some groups, such as South-East Asians, exhibit resilience, with their second-generation children often achieving academic success comparable to or even exceeding that of their peers (Porcu et al., 2023)[52].

2.3.3 Reference literature on PISA: the case of Sweden

In Sweden, PISA data reveal significant disparities in educational outcomes between immigrant and native students. Over a third of the gap is explained by socio-economic differences, as immigrant students are disproportionately represented among disadvantaged groups. After accounting for both the socioeconomic status and the language spoken at home, the gap in mathematics remains large (OECD, 2023)[53].

Ethnic disparities are also notable, with students from Middle Eastern, African, and South Asian backgrounds generally performing worse compared to those from European backgrounds. However, second-generation immigrants often show improved educational outcomes as they integrate more fully into Swedish society and gain better access to educational resources (OECD, 2019)[54].

3 DATA, METHODOLOGY AND RESEARCH OBJECTIVES

This chapter outlines the core components of the research, including the data utilized, the variables analyzed, and the methodological approach adopted to address the research questions.

The first section offers a comprehensive description of the Programme for International Student Assessment (PISA) dataset, which is collected by the Organisation for Economic Co-operation and Development (OECD) and serves as the primary data source for this research. PISA provides a wealth of information on the academic performance of 15-year-old students across various countries, along with extensive background data on students' socioeconomic status, family background, and learning environments. We shall elaborate on the scope of the dataset, the countries involved, and the key features relevant to the study of immigrant students' educational outcomes.

A detailed description of the variables employed in the analysis shall be reported in the second section. The study focuses mainly on the differentials in educational outcomes for the realm of mathematics among native and immigrant students in Italy, Germany and Sweden. The variables included in the model encompass factors such as migration background, socioeconomic status, educational resources, and individual characteristics, which are hypothesized to influence student performance.

The third section illustrates the research methodology, outlining the statistical models employed to examine the impact of all the variables included in the study to explain the performance gaps in mathematics between native and immigrants across the three countries.

3.1 Data structure and content

The Program for International Student Assessment (PISA) is of primary importance in evaluating educational systems across the globe by measuring 15-year-olds' knowledge and skills in reading, mathematics, and science every three years (World Bank, 2019)[55]. PISA data is particularly valuable for examining the educational performance of students with a migratory background, providing insights into how these students perform compared to their native peers across various countries (OECD, 2023)[56]. In the context of European countries, including Italy, Germany, and Sweden, PISA data has been extensively used to understand the educational disparities and challenges faced by immigrant students, as well as to assess the effectiveness of different educational policies aimed at fostering their integration and academic success.

The following sub-section gives an overview of the structure of the PISA investigation and of the content of the data

3.1.1 Data structure and content

The database PISA is comprehensive of the student’s achievements in the three primary domains of reading, mathematics and science. These assessments are designed to measure not only the knowledge but also the ability to apply that knowledge in various contexts. In addition to the cognitive assessments, PISA includes several contextual questionnaires completed by students, school leaders, teachers, and parents. These data gather information about different topics, such as student background (demographic information, socioeconomic status and migratory background), school environment (resources available,

school policies, and teaching practices) and learning context (student attitudes towards learning, teacher-student relations, and extracurricular activities).

The Program is divided in cycles, each one of which concentrates on one of the primary domains. For the 2022 round the major area of assessment is mathematics, complemented by the introduction of a new domain: the domain of creative thinking (OECD, 2023)[57]. In any case, the three domains have been found to be highly correlated. Therefore, when we will apply a regression analysis to further examine the data, we shall mainly focus on the mathematics domain.

The particular structure of the data allows to explore determinants of a wide range of educational outcomes, as each of the rounds of investigation is designed to facilitate comparative analysis cross country and over time of the various indicators.

3.2 Description of the Variables

In this section, the key variables utilized in the analysis are described, highlighting their importance in understanding the educational outcomes of immigrant students.

- **Immigration Gap**
  The objective of this study is to obtain and explain the "Mean Difference Between Natives and Immigrants" by analyzing the educational performance gap in the realm of mathematics between immigrant and native students, as measured by the difference in PISA scores. This gap is calculated using the IMMIGRANT variable, which categorizes students as either immigrants or natives. The analysis focuses on understanding the various impacts of the examined variables on the gap in mathematics.
- **IMMIG / IMMIGRANT**
  The IMMIG variable, based on students and their parents' countries of birth, provides essential information for analyzing the educational outcomes of immigrant populations. The variable divides students into three main groups:

  1. Native Students: Students who were born in the country of assessment and have at least one parent also born in that country.
  2. Second-Generation Immigrants: Students who were born in the country of assessment but whose parents were born in another country.
  3. First-Generation Immigrants: Students who, along with their parents, were born outside the country of assessment.

  Data for the IMMIG variable is collected through student questionnaires, where students are asked to provide information about their own and their parents' countries of birth.
  The IMMIG variable is crucial in educational research as it helps understanding the disparities in academic performance between immigrant and native students. Through the descriptive statistics, it is possible to learn how the impact of other variables (such as socio-economic status or language spoken at home) may affect the educational achievement of immigrant students compared to their native peers (Avvisati, 2020)[58].

The regression analysis introduces a new variable **IMMIGRANT**, which replaces the previously described "IMMIG". This variable assumes values of 0 for native students and 1 for both first-generation and second-generation immigrants, thereby creating a binary classification. This binary variable serves as the grouping variable, crucial for applying the Oaxaca-Blinder decomposition (Blinder, 1973[59]; Oaxaca, 1973)[60], as it enables for a clear differentiation between the two groups of students. This facilitates the analysis of how observable characteristics contribute to the achievement gap between native and immigrant students.

- **ESCS**

  ESCS (Economic, Social, and Cultural Status Index) is a composite measure used to assess the socio-economic background of the students. Positive values of this variable indicate that a student reported a better socio-economic condition than the average student across OECD countries. The index is built from three main components: parental education (PAREDINT), the highest parental occupation (HISEI), and home possessions related to educational resources (HOMEPOS), which includes items such as number of books available at home. These components are combined using principal component analysis (PCA) to create a standardized metric that reflects a student's access to family resources, which, in turn, influences their social position and educational opportunities (Ministero dell'Istruzione, 2024)[61]. An important aspect of the present analysis is how variations in ESCS influence the magnitude of the immigration gap.

- **HISCED / PARENTALEDU**

  The HISCED (Highest Education level of Parents) Index of is a categorical variable that indicates the highest level of education attained by the student's parents. It is derived from student responses regarding their parents' educational qualifications, which are then coded according to the six categories of the International Standard Classification of Education (ISCED). It can assume the following values:

  1. Less than ISCED Level 1
  2. ISCED level 1 (primary education)
  3. ISCED level 2 (lower secondary)
  4. ISCED level 3.3 (upper secondary education with no direct access to tertiary education)
  5. ISCED level 3.4 (upper secondary education with direct access to tertiary education)
  6. ISCED level 4 (post-secondary non-tertiary)
  7. ISCED level 5 (short-cycle tertiary education)
  8. ISCED level 6 (Bachelor's or equivalent first or long first-degree program)
  9. ISCED level 7 (Master's or equivalent long first-degree program)
  10. ISCED level 8 (Doctoral or equivalent level).

  The index is constructed by considering the indices of mother's (MISCED) and father's (FISCED) educational level, and by picking the higher ISCED level of either parent. The conversion from ISCED levels to years of education was standardized across countries based on modal years of education for each ISCED level (OECD, 2024)[62]. This variable is used in the descriptive analyses for understanding the influence of parental education on student performance across different IMMIG values.

For the purpose of the regression analysis, the variable HISCED has been mapped into a new variable, **PARENTALEDU**, which can assume values 0, 1, or 2. These correspond to the following educational levels:

0. ISCED level 1 and 2 (primary education or less)
1. ISCED level 3.3 and 3.4 (secondary education)
2. ISCED level 4, 5, and 6 (post-secondary education)

The PARENTALEDU variable can be used for understanding the influence of parental education on the performance gap between immigrant and native students.

- **LANGUAGE**

  The LANGUAGE (Language Spoken at Home) variable captures the language predominantly spoken at home by the student, distinguishing between the host country's language and other languages. The categorization is binary:

  0 = The language spoken at home is the same as the language of the assessment.
  1 = The language spoken at home is different from the language of the assessment.

  The language spoken at home is a critical factor in determining the extent to which language barriers affect the immigration gap. Those who speak a different language at home may face additional challenges in understanding the material.

  In constructing the LANGUAGE variable, national PISA centers are responsible for mapping local languages and dialects to either of the two categories. For example, in Belgium, the Flemish dialect is considered equivalent to Dutch, the language of the test, while in other communities, local dialects may be mapped to the "another language" category, depending on how they relate to the language of assessment (OECD, 2023)[63].

- **FEMALE**

  The variable FEMALE (gender) is a binary indicator that takes value 0 for male students and 1 for female students. This variable is included in the regression analysis to investigate if it contributes to the differences in test scores between native and immigrant students. By examining the interaction between gender and immigration status, we aim at determining if a specific gender displays higher or lower performance gap in academic achievement across the two groups.

- **LINK**

  The LINK (Internet Access at Home) variable is another binary indicator that can either take the value of 0 if there is no internet connection at home or 1 if there is an internet connection at home. By considering LINK in the regression, we would like to assess whether having an internet connection at home plays a significant role in the performance gap between native and immigrant students across the three countries.

- **COMPUTER**

  The COMPUTER (Computer at Home) variable uses a binary classification where 0 stands for no computer access at home and 1 identifies computer access at home. This variable is included in the regression analysis to explore how access to a computer at home affects the performance gap in mathematics between native and immigrant students.

- **BELONG**

  The BELONG (Sense of Belonging) variable is a continuous variable that reflects the sense of belonging students feel within their schools. This index was constructed using students' responses to a trend question, where they were asked if they agree with six school-related statements. Positive values on this scale indicate that a student reported a stronger sense of belonging than the average student across OECD countries (OECD, 2023)[64]. This variable is used in the regression analysis to understand how students' integration and identification with their school environment may influence the immigration gap in mathematics.

- **AGE**

  The AGE (Student's Age) variable is a continuous variable that identifies the age of students, ranging from 15.25 to 16.33 years. It is included in the regression analysis to explore its potential impact on the performance gap between native and immigrant students.

- **REPEAT**

  The variable REPEAT (Grade Repetition) has a binary categorization that takes the value of 0 if the student has not repeated a grade and 1 if the student has experienced grade repetition. This variable is included in the model to examine how grade repetition affects academic performance and whether grade repetition contributes to widening or narrowing the achievement gaps in mathematics between the two groups of students.

- **HOUSEHOLDWORK**

  The variable HOUSEHOLDWORK (Work in the Household) is a categorical variable that takes the value:

  0. for no work in the household,
  1. for 1 or 2 days of work in the household per week,
  2. for 3 or more days of work in the household per week.

  This variable will be included in the regression analysis to investigate how the amount of time spent on household work affects students' achievement gaps between native and immigrant students. Specifically, the analysis will assess if an increased workload at home potentially widens or narrows the performance differential between these two groups.

- **HOMEWORK**

  The variable HOMEWORK (Study for School) is a categorical variable that takes the value

  0. for no homework,
  1. for 1 or 2 days of homework per week,
  2. for 3 or more days of homework per week.

  By incorporating HOMEWORK, we aim to investigate how the frequency of homework completion affects students' academic performance gaps between native and immigrant students. In particular, the regression will examine if an increased frequency of homework potentially widens or narrows the achievement differential between these two groups.

VARIABLES INCLUDED IN THE MODEL	
IMMIGRANT	Index on Immigrant Background
ESCS	Economic, Social, and Cultural Status Index
PARENTALEDU	Index of Highest Education level of Parents
LANGUAGE	Language Spoken at Home
FEMALE	Student (Standardized) Gender
LINK	Internet Access at Home
COMPUTER	Computer at Home
BELONG	Sense of Belonging
AGE	Student's age
REPEAT	Grade Repetition
HOUSEHOLDWORK	Work in the Household
HOMEWORK	Study for School

3.3 Methodology of the research

This research utilizes data from the PISA 2022 dataset, focusing specifically on student performance in the domains of reading, mathematics, and science. The initial phase of analysis involves filtering the dataset to include only European countries that participated in the PISA assessment. A descriptive analysis is conducted based on the immigratory background variable IMMIG, allowing for a comparison of test scores across different immigrant groups.

Following this initial analysis, the dataset is further refined to focus on Italy, Germany, and Sweden. These three countries were selected for their importance and because they present three very diverse immigration profiles and integration policies, as seen by their distinct positions in the Migrant Integration Policy Index (MIPEX) and the Multiculturalism Policy Index (MCP).

Once the data is extracted and filtered, a series of descriptive statistics is presented. Initially, the performance of native and immigrant students in these countries is compared to their counterparts in other European nations. Subsequently, variables such as the Economic, Social, and Cultural Status (ESCS), the Index of Highest Education level of Parents (HISCED) and the language spoken at home (LANGUAGE) are analyzed for immigrants in the three countries through descriptive statistics.

Finally, the Oaxaca-Blinder decomposition (Blinder, 1973[65];Oaxaca, 1973[66]) is applied to examine the differential in mathematics' test scores between native (Group 1) and immigrant students (Group 2) across Italy, Germany, and Sweden.

It has been verified that the differences in test scores between native and immigrant students across the three domains of reading, math, and science are strongly correlated with each other. This high correlation suggests that the factors contributing to the immigration gap are consistent across these subjects. Therefore, the decision to focus solely on the mathematics domain in the regression analysis stems from this correlation and the fact that mathematics is the primary focus of the PISA 2022 round.

The formula of the decomposition considering the two groups of students can be written as follows:

$$\Delta Y = \bar{Y}_1 - \bar{Y}_2 = (\bar{X}_1 - \bar{X}_2)\beta_2 + \bar{X}_2(\beta_1 - \beta_2)$$

Where:

- $\bar{Y}^1$ and $\bar{Y}_2$ are the mean values of test scores for natives and immigrants respectively
- $\bar{X}_1$and $\bar{X}_2$ are the mean values of the characteristics for natives and immigrants respectively
- β_1 and β_2 denotes the effects of these characteristics for natives and immigrants respectively

This econometric method allows to break down the observed gap in mean test scores into two key parts:

- The explained component, or endowment effect, captures the portion of the gap that can be attributed to differences in observable characteristics, such as socioeconomic status, parental education, and language spoken at home. This is calculated by weighting the differences in these characteristics by the coefficients associated with the native group.

$$E = (\bar{X}_1 - \bar{X}_2)\beta_2$$

- The unexplained component, or coefficient effect, captures the differences in how characteristics are valued between the two groups, which could arise from discrimination, differing returns on characteristics, or other unobservable factors.

$$C = \bar{X}_2(\beta_1 - \beta_2)$$

The coefficient effect indicates the extent to which the same characteristics are associated with different outcomes between natives and immigrants.

By focusing on these two components, the Oaxaca-Blinder decomposition helps to identify how much of the educational disparity in mathematics between native and immigrant students is due to differences in observable characteristics versus how much is due to differing returns on these characteristics across Italy, Germany, and Sweden.

4 DESCRIPTIVE ANALYSIS

The descriptive analysis provides an overview of PISA 2022 data focusing on student performance across different domains and demographic groups. This section comments the findings from the descriptive statistics on the aggregate data of the European countries covered by the program, focusing on the performance in mathematics, reading, and science among native students, second-generation immigrants, and first-generation immigrants.

The first subsection analyses test results across European countries, while the second one focuses on the specific position of Italy, Germany, and Sweden with respect to the aggregate mean of European countries. All results presented relate to the findings reported in Figure 1.

In the subsequent sections, descriptive statistics for various variables across these three countries are presented. Initially, the variable IMMIG, reflecting migration background, will be examined. This will be followed by an exploration of ESCS, HISCED and LANGUAGE in relation to migration background and test performance.

4.1 Cross-country analysis

The results of students across the three domains of assessment are highly correlated and can thus be analyzed in an aggregate manner. For this analysis, the focus will be on mathematics, the main domain assessed in PISA 2022.

High correlations are also present among the differential between natives and first-generation students and both the differential between native and second-generation students and the differential between second-generation students and first-generation students. Given these considerations, the differential between natives and first-generation immigrants will be considered.

4.1.1 Cross-country analysis of European aggregate results

The aggregate results indicate that certain countries, such as Switzerland and Estonia, consistently perform well across all disciplines, with scores exceeding 500. In contrast, countries like Greece, Romania, and Bulgaria show significantly lower performance, with scores below 450 even among native students.

In the majority of European countries, the test scores of immigrants are substantially lower compared to their native peers. However, it is essential to note that the degree of this disparity varies significantly across countries, the largest immigration gap being observed in countries such as Finland, Germany, the Netherlands, Slovenia, and Sweden. This suggests that, despite the generally high education standards, there still are significant barriers to educational equality for immigrant students. Sweden, in particular, while being one of the top performers globally, exhibits a pronounced disparity.

Conversely, in Romania, Latvia, Lithuania, and Croatia, first-generation immigrants actually outperform native students, while in countries like Malta, Montenegro, Serbia, and the United Kingdom, the difference in mathematics scores between natives and first-generation immigrants is statistically insignificant (OECD, 2023)[67].

On average, across the examined European countries, the performance gap between native and first-generation immigrant pupils in mathematics is about 11.19%. If we rank countries according to the

immigration gap, with the higher difference at the top, the first 13 out of the 30 countries analyzed place above the average threshold.

		MATH				READING				SCIENCE	
cnt	Native	2nd generation	1 generation	diff N-1	Native	2nd generation	1 generation	diff N-1	Native	2nd generation	1 generation
CHE	527.4653	475.4674	470.7112	56.7541	504.9031	453.3821	442.7208	62.1823	523.4781	469.7664	462.4744
EST	515.0416	492.298	475.9588	39.0828	518.3208	496.3481	474.18	44.1408	531.059	506.601	486.3141
NLD	507.8235	461.7528	430.8026	77.0209	476.0357	438.1366	391.1524	84.8833	504.9076	453.0468	427.7485
BEL	504.2484	452.2269	439.2619	64.9865	494.1015	447.8979	422.7479	71.3536	505.9467	451.7244	435.6325
AUT	504.2078	452.2949	442.9832	61.2246	499.8455	442.5358	419.7482	80.0973	513.9514	445.3986	431.338
SWE	498.475	448.9829	422.3143	76.1607	510.5817	454.3949	397.0724	113.5093	516.2362	447.7156	410.1319
DNK	497.4017	441.7845	432.218	65.1837	496.7222	443.7874	417.1247	79.5975	501.4783	437.5568	430.1224
DEU	494.7169	457.2712	396.7131	98.0038	502.4537	464.915	382.213	120.2407	516.6277	470.9752	391.277
IRL	494.463	489.6179	481.2805	13.1825	520.3866	518.0285	501.6731	18.7135	507.3953	502.8656	502.7935
GBR	493.7307	507.7858	483.4235	10.3072	502.7662	500.9318	482.6938	20.0724	506.7846	511.2884	488.3531
SVN	492.4917	450.5033	423.4952	68.9965	476.5907	455.5538	408.8657	67.725	510.4884	458.0139	425.3039
POL	491.0604	556.8482	438.9644	52.096	492.4249	545.7136	397.9402	94.4847	502.1644	476.0336	418.7622
FIN	490.893	439.9733	411.57	79.323	498.7468	444.0952	391.1956	107.5512	517.0022	459.9479	410.65
CZE	488.6984	484.6593	441.2733	47.4251	490.6964	483.4187	414.6645	76.0319	500.358	491.5298	430.8257
FRA	485.2746	436.326	424.2576	61.017	485.76	444.357	409.9035	75.8565	499.9643	449.5926	420.3275
LVA	485.204	492.1836	496.9561	-11.7521	477.046	473.488	493.326	-16.28	494.4324	487.9601	505.0854
Total	484.3936	459.8999	435.6511	48.7425	487.176	462.3796	425.3935	61.7825	495.9797	466.8844	435.7621
ESP	480.3919	458.6104	432.0495	48.3424	482.3359	462.2761	433.7912	48.5447	491.9079	466.7873	446.3693
NOR	477.9586	449.8084	437.275	40.6836	489.2841	448.0914	425.621	63.6631	491.0979	451.5874	433.4838
LTU	477.5139	452.6657	481.9506	-4.4367	475.6811	417.7227	458.1224	17.5587	486.7069	485.7181	487.531
PRT	477.0759	461.9361	432.605	44.4709	479.9306	463.9179	456.3305	23.6001	489.5816	477.5162	456.6751
ITA	476.515	453.3269	429.8294	46.6856	488.0381	466.3952	426.7814	61.2567	482.8094	453.6703	435.2649
HUN	473.649	490.868	452.4231	21.2259	475.143	498.3521	423.9706	51.1724	488.3634	511.8133	455.211
MLT	469.8803	449.0475	485.4079	-15.5276	450.0769	447.4944	458.1403	-8.0634	468.1758	459.3301	486.807
SVK	467.709	448.5999	450.06	17.649	451.2462	423.5504	390.6378	60.6084	465.8594	438.1313	427.009
HRV	465.9736	450.3202	462.8253	3.1483	479.1087	457.3351	453.6863	25.4224	487.2526	462.4421	475.609
ISL	464.3471	437.647	417.2384	47.1087	443.5187	388.0154	365.6651	77.8536	451.2236	421.8038	384.8079
GRC	438.2665	404.9622	373.1466	65.1199	447.4241	410.7997	373.4117	74.0124	449.4646	411.0256	364.3392
ROU	431.5074	382.4343	444.0436	-12.5362	431.8061	373.6133	430.7164	1.0897	431.5478	358.3656	404.0596
BGR	423.2986	367.1721	404.3171	18.9815	413.4932	386.2081	381.9777	31.5155	428.0135	400.7729	415.6869

Figure 1: European aggregate results in maths, reading and science. The differentials between native and first-generation immigrants is calculated in the "diff n-1" column.

4.1.2 Cross-country analysis: The Case of Italy

Italian students generally perform slightly worse compared to their peers in Germany and Sweden across all three disciplines, as depicted in Figure 1. Native Italians (vs. Germans and Swedish, respectively) have average scores of approximately 477 (vs. 495 and 499) in mathematics, 488 (vs. 503 and 511) in reading, and 482 (vs. 517 and 516) in science.

The performance gap between native students and first-generation immigrants in Italy is notable but relatively smaller compared to the mean of European countries. First-generation immigrant students in Italy score approximately 10.86% lower than their native counterparts, placing Italy in the 17th position in terms of the immigration gap, well below the average value of 11.19%.

4.1.3 Cross-country analysis: The Case of Germany

When comparing Italy to Germany and Sweden, the differences become more pronounced. In Germany, the gap between native students and first-generation immigrants is among the largest in Europe, highlighting the substantial challenges faced by immigrant students in the German education system.

Interestingly, the performance gap in Italy decreases to about 5.12% when considering second-generation immigrants. This reduction indicates that the Italian education system may be more effective in supporting the children of immigrants, as they tend to perform closer to their native peers compared to first-generation immigrants. This trend contrasts with the situation in Germany and Sweden, where the gaps between natives and second-generation immigrants, while reduced, remains substantial.

While native German students exhibit strong academic performance, with average scores of 495 in mathematics, 503 in reading, and 517 in science, first-generation immigrant students score 24.70% lower compared to their native peers. This substantial disparity places Germany at the top of the ranking as the country with the largest educational performance gaps between natives and immigrants in Europe. The gap diminishes to 8.19% for second-generation immigrants, still larger than the European mean.

It is particularly striking that Germany, despite its strong reputation for integration policies, continues to struggle with such large educational disparities. This suggests that while Germany's integration policies may be effective in certain areas, they are less successful in bridging the educational divide between native and immigrant students (Entorf, 2015)[68]. This issue is not only significant within Europe but also on a global scale, as Germany's gap between native and immigrant students is among the largest observed across all countries participating in the PISA program.

4.1.4 Cross-country analysis: The Case of Sweden

Sweden demonstrates strong academic performance, with native students achieving scores around 499 in mathematics, and slightly higher in reading and science. These results place Sweden among the top-performing countries in Europe.

However, the immigration gap in Sweden is substantial, with first-generation immigrants scoring over 18.02% lower relative to their native peers. This wide disparity is particularly notable given Sweden's commitment to inclusive education and social equity.

When considering second-generation immigrants, the gap decreases to around 11.03%, indicating some improvement as these students become more integrated into Swedish society. However, even this reduced gap is significant and highlights ongoing challenges in achieving full educational equity.

Despite Sweden's reputation as one of the top performers in integration policies according to international indicators (MIPEX, 2020)[69], the country faces significant challenges in closing the educational gap between native students and those from immigrant background. It holds the fourth position in the European ranking for its performance gap between native and first-generation immigrants, just slightly below Germany.

4.2 Descriptive analysis of the variables

In order to understand the impact of the migratory background on children test scores, we selected the main variables that may influence test results. Our multi-faceted analysis will provide a comprehensive overview of how these variables interact and influence educational outcomes in Italy, Germany, and Sweden.

4.2.1 Descriptive Analysis of the IMMIG Variable

In the previous sections, the relationship between different values of the IMMIG variable and PISA test results has been explored firstly across European countries, and secondly with a particular focus on Italy, Germany, and Sweden. These analyses highlighted how the migratory background significantly influences educational outcomes, with native students generally outperforming both first- and second-generation immigrants across all three countries.

When examining the distribution of different migratory backgrounds among Italy, Germany, and Sweden, notable differences emerge. As shown in Figure 2, Italy has the smallest percentage of immigrant students, accounting for approximately 12% of the total student population included in the PISA program. This relatively low proportion reflects Italy's more recent history of immigration compared to other European nations, as well as its distinctive migration policies and economic conditions, which may limit the influx of immigrant families and their access to the public education system.

Germany, on the other hand, has the highest percentage of immigrant students, with a particularly significant proportion of second-generation immigrants. Second-generation students constitute about 16.7% of the total student population, highlighting Germany's long-standing status as a destination for immigrants, particularly from Turkey and other countries with which Germany has historical migration agreements. The presence of such a large second-generation immigrant population suggests that Germany's education system faces unique challenges related to the integration of students who, despite being born in the country, still struggle with socio-economic and cultural hurdles that impact their academic performance (Teltelmann et al., 2018)[70].

Sweden stands out with the highest percentage of first-generation immigrant students, who make up 10.38% of the total student body. This high percentage reflects Sweden's open immigration policies and its reputation as a welcoming destination for refugees and migrants from diverse backgrounds. However, this also means that the education system must accommodate a large number of students who may have arrived with limited proficiency in the Swedish language and varying levels of prior education, presenting distinct challenges in ensuring these students can achieve academic success (Lundahl and Lindblad, 2018)[71].

These disparities in the distribution of immigrant students underscore the importance of considering migratory background when analyzing educational outcomes. The different proportions of first- and second-generation immigrants in Italy, Germany, and Sweden are reflective of broader socio-political contexts, and they play a crucial role in shaping the specific educational needs and challenges that each country must address.

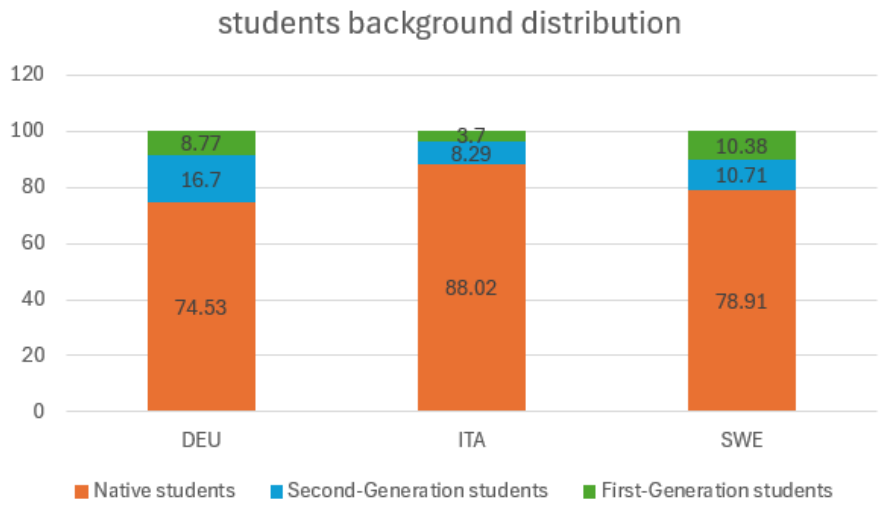

Figure 2: Background distribution of students in Germany, Italy and Sweden

In the following paragraphs, the IMMIG variable will be further examined in relation to ESCS, PARENTALEDU, and LANGUAGE, to explore how migratory background interacts with socio-economic status, parental education, and language spoken at home, and how these factors collectively influence educational outcomes.

4.2.2 Descriptive Analysis of the ESCS Variable

The analysis of the Economic, Social, and Cultural Status (ESCS) variable in relation to immigrant background (IMMIG) reveals significant disparities across Italy, Germany, and Sweden. A clear pattern emerges where having an immigrant background is strongly associated with lower ESCS scores, regardless of whether individuals are first or second-generation immigrants. The findings are summarized in Figure 3.

In Sweden, students display the highest ESCS scores across all categories of IMMIG. On the other hand, Italy exhibits the most pronounced difference between native students and second-generation immigrants, coupled with the lowest ESCS scores among its native population. This finding highlights a critical issue within the Italian education and socio-economic system: not only do immigrants face significant disadvantages, but even the native population shows weaker socio-economic standing compared to other European countries.

The consistent pattern of higher ESCS scores among native students across all three countries underlines the importance of socio-economic status in educational achievements. Native students generally enjoy better socio-economic conditions, which positively influence their academic performance (Lagravinese et al., 2020)[72]. However, the ESCS variable alone does not fully explain the varying impacts of immigrant backgrounds on test results across Italy, Germany, and Sweden. Despite similar gaps in ESCS scores between first-generation immigrants and natives, the educational outcomes differ significantly among the three countries, indicating that other factors (such as education system structure, language barriers, and societal attitudes towards immigrants) may be responsible for shaping these outcomes (Tan, 2024)[73].

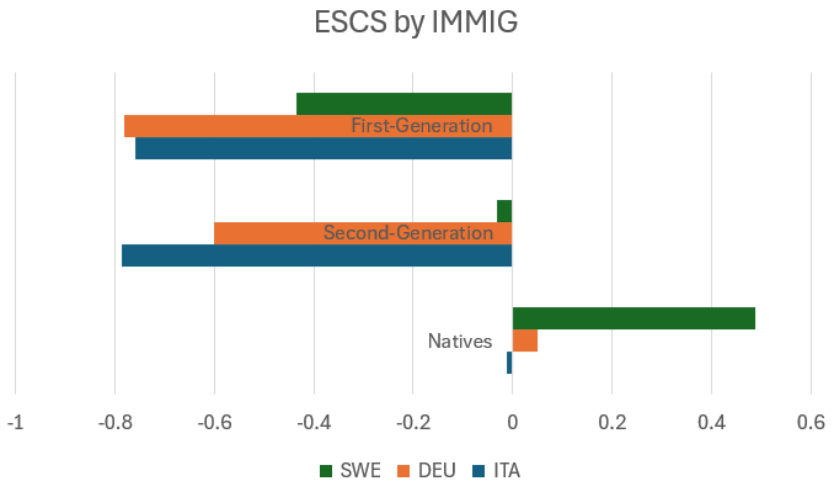

Figure 3: Descriptive analysis of the HISCED variable

4.2.3 Descriptive Analysis of the HISCED Variable

The HISCED variable, which measures the highest level of parental education according to the International Standard Classification of Education (ISCED) levels, provides important insights into the educational landscape across different countries and demographic groups. From a descriptive perspective, a noticeable gap in educational outcomes emerges among native students in Italy, Germany, and Sweden. In contrast, this gap is not significant among immigrant students –please refer to Figure 4 and Figure 5 for a detailed summary.

In Germany, students whose parents have low ISCED levels (ISCED 1 or below) perform relatively better compared to their counterparts in Italy and Sweden. Specifically, among children with low-educated parents, native students in Germany tend to achieve higher educational outcomes. In contrast, in Italy and Sweden, immigrant students from similarly low-educated families often perform better on average.

In general, students whose parents have achieved higher ISCED levels (specially 6 or 7), consistently show the best average performance across all domains, regardless of the country. Conversely, students whose parents have only achieved ISCED level 1 or lower tend to be the worst performers, highlighting the strong correlation between parental education and student's achievement (Won-Tack Lim, 2021)[74].

FIRST AND SECOND GENERATION IMMIGRANTS									
	READING			MATH			SCIENCE		
Hisced	ITA	DEU	SWE	ITA	DEU	SWE	ITA	DEU	SWE
Less than ISCED 1	392.3105	404.2191	391.5303	388.7124	400.7069	388.1839	380.0721	398.6403	379.5085
ISCED level 1	389.5105	388.3901	389.4749	372.015	369.5543	370.6037	382.4707	379.9167	380.7805
ISCED level 2	401.6727	409.1409	392.5017	397.808	407.0805	391.8561	399.555	411.7476	394.2414
ISCED level 3.3	413.0466	409.682	410.1678	430.4259	428.7284	429.0617	430.2423	429.6727	429.8199
ISCED level 3.4	444.7407	444.6871	442.4002	436.8504	436.7604	434.2271	448.7232	449.6412	446.7251
ISCED level 4	415.8115	426.8314	413.6174	414.1204	423.2254	412.0533	425.0501	435.8758	423.0855
ISCED level 5	444.6885	442.8207	441.751	434.1449	433.5464	432.2269	440.3836	439.8612	438.6874
ISCED level 6	485.3727	486.8336	485.1405	472.6187	473.7492	472.7399	487.2866	488.4654	487.5233
ISCED level 7	480.9084	482.2247	481.2938	473.5878	476.2244	473.9911	484.891	487.5403	485.2496
ISCED level 8	394.2783	394.8676	394.9408	409.4511	409.2506	409.8758	417.0415	417.7594	417.7269
Total	442.697	444.2707	441.6765	439.2088	440.9547	438.6382	448.4998	451.016	448.2312

Figure 4: Immigrants' scores by HISCED variable values

NATIVES									
	READING			MATH			SCIENCE		
	ITA	DEU	SWE	ITA	DEU	SWE	ITA	DEU	SWE
Less than ISCED	315.1674	426.3722	230.224	337.6478	427.568	347.571	344.2275	440.2358	291.876
ISCED level 1	402.7822	-	468.4621	387.2227	-	431.2671	434.4393	-	446.4866
ISCED level 2	445.1273	479.0726	462.0473	426.5479	462.1086	448.9346	433.7563	482.6296	453.1044
ISCED level 3.3	463.0892	-	477.3573	450.8419	-	462.6953	442.1647	-	474.2784
ISCED level 3.4	486.0484	507.6789	481.4424	477.485	503.0062	479.0795	485.4657	535.058	486.455
ISCED level 4	476.1249	494.934	490.9985	475.7049	484.6997	485.1795	484.4612	511.7327	497.9824
ISCED level 5	491.3442	474.2909	493.2185	473.4959	480.0118	486.4503	480.0083	497.4494	506.7177
ISCED level 6	492.9484	521.6277	525.3775	477.5355	506.9565	506.7784	481.8151	527.179	529.0743
ISCED level 7	506.994	540.8491	537.3025	498.331	539.4701	518.2282	507.5265	558.639	537.5098
ISCED level 8	489.6744	497.7037	501.6668	489.1525	498.6892	498.0968	488.2915	516.6522	514.4467
Total	488.2218	505.6774	511.5735	476.6998	497.7398	499.309	483.0308	519.2027	517.1016

Figure 5: Natives' scores by HISCED variable values

Looking at the incidence of high parental education across different immigrant backgrounds, it emerges that in Italy, 68% of native students have parents with ISCED levels 5, 6, 7, or 8, compared to only 57% of first-generation immigrant students. This discrepancy is even more pronounced in Sweden, where 80% of native students have parents who reached higher ISCED levels, compared to 65% of first-generation immigrants. In Germany, however, the gap is narrower, with 58% of native students having parents with higher ISCED levels compared to 57% of first-generation immigrants. Please refer to Figure 6 for a visual comparison among natives and immigrants across the three countries.

It is important to note that the figures above could be influenced by an asymmetric distribution of missing responses, most of which are likely to be from students whose parents have lower ISCED levels, potentially skewing the data slightly (OECD, 2019)[75].

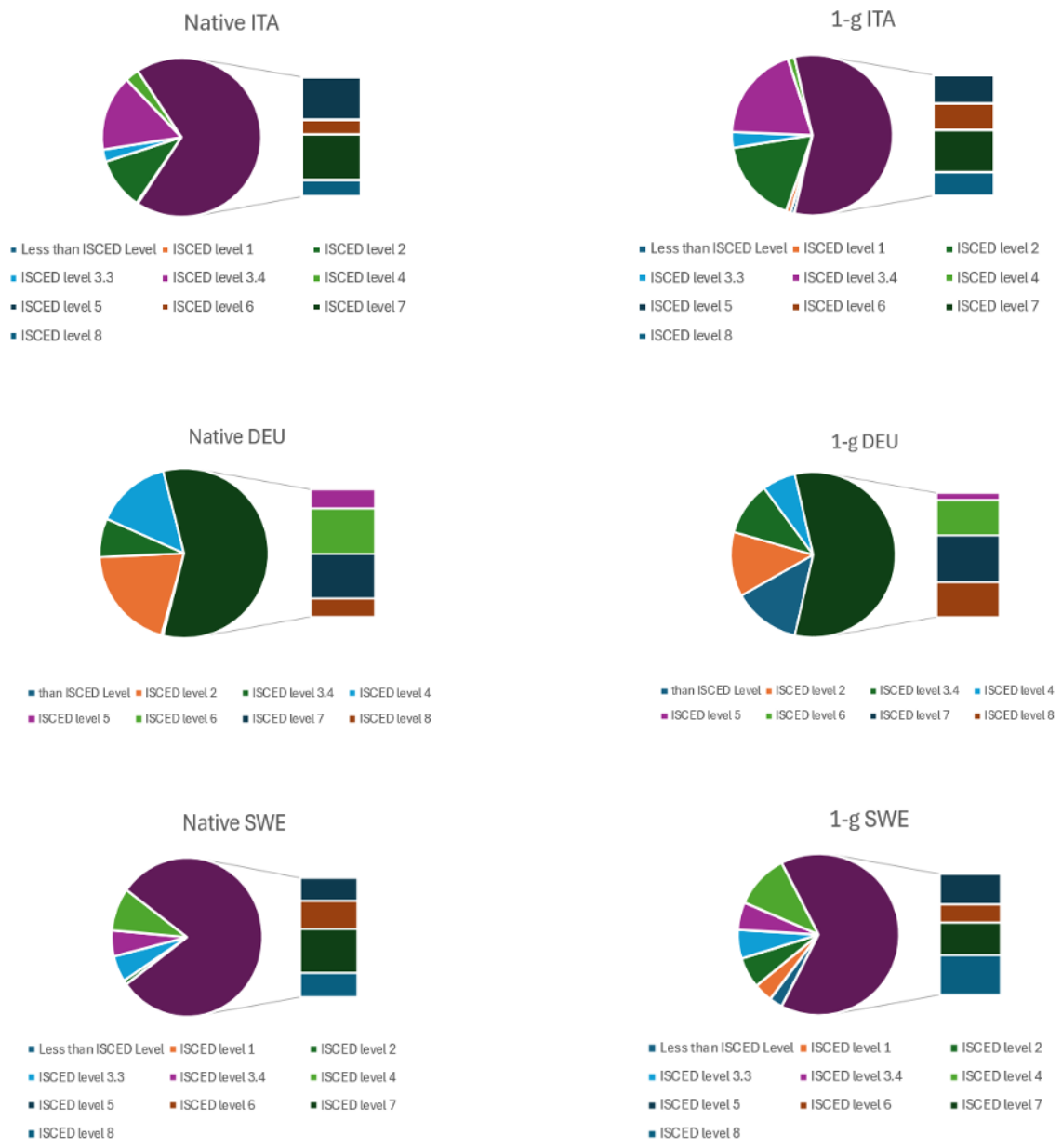

Figure 6: Relative weight of HISCED levels across Italy, Germany and Sweden, among native and immigrant students

4.2.4 Descriptive analysis of the LANGUAGE variable

The language spoken at home, captured by the variable LANGUAGE, is especially significant when analyzing the relationship between language used at home and performance on PISA tests. Immigrant students who speak a language different from the test language at home generally perform slightly worse compared to those who use the test language in their daily family interactions. Although non-immigrant students consistently outperform their immigrant peers, the performance gap narrows when comparing native students who also speak a different language at home. This trend suggests that the language spoken with one's parents has a substantial impact on test scores for all students, not just immigrants –please refer to **Error! Reference source not found.** and **Error! Reference source not found.** for a visual comparison.

Germany emerges as the country with the most pronounced difference in test scores between students who speak German at home and those who do not. This difference is observed among both native students and first- and second-generation immigrants, indicating that language proficiency, particularly in the language of instruction, is a critical factor in academic success in Germany. When analyzing immigrant performance across the three subjects—reading, science, and mathematics—the gap in test results is more significant in reading and science than in mathematics across all three countries. However, it is notable that mathematics is the subject in which immigrants perform the worst in all three countries, highlighting a specific area of academic struggle that transcends linguistic barriers.

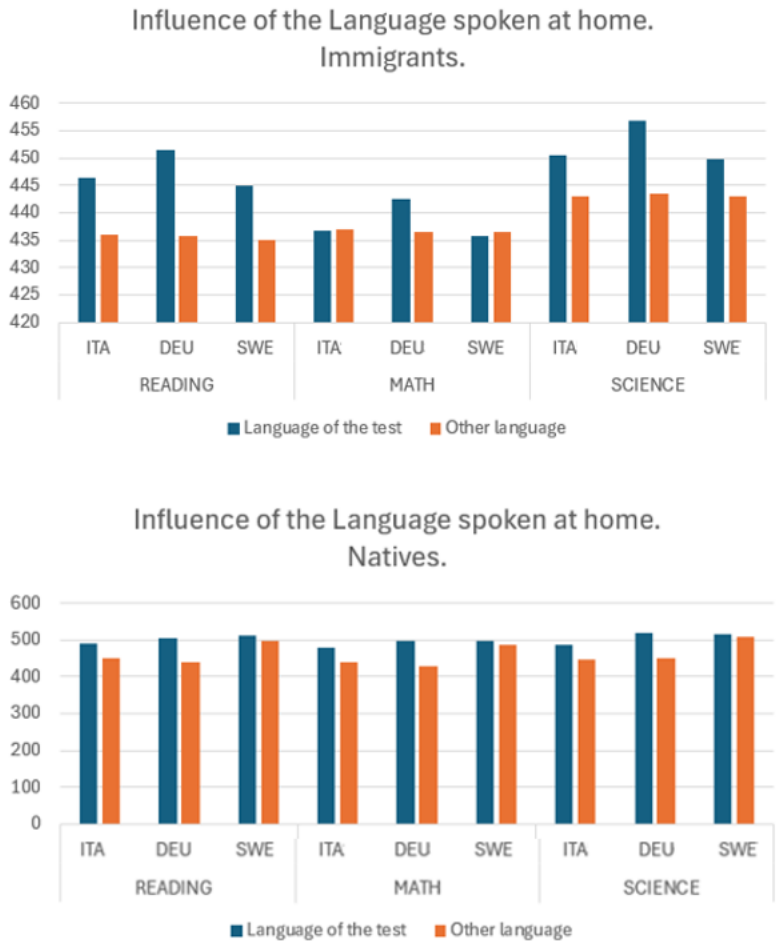

Figure 7: Test scores in Reading, Maths and Science of immigrants (upper graph) and natives (lower graph) by language spoken at home, for Italy, Germany and Sweden.

Regarding language use at home, over 90% of native students in Italy, Germany, and Sweden speak the language in which they took the test, even when communicating with their parents. Among second-generation immigrants, the percentage of those who speak a different language at home rises to about 50% in Italy and Germany and 63% in Sweden. This frequency increases significantly among first-generation immigrants, with around 75% speaking another language at home in Italy, and as high as 88%

in Germany and Sweden. These statistics, reported in Figure 8, suggest that first-generation immigrants in Italy are more likely to speak Italian at home compared to their counterparts in Germany and Sweden, who are less likely to speak German and Swedish, respectively. This higher proficiency in the host country's language among first-generation immigrants in Italy may contribute to better integration and potentially reduce immigrants' gaps in educational outcomes, although further research would be needed to confirm this hypothesis.

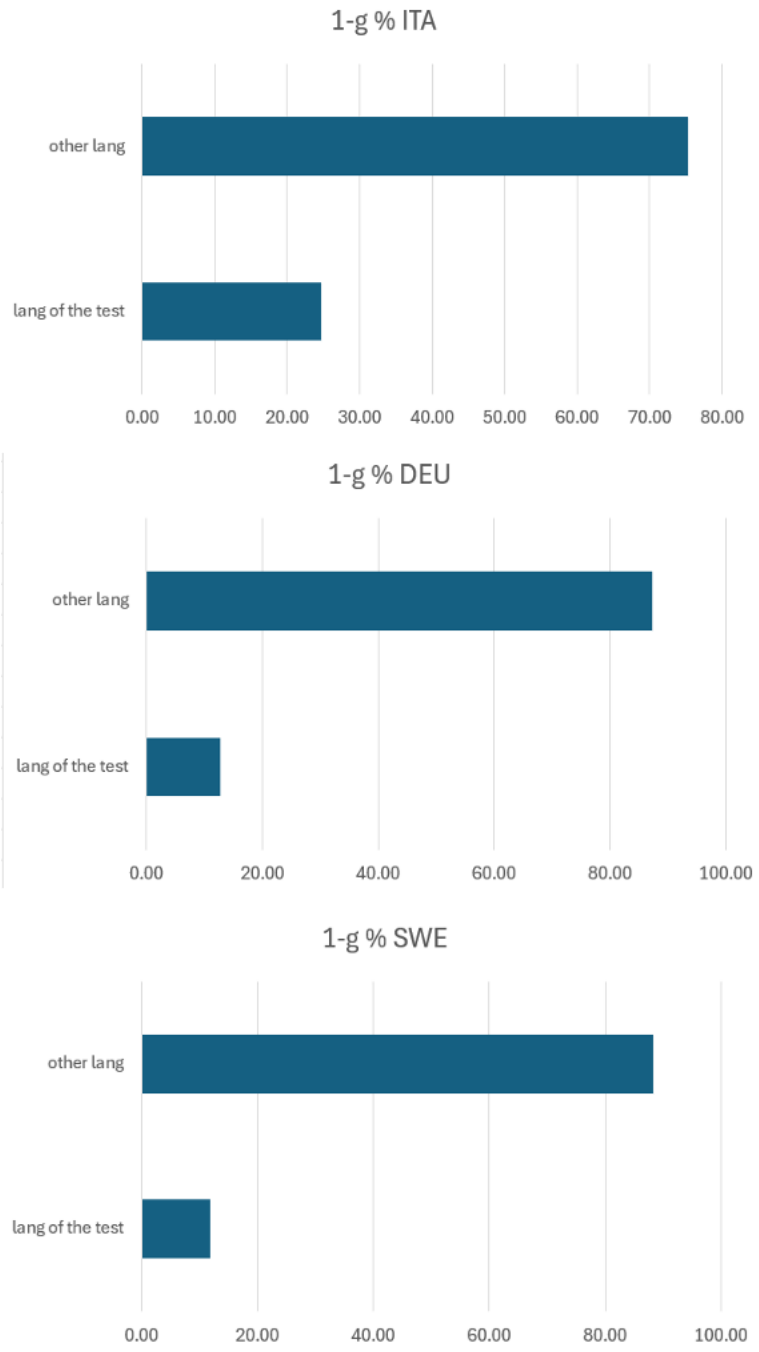

Figure 8**:** Language spoken at home by first-generation immigrants, expressed in percentage of the students' sample, in Italy, Germany and Sweden.

5 DECOMPOSITION ANALYSIS

This section focuses on the comparative analysis of the results and their interpretation in relation to educational performance gaps between native and immigrant students across Italy, Germany, and Sweden.

The first subsection presents a comparative analysis of the Oaxaca-Blinder decomposition results, which separates the explained and unexplained components of the performance gap in mathematics. The results are compared across all three countries, while an in-depth examination of each country individually follows.

In the second subsection, the results of the study are contextualized and compared with findings from the OECD's PISA 2022 publications. Further observations are made regarding the unexplained components of the performance gap in each country, offering potential interpretations.

The third subsection acknowledges the limitations of the research and suggests potential policy implications for improving educational outcomes among immigrant populations in Italy, Germany, and Sweden.

5.1 Analysis of the Results

The initial analysis of the educational performance of native (group_1) and immigrant (group_2) students in Italy, Germany, and Sweden reveals significant differences in mathematics scores based on the Oaxaca-Blinder decomposition.

5.1.1 Main Results Of The Oaxaca-Blinder Decomposition Analysis

In all three countries, native students (group_1) outperform their immigrant peers (group_2) with mean scores of 477.79 in Italy, 499.55 in Germany, and 500.44 in Sweden, while the scores for immigrant students are notably lower: 447.85, 445.22, and 443.33, respectively.

The immigration gap, as represented by the "difference" row in the table reported in the Appendix, is statistically significant across all three countries, indicating a persistent disparity between native and immigrant students. A significant portion of this gap is "explained" by observable characteristics (the endowments of each group) and is often referred to as the "endowment effect". However, there remains an "unexplained" component, the "coefficient effect", which could point to factors such as discrimination or cultural differences that are not captured by the observable variables considered here.

In Italy, the unexplained portion of the gap is negative (-12.57) and statistically significant, whereas in Sweden, it is positive (19.36) and also statistically significant. In Germany the unexplained component (4.98) is not statistically significant, implying that most of the performance gap can be attributed to observable characteristics rather than unobserved factors. This suggests different dynamics at play in each country, potentially influenced by their unique integration policies and socio-economic contexts.

Our analysis shows that certain factors are significant across all three countries in explaining the educational gaps in mathematics between the two groups. One of the most influential variables is socio-economic status (ESCS), indicating that differences in family resources play a crucial role in shaping student outcomes in all three countries. This finding aligns with previous literature, which highlights that

socio-economic background is one of the most critical factors influencing educational outcomes for students with an immigrant background (OECD, 2022)[76].

Another key factor is the language spoken at home, which significantly affects the immigration gap. This underscores the importance of language integration in educational success, even for the domain of mathematics, as using the host country's language at home is associated with better scores.

Other significant components contributing to the gap across the three countries are grade repetition (REPEAT), and parental education (PARENTALEDU). In particular, lower (parentaledu_1) and higher levels (parentaledu_3) of this last represent a significant component in each country, both displaying negative coefficients.

5.1.2 Results for Italy

The decomposition results for Italy reveal that the average score difference between the two groups is about 30.0 points, which is smaller compared to those of Germany and Sweden. The portion of the differential that can be explained by observable factors is of 42.5 points, yielding a negative unexplained component of -12.6 points, which is statistically significant. Thus, after accounting for all the variables included in the model, the explained component appears to be larger than the actual difference in average scores between native and immigrant students.

This result indicates that, based on observable characteristics alone, one would predict immigrant students to perform worse, and/or native students to perform better than they actually do. In contrast, countries like Sweden have a positive unexplained component, suggesting that there may be additional influential factors that are not captured by the variables considered, such as possible biases within the educational system or integration difficulties.

In Italy, the explained performance gap between native and immigrant students is primarily driven by socio-economic status (ESCS). This factor alone accounts for a differential of 30 points, which is exactly the observed gap: this may suggest that the other contributing factors are highly correlated with this one, or that the other significant factors have opposite effects that cancel each other. In the context of the multi factor analysis, this factor constitutes in any case the largest portion of the explained gap, corresponding to more than half of the predicted differential. The high contribution of this variable underscores how disparities in family resources are the primary explanation of the performance gap among the two groups.

The Language spoken at home (LANGUAGE) is also significant, with a contribution of 7.8 in Italy, slightly more than a sixth of the predicted differential. A similar contribution, amounting to 7.1 points, is found for Grade Repetition (REPEAT), which also plays a considerable role in Italy. The impact of REPEAT is numerically greater than in Germany and Sweden, as it represents 17% of the explained gap, indicating that immigrants are more likely to fail a year in Italy, and that this has a strong impact on test scores.

In summary, the variables REPEAT, ESCS and LANGUAGE seem to play a disproportionately large role in explaining the performance gap for immigrant students in Italy compared to the two other countries. This result may pose important questions on the educational and social system, affecting both immigrants and natives.

Finally, as already discussed, Parental education significantly influences the gap in all three countries, with "parentaledu_3" delivering a negative contribution of -4.4 in Italy. This pattern is also observed in Germany and Sweden, although less pronounced.

Let us now focus on the unexplained component, which is negative when we include all factors considered (-12.6 points). Again, the socio-economic status (ESCS) plays a significant role, with a contribution of -13.4. One possible interpretation is that, beyond the observable characteristics accounted for in the explained component, other unmeasured factors related to socio-economic status are helping to reduce the performance gap. Similarly, the language spoken at home (LANGUAGE) brings another negative contribution (-5.66) to the unexplained component, further decreasing the differential.

It is important to note here that, a prediction based on ESCS and LANGUAGE alone may well reduce the unexplained component.

5.1.3 Results for Germany

In Germany, the Oaxaca-Blinder decomposition results reveal a significant immigration gap of 54.3 points between native (group_1) and immigrant (group_2) students, which is larger than the gap observed in Italy (30.0) and somewhat close to that of Sweden (57.1).

The explained component of this gap in Germany is 49.4 points, indicating that most of it can be attributed to observable factors. Among these, socio-economic status (ESCS) plays a major role, contributing 25.7 points, i.e. around a half of the total explained component.

The language spoken at home (LANGUAGE) also has a significant impact in Germany, contributing 21.3 points, more than 40% of the total explained component. Interestingly, the variable LANGUAGE seems to have a much larger influence over performance gaps in Germany compared to Italy and Sweden. This suggests that the language barrier have a pronounced impact on the academic performance of students in Germany, and that they may be responsible for a large portion of the immigration gap.

Grade repetition (REPEAT) is also significant, amounting to 5.0 points of the explained component. Conversely, parental education (PARENTALEDU), in particular lower ("parentaledu_1") and higher ("parentaledu_3") levels, have a negative explanatory power on the differential. Other significant variables like COMPUTER have a minor impact on the prediction of the model.

As for the unexplained component, in Germany this is not statistically significant, suggesting that the performance gap can largely be attributed to observable factors, such as socio-economic status and language proficiency, rather than unobserved ones.

5.1.4 Results for Sweden

In Sweden, the overall immigration gap between native and immigrant students is 57.1 points, the largest among the three countries analyzed. The explained component of this gap is 37.8 points, suggesting that, while a significant portion thereof can be attributed to observable factors, there is still a high positive unexplained component of 19.4 points.

One of the most significant variables in the explained component for Sweden is the socio-economic status (ESCS), contributing 27.7 points which accounts for more than 70% of the explained component.

Language spoken at home (LANGUAGE) and grade repetition (REPEAT) are other significant factors in Sweden, but they only contribute 5.5 and 3.7 points respectively to the explained component. Although their effects are smaller compared to Germany and Italy in absolute terms, they constitute a similar portion of the observable characteristics in all three countries. Parental education (PARENTALEDU), on the other hand, shows a negative influence on the explained part of the gap. As in the other countries, "parentaledu_1" (low parental education) and "parentaledu_3" (higher levels of education) constitute the significant values. Other significative variables, such as HOUSEHOLDWORK and HOMEWORK deliver minor contributions.

The unexplained component in Sweden is positive and significant, in contrast to Italy (where it is negative) and to Germany (where it is not statistically significant). The positive unexplained component in Sweden suggests that there may be unobserved factors, such as discrimination or cultural barriers, that affect the academic performance of immigrant students, further widening the gap. However, the specific nature of these unobserved factors requires further investigation beyond the scope of this analysis.

5.2 Interpretation of the Results

The results obtained from the Oaxaca-Blinder decomposition are consistent with the findings reported by the OECD in their publications on PISA 2022 (OECD, 2022)[77]. In particular, the explained contributions of socio-economic status (ESCS) and language spoken at home (LANGUAGE) to the performance gap in the mathematics test tests administered in Italy, Germany, and Sweden align closely with those outlined in the OECD's findings.

5.2.1 Possible Explanations of Cross-Country Differences

In all three countries, the socio-economic status emerges as the primary driver of the performance gap, confirming that disparities in family resources are a central issue affecting educational outcomes. Even the findings of the language spoken at home as a contributing factor to the explained gap mirrors the OECD publication, particularly highlighting its strong influence in Germany and, to a lesser extent, in Italy and Sweden. This consistency across both our analysis and the OECD results also expands to Italy’s explained component, which exceeds the overall immigration gap, and also to Germany’s unsignificant unexplained part and to Sweden’s positive unexplained component.

There are several unobserved characteristics that may influence the performance gap, some of which can provide an explanation to several finding of this analysis. In Germany, for instance, some groups of migrants, such as undocumented immigrants, face restrictions on educational access (as noted in the MCP study by Queen’s University), while in Sweden, most immigrants are asylum seekers, who generally have full access to the educational system.

The structure of educational systems also plays a role. Germany's early tracking may disproportionately direct immigrant students into vocational paths, contributing to lower PISA scores. Italy's education system, with its more comprehensive approach, delays student tracking, possibly allowing more time for immigrant students to integrate and catch up academically. Sweden's inclusive education system actively supports integration, yet the unexplained part of the gap suggests underlying challenges that need to be explored further.

5.2.2 The Unexplained Component in the Italian Data

The negative unexplained component of the gap observed in Italy may have various causes, such as biased samples, neglected or unobserved characteristics, and confounding or highly correlated factors.

We already noted that the ESCS factor alone may be able to predict most of the differential, potentially reducing the unexplained component. This suggests that socio-economic differences may be more important in determining the academic success than all other background information, including the immigration history itself. Further analysis is needed to test the actual contribution of the main factors, getting rid of potential confounding and highly correlated ones; in particular, a prediction only based on ESCS and, potentially, LANGUAGE, may well reduce the unexplained component.

Other explanations are also possible, including a sample bias due to an underrepresentation of undocumented migrants. In fact, Italy is often a transit country, where children who intend to reside only temporarily might have an incentive to hide and avoid public schooling.

Other factors that have not been considered may be relevant, such as those stemming from the peculiar migratory history of the country. In Italy, the largest immigrant groups are Romanians and Albanians, who often speak Italian as a second language or are able to learn it quickly, and share cultural similarities. This would explain why Italy has the highest percentage of immigrant students who speak the language of the test among the three countries considered. Furthermore, cultural similarities could facilitate easier integration into the Italian education system and explain why the language barrier has a smaller impact on the performance gap compared to Germany and Sweden.

5.3 Limitations, Future Work and Policy Implications

Our research has some known limitations, which we shall briefly outline to pave the way of further work. Our provisional findings, however, may already suggest the implementation of new policies.

5.3.1 Limitations of This Research and Future Work

In Sweden, although the unexplained component is significant, none of the individual variables within this component were found to be influential. This shows that there exist unmeasured factors that the present model does not capture. Therefore, this aspect requires further exploration to understand the underlying dynamics.

Additional studies are also needed to better understand the fact that the Italian explained component is larger than the observed differential, and to what extent this is due to immigrants performing higher than predicted vs. natives performing lower than expected. A better understanding of these dynamics is essential in order to properly address the low performances of both immigrant and native students in Italy when compared to other European countries.

Our reliance on the PISA 2022 dataset does not address changes over time in both educational outcomes and in the influence of the different variables over the immigration gap. Future research should also consider the time evolution of the results in mathematics and compare them to those of reading, science and of the new realm of creative thinking.

5.3.2 Policy Implications

The findings of this study could suggest several policy implications.

In Italy, interventions should focus on enhancing support for students at risk of grade repetition and addressing the role of socio-economic disparities. The social security system has largely neglected integration policies which may serve this purpose: a known problem, whose solutions require investments and courageous political decisions.

Germany's educational policies should include the creation of more flexible educational pathways for immigrant students, mitigating the effects of early tracking into vocational education. Foreign students may use extra time and guidance to improve their academic results, enjoying a perspective of a longer period of studies with potential higher salaries at the end.

It is currently harder to suggest a way forward for Sweden because of the large contribution of unmeasured factors affecting the performance gap, especially for asylum-seeking students. Further analyses are needed in this area.

Overall, the study highlights the importance of socio-economic support and inclusive educational policies in mitigating disparities between native and immigrant students in these countries.

6 CONCLUSIONS

This thesis explores the educational outcomes of immigrant students in Italy, Germany, and Sweden, analyzing the differences between these countries in order to understand the factors contributing to the academic gap between native and immigrant students. By focusing on data from the PISA assessment, administered to 15-year-old students in 2022, this study seeks to investigate how different factors, such as the socio-economic, linguistic, and family background, influence the performance of immigrant students compared to their native peers across all three countries.

We first discuss the broader context of immigration and education, highlighting how the influx of immigrant populations has reshaped the educational landscape in many European countries. Italy, Germany, and Sweden offer distinct examples due to their peculiar migration histories, integration policies, and educational systems.

A statistical analysis is carried out on the three subjects covered by the PISA tests, with a specific focus on mathematics scores. The Oaxaca-Blinder decomposition method is used to dissect the differences in performance between native and immigrant students, attributing parts of the achievement gap to observable factors explained by the variables included in the model, while also identifying an "unexplained" component that may point to other factors like cultural barriers or discriminatory practices. The comparative approach provides a clear view of how these factors operate differently in the three countries.

The study reveals that socio-economic disparities are identified as the most important determinant of academic performance. Immigrant students, who generally come from lower socio-economic backgrounds, tend to perform worse than their native peers. In Italy, in particular, socio-economic factors are able to explain a large portion of the immigration gap, suggesting that census differences are more important than other factors, including the immigration status, in the academic scores.

Language proficiency also emerges as a critical factor in shaping academic outcomes even in the realm of mathematics. In Germany, immigrant students who do not speak German at home perform significantly worse than those who do, widening the educational gap. Italy, on the other hand, benefits from a larger proportion of immigrant students who speak Italian at home, which reduces the impact of language difficulties on the test scores.

The educational systems in these three countries also play a significant role in the observed disparities. Germany tracks students into different educational paths at an early age, reinforcing socio-economic inequalities as immigrant students are more likely to be directed into vocational tracks, which offer fewer opportunities for academic achievement. In contrast, Italy results as the country with the highest impact of grade repetition on the explained differential in test scores, implying that reducing failing rates should be a priority. Sweden’s inclusive policies aim to integrate immigrant students, but the results suggest that other, less tangible factors, such as potential discrimination or cultural barriers, may still impede their success, as indicated by the large unexplained component in the performance gap.

The results of the thesis emphasize that targeted policies providing socio-economic support, promote language learning, and offer more flexible educational pathways can help mitigate these disparities. By providing a comparative analysis, this research offers valuable insights into how different countries can improve their educational policies to foster greater equity and inclusion for immigrant students.

7 BIBLIOGRAPHY

[1] OECD Reviews of Migrant Education 2015 Immigrant Students at School EASING THE JOURNEY TOWARDS INTEGRATION

[2] Bilgili, O., Volante, L., & Klinger, D. A., 2018. Policy Approaches to Integration of Newly Arrived Immigrant Children in Schools. OECD.

[3] EUROSTAT, 2023. EU's population projected to drop by 6% by 2100. Available at: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230330-1

[4] Intergovernmental Panel on Climate Change (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press

[5] Kahanec and Zimmerman, 2009. Migration in an enlarged EU: A challenging solution? Available at: https://ec.europa.eu/economy_finance/publications/pages/publication14287_en.pdf#:~:text=URL%3A%20https%3A%2F%2Fec.europa.eu%2Feconomy_finance%2Fpublications%2Fpages%2Fpublication14287_en.pdf%0AVisible%3A%200%25%20

[6] Lafleur and Stanek, 2018. Southern European Migration Towards Northern Europe. Available at: https://www.iemed.org/publication/southern-european-migration-towards-northern-europe/

[7]https://www.dw.com/en/60-years-of-german-turkish-recruitment-agreement/a-59620622

[8]Goldenberg, 2021. 60 years of German-Turkish Recruitment Agreement. Available at: https://books.google.it/books?hl=en&lr=&id=1ofdz6UWy2MC&oi=fnd&pg=PR5&dq=bade+2003+migration&ots=5c7UU5HRSa&sig=2YzGNpGmEYDl3_SvV5A1A-GMIcs#v=onepage&q=bade%202003%20migration&f=false

[9, 14, 17](Castles, S., De Haas, H., & Miller, M. J. (2014). The age of migration: International population movements in the modern world. Basingstoke: Palgrave Macmillan Castles, S., De Haas, H., & Miller, M. J. (2014). The age of migration: International population movements in the modern world. Basingstoke: Palgrave Macmillan)

[10, 18](Dietz, B. (2006). Aussiedler in Germany: From smooth adaptation to tough integration. In L. Lucassen, D. Feldman, & J. Oltmer (Eds.), Paths of integration: Migrants in Western Europe, 1880–2004 (pp. 116–136). Amsterdam: Amsterdam University Press.)

[11]Ambrosini, 2011. Becoming receiving countries: Southern Europe and international migrations. Available at: https://air.unimi.it/handle/2434/233580

[12]Scotto, 2017. From Emigration to Asylum Destination, Italy Navigates Shifting Migration Tides. Available at: https://www.migrationpolicy.org/article/emigration-asylum-destination-italy-navigates-shifting-migration-tides

[13]Camilli, 2018. La lunga storia dell'immigrazione in Italia. Available at: https://www.internazionale.it/bloc-notes/annalisa-camilli/2018/10/10/storia-immigrazione-italia

[15]OECD,2022. International Migration Outlook 2022. Available at: https://www.oecd-ilibrary.org/sites/30fe16d2-en/1/3/8/20/index.html?itemId=/content/publication/30fe16d2-en&_csp_=97175d429ae5e4e04cd3cccbbfc84945&itemIGO=oecd&itemContentType=book

[16]BAMF, 2005. The Impact of Immigration on Germany Society. Available at: https://www.bamf.de/SharedDocs/Anlagen/EN/Forschung/Forschungsberichte/fb01-einfluss-zuwanderung.pdf?__blob=publicationFile&v=10#:~:text=URL%3A%20https%3A%2F%2Fwww.bamf.de%2FSharedDocs%2FAnlagen%2FEN%2FForschung%2FForschungsberichte%2Ffb01

[19, 21] DW, 2023. Germany: Immigrants made up over 18% of 2022 population. Available at: https://www.dw.com/en/germany-immigrants-made-up-over-18-of-2022-population/a-65383249

[20,22]Destatis, 2023. 1.1 million arrivals of people from Ukraine in 2022. Available at: https://www.destatis.de/EN/Press/2023/02/PE23_N010_12411.html

[23]DW, 2022. Ukrainians push German population to record. Available at: https://www.dw.com/en/ukrainian-refugees-push-germanys-population-to-record-high/a-63258430

[24]Martin Dribe, Björn Eriksson, Jonas Helgertz, From Sweden to America: migrant selection in the transatlantic migration, 1890–1910, European Review of Economic History, Volume 27, Issue 1, February 2023, Pages 24–44, Available at: https://doi.org/10.1093/ereh/heac007

[25, 26]Westin, C. (2006) 'Sweden: Restrictive Immigration Policy and Multiculturalism.' Migration Policy Institute. Available at: https://www.migrationpolicy.org/article/sweden-restrictive-immigration-policy-and-multiculturalism/

[27]Di Iasio and Wahba, 2023. Asylum seekers in Europe: where do people go and why?. Available at: https://www.economicsobservatory.com/asylum-seekers-in-europe-where-do-people-go-and-why

[28]European Commision, 2024. Governance of migrant integration in Sweden. Available at: https://migrant-integration.ec.europa.eu/country-governance/governance/sweden_en#

[29]MIPEX, 2020. Measuring policies to integrate migrants across six continents. Available at: https://www.mipex.eu/?gad_source=1

[30] Queen's University, 2024. Multiculturalism Poilicies in Contemporary Democracy. Available at: https://www.queensu.ca/mcp/

[31]MIPEX, 2020. Italy. Available at: https://mipex.eu/italy

[32] Queen's University, 2024. Multiculturalism Poilicies in Contemporary Democracy. Mapping the Index. Available at: https://www.queensu.ca/mcp/immigrant-minorities/mapping-the-index-im

[33] Available at: Schachner, M. K., He, J., Heizmann, B., & Van de Vijver, F. J. R. (2017) 'Acculturation and school adjustment of immigrant youth in six European countries: Findings from the Programme for International Student Assessment (PISA)', Frontiers in Psychology, 8, p. 649. doi: 10.3389/fpsyg.2017.00649.

[34] Queen's University, 2024. Multiculturalism Poilicies in Contemporary Democracy. Results by country for immigrants minorities, Italy. Available at: https://www.queensu.ca/mcp/immigrant-minorities/resultsbycountry-im/italy-im

[35] MIPEX, 2020. Germany. Available at: https://mipex.eu/germany

[36] Queen's University, 2024. Multiculturalism Poilicies in Contemporary Democracy. Results by country for immigrants minorities, Germany.Available at: https://www.queensu.ca/mcp/immigrant-minorities/resultsbycountry-im/germany-im

[37] MIPEX, 2020. Sweden. Available at: https://mipex.eu/sweden

[38] Multiculturalism Poilicies in Contemporary Democracy. Results by country for immigrants minorities, Sweden. Available at: https://www.queensu.ca/mcp/immigrant-minorities/resultsbycountry-im/sweden-im

[39] European Commision, 2015. EU-wide: OECD sums up its PISA evidence on immigrant pupils. Available at: https://migrant-integration.ec.europa.eu/news/eu-wide-oecd-sums-its-pisa-evidence-immigrant-pupils_en

[40, 46, 53, 54, 56, 76, 77] OECD (2023), "Immigrant background and student performance", in *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*, OECD Publishing, Paris, https://doi.org/10.1787/129b79ed-en.

[41] OECD, 2023. PISA 2022 Results (Volume I and II) - Country Notes: Italy. Available at: https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/italy_2e8d98df-en.html#:~:text=Students%20in%20Italy%20scored%20close,in%20at%20least%20one%20subject.

[42] Ferri, V., Di Castro, G., & Marsiglia, S. (2023). Does the Immigrant Background Affect Student Achievement? Cross-Country Comparisons of PISA Scores. Journal of Educational Research and Development

[43] Ferri, V., Di Castro, G., & Marsiglia, S., (2023). Exploring immigrant gaps in education: empirical evidence. Journal of Educational Research and Development. INAPP – National Institute for the Analysis of Public Policies, Rome, Italy.

[44] Pivovarova and Powers, 2019. Generational status, immigrant concentration and academic achievement: comparing first and second-generation immigrants with third-plus generation students. SpringerOpen. Available at: https://largescaleassessmentsineducation.springeropen.com/articles/10.1186/s40536-019-0075-4

[45] Colombo M. (2014). I giovani migranti nelle scuole italiane: percorsi formativi, disuguaglianze, risorse. REMHU: Revista Interdisciplinar da Mobilidade Humana, 22, 159-170.

[47] Koehler, C. and Schneider, J., 2019. Young refugees in education: the particular challenges of school systems in Europe. Comparative Migration Studies

[48] Morris-Lange et al., 2013. Segregation in German schools. Extent, consequences and recommendations for action for better educational chances. Available at: https://migrant-integration.ec.europa.eu/library-document/segregation-german-schools-extent-consequences-and-recommendations-action-better_en

[49] Gries et al., 2021. Educational Assimilation of First-Generation and Second-Generation Immigrants in Germany. Available at: https://link.springer.com/article/10.1007/s12134-021-00863-9

[50] Teltelmann et al., 2018. Immigrant Student Achievement and Education Policy in Germany. Available at: https://link.springer.com/chapter/10.1007/978-3-319-74063-8_3

[51] Adedeji et al., 2021. Trust, Sociability, and Quality of Life of Sub-Saharan African Migrants in Germany. Available at: https://www.frontiersin.org/journals/sociology/articles/10.3389/fsoc.2021.741971/full

[52] Porcu et al., 2023. Will the gap ever be bridged? A cross-national comparison of non-native students' educational achievements. Available at: https://genus.springeropen.com/articles/10.1186/s41118-023-00199-5

[55] World Bank, 2019. OECD's Program for International Student Assessment (PISA) 2018 Survey. Available at: https://www.worldbank.org/en/topic/education/brief/oecds-program-for-international-student-assessment-pisa-2018-survey

[57] OECD (2023), "PISA 2022 Creative Thinking Framework", in PISA 2022 Assessment and Analytical Framework, OECD Publishing, Paris, https://doi.org/10.1787/471ae22e-en.

[58] Avvisati, F. The measure of socio-economic status in PISA: a review and some suggested improvements. Large-scale Assess Educ 8, 8 (2020). https://doi.org/10.1186/s40536-020-00086-x

[59,65] Blinder A. S. 1973. Wage discrimination: Reduced form and structural estimates. Journal of Human Resources, Vol. 8, pp. 436-455

[60,66] Oaxaca, R. 1973. Male-Female Wage Differentials in Urban Labor.

[61] Ministero dell'Istruzione, 2024. Invalsi, la restituzione dei dati alle scuole – L'ESCS. Available at: https://www.istruzione.it/snv/allegati/01_A_INVALSI_escs_slide.pdf

[62] OECD (2024), PISA 2022 Technical Report, PISA, OECD Publishing, Paris, https://doi.org/10.1787/01820d6d-en.

[63] OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, https://doi.org/10.1787/53f23881-en.

[64] OECD (2023), "Construction of indices", in PISA 2023 Results (Volume II): Annex A1, OECD Publishing, Paris, https://www.oecd-ilibrary.org/docserver/1e412e2e-en.pdf?expires=1726741891&id=id&accname=guest&checksum=00BA2B5D804CB8673FD3A330A6F744FF

[67] OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, https://doi.org/10.1787/53f23881-en.

[68] Entorf, 2015. Migrants and educational achievement gaps. IZA World of Labor 2015: 146 doi: 10.15185/izawol.146

[69] MIPEX, 2020. Sweden. Available at: https://mipex.eu/sweden

[70] Teltelmann et al., 2018. Immigrant Student Achievement and Education Policy in Germany. Available at: https://link.springer.com/chapter/10.1007/978-3-319-74063-8_3

[71] Lundahl, L., Lindblad, M. (2018). Immigrant Student Achievement and Education Policy in Sweden. In: Volante, L., Klinger, D., Bilgili, O. (eds) Immigrant Student Achievement and Education Policy. Policy Implications of Research in Education, vol 9. Springer, Cham. https://doi.org/10.1007/978-3-319-74063-8_5

[72] Lagravinese et al., 2020. The impact of economic, social and cultural conditions on educational attainments. Journal of Policy Modeling, Volume 42, Issue 1, January–February 2020, Pages 112-132. https://doi.org/10.1016/j.jpolmod.2019.03.007

[73] Tan, 2024. C.Y. Socioeconomic Status and Student Learning: Insights from an Umbrella Review. Educ Psychol Rev 36, 100. https://doi.org/10.1007/s10648-024-09929-3

[74] Won-Tack Lim. (2021). Impacts of Parental Involvement and Parents' Level of Education on Student's Academic Accomplishment. Education Journal, 10(1), 35-39. https://doi.org/10.11648/j.edu.20211001.15

[75] OECD (2019), PISA 2018 Results (Volume II): Where All Students Can Succeed, PISA, OECD Publishing, Paris, https://doi.org/10.1787/b5fd1b8f-en.

APPENDIX

The table below represents all the results of the Oaxaca-Blinder decomposition performed with the Stata software, applied to the mathematics scores of the 2022 PISA data for Italy, Germany and Sweden.

	ITA	**DEU**	**SWE**
overall			
group_1	477.7881***	499.5549***	500.4382***
	[1.1636]	[1.4783]	[1.3601]
group_2	447.8518***	445.2197***	443.3270***
	[2.7596]	[2.6597]	[2.8280]
difference	29.9363***	54.3351***	57.1112***
	[2.9949]	[3.0429]	[3.1380]
explained	42.5019***	49.3577***	37.7553***
	[2.1314]	[2.6968]	[3.3517]
unexplained	-12.5656***	4.9774	19.3559***
	[3.3165]	[3.2978]	[4.2974]
explained			
escs	30.0053***	25.7104***	27.6950***
	[1.6043]	[1.6775]	[1.7850]
language	7.7561***	21.3059***	5.4581*
	[1.4980]	[2.1387]	[2.9358]
female	1.7357***	0.4157	0.1563
	[0.4470]	[0.3245]	[0.1322]
link	-0.3035*	0.6923**	-0.0066
	[0.1768]	[0.2752]	[0.1121]
computer	0.5087**	1.6208***	0.2653*
	[0.2201]	[0.3813]	[0.1535]
belong	-0.5497*	0.0857	0.4476**
	[0.3143]	[0.2361]	[0.1985]
age	0.4870**	-0.0783	-0.0581

	[0.1973]	[0.1313]	[0.0712]
repeat	7.1087***	4.9974***	3.7442***
	[0.8100]	[0.8348]	[0.7473]
parentaledu_1	-0.6256**	-3.1523***	-1.9498***
	[0.2485]	[0.5240]	[0.5014]
parentaledu_2	-0.2836	0.0144	0.1592
	[0.6111]	[0.1374]	[0.1699]
parentaledu_3	-4.3958***	-2.5031***	-1.5273***
	[0.8832]	[0.5715]	[0.4330]
householdwork_1	-0.0659	0.0501	0.4051***
	[0.0588]	[0.0672]	[0.1474]
householdwork_2	0.0585	0.3012*	0.8267***
	[0.0957]	[0.1559]	[0.2062]
householdwork_3	0.1222	-0.0215	2.3902***
	[0.0751]	[0.0719]	[0.3605]
homework_1	-0.1826	-0.0104	-0.7073***
	[0.1248]	[0.1351]	[0.1859]
homework_2	0.0466	0.0222	0.9665***
	[0.1494]	[0.0493]	[0.2450]
homework_3	1.0797***	-0.0926	-0.5097*
	[0.2988]	[0.1938]	[0.3054]
unexplained			
escs	-13.3830***	-3.2990*	-0.4688
	[3.6251]	[1.7024]	[0.3156]
language	-5.6556*	-2.4918	-0.477
	[2.9705]	[2.0544]	[3.7126]
female	-5.4423	2.2187	1.2223
	[3.4380]	[2.7918]	[3.1049]
link	12.2332	-35.1531*	3.8433

	[11.2056]	[20.1181]	[27.0657]
computer	-9.2349	-7.4232	-6.3673
	[10.9674]	[9.8801]	[12.1987]
belong	1.7999*	-0.5756	-0.0002
	[0.9382]	[0.5041]	[0.0357]
age	97.0279	198.035	167.0446
	[165.2766]	[147.2733]	[158.3051]
repeat	-1.8092	-3.7907***	0.7346
	[1.4520]	[1.3970]	[0.7352]
parentaledu_1	0.2755	0.5828	0.4323*
	[0.2550]	[0.3579]	[0.2465]
parentaledu_2	0.5685	-1.2916	1.0971
	[2.7272]	[1.7791]	[1.2324]
parentaledu_3	1.3544	-5.4879	14.6369
	[5.8621]	[5.5617]	[9.8937]
householdwork_1	0.1473	-0.1557	0.7922
	[0.4691]	[0.3608]	[1.0545]
householdwork_2	0.5094	-0.468	-0.8503
	[1.3574]	[1.3106]	[1.2392]
householdwork_3	-2.95	5.3439	-0.5544
	[3.1828]	[4.5926]	[2.3276]
homework_1	-0.5391	-0.2119	-0.3936
	[0.3546]	[0.5103]	[0.4971]
homework_2	0.998	0.7152	-0.7592
	[1.1363]	[1.2416]	[1.7209]
homework_3	8.6319*	0.0484	5.9134*
	[5.0064]	[3.0747]	[3.3293]
_cons	-97.0973	-141.618	-166.49
	[166.2379]	[150.4626]	[158.1765]

N	10129	5079	5529

The results reported in the table above are to be intended with the following degree of statistical significance:

No asterisks → Not significant

* → 90% confidence

** → 95% confidence

*** → 99% confidence