

BBVA | Research

Gender Gap and the role of Non-cognitive Skills in Financial Literacy

A Tale of Two Countries: Spain and Colombia

Edufin Summit 2017, 15-16 June 2017, México D.F.

Key messages

1. There is a **gender gap** in PISA financial literacy test in Spain, but not in Colombia
2. **Non-cognitive** factors (self-confidence, perseverance and motivation) **improve** the results of students (by 26% of the mean value in Colombia, 13% in Spain)
3. Non-cognitive factors **reduce** the gender gap in financial literacy by 20% in **Spain**, no effect in **Colombia**
4. **Importance of family**: Highly educated parents and books in the household improve financial literacy results (by 15% of the mean value in Colombia, 10% in Spain)



Outline

1. Non-cognitive skills and Gender Gap
2. Data: PISA Financial Literacy
3. Econometric Strategy
4. Results



Non-cognitive skills and Gender gap



Non-cognitive skills and Gender gap

Existence of gender gap in financial literacy

- For adult people, a [gender gap in financial literacy](#) in favor of men is documented for a number of developed countries:
 - USA, the Netherlands, Germany (Bucher-Koenen et al., 2011)
 - Sweden (Alemnberg and Säve-Söderbergh, 2011)
 - New Zealand (Crossan, Feslier and Hurnard, 2011)
 - Japan (Sekita, 2011)
- There is evidence of a gender gap in financial literacy for people aged between 23 and 29 years old, so gender differences are present at the [start of the life cycle](#) (Lusardi and Mitchell, 2011).
- Subjective measures, focused on self-assessed financial literacy, reflect that the [mismatch between actual and self-reported knowledge](#) is different by gender (Bucher-Koenen et al., 2014).

Non-cognitive skills and Gender gap

Importance of foundational skills

- There exists an association between **personality features** and better academic outcomes, professional carriers and health (Levi, 2012).
- There are problems to observe foundational (cognitive and non-cognitive) skills:
 - **Cognitive skills** involve conscious intellectual effort, such as thinking, reasoning, or remembering.
 - **Non-cognitive skills** are related to motivation, integrity, and interpersonal interaction.
 - Borghans and Shils (2012) demonstrate that test scores on achievement tests depend on cognitive and non-cognitive skills.
- **Aim:** Using PISA database, analyze the relationship between non-cognitive factors and financial literacy test at the beginning of the life cycle (15-years-old students) controlling for observables variables.

Data: PISA Financial Literacy



Data: PISA Financial Literacy

PISA 2012: Preview

- The 2012 PISA program includes the assessment of competence in financial literacy of 15-year-old students for 18 countries, some of them belonging to the OECD.
- The research focuses on **Spain and Colombia**, countries of the footprint of BBVA which share similarities in terms of culture and language.
- **Importance of stratified process:** Before the random choice of students, there is a random choice of schools → students belong to a higher level of aggregation. Importance of **cluster**: the independence (of observations) assumption is not valid.
- The PISA database provides comprehensive information on:
 - **The student:** family and individual characteristics, as well as factors associated to personality and psychology.
 - **The school:** characteristics of the school, information about the staff and resources of the educational system.

Data: PISA Financial Literacy

PISA 2012: Non-cognitive characteristics

- 3 options:

1. Self-confidence
2. Perseverance
3. Motivation

- **Self-confidence:** How well does each of the following statements below describe you?

Option	Sense of the option
a) "I can handle a lot of information."	Positive
b) "I am quick to understand things."	Positive
c) "I seek explanations for things."	Positive
d) "I can easily link facts together."	Positive
e) "I like to solve complex problems."	Positive

Data: PISA Financial Literacy

PISA 2012: Non-cognitive characteristics

- **Perseverance:** How well does each of the following statements below describe you?

Option	Sense of the option
a) "When confronted with a problem, I give up easily."	Negative
b) "I put off difficult problems."	Negative
c) "I remain interested in the tasks that I start."	Positive
d) "I continue working on tasks until everything is perfect."	Positive
e) "When confronted with a problem, I do more than what is expected of me."	Positive

- **Motivation:** To what extent do you agree with the following statement?

Option	Sense of the option
"Trying hard at school is important."	Positive

Econometric strategy



Econometric strategy

Importance of the data characteristics

- The **dependent variable** is a combination of **5 plausible variables** obtained from the student's result in the test. All these values should be used to avoid bias and inefficiency problems.
- Database provides **8 replicates of individual weightings**, which allow efficient estimators. All observations are used to avoid skewing the influence of the weightings in the estimates.
- The **independent variables / regressors** refer to the 4 main dimensions:

Student - Individual	Student – Family	Student - Non-cognitive	School
Gender	Mother / father has university education	Self-confidence	Financial education courses (yes/no)
Date of Birth (month)	Mother / father has low education	Perseverance – Negative Perseverance – Positive	Academic admission policy
Repeated a year in secondary education	Mother / father works outside	Motivation	State-sector (yes/no)
Claim to have good grades in Maths	E-book / More than 25 books at home		Ratio of computers

Econometric strategy

Modelling

- **Importance of stratified process:** The importance of the nested system of the database prevents the use of conventional linear regression analysis → hierarchy structure (Laird and Ware, 1982):

$$Y_j = X_{1j}\beta_1 + X_{2j}\beta_2 + Z_j\gamma_j + \varepsilon_j \text{ where } \varepsilon = [\varepsilon_j]_{j=1,\dots,179} \text{ and } \varepsilon \sim N(0, \sigma_\varepsilon^2 \Sigma_\varepsilon)$$

X_1 includes non-cognitive skills of the student, X_2 include the rest of characteristics of the student (individual and family) and Z includes characteristics of the school (random effects).

- Several models are considered for both two countries:

Model	Independent variables
1	Only individual characteristics of the student
2	Individual + family characteristics of the student
3	Individual + family + non-cognitive characteristics of the student
4	Individual + family + non-cognitive characteristics of the student + school characteristics

Results



Results

Individual characteristics

- Gender gap in financial literacy: Significant in Spain, but not in Colombia. The gap is reduced 20% in Spain, no change in Colombia

	Model 2	Model 4
Spain	-13.42 **	-10.36 *
Colombia	-8.04	-8.03

- Did you repeated a year in the first phase of secondary education? Bad effect, higher in Spain than in Colombia (-12% of the Spanish mean value [484] and -6% of the Colombian mean [379])

	Model 4
Spain	-57.60 ***
Colombia	-22.86 ***

Results

Family characteristics

- **Importance of Family:** Highly educated parents imply an increase of the test result, nearly triplicated in Colombia wrt. Spain

	Model 4
Spain	9.96 *
Colombia	26.53 **

- More than 25 books in the household? Goods news for both countries:

	Model 4
Spain	40.36 ***
Colombia	29.11 **

- The student with good family characteristics improves the test score above 56 points in Colombia (15% of the mean value) and 50 points in Spain (10% of the mean value)

Results

Non-cognitive characteristics

- Self-confidence, negative perseverance and motivation provide “expected” results:

Model 4	Colombia	Spain
Self-confidence	12.16 ***	11.26 ***
Positive Perseverance	0.75	-5.70 **
Negative Perseverance	-42.20 ***	-13.65 ***
Motivation	34.55 ***	6.64

- The student with excellent non-cognitive characteristics increases the test score 98 points in Colombia (26% of the mean value) and 63 points in Spain (13% of the mean value)

Main conclusion:

Be responsible for your studies, learn from your parents and your environment, encourage your non-cognitive factors and you will have an excellent outcome (in financial literacy)



BBVA | Research

Gender Gap and the role of Non-cognitive Skills in Financial Literacy

A Tale of Two Countries: Spain and Colombia

Edufin Summit 2017, 15-16 June 2017, México D.F.