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Measuring financial knowledge: a macroeconomic perspective

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Abstract

Building an indicator which measures countries' financial knowledge allowing comparisons between them and throughout time is the objective of this paper. Currently, this is a lack in this research field, whose previous works were oriented to microeconomic analysis using survey that not only covered interviewees' financial knowledge but also some of their individual characteristics (e.g. race, ethnic, gender, age, among others). Perhaps that is why there is empirical evidence about the effect of this knowledge on matters such as saving and retirement planning, stock market participation, product and services choice, or over-indebtedness, for example. But its effects on economic variables like development and inequality (among others) have hardly been explored. Therefore, the longitudinal design of our Financial Knowledge Index might contribute to turn definitively towards the macroeconomic perspective in this incipient research field. Our results are consistent with previous works and reveal those countries which have more robust and more mature financial system (some of them have financial matters in their school curricula) register better positions respect with the rest of them.

Keywords Economic capacity · Educational training · Financial assets' use · Financial knowledge index · Social contingencies' planning

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1 Introduction

During the last forty years the world economy has experienced a growing and exponential financial liberalization without historical precedents. It has led to the proliferation of financial products and services assiduously more complex and accessible at the same time. Moreover, this phenomenon has been amplified by the extraordinary technologies' advance.

The recent economic-financial crisis evidenced the gap between this abundant financial offer and the financial knowledge of the agents (OECD/INFE 2009), despite the absence of a comparative macroeconomic measure of financial knowledge which allows observing the advances and setbacks registered in this matter for a given country throughout time and its position with respect to others.

Precisely, the objective of this paper is to cover this absence by building a Financial Knowledge Index (FKI) which approximates this type of knowledge by measuring and using the factors that encourage it, according to the OECD (2005). The sample used covers the maximum number of countries and periods that statistical availability allowed: 63 countries and 16 years (1999–2014).

This longitudinal design of the sample is a novelty in this incipient research field, whose previous works analyzed financial knowledge based on the characteristics of individuals (e.g. race, ethnicity, age, gender, among others) in contrast with the macroeconomic perspective which we propose.

The rest of this paper is structured as follows. In section 2, we examine the prior literature related to the construction of financial knowledge indexes and scores and point out what gaps we cover and what novelty we bring to this research field. In section 3, we explain how we have built our FKI. After that, we show, comment and discuss the results our FKI, as well as those registered by the sub-indexes that make up it. We do it for different years of the analyzed period (section 4). Also, we verify the validity and reliability of our index by studying its degree of correlation with other financial knowledge's variables (section 5). Finally, we present the conclusions and the future research.

2 Literature background

The analysis of financial knowledge in the economic research just as it is known nowadays is relatively recent. Noctor et al. (1992) defined the term 'financial literacy'. But this last one began to become popular after the definition provided by Mandell (1997), upon request of the Jump$tart Coalition for Personal Financial Literacy. Even so, the issue of financial knowledge did not acquire a greater dimension until the OECD (2005) 'internationalized' it by establishing a definition of 'financial education' while pointing out the growing importance of being financially literate given the continuous proliferation of financial products and serves assiduously more complex as well as accessible. In turn, this organization (OECD 2013) perfected the definition of 'financial literacy', thus eclipsing the other related definitions provided by other organizations and/or authors (see Table 1 below).

The outbreak of the crisis ended up evidencing that one growing importance (OECD/INFE 2009). In light of this situation, governments from all over the world

Table 1 Several definitions of financial literacy, financial knowledge, financial education and/or related to them

Publication	Definition
Noctor et al. (1992)	[Financial literacy is] "the ability to make informed judgements and to make effective decisions regarding the use and management of money" (p. 4).
Mandell (1997)	[Financial literacy is] "the ability to use knowledge and skills to manage one's financial resources effectively for lifetime of financial security" (Hastings et al. 2013 p. 349).
Jacob et al. (2000)	"Financial literacy involves the ability to understand financial terms and concepts and to translate that knowledge skillfully into behavior (…). Financial literacy embodies the minimum knowledge necessary to participate gainfully in the economy; it is the essential set of tools that will define how daily money choices are made" (p. 15).
Vitt et al. (2000)	"Personal financial literacy is the ability to read, analyze, manage, and communicate about the personal financial conditions that affect material well-being" (p. xii).
Moore (2003)	"Individuals are considered financially literate if they are competent and can demonstrate they have used knowledge they have learned. Financial literacy cannot be measured directly so proxies must be used. Literacy is obtained through practical experience and active integration of knowledge. As people become more literate they become increasingly more financially sophisticated and it is conjectured that hits may also mean that and individual may be more competent" (p. 29).
OECD (2005)	"Financial education is the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being" (p. 26).
Hogarth (2006)	"Financial education includes: (1) being knowledgeable, educated, and informed on the issues of managing money and assets, banking, investments, credit, insurance, and taxes; (2) understanding the basic concepts underlying the management of money and assets (…); and (3) using that knowledge and understanding to plan, implement, and evaluate financial decisions" (p. 3).
Huston (2010)	"Financial knowledge is an integral dimension of […] financial literacy". [This dimension is the] "stock of knowledge acquired through education and/or experience specifically related to essential personal finance concepts and products" (p. 307).
Remund (2010)	"Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal financial through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions" (p. 284).
Atkinson and Messy (2012)	"Financial literacy is a combination of awareness, knowledge, skill, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing" (p. 39).
UNICEF (2012)	"Financial education inculcates the ability to be both financially literate and financially capable" (p. 3).
OECD (2013)	"Financial literacy is knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (p. 144).
Lusardi and Mitchell (2014)	

Table 1 (continued)

Publication	Definition
	"Endogenizing financial knowledge has important implications for welfare, as well as policies intended to enhance levels of financial knowledge in the larger population" (p. 5).
The World Bank (2015)	"Financial capability' includes and emphasis on the way in which a person manages their personal finances" (p. 7).
Lusardi et al. (2017a)	"Financial knowledge itself should be modeled as an endogenous choice variable akin to human capital investment. The mechanism we posit is that financial knowledge can enable individuals to better allocate resources over their lifetimes in a world of uncertainty and imperfect insurance". (p. 432).

joined their forces to design and implement national financial education strategies, or, where appropriate to improve existing ones (OECD/INFE 2013, 2015a, b). Moreover, the first international assessments of the 15 years-old high school students emerged (OECD 2014, 2017), as well as other evaluations concerning the general population (Atkinson and Messy 2012; Klapper et al. 2015; OECD/INFE 2016).[1]

In addition to these works, there are other few of them that have tried to measure the financial knowledge of a given population by using indexes or scores. Volpe et al. (1996) and Chen and Volpe (1998) were the prelude of all of them, since they created three different financial scores based on their surveys which had previously supplied to American university students. They pointed out the lack of knowledge in investment and finances as a problem to solve.

Hilgert et al. (2003), for their part, used the Survey of Consumers of November and December 2001 (conducted by the Survey Research Center from the University of Michigan) to create a financial knowledge score and five financial practice indexes. Whit them both they proved that those individuals who possess more financial knowledge carry out better financial practices. Moore (2003) employed the Survey of Financial Literacy in Washington State to calculate scores of various financial competences and considered them together to conclude that victims of predatory loans have a financial knowledge lower than the general population. This author also indicates that financial education programs are necessary to raise people awareness about their financial decisions. In this sense, Borden et al. (2008) advocated the effectiveness of a specific type of program (seminars) using for it a financial knowledge score. It was created from seven items of an own survey aimed at the same American college students before and after attending a seminar called 'Credit Wise Cats'.

Bucher-Koenen and Ziegelmeyer (2011) resorted to the 2009 SAVE (Sparen und AltersVorsorge in Deutschland) to build a financial literacy index that could allow them to affirm that, after the outbreak of the crisis, Germans with lower levels of financial knowledge more likely to incur realize losses. It can have an impact on their long-term financial well-being. Also, within the German borders, Driva et al. (2016) constructed a financial knowledge index though a survey of adolescent students to demonstrate the gender gaps that there are between them regarding this matter.

[1] Precisely, we are addressing these three works with more detail in the fifth section, since they three contain the variables with which we are testing the validity and reliability of our index.

Van Rooij et al. (2011, 2012) used the 2005 De Nederlandsche Bank Household Survey (DHS) to create two financial knowledge indexes: (i) basic, and (ii) advanced. From both, they conclude that, in the Netherlands, the level of financial literacy is positively associated with the propensity to participate in stock markets as well as with a greater wealth accumulation. This idea of considering a basic and another advanced financial knowledge indexes was taken from Lusardi and Mitchell (2009), who acted in the same way using some questions from the 2004 Health and Retirement Study (HRS) to inform of the positive link between financial knowledge and retirement planning. Arrondel et al. (2012) also resorted to this basic-advanced binomial. Specifically, they created a 'basic financial requirements index' and a 'financial culture index' by using data from the 2011 PATER Survey. With them both they found that the greater the level of financial knowledge of the French population the greater their participation in stock markets.

Bongini et al. (2015) surveyed students of Economics Faculty of Milano-Bicocca University from which they created a financial literacy index with which they found serious deficits in financial knowledge. In order to resolve them, they invited the design of financial education programs in Italy. Knoll and Houts (2012) built a financial knowledge index through three different surveys dated in 2009 (RAND's American Life Panel -ALP-, Health and Retirement Study -HRS- y FINRA National Financial Capability Study – FINRA NFCS-). They intended that this index could be used by policy makers to evaluate the impact of financial education programs in the United States (U.S.). 2009 FINRA NFCS was also used by Santos and Abreu (2013) to construct another financial literacy index and verify that Americans with greater financial knowledge are less prone to over-indebtedness.

However, Lusardi et al. (2014) preferred the 2008 HRS to create a financial literacy index for over 50 years old Americans. They used it to warn of the potentially serious and negative implications of the lack of financial knowledge of this population segment. In this regard, Seligman (2012) surveyed Americans who were about to retire and obtained a financial literacy score. This author concluded that financial education programs aimed at elder workers potentially improve post-retirement well-being.

Fisch et al. (2016) built two financial literacy indexes. One of them concerning FINRA professional advisors and the other one referring to Amazon Mechanical Turk members. As a result, they discovered that financial advice could mitigate the effect of financial illiteracy in the U.S. Nevertheless, Kramer (2016) pointed out that this assumption is not always valid because people who overestimate their level of financial knowledge do not tend to resort to advisors. This author reached this conclusion by calculating financial literacy scores by using the 2005 De Nederlandsche Bank Household Survey (DHS) as well as a survey conducted in 2011 to retail investors belonged to one of the most recognized Dutch banks.

Within the framework of TIAA[2] Institute and GFLEC,[3] Lusardi et al. (2017b) created a Personal Finance Index (P-Fin Index) from a survey of 28 questions to just over a thousand over 18 years-old Americans. Yakoboski et al. (2018) replicated this work for the following year in order to achieve their goal of converting this index into an annual barometer. The findings were essentially the same: there is a widespread

[2] Teachers Insurance Annuaty Association.
[3] Global Financial Literacy Excellence Center.

financial ignorance and those people who have a higher level of personal financial knowledge are more likely to have positive personal financial experiences. In between, Hasler et al. (2017) published a specific P-Fin Index of the Hispanic population residing in the U.S. They found that this population register less financial knowledge than the whole of U.S. population. In the same way, Hispanics born in the U.S. show a high level of financial knowledge than Hispanics born in other countries.

But Hispanics are not the only vulnerable population for which an index has been built. For example, Hetling et al. (2016) constructed five financial literacy scores after interviewing survivors of intimate partner violence in the U.S. and Puerto Rico. They concluded that financial education programs could be a way economically-financially empower this group.

All these works have as common factor the use of a battery of questions addressed to a certain sample at a specific moment of time in order to measure their financial knowledge. Therefore, they are not longitudinal. In other words, when these surveys cover several countries, they comprise only one year (cross-sectional data) and, on the contrary, when they cover several years, they comprise only one country (temporal series).[4] This lack of longitudinal designs was already pointed out by Collins and O'Rourke (2010). In addition, these works do not always use a representative sample of the entire population, but in many cases that sample only represents a certain group (for example, high school students, college students, people who are about the retire, immigrant population or even domestic violence victims).

Another predominant factor in this research field is the lack of macroeconomic perspective, which was already pointed out by Hogarth (2006) and Fromlet et al. (2007). It is not surprising because most of the works consider the intrinsic characteristics of the interviewees (such as their race, ethnicity, age, gender, social status, etc.) thus perpetuating that microeconomic viewpoint.

Even though the OECD/INFE (2009) recommended a series of methodological guidelines for the preparation of financial knowledge surveys, authors usually employ their own method (including the questions using to measure that knowledge). This methodological chaos was already pointed out by Hung et al. (2009) and Schmeiser and Seligman (2013). Consequently, this fact hinders the results' consistency.

We propose a novel Financial Knowledge Index (FKI) which covers all these shortcomings. This is a longitudinal measure of financial knowledge that allows us to make comparisons between countries and over time. We use a sample as wide as the availability of statistical data has allowed us: 63 countries during 1999–2014. Precisely, we have built this index by using macroeconomic variables which are available to all researchers. In addition, our FKI will allow all of us shed light on many macroeconomic questions related to financial knowledge by using longitudinal methods (such us panel data estimators).

[4] Some authors such as Jappelli (2010), Jappelli and Padula (2013) and Lo Prete (2018), among others, deal with financial knowledge in a longitudinal way but using two indicators biased because of their subjective nature. In fact, they both are built from the valuation in scale 0–10 that different business leaders of different countries about the level of economic-financial knowledge of the individuals. Thus, it is only a perception. Such indicators (called 'economic literacy among the population' and 'education in finance') were created within the framework of the World Competitiveness Center in order to measure the competitiveness of several countries. They were only available for 55 countries during 1995–2008.

3 Empirical analysis

This section addresses the creation of our FKI. It consists of an approximation of the level of financial knowledge that there is in the countries given a set of circumstances that the OECD (2005) already glimpsed. These last can be grouped into: (i) income levels that allow people to save and invest; (ii) educational levels that favor the intelligibility of the financial world; (iii) experience which is acquired through the use of financial assets (especially those that report a certain degree of complexity); and (iv) contingencies that people need to cover (such us the retirement income).

Precisely, these circumstances constitute the four sub-indexes from which our FKI is created: (i) sub-index of economic capacity; (ii) sub-index of educational training; (iii) sub-index of use; and (iv) sub-index of need. Each one of these sub-indexes is built by following the methodological recommendations for the construction of composite indicators proposed by the OECD (2008). Specifically, the standardization method chosen is re-scaling (or min-max normalization), while the aggregation method is the geometric mean weighted (which avoid the perfect substitutability between sub-indexes). These both methods have already been used by other organizations such as UNDP (2016 p.2) to create its HDI. However, the value of each weighting factor has been established based on the inverse of its standard deviation (i.e. the greater the standard deviation of a sub-index, the lower its weight in the geometric mean). This criterion is like that used by The Conference Board (2001, 2017) for creating some of its indicators.

Analytically:

First, the variable (X) which defines each sub-index is standardized as follows:

$$S_{it} = \frac{X_{it} - X_{mint}}{X_{maxt} - X_{mint}}$$

Where:

- X_{it}: value of X for a country i a year t.
- X_{min}: minimum value of X. It is predetermined for all years in each sub-index.
- X_{maxt}: maximum value registered by X in its corresponding year.
- Before grouping the standardized sub-indexes, weights $\left(W_{S_{nit}}\right)$ must be calculated:

$$W_{S_{nit}} = \frac{\sigma^{-1}_{S_{nit}}}{\sum \sigma^{-1}_{S_{nit}}} = \frac{\sigma^{-1}_{S_{nit}}}{\left(\sigma^{-1}_{S_{1it}} + \ldots + \sigma^{-1}_{S_{nit}}\right)}$$

Where:

- $\sigma^{-1}_{S_{nit}}$: inverse of the standard deviation of $S_{n_{it}}$.

– After of obtaining each standardized sub-index, they all are grouped by using a weighted geometric mean as follows:

$$I = \sqrt[\sum WSnit]{\prod S_{n_{it}}^{W_{S_{n_{it}}}}} = \sqrt[\sum W1it+\ldots+\sum WSnit]{S_{1_{it}}^{W_{S_{1_{it}}}} \ldots S_{n_{it}}^{W_{S_{n_{it}}}}})$$
$$\sum W_{S_{n_{it}}} = 1 \Leftrightarrow I = \prod S_{n_{it}}^{W_{S_{n_{it}}}} = S_{1_{it}}^{W_{S_{1_{it}}}} \ldots S_{n_{it}}^{W_{S_{n_{it}}}}$$

Where:

– I: index to calculate.
– $S_{n_{it}}$: standardized sub-index.
– $W_{S_{n_{it}}}$: weighted corresponding to $S_{n_{it}}$.

In the specific case of our FKI, its calculation would proceed as follows:

$$FKI = \sqrt[WIECit+WIETit+WIUit+WINit]{\mathrm{IEC}_{\mathrm{it}}^{\mathrm{W_{IEC_{it}}}} \cdot \mathrm{IET}_{\mathrm{it}}^{\mathrm{W_{IET_{it}}}} \mathrm{IU}_{\mathrm{it}}^{\mathrm{W_{IU_{it}}}} \cdot \mathrm{IN}_{\mathrm{it}}^{\mathrm{W_{IN_{it}}}}})$$

Where:

– IEC_{it}: Sub-Index of Economic Capacity, and $W_{IEC_{it}}$ is its weighting factor.
– IET_{it}: Sub-Index of Educational Training, and $W_{IET_{it}}$ is its weighting factor.
– IU_{it}: Sub-Index of Use, and $W_{IU_{it}}$ is its weighting factor.
– IN_{it}: Sub-Index of Need, and $W_{IN_{it}}$ is its weighting factor.

Next, Table 2 is dedicated to the sub-indexes that make up our FKI. Exactly, in there we define each one of them, indicate which variables are used to measures them and in which way they are used. Also, we reveal the source of each variable. The last column covers certain important methodological notes. This Table 2 is complemented by Table 3. This table contains the descriptive statistics of both our FKI, the sub-indexes that make it up, as well as the variables from which we make each sub-index. This information allows us to know the quality of the databases used to build our index.

4 Results and discussion

In this section we address, comment, and discuss the results of our FKI, as well as each of the sub-indexes that make up the last one. In Table 4 we show the results of our FKI for the years 1999, 2007 and 2014. However, Table 6 in the appendix shows our FKI values for each of the years in the 1999–2014 period. In both tables we provide the value of the descriptive statistics (mean, standard deviation, maximum and minimum). Providing the values of our index for the different years allows us to observe its evolution over time, in addition to making comparisons between the different countries. These are precisely two of the advantages of our FKI over those indicators of financial knowledge that are not longitudinal.

Table 2 Sub-Indexes which make up our FKI

Sub-Index Name	Description	Variable(s)	Source(s)	Notes
Economic Capacity	There is a direct link between a country's income and its capacity to invest and save. This relationship causes a positive effect on the financial knowledge acquisition (Bujan et al. 2016, and Mouna and Anis 2017). In addition, the last one is feedbacked due to its endogenous character (Lusardi et al. 2017a, b).	Logarithm of GDP per capita in Current International Dollars and using Purchasing Power Parity (PPP).	The World Bank (World Development Indicators).	We use the logarithm because of the need to emphasize the marginal effect of transferring income to investment. We set the minimum value to 100 dollars corresponding to the lowest level of per capita income recorded by any country in the World in recent years, as the UNDP (2017) does to set the minimum value of the income dimension of its HDI.
Educational Training	People who are better trained have a greater capacity to understand financial matters. This fact is supported by authors such as Lusardi et al. (2010) and Murendo and Mutsonziwa (2017). Also, Bujan et al. (2016), and Mouna and Anis (2017) found that educational level influences financial knowledge. These works all are according to OECD (2005 p. 42).	This sub-index is obtained by combining two variables: (i) Gross Graduation Ratio from first degree programmes (ISCED 6 and 7) in tertiary education, both sexes (%), and (ii) Means Years of Schooling. The first one indicates the highly qualified human capital in a country. The second variable is indicative of the general education of a given population.	UNESCO Education Database for Gross Graduation Ratio, and UNDP for Means Years of Schooling.	We calculate this sub-index in the same way that we calculate the FKI. I.e. both variables are standardized separately and grouped by using a weighted geometric mean. Weights are calculated based on the inverse of the standard deviation of each variable. We set the minimum value to zero for both variables because "societies can subsist without formal education (UNDP 2017).
Use	Authors such as Kimball and Shumway (2006), Graham	We use three variables to define use. First, Gross Portfolio Equity Assets	The World Bank provides the three variables. Exactly, the first	The minimum value of this sub-index is: $(GPEA_{mint} + ICA_{mint})^{IUS_W}$

Table 2 (continued)

Sub-Index Name	Description	Variable(s)	Source(s)	Notes
	et al. (2009), Christelis et al. (2010), van Rooij et al. (2011), and Choi et al. (2011), among others, confirm the existence of a direct relationship between the complexity of financial assets and the knowledge that people need to invest in them. Moreover, Lusardi et al. 2017a, b p. 472) note the endogenous learning derived from the management and contracting of financial assets. The OECD (2005 p. 28) had already pointed to the several avenues of saving and investment alternatives that emerged recently (such as deposits certificates, shares and other equity, as well as the preventive mechanisms like pensions and insurance schemes. Also, technologies use amplifies the proliferation and use of financial assets (OECD 2005 p.29). In fact, Bogan (2008) designated the skill in the management of technologies as a	(GPEA) to GDP (%). It includes shares, participations and similar documents (such as certificates of deposits) that usually denote ownership of wealth. Second, Insurance Company Assets (ICA) to GDP (%). Third, and last, Number of Internet Users (IUS) per 100 people, expressed as a decimal. With them, we define use (FA) as follows: $FA = (GPEA + ICA)^{IUS}$	two belong to Global Financial Development Database, meanwhile the third one is in World Development Indicators Database.	We consider the sum of the minimum value of the gross portfolio equity assets and the minimum value of the insurance company assets instead of the minimum of the sum of both because they are not synonymous. Exactly, we believe their separate consideration represent reality more faithfully given that a country can record a little value in the first variable and a very higher value in the second, or vice versa. However, we consider the number of internet users worldwide due to de the global nature inherent in this technology.

Table 2 (continued)

Sub-Index Name	Description	Variable(s)	Source(s)	Notes
	driving element of the agents's participation in financial markets. Even Kurihara (2013) give these skills a more important role than financial skills.			
Need	In the event of certain contingencies (e.g. retirement), people could obtain and income lower than the income which they received during its pre-contingency period (e.g. working life). Then, individuals incur in the necessity to cover this income gap. Therefore, longevity is an important factor in this sub-index due to the increase in life expectancy means the possibility of more time spend in retirement and, thus, a greater need for asset management, tax and estate planning, expanded insurance products, and other financial strategies as longevity increases" (OECD 2005 p. 31). Thus, how much	We use three variables to measure this need. First, Pension Fund Assets (PFA) to GDP (%). Second, the proportion which 2% of Household Financial Consumption Expenditure in current international dollars (or aggregate consumption, AC) represents on the GDP. Third, the ratio between the 65 years of age and older population and under 15 years of age population. This ratio could be named "population aging" and is expressed as decimal. With them we define need (N) as follows: $N = (PFA + AC)^A$	The World Bank for the three all variables. But the first one belongs to Global Financial Development Database, while the other two are from World Development Indicators Database.	The minimum value established to the need for each year is the lowest value registered by the weight that 2% of the aggregate consumption represents on the GDP (AC_{min}) each year elevated to the average of the growth rate of the ratio of 65 years people and older on 20 to 64 years old people (α). That is: $N_{mint} = (AC_{min})^{\alpha}$ Being[a]: $\alpha = \frac{1}{i} \sum_{i=1}^{t} \beta$ When we set the minimum value, we consider that the pension fund assets are zero because the difference between retirement income and labor income (i.e. net replacement rate) could be zero. However, we cannot ignore the weight of 2% of aggregate consumption on GDP, according to Caliendo and Findley (2013). Regarding α, we do not consider the under 20 years old population because Riley (2005) and Maddison (2010) postulate that a society is no able to last over time if it does nor have a

Table 2 (continued)

Sub-Index Name	Description	Variable(s)	Source(s)	Notes
	money people invest in income preventive plans/funds is an important matter (the greater it the greater the need to supplement public pensions, if they exist). Financial knowledge and retirement planning are positively correlated just like several authors corroborate (Hershey and Mowen 2000; Ameriks et al. 2003; Lusardi 2004; Lusardi and Mitchell 2005; Lusardi and Mitchell 2007; Hung et al. 2009; van Rooij et al. 2012; Moure 2016; Prast and van Soest 2016; Boisclair et al. 2017, and Clark et al. 2017, among others). Moreover, Jappelli (2010) pointed out that the deficiencies (or absence) of public guarantees for income forecasting is the first factor which motivates the agents to be financially trained. Caliendo and Findley (2013) went beyond and proclaim even if there are			minimum life expectancy equal to 20 years old.

Table 2 (continued)

Sub-Index Name	Description	Variable(s)	Source(s)	Notes
	efficient public pension systems, the acquisition of financial education related to retirement planning results in an increase in social welfare equivalent to 2% of aggregate consumption. Thus, supplementing pensions with additional mechanism might be appropriate even when the different between the labor income and the retirement income were zero			

[a] Where:

$$\beta_i = \frac{\left(P^{65+}/P^{20-64}\right)^{2014} - \left(P^{65+}/P^{20-64}\right)^{1999}}{\left(P^{65+}/P^{20-64}\right)^{1999}}$$

In both Tables (4 and 6) are shown, in descending order, the values recorded by our FKI for each of the countries and years of the sample. All these results are ordered by employing the K-means algorithm (MacQueen 1967) applied to the 2014 values. This is a type of non-hierarchical clustering that has the peculiarity that the centroid is calculate from the members of the cluster after each assignment and not at the end of each case. Consequently, this is one of the most efficient classification methods that exist. Of course, the last one is more objective and precise than the delimitation of pre-established cutting points based on positional measures such as quartiles, as, for example, the UNDP (2016 p.3) does it to classify its HDI values.

The groups around which our FKI values are classified are four (named as *high*, *medium-high*, *medium-low*, and *low*). Why? Observing the curve of the sum of squares (WSS) which is represented in the left scree plot of Fig. 1 (see appendix), just at k = 4 a kink occurs. According to Makles (2012) it is this value (i.e. where the kink takes place) that detects 'the optimal number of groups k^* from the set of K solutions' (p. 347). On the right side within this same figure the curve of the η^2 coefficient is represented. This last is another criterion for detecting the optimal number of cluster and which also indicates that k = 4 is an optimal solution.

Table 3 Descriptive Analysis of our FKI, the Sub-Indexes which make up it, and the variables that make up the Sub-Indexes (1999–2014)

	Mean	Standard Deviation	Minimum	Maximum	Observations
FKI	0.234	0.178	0,025	0,918	1008
Sub-Index of Economic Capacity	0.789	0.105	0.491	1000	1008
Logarithm of GDP per capita *in Current International Dollars and using Purchasing Power Parity (PPP)*	4.262	0.315	3.327	4.999	1008
Sub-Index of Educational Training	0.633	0.166	0,109	1.000	1008
Gross Graduation Ratio from first degree programmes in tertiary education (%)	29.659	15.328	0.720	79.368	1008
Mean Years of Schooling	10.017	2.092	4.200	13.400	1008
Sub-Index of Use	0.152	0.233	0,000	1000	1008
Gross Portfolio Equity Assets to GDP (%)	20.091	39.640	0.000	421.933	1008
Insurance Company Assets to GDP (%)	26.064	34.269	0.186	200.256	1008
Number of Internet Users per 100 people, expressed as decimal	0.429	0.282	0.001	0.982	1008
Sub-Index of Need	0.074	0.168	0,000	1000	1008
Pension Fund Assets to GDP (%)	21.776	30.952	0.000	184.143	1008
Proportion which 2% of Aggregate Consumption represents on the GDP	1.097	0.205	0.557	1.942	1008
Population aging	0.679	0.408	0.078	1.987	1008

Regarding FKI's values interpretation, they range from zero to one. When FKI = 1 there is absolute financial knowledge. Meanwhile, if FKI = 0 then financial knowledge is null.

Our results reveal that there is a general lack of financial knowledge worldwide, such as OECD/INFE 2009 2013 and 2015a, 2015b), Atkinson and Messy (2012), Klapper et al. (2015) and OECD (2014 2016 and 2017) warned. In general, this finding is consistent with most of the prior literature. In this sense, no country can boast of being a reference in the financial knowledge field. However, some countries differ considerably from others, so those that register higher values would need to make less efforts to improve their level of financial knowledge compared to those that register lower values.

Given the longitudinal design of our FKI, it is not only possible to compare between countries, but also over time. Overall, the FKI mean is higher during the period 1999–2007 (pre-crisis) compared to the period 2008–2014 (post-crisis). That is, although with ups and downs, we observe increases in financial knowledge during the years prior to crisis (peak in 2007), while after the outbreak of this crisis, financial knowledge has shown a downward trend. In fact, by 2014 a good part of the countries registers a level of financial knowledge lower than the start year (1999). Therefore, the role of the crisis as an 'efficient promoter' of the financial crisis (OECD/INFE 2009 p.9) is more than

Table 4 Financial knowledge index ranking

Rank	Country	1999	2007	2014
Group 1: High Financial Knowledge				
1	Japan	0.596	0.739	0.801
2	Switzerland	0.857	0.819	0.655
3	Netherlands	0.796	0.707	0.599
Group 2: Medium-High Financial Knowledge				
4	Denmark	0.647	0.566	0.527
5	Finland	0.581	0.528	0.472
6	Germany	0.391	0.584	0.470
7	Hong-Kong, SAR	0.323	0.552	0.469
8	United Kingdom	0.691	0.613	0.439
9	Canada	0.577	0.474	0.403
10	Sweden	0.569	0.493	0.378
Group 3: Medium-Low Financial Knowledge				
11	Australia	0.593	0.482	0.331
12	Malta	0.111	0.128	0.310
13	Ireland	0.365	0.336	0.300
14	United States	0.595	0.434	0.298
15	Iceland	0.440	0.510	0.267
16	Croatia	0.120	0.273	0.265
17	Italy	0.184	0.292	0.250
18	Portugal	0.369	0.356	0.249
19	Norway	0.484	0.366	0.242
20	Austria	0.323	0.334	0.239
21	Estonia	0.112	0.280	0.236
22	Spain	0.321	0.363	0.226
23	Belgium	0.322	0.324	0.219
24	Korea, Rep.	0.203	0.225	0.207
25	Czech Rep.	0.168	0.228	0.205
26	Latvia	0.109	0.202	0.198
27	Slovenia	0.123	0.268	0.196
28	Cyprus	0.124	0.205	0.191
29	New Zealand	0.377	0.243	0.190
30	Luxembourg	0.267	0.253	0.186
31	Chile	0.196	0.215	0.185
32	Slovak Rep.	0.099	0.216	0.185
33	Israel	0.265	0.222	0.172
34	Lithuania	0.099	0.190	0.172
35	Bulgaria	0.095	0.220	0.167
36	Poland	0.117	0.230	0.165
Group 4: Low Financial Knowledge				
37	Hungary	0.193	0.317	0.160
38	France	0.241	0.164	0.128

Table 4 (continued)

Rank	Country	1999	2007	2014
39	Malaysia	0.166	0.164	0.117
40	Macedonia, FYR	0.082	0.115	0.103
41	Thailand	0.117	0.132	0.100
42	Romania	0.093	0.097	0.096
43	Costa Rica	0.100	0.118	0.095
44	Brazil	0.110	0.136	0.092
45	Kazakhstan	0.112	0.133	0.086
46	Peru	0.106	0.133	0.085
47	Russian Federation	0.080	0.147	0.081
48	Panama	0.122	0.096	0.080
49	Greece	0.144	0.121	0.080
50	South Africa	0.115	0.132	0.078
51	Mexico	0.096	0.112	0.075
52	El Salvador	0.068	0.103	0.070
53	Argentina	0.141	0.131	0.062
54	Turkey	0.077	0.083	0.060
55	Namibia	0.100	0.094	0.058
56	Jordan	0.111	0.101	0.058
57	Philippines	0.091	0.076	0.057
58	Paraguay	0.083	0.076	0.057
59	Albania	0.073	0.075	0.046
60	Egypt, Arab Rep.	0.090	0.081	0.044
61	Honduras	0.056	0.064	0.038
62	Indonesia	0.080	0.066	0.037
63	Armenia	0.091	0.084	0.035
	Mean	*0.247*	*0.264*	*0.208*
	Standard Deviation	*0.207*	*0.187*	*0.165*
	Maximum	*0.857*	*0.819*	*0.801*
	Minimum	*0.056*	*0.064*	*0.035*

Table 5 FKI and its connection with other financial knowledge's variables

	Rho (Spearman)	z (BKR test)
FKI 2014 vs. Klapper et al. (2015)	0.767 (0.000 < 0.001)	4.360 (0.000 < 0.001)
FKI 2014 vs. OECD/INFE (2016)	0.638 (0.000 < 0.001)	3.158 (0.000 < 0.001)
FKI 2010 vs. Atkinson and Messy (2012)	0.566 (0.044 < 0.05)	

questionable. But, what could have led to this situation? To solve this question, we analyze the values of each of the sub-indexes that make up our FKI.

Tables 7, 8, 9 and 10 (see appendix) show the values of each of the sub-indexes which make up our FKI, for each of the years of the period 1999–2014. They are classified in the same way as the FKI does it and by following the same order to better visualize the comparisons. In addition, the weighting factors are in brackets just below each year for each sub-index. They allow us to find out the degree of importance of the sub-indexes (i.e. what of them are having more weight or less weight in each year). Although the weights are not exactly the same in each year, they are similar. In order, the weight of the sub-index of economic capacity is always higher that the weights of the sub-indexes of educational training and need, respectively, (which hardly differ from each other) and, finally, the sub-index of use.

This order in the weights obtained for each sub-index is not surprising, since it is common to find in previous literature that income level is positively associated with financial knowledge more strongly than the rest of variables. Likewise, it is usually followed, in order of strength, by the educational attainment, whose strong and direct relationship is almost unanimous in prior literature. It is also common to fin works that reveals that financial knowledge is positively influenced by the contracting of private pension plans (indicative of the need), as well as by the use of complex financial assets (i.e., other than bank deposits). But it is also true that this influence is weaker in the latter two cases compared to educational attainment and, even more so, income level. Therefore, the vale obtained for each weight of each sub-index is not surprising, as they are consistent with the findings of previous works (see, for example, van Rooij et al. 2011, 2012, Lusardi et al. 2010, 2014, 2017b; Bujan et al. 2016; Mouna and Anis 2017; Hasler et al. 2017; among others).

If we look at the mean of each sub-index for each year, the mean of the sub-index of economic capacity has shown an increasing evolution in general terms, although with setbacks in 2006, 2011, and 2013 compared to their immediately previous years (2005, 2010, and 2011, respectively). Moreover, the growth rate of the mean of this sub-index is higher during 1999–2007 (pre-crisis) compared to 2008–2014 (post-crisis). Thus, during the pre-crisis period the average growth rate is 0.3%, while for the post-crisis period it is 0.2%. This behavior explains much of the FKI trend that we pointed out two paragraphs ago.

Likewise, despite the slight ups and downs in the mean of the sub-index of educational training, its value shows an increasing trend during the analysis period, which has positive implications for financial knowledge. This is not surprising given that most governments are increasingly aware of the importance of human capital and they act accordingly. Even so, this trend is more moderate compared to the trend of the mean of the sub-index of the economic capacity. Meanwhile, the trends that show the sub-indexes of economic capacity and educational training (analogous to each other) are not given for the rest of the sub-indexes (use and need).

On the one hand, the mean of the sub-index of use reflects a downward trend between 1999 and 2004, when it began to grow to reach its peak in 2007, just before the outbreak of the crisis. Since then, its trend is downward until 2012, when it grows again, although moderately and without reaching at the end of the period that level of 2007. This behavior suggests that the outbreak of the 2008 crisis has had a negative impact on the confidence of agents in the financial markets (and, therefore, in the use of

financial assets with a certain degree of complexity), which has negative implications for financial knowledge.

On the other hand, the mean of the sub-index of need reports a generally decreasing trend over the whole period of analysis. This fact suggests that, even though public pensions systems are becoming increasingly unsustainable, agents continue to rely on them. This confidence leads to individuals not yet being fully aware of the need to supplement their (public) income for their retirement. This confidence is probably due to the fact that public systems have work so far and, especially, to the efforts of governments to resolve this unsustainability (OECD 2019), even though the latter has become more apparent after the 2008 crisis. All this have negative implications to financial knowledge.

There are some countries that do not comply with this general trend. For example, Sweden, Iceland, Norway, and New Zealand they all recorded significant FKI falls. The origin of these decreases is found in the behavior of their sub-indexes of need and educational training. On the one hand, they are countries that are characterized by strong degree of social protection. Likewise, in Sweden and Norway population aging is not yet sufficiently pronounced, while in Iceland and New Zealand this is not even a problem. On the other hand, although Sweden is one of the countries with the highest mean years of schooling, this country has a notably lower gross graduation ratio in tertiary education in comparison with the rest of the sample. Norway is in a similar situation, but much less accused. In Iceland and New Zealand, the situation is reversed: they stand out more for their gross graduation ratio in tertiary education that for their mean years of schooling. Other countries registering flashy FKI declines are Australia and United States. They both have been influence by the decrease in the sub-index of need and although in these countries the responsibility for retirement planning falls heavily on individuals, population aging is not sufficiently pronounced like it is in the rest of the developed countries.

On the contrary, there are other countries that break the general trend because they end the period with an FKI higher than the beginning. Some of them register quite acceptable positions (such as Malta, Estonia, Czech Republic, Latvia, and Slovenia) while others are further behind (such us Slovak Republic, Lithuania, Bulgaria, Poland, and specially Macedonia). In the case of the Malta, its rise lies in the sub-indexes of need and educational training. The first of them has been driven by the extraordinary increase in population aging. The second is due to the effects that the Equal Opportunities Law (approved in 2000) has exercised in the mean years of schooling as well as the gross graduation ratio in tertiary education. The rest of the mentioned countries are characterized by having abandoned their respective socialist regimes and started a transition towards the market economy (which implies greater contact with the financial world). With the exception of Slovenia and Latvia, all of them have seen an increase in their sub-index of economic capacity which has given them a higher level of financial knowledge. In addition, Estonia, Czech Republic, Slovenia, Slovak Republic, Lithuania, and Poland have increased their sub-indexes of educational training. These last countries have been making their educational systems more and more universal. Hence, the remarkable increase in their mean years of schooling and their gross graduation ratio in tertiary education are not strange. For their part, in Estonia, Bulgaria, and specially Latvia, the sub-index of need has played an import role. Precisely, in Estonia and Latvia, although young adults are entitled to a public pension for retirement in the

future, the need to complement it is such that the law requires them to contract private funds. In Bulgaria this is not mandatory, but population aging is higher than the degree of social protection, and it increase this need.

Finally, there is an obvious fact: it is easier to find countries with well-established and robust financial systems in the top positions of our FKI's ranking. In addition, some of these countries have been introducing financial contents in their school curricula for years (OECD/INFE 2015a; 2015b).

5 Validity and reliability of our FKI

After exposing, commenting, and discussing the FKI's values, one question remains: to what extent can we affirm that our FKI is a valid and reliable measure of financial knowledge? To answer this question, we analyze what the connection of our FKI with other variables of great similarity. For that, we continue following the recommendations provided by the OECD (2008 p. 35) for the construction of composite indicators. In this sense, if the degree of correlation between such variables and our FKI is significantly strong and positive, this last one could be considered valid and reliable.

Specifically, this section addresses the extent to which our FKI is correlated with three variables of financial knowledge which are created by using surveys aimed at population's samples of different countries at a specific point in time (cross-sectional data). Therefore, they lack longitudinal perspective, a gap that precisely our FKI covers. These three variables are: (i) percentage of adults who are financially literate (Klapper et al. 2015); (ii) percentage of the adult population that correctly answered at least 70% of the basic financial knowledge questions (OECD/INFE 2016); and, lastly, (iii) percentage of the adult population that in a financial knowledge test correctly answered at least 75% of the questions (Atkinson and Messy 2012).

These variables are chosen because they cover a representative sample of the entire adult's population (15 years old and above, aged 18 to 79, and 18 and older, respectively), unlike many others that adhere to a specific population segment (such as university students, high school adolescents, people who are about the retire, etc.). In addition, they cover a large sample of countries, although cases coinciding with our FKI are selected here (61, 27, and 13 countries, respectively). Regarding the reference year, for the first variable the data was collected during 2014, and for the third variable it was during 2010. Meanwhile, the second variable was constructed with both 2014 and 2015 years data but given that the temporary differences are not substantial it can be considered that they all data are referred to the same unit of time (in this case 2014). In fact, it is difficult to find a survey in which all the interviewees answered the same day and at the same time. Therefore, in this sense, the cross-sectional design is flexible (Lavrakas 2008 p.171).

Each one of these three variables will be submitted to the same process. In particular, each one is going to be represented with our FKI of the corresponding year in a scatter plot. In this way, we are going to be able to appreciate if both variables follow the same trend (i.e. if they have some relation). In the affirmative case, we will quantify the degree to which this correlation occurs by employing coefficients. In fact, the three scatter plots are shown in the appendix (Figs. 2, 3 and 4). For all three cases, we

observe that the values follow the same trend (they are increasing), although not all at the same time. That is, there seems to be a monotonic and positive relationship.

The most appropriate coefficient to corroborate this last fact and see to what degree it occurs is the Spearman's coefficient. In addition, the BKR test modified by Mudholkar and Wilding (2003, 2005) is applicable for the first two cases.[5] The first of them brings a score, rho, that oscillates between −1 and 1. A rho = 1 indicates that the correlation is perfectly positive, meanwhile a rho = −1 indicates that the correlation is perfectly negative. Regarding the BKR test, it brings a score called 'z' which is positive when the variables are correlated and negative then they are independent. Of course, these scores are subject to appropriate levels of significance.

Table 5 (see below) show the values of the Spearman's rho, as well as the results of the BKR test. In brackets, their respective *p* value is provided. Z-score (only applicable to the first two cases) brings positive values, which means that there is a correlation between the variables faced. Meanwhile, Spearman's rho reveals highly positive values (especially in the first two cases), which means that the variables faced are strongly correlated. The different *p*-values report the significance of each of these values. The null hypothesis (i.e. the variables are independent) can be rejected in all cases. Therefore, all these correlations are significant. Specifically, the level of significance (α) is 0.01 to the first two cases and 0.05 to the third case.

In a nutshell, there are highly positively and significant degrees of correlation between each of these three financial knowledge's variables and our FKI's values for coinciding years and countries both. Therefore, it is legitimate to affirm that our FKI is a valid and reliable measure of financial knowledge.

6 Conclusions

Analyzing financial knowledge is an incipient phenomenon in economic research and, so, it requires exploration. All previous works analyzed financial knowledge from a microeconomic perspective and using surveys which considered aspect inherent to the interviewees (e.g. gender, age, race, ethnicity, among others). Those papers analyzed the financial knowledge effect on microeconomic issues such as personal saving and retirement planning, stock market participation, better products and services choice, lower propensity to over-indebtedness, among others. In addition, their authors use non-longitudinal designs.

Nevertheless, there is not enough empirical evidence to affirm whether financial knowledge influences certain macroeconomic variables such as economic growth, economic development or inequality (even though many countries are implementing national financial education strategies). This insufficient empirical evidence probably lies in the lack of an indicator that measures countries' financial knowledge allowing comparisons between them and throughout time (i.e. a longitudinal indicator).

Precisely, in this work we build our Financial Knowledge Index (FKI) in order to cover this lack. In addition, our contribution contributes to turn definitively towards the macroeconomic perspective, which is hardly explored in this research field.

[5] This test requires that the number of individuals (in this case countries) that make up the sample is greater than 15, a condition that the third variable does not meet.

Since most of the previous works that analyzed financial knowledge by comparing countries did it by using different surveys and focus them on different population segments, comparisons between those works as well as with our work is difficult. But, if we look globally at each of the works which considered financial knowledge of each country, our results are consistent with theirs. Furthermore, we have demonstrated that our FKI is highly positively and significantly correlated with three financial knowledge's variables for coinciding years and countries both. It is an indication that our FKI is valid and reliable.

Our results reveal there is a general lack of financial knowledge worldwide as other works have already warned. Besides, a good part of the analyzed countries registers a lower FKI's value at the end of the study period than at the beginning of it (i.e. there is a general downward trend over time). This last is generally originated by decreases in the sub-indexes of use and need. Even so, those countries whose financial systems are comparatively more both strengthened and robust and have financial matters in their school curricula registered better positions in our ranking than those which have neither one and the other thing.

In future researches, we would like to analyze several macroeconomic issues related to financial knowledge and do it by using our FKI. With this, for example, we could know some of its macroeconomic determining factors or find out how does financial knowledge influences (or is influenced by) other macroeconomic variables such us inequality or development, among others.

We are grateful for the collaboration of Ph.D. José Alberto Serra Ferreira Rodrigues Fuin has as scientific advisor to the doctoral student Francisco José Oliver Márquez during his quarterly research stay at the University of Beira Interior between March 1th and May 30th, 2017.

Appendix

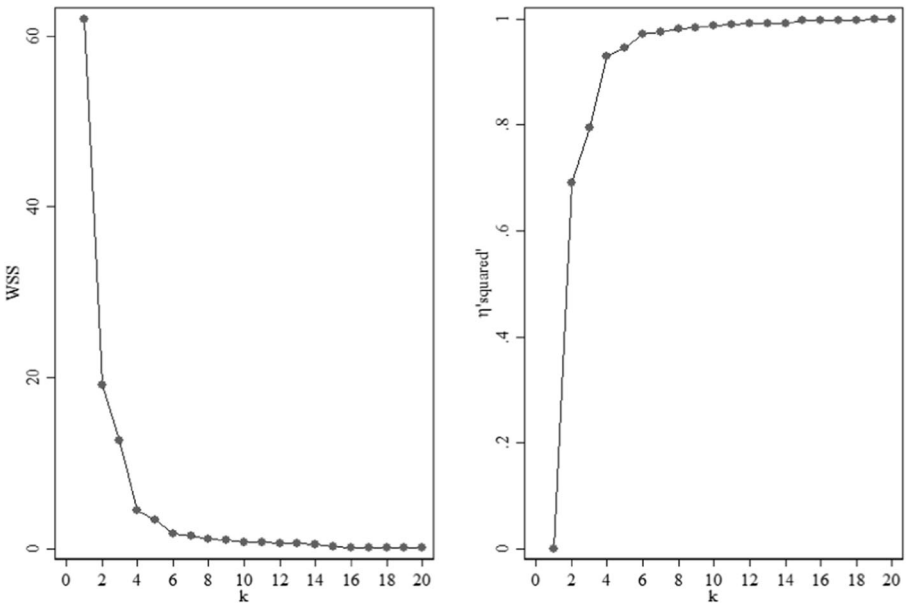

Fig. 1 Optimal k-means cluster solutions: WSS and η^2 coefficient

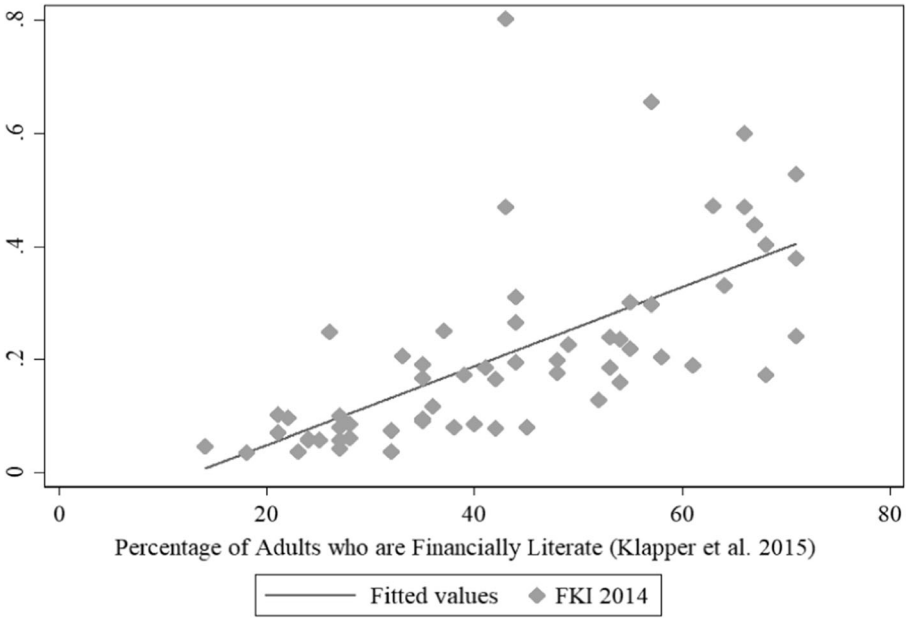

Fig. 2 Scatter Plot: FKI 2014 vs. Percentage of Adults who are Financially Literate Klapper et al. (2015)

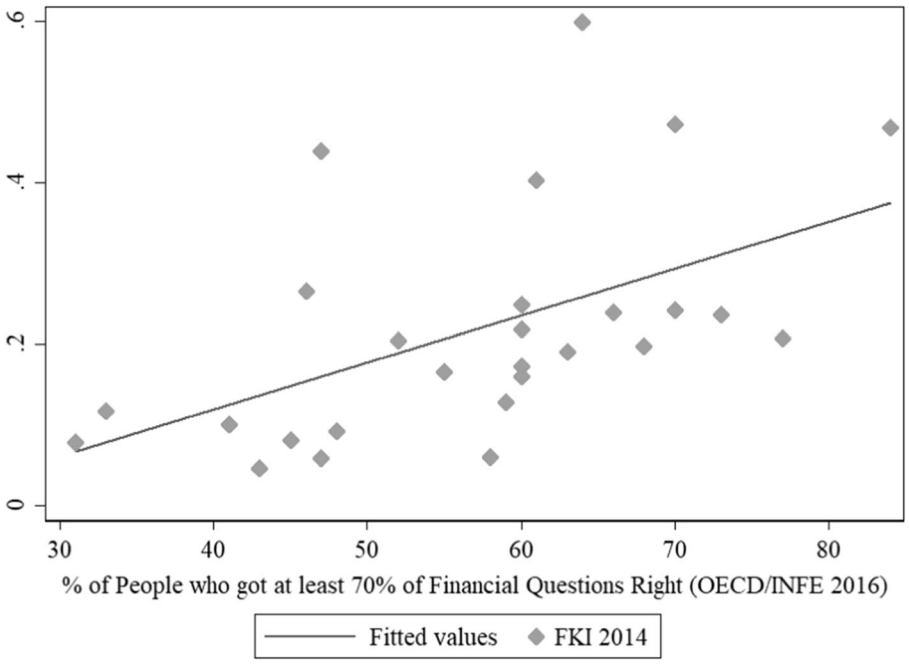

Fig. 3 Scatter Plot: FKI 2014 vs. Percentage of People who got at least 70% Financial Questions Right (OECD/INFE 2016)

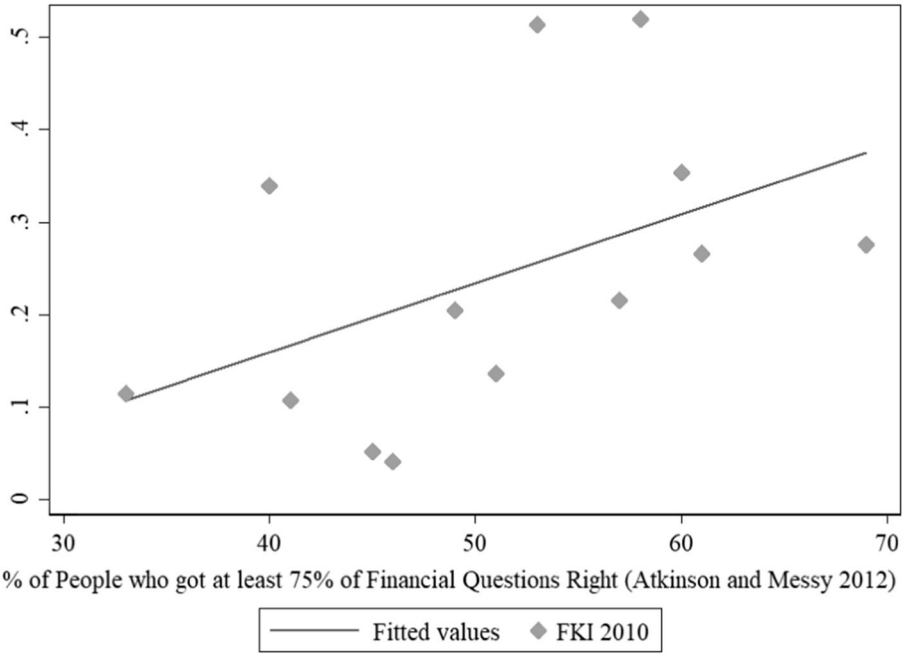

Fig. 4 Scatter Plot: FKI 2010 vs. Percentage of People who got at least 75% of Financial Questions Right (Atkinson and Messy 2012)

Table 6 Financial Knowledge Index, FKI (1999–2014)

Rank (2014)	Country/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Group 1: High Financial Knowledge																	
1	Japan	0.596	0.613	0.648	0.650	0.617	0.575	0.692	0.679	0.739	0.697	0.692	0.710	0.697	0.694	0.794	0.801
2	Switzerland	0.857	0.915	0.918	0.878	0.776	0.769	0.726	0.816	0.819	0.747	0.730	0.755	0.709	0.715	0.676	0.655
3	Netherlands	0.796	0.602	0.570	0.686	0.615	0.681	0.665	0.699	0.707	0.575	0.588	0.632	0.620	0.662	0.583	0.599
Group 2: Medium-High Financial Knowledge																	
4	Denmark	0.647	0.552	0.543	0.598	0.565	0.577	0.539	0.543	0.566	0.601	0.550	0.593	0.525	0.517	0.489	0.527
5	Finland	0.581	0.536	0.552	0.607	0.542	0.508	0.585	0.513	0.528	0.538	0.463	0.500	0.412	0.428	0.494	0.472
6	Germany	0.391	0.376	0.421	0.456	0.365	0.491	0.538	0.552	0.584	0.524	0.538	0.519	0.520	0.501	0.440	0.470
7	Hong-Kong, SAR	0.323	0.325	0.365	0.335	0.418	0.471	0.456	0.430	0.552	0.507	0.501	0.523	0.451	0.469	0.423	0.469
8	United Kingdom	0.691	0.580	0.569	0.678	0.631	0.626	0.643	0.598	0.613	0.545	0.561	0.513	0.485	0.565	0.527	0.439
9	Canada	0.577	0.550	0.552	0.504	0.504	0.468	0.466	0.458	0.474	0.438	0.417	0.419	0.410	0.401	0.396	0.403
10	Sweden	0.569	0.479	0.519	0.552	0.545	0.523	0.441	0.521	0.493	0.465	0.457	0.430	0.425	0.442	0.383	0.378
Group 3: Medium-Low Financial Knowledge																	
11	Australia	0.593	0.511	0.516	0.462	0.446	0.458	0.401	0.414	0.482	0.398	0.362	0.356	0.366	0.313	0.294	0.331
12	Malta	0.111	0.109	0.130	0.130	0.116	0.122	0.112	0.110	0.128	0.140	0.114	0.130	0.135	0.240	0.263	0.310
13	Ireland	0.365	0.345	0.362	0.343	0.336	0.368	0.324	0.323	0.336	0.365	0.338	0.353	0.333	0.327	0.277	0.300
14	United States	0.595	0.490	0.474	0.450	0.458	0.458	0.423	0.416	0.434	0.358	0.321	0.354	0.334	0.334	0.298	0.298
15	Iceland	0.440	0.404	0.399	0.428	0.488	0.500	0.482	0.497	0.510	0.426	0.391	0.376	0.362	0.311	0.305	0.267
16	Croatia	0.120	0.121	0.149	0.163	0.168	0.202	0.191	0.228	0.273	0.237	0.237	0.250	0.245	0.261	0.247	0.265
17	Italy	0.184	0.265	0.271	0.256	0.222	0.232	0.236	0.247	0.292	0.239	0.237	0.266	0.253	0.243	0.243	0.250
18	Portugal	0.369	0.322	0.315	0.309	0.270	0.256	0.251	0.308	0.356	0.320	0.313	0.295	0.252	0.267	0.246	0.249
19	Norway	0.484	0.418	0.484	0.422	0.396	0.400	0.352	0.341	0.366	0.362	0.350	0.339	0.303	0.299	0.275	0.242
20	Austria	0.323	0.310	0.285	0.278	0.246	0.330	0.313	0.323	0.334	0.305	0.288	0.296	0.274	0.275	0.241	0.239

Table 6 (continued)

Rank (2014)	Country/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
21	Estonia	0.112	0.108	0.122	0.156	0.174	0.224	0.234	0.244	0.280	0.218	0.235	0.266	0.225	0.260	0.230	0.236
22	Spain	0.321	0.295	0.334	0.320	0.335	0.335	0.342	0.342	0.363	0.269	0.298	0.290	0.260	0.238	0.220	0.226
23	Belgium	0.322	0.316	0.351	0.379	0.294	0.342	0.313	0.328	0.324	0.283	0.238	0.277	0.259	0.248	0.224	0.219
24	Korea. Rep.	0.203	0.206	0.234	0.233	0.177	0.228	0.205	0.218	0.225	0.223	0.211	0.211	0.215	0.211	0.201	0.207
25	Czech Rep.	0.168	0.166	0.196	0.207	0.198	0.206	0.197	0.213	0.228	0.231	0.219	0.215	0.225	0.224	0.194	0.205
26	Latvia	0.109	0.091	0.110	0.130	0.135	0.127	0.147	0.173	0.202	0.202	0.225	0.228	0.218	0.238	0.206	0.198
27	Slovenia	0.123	0.107	0.126	0.109	0.118	0.113	0.093	0.080	0.268	0.237	0.237	0.243	0.208	0.225	0.202	0.196
28	Cyprus	0.124	0.128	0.167	0.226	0.205	0.214	0.197	0.209	0.205	0.184	0.203	0.184	0.194	0.178	0.193	0.191
29	New Zealand	0.377	0.325	0.347	0.322	0.276	0.282	0.232	0.264	0.243	0.253	0.238	0.218	0.208	0.206	0.199	0.190
30	Luxembourg	0.267	0.279	0.271	0.268	0.328	0.216	0.254	0.261	0.253	0.251	0.248	0.296	0.258	0.239	0.200	0.186
31	Chile	0.196	0.205	0.229	0.228	0.199	0.204	0.206	0.211	0.215	0.188	0.186	0.179	0.178	0.194	0.178	0.185
32	Slovak Rep.	0.099	0.085	0.106	0.131	0.109	0.121	0.138	0.174	0.216	0.127	0.196	0.194	0.200	0.200	0.174	0.177
33	Israel	0.265	0.263	0.237	0.255	0.215	0.219	0.187	0.190	0.222	0.216	0.206	0.231	0.213	0.189	0.178	0.172
34	Lithuania	0.099	0.091	0.096	0.101	0.096	0.113	0.123	0.150	0.190	0.169	0.185	0.189	0.179	0.183	0.144	0.172
35	Bulgaria	0.095	0.107	0.138	0.151	0.140	0.151	0.156	0.174	0.220	0.190	0.190	0.193	0.189	0.197	0.178	0.167
36	Poland	0.117	0.119	0.180	0.223	0.188	0.206	0.185	0.202	0.230	0.243	0.224	0.204	0.215	0.215	0.177	0.165
Group 4: Low Financial Knowledge																	
37	Hungary	0.193	0.184	0.231	0.197	0.219	0.237	0.249	0.269	0.317	0.242	0.271	0.276	0.167	0.180	0.143	0.160
38	France	0.241	0.213	0.263	0.255	0.231	0.237	0.135	0.138	0.164	0.161	0.147	0.161	0.146	0.151	0.129	0.128
39	Malaysia	0.166	0.177	0.166	0.184	0.159	0.171	0.155	0.162	0.164	0.142	0.126	0.136	0.129	0.131	0.106	0.117
40	Macedonia, FYR	0.082	0.078	0.089	0.112	0.097	0.106	0.096	0.089	0.115	0.113	0.108	0.100	0.102	0.106	0.100	0.103
41	Thailand	0.117	0.098	0.112	0.133	0.118	0.119	0.115	0.116	0.132	0.116	0.106	0.106	0.107	0.088	0.078	0.100
42	Romania	0.093	0.077	0.093	0.103	0.080	0.090	0.084	0.084	0.097	0.096	0.094	0.102	0.103	0.110	0.086	0.096

Table 6 (continued)

Rank (2014)	Country/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
43	Costa Rica	0.100	0.087	0.110	0.118	0.100	0.099	0.097	0.098	0.118	0.108	0.099	0.104	0.104	0.105	0.091	0.095
44	Brazil	0.110	0.105	0.121	0.128	0.116	0.124	0.115	0.122	0.136	0.121	0.109	0.106	0.103	0.105	0.092	0.092
45	Kazakhstan	0.112	0.081	0.113	0.133	0.119	0.105	0.113	0.098	0.133	0.106	0.086	0.107	0.107	0.102	0.091	0.086
46	Peru	0.106	0.096	0.113	0.114	0.102	0.104	0.100	0.115	0.133	0.123	0.107	0.107	0.101	0.099	0.085	0.085
47	Russian Federation	0.080	0.074	0.085	0.104	0.102	0.110	0.129	0.133	0.147	0.121	0.109	0.107	0.105	0.094	0.089	0.081
48	Panama	0.122	0.106	0.128	0.125	0.106	0.108	0.096	0.082	0.096	0.110	0.093	0.085	0.090	0.086	0.075	0.080
49	Greece	0.144	0.121	0.138	0.142	0.123	0.138	0.115	0.133	0.121	0.096	0.099	0.100	0.097	0.092	0.075	0.080
50	South Africa	0.115	0.120	0.152	0.151	0.127	0.133	0.118	0.109	0.132	0.112	0.099	0.115	0.117	0.116	0.086	0.078
51	Mexico	0.096	0.089	0.107	0.113	0.097	0.099	0.096	0.098	0.112	0.100	0.093	0.091	0.090	0.088	0.074	0.075
52	El Salvador	0.068	0.076	0.087	0.093	0.082	0.083	0.085	0.087	0.103	0.087	0.076	0.074	0.072	0.072	0.063	0.070
53	Argentina	0.141	0.126	0.143	0.148	0.136	0.125	0.106	0.130	0.131	0.109	0.101	0.089	0.084	0.087	0.070	0.062
54	Turkey	0.077	0.065	0.076	0.078	0.069	0.070	0.061	0.069	0.083	0.071	0.063	0.071	0.068	0.068	0.058	0.060
55	Namibia	0.100	0.096	0.108	0.105	0.090	0.091	0.084	0.080	0.094	0.085	0.073	0.075	0.072	0.070	0.059	0.058
56	Jordan	0.111	0.091	0.120	0.114	0.097	0.095	0.091	0.088	0.101	0.096	0.082	0.078	0.076	0.066	0.062	0.058
57	Philippines	0.091	0.078	0.091	0.094	0.080	0.075	0.066	0.065	0.076	0.065	0.057	0.069	0.067	0.067	0.056	0.057
58	Paraguay	0.083	0.075	0.088	0.072	0.070	0.072	0.066	0.056	0.076	0.066	0.057	0.053	0.052	0.054	0.047	0.052
59	Albania	0.073	0.064	0.076	0.080	0.067	0.070	0.059	0.063	0.075	0.063	0.052	0.052	0.048	0.053	0.044	0.046
60	Egypt. Arab Rep.	0.090	0.079	0.091	0.095	0.081	0.088	0.079	0.078	0.081	0.075	0.063	0.059	0.056	0.052	0.042	0.044
61	Honduras	0.056	0.060	0.070	0.073	0.062	0.061	0.055	0.056	0.064	0.056	0.046	0.044	0.043	0.043	0.035	0.038
62	Indonesia	0.080	0.076	0.090	0.091	0.077	0.078	0.069	0.071	0.066	0.056	0.047	0.047	0.044	0.051	0.040	0.037
63	Armenia	0.091	0.080	0.087	0.094	0.077	0.079	0.063	0.070	0.084	0.071	0.055	0.041	0.025	0.034	0.036	0.035
	Mean	*0.247*	*0.228*	*0.245*	*0.252*	*0.235*	*0.243*	*0.234*	*0.241*	*0.264*	*0.239*	*0.230*	*0.235*	*0.221*	*0.224*	*0.206*	*0.208*
	Standard Deviation	*0.207*	*0.188*	*0.185*	*0.188*	*0.178*	*0.180*	*0.181*	*0.184*	*0.187*	*0.172*	*0.170*	*0.174*	*0.163*	*0.166*	*0.165*	*0.165*

Table 6 (continued)

Rank (2014)	Country/Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Maximum	*0.857*	*0.915*	*0.918*	*0.878*	*0.776*	*0.769*	*0.726*	*0.816*	*0.819*	*0.747*	*0.730*	*0.755*	*0.709*	*0.715*	*0.794*	*0.801*
	Minimum	*0.056*	*0.060*	*0.070*	*0.072*	*0.062*	*0.061*	*0.055*	*0.056*	*0.064*	*0.056*	*0.046*	*0.041*	*0.025*	*0.034*	*0.035*	*0.035*

Table 7 Sub-Index of Economic Capacity (1999–2014)

Rank (2014)	Country/Year	1999 (0.36)	2000 (0.37)	2001 (0.34)	2002 (0.35)	2003 (0.35)	2004 (0.36)	2005 (0.36)	2006 (0.38)	2007 (0.39)	2008 (0.38)	2009 (0.37)	2010 (0.38)	2011 (0.37)	2012 (0.37)	2013 (0.38)	2014 (0.38)
Group 1: High Financial Knowledge																	
1	Japan	0.889	0.886	0.889	0.886	0.887	0.886	0.884	0.873	0.869	0.867	0.867	0.869	0.864	0.869	0.869	0.866
2	Switzerland	0.935	0.932	0.935	0.932	0.929	0.925	0.921	0.919	0.923	0.927	0.933	0.931	0.930	0.934	0.932	0.929
3	Netherlands	0.910	0.912	0.917	0.916	0.911	0.910	0.909	0.904	0.904	0.908	0.910	0.905	0.902	0.903	0.902	0.897
Group 2: Medium-High Financial Knowledge																	
4	Denmark	0.897	0.897	0.900	0.900	0.897	0.898	0.895	0.891	0.887	0.892	0.896	0.899	0.895	0.896	0.894	0.891
5	Finland	0.885	0.886	0.891	0.889	0.888	0.890	0.885	0.879	0.883	0.887	0.887	0.885	0.883	0.882	0.878	0.873
6	Germany	0.895	0.889	0.895	0.893	0.893	0.891	0.885	0.878	0.877	0.880	0.884	0.886	0.890	0.893	0.891	0.891
7	Hong-Kong, SAR	0.885	0.887	0.889	0.887	0.892	0.899	0.905	0.901	0.903	0.904	0.909	0.914	0.914	0.917	0.915	0.915
8	United Kingdom	0.880	0.882	0.888	0.889	0.893	0.892	0.887	0.878	0.872	0.872	0.872	0.872	0.867	0.870	0.869	0.870
9	Canada	0.903	0.900	0.903	0.901	0.904	0.902	0.904	0.894	0.889	0.888	0.890	0.889	0.886	0.888	0.887	0.884
10	Sweden	0.900	0.900	0.901	0.899	0.901	0.901	0.894	0.891	0.893	0.894	0.894	0.895	0.894	0.896	0.892	0.889
Group 3: Medium-Low Financial Knowledge																	
11	Australia	0.889	0.884	0.888	0.889	0.892	0.891	0.888	0.878	0.878	0.878	0.896	0.886	0.887	0.889	0.892	0.889
12	Malta	0.825	0.835	0.836	0.837	0.837	0.832	0.829	0.820	0.821	0.825	0.832	0.836	0.832	0.836	0.838	0.838
13	Ireland	0.899	0.905	0.916	0.922	0.923	0.923	0.921	0.917	0.915	0.902	0.901	0.901	0.900	0.902	0.900	0.904
14	United States	0.939	0.935	0.937	0.934	0.937	0.936	0.935	0.924	0.919	0.916	0.919	0.917	0.913	0.917	0.913	0.913
15	Iceland	0.913	0.901	0.911	0.907	0.905	0.909	0.908	0.896	0.894	0.896	0.899	0.883	0.879	0.882	0.881	0.881
16	Croatia	0.736	0.742	0.749	0.756	0.764	0.767	0.768	0.772	0.779	0.786	0.787	0.780	0.784	0.786	0.784	0.781
17	Italy	0.890	0.888	0.892	0.889	0.888	0.881	0.876	0.869	0.867	0.869	0.873	0.870	0.867	0.866	0.858	0.854
18	Portugal	0.832	0.831	0.835	0.836	0.836	0.832	0.833	0.829	0.826	0.827	0.833	0.833	0.822	0.819	0.820	0.821

Table 7 (continued)

Rank (2014)	Country/Year	1999 (0.36)	2000 (0.37)	2001 (0.34)	2002 (0.35)	2003 (0.35)	2004 (0.36)	2005 (0.36)	2006 (0.38)	2007 (0.39)	2008 (0.38)	2009 (0.37)	2010 (0.38)	2011 (0.37)	2012 (0.37)	2013 (0.38)	2014 (0.38)
19	Norway	0.919	0.937	0.940	0.933	0.932	0.938	0.947	0.947	0.941	0.951	0.944	0.944	0.945	0.952	0.948	0.940
20	Austria	0.902	0.901	0.901	0.902	0.903	0.902	0.899	0.891	0.888	0.891	0.898	0.896	0.896	0.901	0.899	0.896
21	Estonia	0.712	0.721	0.734	0.747	0.763	0.770	0.784	0.791	0.802	0.803	0.795	0.798	0.809	0.817	0.818	0.819
22	Spain	0.850	0.852	0.860	0.864	0.865	0.863	0.863	0.862	0.861	0.861	0.864	0.856	0.848	0.848	0.844	0.843
23	Belgium	0.891	0.893	0.898	0.899	0.899	0.895	0.892	0.883	0.879	0.880	0.888	0.890	0.885	0.888	0.885	0.884
24	Korea. Rep.	0.819	0.824	0.832	0.839	0.840	0.842	0.843	0.836	0.838	0.838	0.844	0.849	0.845	0.848	0.844	0.844
25	Czech Rep.	0.808	0.806	0.818	0.817	0.825	0.827	0.827	0.823	0.828	0.833	0.839	0.834	0.832	0.833	0.833	0.837
26	Latvia	0.691	0.695	0.713	0.725	0.736	0.745	0.757	0.761	0.774	0.780	0.766	0.767	0.777	0.787	0.790	0.793
27	Slovenia	0.826	0.824	0.830	0.835	0.838	0.841	0.841	0.835	0.836	0.843	0.839	0.835	0.833	0.832	0.829	0.831
28	Cyprus	0.850	0.853	0.863	0.861	0.860	0.862	0.866	0.861	0.863	0.867	0.870	0.862	0.853	0.847	0.834	0.828
29	New Zealand	0.856	0.852	0.857	0.857	0.858	0.856	0.852	0.846	0.845	0.844	0.855	0.853	0.851	0.852	0.858	0.857
30	Luxembourg	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
31	Chile	0.720	0.728	0.733	0.732	0.738	0.742	0.747	0.760	0.763	0.756	0.760	0.773	0.781	0.788	0.789	0.787
32	Slovak Rep.	0.751	0.750	0.763	0.768	0.775	0.779	0.785	0.788	0.797	0.810	0.813	0.820	0.817	0.820	0.820	0.821
33	Israel	0.871	0.875	0.874	0.869	0.857	0.857	0.847	0.835	0.836	0.832	0.839	0.841	0.841	0.846	0.850	0.848
34	Lithuania	0.700	0.704	0.720	0.731	0.751	0.755	0.764	0.768	0.781	0.790	0.777	0.787	0.798	0.809	0.814	0.816
35	Bulgaria	0.651	0.659	0.671	0.684	0.693	0.700	0.711	0.712	0.723	0.736	0.740	0.743	0.743	0.747	0.745	0.747
36	Poland	0.740	0.740	0.746	0.749	0.753	0.758	0.757	0.755	0.762	0.772	0.786	0.794	0.798	0.804	0.803	0.804
Group 4: Low Financial Knowledge																	
37	Hungary	0.753	0.757	0.773	0.782	0.789	0.788	0.788	0.783	0.780	0.789	0.796	0.797	0.798	0.799	0.801	0.803
38	France	0.883	0.883	0.890	0.889	0.884	0.880	0.878	0.870	0.868	0.868	0.874	0.874	0.871	0.871	0.871	0.868
39	Malaysia	0.766	0.769	0.769	0.771	0.777	0.781	0.783	0.778	0.784	0.785	0.787	0.791	0.792	0.800	0.800	0.804
40		0.643	0.654	0.651	0.653	0.655	0.662	0.669	0.671	0.674	0.689	0.702	0.702	0.699	0.702	0.706	0.710

Table 7 (continued)

Rank (2014)	Country/Year	1999 (0.36)	2000 (0.37)	2001 (0.34)	2002 (0.35)	2003 (0.35)	2004 (0.36)	2005 (0.36)	2006 (0.38)	2007 (0.39)	2008 (0.38)	2009 (0.37)	2010 (0.38)	2011 (0.37)	2012 (0.37)	2013 (0.38)	2014 (0.38)
	Macedonia, FYR																
41	Thailand	0.681	0.681	0.687	0.692	0.702	0.706	0.710	0.707	0.710	0.712	0.718	0.726	0.723	0.735	0.734	0.733
42	Romania	0.648	0.646	0.663	0.672	0.683	0.700	0.703	0.716	0.729	0.754	0.758	0.764	0.764	0.771	0.771	0.773
43	Costa Rica	0.694	0.691	0.696	0.696	0.701	0.702	0.704	0.703	0.709	0.713	0.717	0.719	0.720	0.727	0.725	0.726
44	Brazil	0.714	0.713	0.715	0.715	0.715	0.719	0.719	0.714	0.717	0.722	0.728	0.735	0.735	0.738	0.738	0.735
45	Kazakhstan	0.682	0.693	0.715	0.727	0.741	0.751	0.761	0.764	0.771	0.773	0.779	0.784	0.788	0.795	0.797	0.799
46	Peru	0.629	0.627	0.628	0.632	0.637	0.641	0.647	0.648	0.655	0.666	0.672	0.680	0.683	0.692	0.695	0.695
47	Russian Federation	0.655	0.670	0.681	0.689	0.709	0.717	0.733	0.753	0.761	0.786	0.787	0.790	0.806	0.813	0.799	0.800
48	Panama	0.707	0.702	0.702	0.700	0.705	0.710	0.716	0.716	0.726	0.736	0.743	0.746	0.755	0.768	0.771	0.775
49	Greece	0.838	0.836	0.846	0.852	0.857	0.858	0.851	0.851	0.845	0.849	0.854	0.837	0.818	0.813	0.811	0.808
50	South Africa	0.690	0.689	0.694	0.695	0.699	0.700	0.704	0.701	0.703	0.705	0.708	0.708	0.707	0.710	0.708	0.706
51	Mexico	0.735	0.735	0.734	0.729	0.730	0.731	0.736	0.734	0.732	0.735	0.737	0.740	0.744	0.748	0.744	0.746
52	El Salvador	0.625	0.623	0.627	0.628	0.632	0.632	0.635	0.633	0.635	0.636	0.638	0.637	0.637	0.641	0.640	0.641
53	Argentina	0.766	0.757	0.750	0.727	0.739	0.748	0.757	0.756	0.763	0.767	0.764	0.774	0.777	0.776	0.774	0.766
54	Turkey	0.714	0.720	0.713	0.709	0.710	0.722	0.728	0.733	0.738	0.746	0.746	0.758	0.766	0.767	0.766	0.765
55	Namibia	0.618	0.615	0.617	0.620	0.626	0.640	0.640	0.640	0.645	0.646	0.651	0.654	0.655	0.661	0.663	0.667
56	Jordan	0.654	0.653	0.661	0.664	0.668	0.674	0.680	0.677	0.679	0.683	0.692	0.687	0.682	0.683	0.679	0.678
57	Philippines	0.557	0.557	0.561	0.561	0.567	0.572	0.576	0.574	0.579	0.583	0.589	0.595	0.596	0.605	0.610	0.615
58	Paraguay	0.626	0.615	0.613	0.608	0.613	0.614	0.614	0.611	0.614	0.621	0.619	0.634	0.635	0.633	0.647	0.651
59	Albania	0.580	0.586	0.601	0.607	0.616	0.622	0.627	0.631	0.638	0.653	0.669	0.678	0.680	0.684	0.679	0.685
60	Egypt. Arab Rep.	0.648	0.649	0.654	0.652	0.655	0.656	0.658	0.657	0.662	0.669	0.680	0.682	0.678	0.680	0.677	0.675

Table 7 (continued)

Rank (2014)	Country/Year	1999 (0.36)	2000 (0.37)	2001 (0.34)	2002 (0.35)	2003 (0.35)	2004 (0.36)	2005 (0.36)	2006 (0.38)	2007 (0.39)	2008 (0.38)	2009 (0.37)	2010 (0.38)	2011 (0.37)	2012 (0.37)	2013 (0.38)	2014 (0.38)
61	Honduras	0.524	0.526	0.530	0.531	0.536	0.541	0.547	0.547	0.552	0.555	0.555	0.556	0.557	0.563	0.563	0.565
62	Indonesia	0.606	0.607	0.613	0.616	0.622	0.625	0.631	0.629	0.633	0.640	0.651	0.656	0.659	0.668	0.671	0.675
63	Armenia	0.491	0.498	0.516	0.535	0.557	0.572	0.591	0.604	0.621	0.631	0.616	0.617	0.620	0.632	0.633	0.637
	Mean	*0.771*	*0.772*	*0.778*	*0.780*	*0.784*	*0.787*	*0.789*	*0.787*	*0.789*	*0.794*	*0.797*	*0.799*	*0.799*	*0.802*	*0.801*	*0.801*
	Standard Deviation	*0.121*	*0.120*	*0.119*	*0.117*	*0.113*	*0.111*	*0.108*	*0.104*	*0.102*	*0.099*	*0.099*	*0.097*	*0.095*	*0.094*	*0.093*	*0.091*
	Maximum	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
	Minimum	*0.491*	*0.498*	*0.516*	*0.531*	*0.536*	*0.541*	*0.547*	*0.547*	*0.552*	*0.555*	*0.555*	*0.556*	*0.557*	*0.563*	*0.563*	*0.565*

Table 8 Sub-Index of Educational Training (1999–2014)

Rank (2014)	Country/Year	1999 (0.22)	2000 (0.18)	2001 (0.25)	2002 (0.26)	2003 (0.24)	2004 (0.24)	2005 (0.23)	2006 (0.23)	2007 (0.24)	2008 (0.22)	2009 (0.23)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.23)	2014 (0.24)
Group 1: High Financial Knowledge																	
1	Japan	0.798	0.864	0.816	0.589	0.621	0.341	0.592	0.597	0.609	0.595	0.604	0.805	0.652	0.627	0.810	0.810
2	Switzerland	0.705	0.712	0.779	0.768	0.629	0.613	0.584	0.801	0.681	0.648	0.675	0.761	0.737	0.773	0.789	0.741
3	Netherlands	0.865	0.266	0.330	0.727	0.677	0.962	0.730	0.916	0.920	0.448	0.645	0.820	0.714	0.838	0.642	0.624
Group 2: Medium-High Financial Knowledge																	
4	Denmark	0.842	0.450	0.563	0.627	0.575	0.578	0.555	0.561	0.724	1.000	0.864	1.040	0.613	0.591	0.690	0.826
5	Finland	0.814	0.595	0.623	0.636	0.506	0.350	0.752	0.332	0.337	0.659	0.339	0.398	0.402	0.404	0.889	0.661
6	Germany	0.646	0.531	0.889	0.780	0.379	0.812	1.000	1.000	1.000	0.693	1.000	0.878	1.000	0.837	0.825	1.000
7	Hong-Kong, SAR	0.532	0.490	0.452	0.308	0.729	0.769	0.820	0.451	0.792	0.760	0.746	0.770	0.501	0.611	0.521	0.768
8	United Kingdom	0.924	0.505	0.524	0.706	0.624	0.670	0.842	0.667	0.689	0.739	0.758	0.550	0.516	1.000	1.000	0.479
9	Canada	0.811	0.544	0.536	0.540	0.832	0.633	0.687	0.641	0.656	0.704	0.672	0.725	0.688	0.684	0.817	0.821
10	Sweden	0.812	0.531	0.736	0.755	0.845	0.604	0.366	0.684	0.682	0.655	0.630	0.492	0.646	0.822	0.627	0.637
Group 3: Medium-Low Financial Knowledge																	
11	Australia	1.000	0.627	0.628	0.543	0.770	0.823	0.580	0.631	0.907	0.707	0.606	0.662	0.844	0.487	0.477	0.795
12	Malta	0.418	0.533	0.504	0.330	0.350	0.329	0.292	0.267	0.378	0.739	0.374	0.583	0.732	0.746	0.768	0.766
13	Ireland	0.773	0.647	0.634	0.620	0.691	0.934	0.680	0.376	0.385	0.820	0.772	0.855	0.815	0.767	0.613	0.864
14	United States	0.887	0.465	0.478	0.444	0.711	0.712	0.677	0.689	0.652	0.492	0.503	0.802	0.780	0.777	0.774	0.745
15	Iceland	0.712	0.795	0.693	0.650	0.771	0.728	0.740	0.744	0.816	0.744	0.781	0.838	0.856	0.506	0.724	0.451
16	Croatia	0.534	0.665	0.586	0.576	0.642	0.740	0.502	0.790	0.812	0.808	0.879	0.909	0.766	0.789	0.746	0.834
17	Italy	0.584	0.716	0.352	0.313	0.303	0.325	0.488	0.504	0.714	0.483	0.499	0.780	0.737	0.510	0.665	0.635
18	Portugal	0.581	0.431	0.426	0.448	0.295	0.281	0.248	0.505	0.609	0.734	0.755	0.708	0.653	0.643	0.644	0.647

Table 8 (continued)

Rank (2014)	Country/Year	1999 (0.22)	2000 (0.18)	2001 (0.25)	2002 (0.26)	2003 (0.24)	2004 (0.24)	2005 (0.23)	2006 (0.23)	2007 (0.24)	2008 (0.22)	2009 (0.23)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.23)	2014 (0.24)
19	Norway	0.915	0.606	1.000	0.610	0.682	0.684	0.634	0.578	0.694	0.909	0.905	0.761	0.744	0.747	0.868	0.496
20	Austria	0.529	0.425	0.303	0.416	0.347	0.793	0.797	0.825	0.755	0.738	0.758	0.808	0.720	0.779	0.757	0.820
21	Estonia	0.480	0.644	0.623	0.631	0.688	0.731	0.786	0.600	0.611	0.456	0.493	0.862	0.607	0.872	0.799	0.812
22	Spain	0.711	0.377	0.541	0.536	0.595	0.588	0.739	0.769	0.763	0.330	0.774	0.772	0.553	0.412	0.418	0.432
23	Belgium	0.598	0.367	0.673	0.775	0.463	0.779	0.754	0.945	0.753	0.742	0.461	0.797	0.710	0.706	0.778	0.711
24	Korea. Rep.	0.740	0.604	0.541	0.551	0.313	0.649	0.778	0.643	0.660	0.765	0.743	0.674	0.855	0.721	0.842	0.780
25	Czech Rep.	0.585	0.512	0.497	0.505	0.570	0.601	0.602	0.623	0.520	0.648	0.713	0.637	0.849	0.823	0.639	0.804
26	Latvia	0.730	0.603	0.641	0.554	0.905	0.410	0.637	0.901	0.804	0.791	0.820	0.679	0.631	0.892	0.750	0.778
27	Slovenia	0.648	0.789	0.542	0.346	0.898	0.664	0.633	0.642	0.625	0.657	0.769	0.744	0.487	0.768	0.821	0.786
28	Cyprus	0.350	0.694	0.382	0.690	0.799	0.744	0.725	0.814	0.465	0.446	0.785	0.543	0.707	0.424	0.875	0.874
29	New Zealand	0.932	0.631	0.601	0.553	0.620	0.683	0.477	0.718	0.480	0.890	0.892	0.560	0.585	0.589	0.808	0.652
30	Luxembourg	0.351	0.550	0.250	0.264	0.623	0.620	0.641	0.779	0.725	0.652	0.445	0.895	0.778	0.699	0.661	0.648
31	Chile	0.610	0.440	0.550	0.560	0.495	0.518	0.678	0.703	0.506	0.494	0.530	0.443	0.444	0.643	0.698	0.744
32	Slovak Rep.	0.660	0.700	0.682	0.697	0.768	0.454	0.903	0.783	0.947	0.930	0.788	0.659	0.819	0.797	0.786	0.817
33	Israel	0.793	1.000	0.637	1.000	1.000	1.000	0.657	0.688	0.577	0.547	0.614	0.941	0.889	0.589	0.827	0.701
34	Lithuania	0.651	0.814	0.491	0.381	0.473	0.668	0.686	0.765	0.811	0.682	0.796	0.844	0.811	0.800	0.464	0.875
35	Bulgaria	0.560	0.716	0.734	0.724	0.791	0.662	0.660	0.710	0.725	0.801	0.802	0.846	0.784	0.777	0.628	0.380
36	Poland	0.812	0.346	0.795	0.911	0.659	0.623	0.342	0.358	0.378	0.776	0.683	0.445	0.673	0.651	0.419	0.677
Group 4: Low Financial Knowledge																	
37	Hungary	0.725	0.755	0.782	0.403	0.906	0.913	0.818	0.819	0.798	0.360	0.651	0.699	0.435	0.670	0.465	0.762
38	France	0.847	0.619	0.689	0.680	0.793	0.812	0.747	0.765	0.778	0.778	0.779	0.806	0.778	0.837	0.823	0.772
39	Malaysia	0.449	0.747	0.353	0.500	0.543	0.602	0.576	0.648	0.497	0.383	0.372	0.550	0.501	0.535	0.514	0.708
40		0.359	0.454	0.470	0.509	0.594	0.693	0.679	0.506	0.725	0.762	0.776	0.576	0.529	0.547	0.543	0.550

Table 8 (continued)

Rank (2014)	Country/Year	1999 (0.22)	2000 (0.18)	2001 (0.25)	2002 (0.26)	2003 (0.24)	2004 (0.24)	2005 (0.23)	2006 (0.23)	2007 (0.24)	2008 (0.22)	2009 (0.23)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.23)	2014 (0.24)
	Macedonia, FYR																
41	Thailand	0.405	0.290	0.318	0.564	0.625	0.604	0.566	0.554	0.560	0.582	0.596	0.633	0.630	0.281	0.279	0.642
42	Romania	0.575	0.699	0.635	0.834	0.756	0.761	0.765	0.829	0.849	0.872	0.824	0.849	0.763	0.733	0.388	0.459
43	Costa Rica	0.584	0.499	0.700	0.695	0.671	0.649	0.628	0.607	0.649	0.757	0.703	0.757	0.728	0.733	0.734	0.756
44	Brazil	0.327	0.525	0.533	0.543	0.611	0.611	0.582	0.603	0.586	0.587	0.556	0.538	0.501	0.557	0.599	0.625
45	Kazakhstan	0.655	0.242	0.592	0.815	0.994	0.488	0.926	0.474	0.952	0.652	0.385	0.969	0.909	0.776	0.768	0.546
46	Peru	0.580	0.678	0.501	0.474	0.493	0.459	0.459	0.686	0.722	0.891	0.718	0.741	0.688	0.676	0.705	0.690
47	Russian Federation	0.714	0.569	0.345	0.544	0.623	0.812	0.929	0.931	0.782	0.902	0.831	0.915	0.857	0.478	0.773	0.443
48	Panama	0.569	0.543	0.751	0.705	0.799	0.768	0.755	0.270	0.318	0.747	0.551	0.423	0.555	0.525	0.538	0.709
49	Greece	0.491	0.390	0.478	0.472	0.516	0.648	0.331	0.530	0.605	0.310	0.652	0.683	0.644	0.645	0.495	0.667
50	South Africa	0.399	0.493	0.716	0.710	0.747	0.776	0.772	0.562	0.795	0.765	0.748	0.789	0.778	0.796	0.467	0.529
51	Mexico	0.453	0.485	0.510	0.491	0.558	0.565	0.651	0.685	0.703	0.731	0.839	0.818	0.738	0.693	0.625	0.619
52	El Salvador	0.109	0.300	0.320	0.342	0.388	0.347	0.462	0.484	0.521	0.410	0.421	0.458	0.426	0.458	0.463	0.574
53	Argentina	0.389	0.305	0.411	0.458	0.682	0.508	0.320	0.796	0.538	0.488	0.727	0.538	0.518	0.712	0.697	0.548
54	Turkey	0.327	0.373	0.386	0.375	0.516	0.471	0.339	0.484	0.495	0.517	0.509	0.579	0.570	0.541	0.509	0.491
55	Namibia	0.352	0.454	0.449	0.428	0.464	0.459	0.464	0.379	0.472	0.562	0.551	0.570	0.547	0.553	0.557	0.478
56	Jordan	0.622	0.583	0.904	0.684	0.712	0.518	0.498	0.520	0.509	0.733	0.740	0.753	0.677	0.450	0.689	0.487
57	Philippines	0.507	0.604	0.609	0.612	0.749	0.537	0.497	0.472	0.522	0.521	0.535	0.841	0.801	0.755	0.714	0.696
58	Paraguay	0.344	0.540	0.557	0.243	0.484	0.497	0.492	0.243	0.490	0.496	0.531	0.620	0.608	0.651	0.683	0.686
59	Albania	0.435	0.728	0.732	0.711	0.783	0.790	0.538	0.738	0.730	0.540	0.496	0.552	0.411	0.539	0.509	0.489
60	Egypt. Arab Rep.	0.426	0.519	0.517	0.507	0.555	0.529	0.523	0.535	0.395	0.505	0.493	0.500	0.464	0.441	0.421	0.410

Table 8 (continued)

Rank (2014)	Country/Year	1999 (0.22)	2000 (0.18)	2001 (0.25)	2002 (0.26)	2003 (0.24)	2004 (0.24)	2005 (0.23)	2006 (0.23)	2007 (0.24)	2008 (0.22)	2009 (0.23)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.23)	2014 (0.24)
61	Honduras	0.147	0.449	0.446	0.441	0.484	0.459	0.447	0.455	0.464	0.487	0.486	0.510	0.486	0.481	0.488	0.512
62	Indonesia	0.284	0.522	0.546	0.557	0.641	0.650	0.556	0.595	0.248	0.233	0.266	0.301	0.286	0.612	0.484	0.279
63	Armenia	0.646	0.797	0.547	0.679	0.766	0.797	0.440	0.742	0.802	0.804	0.871	0.827	0.784	0.754	0.702	0.791
	Mean	*0.597*	*0.561*	*0.569*	*0.572*	*0.636*	*0.632*	*0.619*	*0.633*	*0.646*	*0.652*	*0.658*	*0.700*	*0.665*	*0.659*	*0.659*	*0.664*
	Standard Deviation	*0.199*	*0.156*	*0.159*	*0.159*	*0.166*	*0.163*	*0.167*	*0.172*	*0.169*	*0.169*	*0.162*	*0.160*	*0.149*	*0.145*	*0.152*	*0.148*
	Maximum	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
	Minimum	*0.109*	*0.242*	*0.250*	*0.243*	*0.295*	*0.281*	*0.248*	*0.243*	*0.248*	*0.233*	*0.266*	*0.301*	*0.286*	*0.281*	*0.279*	*0.279*

Table 9 Sub-Index of Use (1999–2014)

Rank (2014)	Country/Year	1999 (0.19)	2000 (0.20)	2001 (0.19)	2002 (0.18)	2003 (0.19)	2004 (0.19)	2005 (0.17)	2006 (0.17)	2007 (0.14)	2008 (0.17)	2009 (0.16)	2010 (0.17)	2011 (0.16)	2012 (0.15)	2013 (0.14)	2014 (0.13)
Group 1: High Financial Knowledge																	
1	Japan	0.252	0.260	0.275	0.263	0.178	0.270	0.304	0.271	0.388	0.320	0.290	0.241	0.268	0.254	0.396	0.409
2	Switzerland	0.749	1.000	1.000	0.816	0.642	0.574	0.572	0.647	0.811	0.557	0.520	0.495	0.522	0.513	0.517	0.511
3	Netherlands	0.888	0.708	0.598	0.641	0.505	0.501	0.844	0.809	1.000	0.710	0.691	0.643	0.669	0.740	0.751	0.708
Group 2: Medium-High Financial Knowledge																	
4	Denmark	0.474	0.477	0.369	0.607	0.687	0.685	0.725	0.783	0.818	0.558	0.537	0.520	0.593	0.697	0.750	0.825
5	Finland	0.385	0.312	0.256	0.370	0.326	0.308	0.319	0.380	0.449	0.276	0.275	0.324	0.318	0.361	0.382	0.410
6	Germany	0.243	0.275	0.194	0.292	0.261	0.306	0.332	0.318	0.394	0.319	0.267	0.255	0.246	0.250	0.258	0.275
7	Hong-Kong, SAR	0.222	0.212	0.264	0.216	0.267	0.288	0.266	0.319	0.551	0.356	0.437	0.441	0.402	0.417	0.426	0.567
8	United Kingdom	0.312	0.272	0.266	0.546	0.516	0.428	0.494	0.401	0.611	0.490	0.556	0.495	0.500	0.543	0.585	0.600
9	Canada	0.547	0.672	0.654	0.418	0.305	0.254	0.284	0.253	0.300	0.217	0.230	0.191	0.220	0.214	0.240	0.262
10	Sweden	1.000	0.751	0.687	1.000	1.000	1.000	1.000	1.000	0.831	0.797	0.823	0.659	0.710	0.733	0.752	0.683
Group 3: Medium-Low Financial Knowledge																	
11	Australia	0.647	0.532	0.460	0.319	0.222	0.193	0.187	0.183	0.244	0.169	0.163	0.139	0.155	0.145	0.169	0.174
12	Malta	0.037	0.039	0.037	0.053	0.041	0.040	0.052	0.044	0.067	0.059	0.068	0.067	0.082	0.067	0.056	0.053
13	Ireland	0.129	0.150	0.148	0.114	0.125	0.120	0.147	0.298	0.479	0.405	0.427	0.458	0.625	0.736	0.817	0.950
14	United States	0.546	0.459	0.388	0.368	0.282	0.259	0.270	0.243	0.372	0.232	0.173	0.155	0.145	0.169	0.139	0.144
15	Iceland	0.259	0.180	0.138	0.219	0.479	0.502	0.621	0.734	0.983	0.379	0.351	0.244	0.247	0.248	0.247	0.232
16	Croatia	0.023	0.018	0.019	0.019	0.015	0.017	0.017	0.018	0.028	0.022	0.021	0.023	0.026	0.028	0.030	0.033
17	Italy	0.122	0.148	0.122	0.081	0.054	0.054	0.053	0.052	0.064	0.054	0.053	0.055	0.057	0.059	0.065	0.078
18	Portugal	0.107	0.076	0.056	0.040	0.046	0.041	0.046	0.047	0.065	0.053	0.051	0.051	0.054	0.063	0.063	0.068

Table 9 (continued)

Rank (2014)	Country/Year	1999 (0.19)	2000 (0.20)	2001 (0.19)	2002 (0.18)	2003 (0.19)	2004 (0.19)	2005 (0.17)	2006 (0.17)	2007 (0.14)	2008 (0.17)	2009 (0.16)	2010 (0.17)	2011 (0.16)	2012 (0.15)	2013 (0.14)	2014 (0.13)
19	Norway	0.652	0.683	0.752	0.690	0.592	0.498	0.545	0.509	0.776	0.619	0.783	0.710	0.674	0.738	0.776	0.883
20	Austria	0.223	0.266	0.216	0.120	0.103	0.138	0.151	0.165	0.229	0.181	0.157	0.146	0.162	0.168	0.160	0.154
21	Estonia	0.076	0.097	0.070	0.063	0.047	0.052	0.067	0.066	0.088	0.048	0.060	0.061	0.061	0.063	0.063	0.068
22	Spain	0.053	0.066	0.060	0.044	0.074	0.071	0.074	0.069	0.090	0.075	0.066	0.063	0.070	0.073	0.081	0.097
23	Belgium	0.148	0.279	0.202	0.278	0.216	0.209	0.213	0.219	0.319	0.242	0.235	0.249	0.334	0.321	0.326	0.374
24	Korea. Rep.	0.186	0.321	0.359	0.268	0.218	0.229	0.208	0.219	0.288	0.243	0.206	0.186	0.200	0.199	0.215	0.247
25	Czech Rep.	0.035	0.031	0.029	0.035	0.034	0.029	0.028	0.038	0.052	0.054	0.045	0.044	0.045	0.048	0.045	0.054
26	Latvia	0.018	0.014	0.011	0.014	0.010	0.011	0.013	0.015	0.020	0.018	0.020	0.024	0.025	0.027	0.025	0.022
27	Slovenia	0.046	0.037	0.055	0.036	0.028	0.034	0.042	0.052	0.076	0.051	0.053	0.057	0.053	0.054	0.058	0.054
28	Cyprus	0.091	0.075	0.064	0.073	0.047	0.043	0.035	0.034	0.044	0.030	0.037	0.033	0.039	0.055	0.064	0.060
29	New Zealand	0.255	0.246	0.278	0.214	0.144	0.119	0.107	0.123	0.140	0.083	0.113	0.093	0.086	0.090	0.090	0.095
30	Luxembourg	0.248	0.232	0.374	0.291	0.427	0.620	0.677	0.633	0.992	1.000	1.000	1.000	1.000	1.000	1.000	1.000
31	Chile	0.034	0.075	0.062	0.051	0.044	0.039	0.040	0.037	0.049	0.035	0.041	0.040	0.050	0.055	0.058	0.067
32	Slovak Rep.	0.025	0.022	0.019	0.039	0.032	0.033	0.030	0.027	0.036	0.040	0.040	0.040	0.039	0.040	0.037	0.038
33	Israel	0.090	0.095	0.052	0.035	0.026	0.025	0.026	0.025	0.072	0.086	0.088	0.093	0.099	0.104	0.099	0.122
34	Lithuania	0.013	0.011	0.009	0.011	0.010	0.010	0.012	0.016	0.024	0.019	0.021	0.019	0.018	0.019	0.017	0.019
35	Bulgaria	0.016	0.012	0.010	0.008	0.006	0.006	0.006	0.008	0.013	0.011	0.011	0.010	0.009	0.009	0.009	0.011
36	Poland	0.025	0.020	0.018	0.025	0.020	0.022	0.025	0.028	0.040	0.035	0.031	0.028	0.027	0.026	0.024	0.026
Group 4: Low Financial Knowledge																	
37	Hungary	0.028	0.020	0.025	0.019	0.015	0.017	0.024	0.030	0.047	0.045	0.042	0.039	0.037	0.037	0.033	0.037
38	France	0.089	0.092	0.143	0.112	0.099	0.096	0.106	0.109	0.321	0.291	0.254	0.285	0.289	0.342	0.332	0.362
39	Malaysia	0.076	0.087	0.078	0.067	0.047	0.049	0.054	0.053	0.075	0.058	0.052	0.042	0.052	0.059	0.039	0.050
40		0.015	0.011	0.010	0.017	0.012	0.012	0.011	0.010	0.010	0.011	0.008	0.006	0.008	0.008	0.010	0.011

Table 9 (continued)

Rank (2014)	Country/Year	1999 (0.19)	2000 (0.20)	2001 (0.19)	2002 (0.18)	2003 (0.19)	2004 (0.19)	2005 (0.17)	2006 (0.17)	2007 (0.14)	2008 (0.17)	2009 (0.16)	2010 (0.17)	2011 (0.16)	2012 (0.15)	2013 (0.14)	2014 (0.13)
	Macedonia, FYR																
41	Thailand	0.018	0.014	0.013	0.012	0.009	0.008	0.010	0.009	0.012	0.010	0.008	0.007	0.009	0.009	0.009	0.012
42	Romania	0.013	0.009	0.007	0.006	0.005	0.005	0.006	0.006	0.009	0.008	0.007	0.006	0.006	0.006	0.005	0.005
43	Costa Rica	0.014	0.010	0.007	0.006	0.004	0.004	0.004	0.004	0.006	0.006	0.006	0.008	0.010	0.011	0.008	0.011
44	Brazil	0.016	0.012	0.010	0.011	0.009	0.010	0.010	0.012	0.016	0.015	0.014	0.012	0.014	0.015	0.015	0.016
45	Kazakhstan	0.012	0.007	0.006	0.005	0.004	0.003	0.003	0.003	0.004	0.005	0.004	0.005	0.009	0.009	0.013	0.017
46	Peru	0.016	0.013	0.015	0.012	0.010	0.010	0.011	0.011	0.016	0.016	0.013	0.012	0.013	0.013	0.012	0.013
47	Russian Federation	0.014	0.010	0.008	0.007	0.006	0.006	0.005	0.005	0.007	0.005	0.004	0.003	0.003	0.004	0.003	0.004
48	Panama	0.023	0.020	0.015	0.011	0.008	0.007	0.006	0.007	0.009	0.012	0.010	0.008	0.009	0.008	0.008	0.008
49	Greece	0.034	0.025	0.020	0.017	0.013	0.013	0.014	0.017	0.024	0.019	0.016	0.014	0.018	0.018	0.020	0.022
50	South Africa	0.042	0.032	0.025	0.017	0.012	0.011	0.009	0.008	0.009	0.008	0.006	0.015	0.028	0.038	0.048	0.054
51	Mexico	0.014	0.012	0.010	0.010	0.007	0.006	0.007	0.006	0.008	0.007	0.006	0.005	0.007	0.007	0.007	0.007
52	El Salvador	0.013	0.008	0.007	0.006	0.004	0.004	0.003	0.003	0.004	0.004	0.003	0.002	0.002	0.002	0.002	0.002
53	Argentina	0.020	0.018	0.015	0.011	0.007	0.006	0.006	0.005	0.006	0.005	0.004	0.003	0.004	0.004	0.004	0.005
54	Turkey	0.014	0.009	0.008	0.007	0.005	0.004	0.005	0.005	0.008	0.005	0.003	0.005	0.005	0.006	0.005	0.007
55	Namibia	0.014	0.014	0.012	0.009	0.007	0.006	0.006	0.005	0.006	0.006	0.004	0.005	0.005	0.005	0.004	0.005
56	Jordan	0.018	0.011	0.010	0.008	0.007	0.007	0.007	0.006	0.009	0.008	0.005	0.004	0.005	0.005	0.004	0.005
57	Philippines	0.015	0.011	0.009	0.008	0.006	0.005	0.004	0.004	0.005	0.004	0.003	0.005	0.006	0.007	0.007	0.008
58	Paraguay	0.012	0.008	0.006	0.005	0.003	0.003	0.003	0.002	0.003	0.003	0.002	0.001	0.001	0.001	0.001	0.002
59	Albania	0.012	0.008	0.006	0.005	0.003	0.003	0.003	0.003	0.004	0.004	0.003	0.002	0.002	0.003	0.002	0.003
60	Egypt. Arab Rep.	0.013	0.009	0.007	0.007	0.005	0.007	0.006	0.005	0.007	0.006	0.004	0.003	0.003	0.002	0.002	0.003

Table 9 (continued)

Rank (2014)	Country/Year	1999 (0.19)	2000 (0.20)	2001 (0.19)	2002 (0.18)	2003 (0.19)	2004 (0.19)	2005 (0.17)	2006 (0.17)	2007 (0.14)	2008 (0.17)	2009 (0.16)	2010 (0.17)	2011 (0.16)	2012 (0.15)	2013 (0.14)	2014 (0.13)
61	Honduras	0.013	0.009	0.007	0.006	0.005	0.004	0.004	0.003	0.005	0.004	0.002	0.002	0.002	0.002	0.001	0.001
62	Indonesia	0.012	0.008	0.007	0.005	0.004	0.003	0.003	0.003	0.004	0.004	0.002	0.002	0.002	0.002	0.001	0.002
63	Armenia	0.010	0.007	0.005	0.004	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000
	Mean	*0.155*	*0.153*	*0.144*	*0.144*	*0.132*	*0.132*	*0.145*	*0.150*	*0.197*	*0.149*	*0.150*	*0.141*	*0.149*	*0.158*	*0.165*	*0.175*
	Standard Deviation	*0.231*	*0.224*	*0.216*	*0.222*	*0.210*	*0.209*	*0.233*	*0.237*	*0.291*	*0.224*	*0.231*	*0.216*	*0.225*	*0.240*	*0.252*	*0.265*
	Maximum	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
	Minimum	*0.010*	*0.007*	*0.005*	*0.004*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*

Table 10 Sub-Index of Need (1999–2014)

Rank (2014)	Country/Year	1999 (0.24)	2000 (0.25)	2001 (0.22)	2002 (0.21)	2003 (0.22)	2004 (0.21)	2005 (0.23)	2006 (0.23)	2007 (0.23)	2008 (0.23)	2009 (0.24)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.25)	2014 (0.25)
Group 1: High Financial Knowledge																	
1	Japan	0.493	0.544	0.632	0.972	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	Switzerland	1.000	1.000	1.000	1.000	0.861	0.950	0.738	0.808	0.813	0.745	0.670	0.724	0.546	0.533	0.421	0.389
3	Netherlands	0.552	0.520	0.496	0.419	0.351	0.366	0.313	0.311	0.292	0.296	0.239	0.263	0.287	0.298	0.242	0.285
Group 2: Medium-High Financial Knowledge																	
4	Denmark	0.399	0.350	0.332	0.280	0.224	0.231	0.191	0.176	0.165	0.201	0.166	0.184	0.182	0.159	0.114	0.123
5	Finland	0.314	0.363	0.443	0.467	0.412	0.472	0.368	0.404	0.385	0.316	0.318	0.334	0.153	0.161	0.141	0.145
6	Germany	0.103	0.103	0.108	0.113	0.112	0.151	0.188	0.210	0.214	0.243	0.216	0.211	0.192	0.184	0.116	0.116
7	Hong-Kong, SAR	0.061	0.075	0.095	0.108	0.100	0.137	0.128	0.148	0.166	0.171	0.145	0.158	0.145	0.135	0.109	0.097
8	United Kingdom	0.687	0.628	0.600	0.495	0.437	0.447	0.358	0.379	0.300	0.202	0.209	0.202	0.181	0.164	0.131	0.121
9	Canada	0.225	0.226	0.232	0.205	0.176	0.186	0.160	0.165	0.155	0.143	0.117	0.123	0.111	0.098	0.080	0.078
10	Sweden	0.132	0.121	0.117	0.098	0.090	0.097	0.097	0.100	0.096	0.076	0.077	0.079	0.063	0.057	0.047	0.046
Group 3: Medium-Low Financial Knowledge																	
11	Australia	0.187	0.188	0.197	0.175	0.148	0.162	0.139	0.140	0.138	0.115	0.089	0.083	0.070	0.062	0.049	0.045
12	Malta	0.004	0.004	0.005	0.004	0.004	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.023	0.041	0.073
13	Ireland	0.107	0.101	0.098	0.083	0.072	0.071	0.053	0.052	0.044	0.034	0.027	0.025	0.019	0.017	0.013	0.011
14	United States	0.222	0.204	0.195	0.161	0.137	0.135	0.106	0.097	0.088	0.077	0.059	0.058	0.052	0.044	0.035	0.034
15	Iceland	0.144	0.142	0.145	0.131	0.112	0.116	0.097	0.093	0.083	0.079	0.057	0.055	0.050	0.042	0.032	0.028
16	Croatia	0.007	0.010	0.015	0.018	0.027	0.043	0.046	0.054	0.059	0.057	0.051	0.059	0.057	0.059	0.050	0.052
17	Italy	0.008	0.033	0.064	0.069	0.058	0.059	0.043	0.046	0.046	0.042	0.040	0.040	0.034	0.037	0.030	0.029
18	Portugal	0.190	0.200	0.213	0.225	0.186	0.161	0.131	0.144	0.136	0.110	0.097	0.079	0.042	0.046	0.035	0.033

Table 10 (continued)

Rank (2014)	Country/Year	1999 (0.24)	2000 (0.25)	2001 (0.22)	2002 (0.21)	2003 (0.22)	2004 (0.21)	2005 (0.23)	2006 (0.23)	2007 (0.23)	2008 (0.23)	2009 (0.24)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.25)	2014 (0.25)
19	Norway	0.081	0.064	0.052	0.046	0.039	0.040	0.030	0.027	0.025	0.020	0.016	0.015	0.012	0.011	0.009	0.008
20	Austria	0.058	0.056	0.057	0.050	0.045	0.047	0.040	0.038	0.035	0.032	0.028	0.028	0.024	0.020	0.015	0.013
21	Estonia	0.002	0.002	0.002	0.005	0.011	0.025	0.026	0.036	0.042	0.037	0.042	0.039	0.027	0.030	0.022	0.021
22	Spain	0.148	0.168	0.190	0.183	0.145	0.142	0.111	0.104	0.091	0.082	0.060	0.055	0.046	0.038	0.028	0.026
23	Belgium	0.073	0.067	0.062	0.048	0.039	0.039	0.033	0.029	0.026	0.019	0.015	0.015	0.012	0.010	0.007	0.007
24	Korea. Rep.	0.008	0.008	0.009	0.008	0.007	0.007	0.006	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006
25	Czech Rep.	0.017	0.026	0.037	0.033	0.029	0.032	0.028	0.027	0.027	0.030	0.024	0.024	0.022	0.020	0.016	0.013
26	Latvia	0.005	0.005	0.006	0.009	0.010	0.014	0.015	0.017	0.020	0.033	0.047	0.053	0.044	0.037	0.027	0.021
27	Slovenia	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.035	0.033	0.028	0.029	0.026	0.020	0.013	0.012
28	Cyprus	0.003	0.003	0.012	0.016	0.017	0.020	0.018	0.019	0.020	0.023	0.017	0.017	0.015	0.013	0.010	0.009
29	New Zealand	0.065	0.059	0.056	0.046	0.033	0.033	0.026	0.024	0.021	0.023	0.014	0.016	0.015	0.013	0.010	0.009
30	Luxembourg	0.030	0.029	0.030	0.028	0.022	0.002	0.006	0.005	0.004	0.004	0.006	0.005	0.004	0.004	0.002	0.002
31	Chile	0.038	0.039	0.042	0.040	0.033	0.034	0.027	0.026	0.026	0.025	0.020	0.019	0.017	0.014	0.010	0.009
32	Slovak Rep.	0.002	0.002	0.003	0.002	0.002	0.004	0.004	0.012	0.015	0.002	0.016	0.016	0.016	0.014	0.010	0.009
33	Israel	0.038	0.037	0.037	0.035	0.027	0.026	0.021	0.019	0.017	0.018	0.013	0.013	0.010	0.008	0.006	0.005
34	Lithuania	0.004	0.005	0.005	0.005	0.004	0.005	0.007	0.010	0.013	0.017	0.020	0.021	0.018	0.016	0.012	0.011
35	Bulgaria	0.004	0.010	0.017	0.023	0.026	0.036	0.035	0.039	0.048	0.039	0.038	0.043	0.040	0.039	0.034	0.033
36	Poland	0.004	0.015	0.026	0.035	0.037	0.046	0.046	0.053	0.051	0.048	0.039	0.042	0.035	0.032	0.025	0.010
Group 4: Low Financial Knowledge																	
37	Hungary	0.034	0.045	0.058	0.062	0.059	0.070	0.067	0.073	0.083	0.081	0.074	0.078	0.015	0.012	0.008	0.007
38	France	0.024	0.022	0.022	0.019	0.015	0.013	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
39	Malaysia	0.012	0.012	0.013	0.012	0.009	0.009	0.007	0.007	0.006	0.006	0.004	0.004	0.004	0.003	0.002	0.002
40		0.004	0.004	0.004	0.005	0.004	0.004	0.003	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.004	0.004

Table 10 (continued)

Rank (2014)	Country/Year	1999 (0.24)	2000 (0.25)	2001 (0.22)	2002 (0.21)	2003 (0.22)	2004 (0.21)	2005 (0.23)	2006 (0.23)	2007 (0.23)	2008 (0.23)	2009 (0.24)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.25)	2014 (0.25)
	Macedonia, FYR																
41	Thailand	0.012	0.012	0.013	0.012	0.010	0.010	0.008	0.008	0.007	0.008	0.006	0.005	0.005	0.004	0.003	0.003
42	Romania	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.002	0.003	0.004	0.004	0.004	0.004	0.004
43	Costa Rica	0.005	0.006	0.008	0.009	0.008	0.007	0.006	0.006	0.006	0.006	0.004	0.004	0.004	0.003	0.002	0.002
44	Brazil	0.011	0.011	0.012	0.011	0.009	0.009	0.007	0.007	0.007	0.006	0.005	0.004	0.004	0.003	0.002	0.002
45	Kazakhstan	0.009	0.010	0.012	0.014	0.012	0.014	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.001
46	Peru	0.007	0.007	0.008	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.004	0.004	0.003	0.002	0.002	0.001
47	Russian Federation	0.002	0.003	0.005	0.006	0.007	0.006	0.012	0.012	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.003
48	Panama	0.008	0.007	0.007	0.007	0.005	0.005	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
49	Greece	0.010	0.010	0.010	0.011	0.008	0.009	0.008	0.007	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001
50	South Africa	0.006	0.009	0.011	0.012	0.009	0.009	0.007	0.007	0.006	0.006	0.004	0.004	0.003	0.002	0.001	0.001
51	Mexico	0.005	0.006	0.007	0.007	0.005	0.005	0.004	0.004	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
52	El Salvador	0.006	0.007	0.008	0.009	0.008	0.008	0.007	0.007	0.006	0.007	0.005	0.005	0.004	0.003	0.002	0.002
53	Argentina	0.020	0.022	0.023	0.026	0.020	0.017	0.013	0.012	0.010	0.009	0.006	0.005	0.003	0.002	0.001	0.001
54	Turkey	0.003	0.002	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001
55	Namibia	0.010	0.009	0.009	0.008	0.006	0.006	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001
56	Jordan	0.007	0.006	0.007	0.007	0.005	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001
57	Philippines	0.005	0.005	0.005	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
58	Paraguay	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
59	Albania	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
60	Egypt. Arab Rep.	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000

Table 10 (continued)

Rank (2014)	Country/Year	1999 (0.24)	2000 (0.25)	2001 (0.22)	2002 (0.21)	2003 (0.22)	2004 (0.21)	2005 (0.23)	2006 (0.23)	2007 (0.23)	2008 (0.23)	2009 (0.24)	2010 (0.23)	2011 (0.24)	2012 (0.24)	2013 (0.25)	2014 (0.25)
61	Honduras	0.002	0.002	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
62	Indonesia	0.005	0.005	0.005	0.005	0.004	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
63	Armenia	0.007	0.007	0.007	0.007	0.005	0.005	0.003	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001
	Mean	*0.090*	*0.090*	*0.094*	*0.094*	*0.084*	*0.089*	*0.077*	*0.080*	*0.078*	*0.073*	*0.066*	*0.068*	*0.058*	*0.056*	*0.048*	*0.047*
	Standard Deviation	*0.182*	*0.179*	*0.182*	*0.196*	*0.181*	*0.190*	*0.168*	*0.174*	*0.172*	*0.164*	*0.157*	*0.162*	*0.148*	*0.147*	*0.139*	*0.139*
	Maximum	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
	Minimum	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.001*	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*

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