# COMPARATIVE ANALYSIS OF THE LEVELS OF FINANCIAL LITERACY AMONG STUDENTS IN THE U.S., BELARUS, AND JAPAN

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## ABSTRACT

*This paper examines levels of financial literacy across students in the US, Belarus, and Japan. A cross country comparative analysis of the levels of financial literacy was conducted using descriptive statistics, correlation analysis, and hypothesis testing. We find that Japanese students, overall, outscored all others in the sample regardless of coursework in personal finance or grade level. Belarusian high school students performed on a par with US high school students without a separate personal finance class and both were outscored by Belarusian college students.*

*Students across all three nations demonstrated highest achievement on the topic of Earning Income and lowest achievement on the topic of Saving.*

*Results by cognitive levels demonstrate that both Belarusian and Japanese students performed better at the knowledge level while American students generally scored higher at the application level.*

## INTRODUCTION

Financial literacy is very important for any society to be successful and competitive in a global community. Financially and economically literate people will make informed decisions as consumers, producers, investors, and citizens. This topic becomes especially urgent in times of economic and financial turmoil and uncertainty. It's a well known fact that lack of financial knowledge and skills have contributed to the latest economic and financial crisis. Many people, young in particular, have limited understanding of such important personal finance topics as budgeting, investment, credit, and spending which leads to making wrong financial decisions and aggravating the crises. These issues are wide spread all over the world, as well as in Belarus, and we find it interesting to conduct research on the status of financial education and the level of personal finance knowledge and skills. In particular, we wish to examine the skill level across

countries as compared to Belarus in order to raise awareness of the importance of education on these vital financial issues.

Evidently, effective management of money and finances requires special training. Economic and personal finance education is highly debated in developed countries. There is much research (see Mandell 1998, 2002, 2004; Fetterman and Hansen, 2006; Walstad and Rebeck, 2005; Jump$tart Coalition for Personal Finance, 2008; Orton, 2007 among others) that suggests there is an urgent need for wide-ranging financial training and education of the general public. Numerous educational and business organizations put their forces together to develop personal finance curricula for secondary and college levels and try to disseminate the materials that can help teach young people to be financially literate, to make better decisions about earning income, managing finances, spending and saving, borrowing and investing.

The authors collected baseline information on financial literacy among both high school and college students in Belarus, a country with transitional economy and an underdeveloped financial sector, using existing test instruments and methods and, then, compare those results with results from the U.S. and Japan.

## LITERATURE REVIEW

The need for personal finance education has been identified in many countries and is well-documented by current research in the field. For instance, it is widely reported that many young people do not feel prepared for the financial challenges they will face, such as financing their education, buying a car, using credit, saving and investing, or purchasing a home. Recent analysis shows that sixty percent of young people in their 20s "feel they're facing tougher financial pressures than young people did in previous generations. And thirty percent say they worry frequently about their debt" (www.nefe.org). High credit card debt and relatively low savings rates have become a national concern in many developed, as well as developing, countries.

U.S. President's Advisory Council on Financial Literacy (2009) summarized the results of multiple surveys and tests on financial knowledge and reported consistently low average performance of teenagers. Jump$tart coalition (2008) also reported the lowest scores of 48.3% demonstrated by the $12^{th}$ graders for over a decade of testing in personal finance.

Even a brief overview of the previously conducted research on the topic demonstrates the evidence of palpable lack of financial competency among the young people in various countries. For example, Larry Orton (2007) provides a thorough overview of the major reasons for increased importance of financial education such as, changing demographics, growing complexity of the financial sector, declining personal savings along with rising indebtedness. International experience drawn on such countries as United Kingdom, the United States, and Australia shows similarities in poor results on recently conducted surveys to evaluate personal finance literacy. They also proved existing correlation between the levels of education and

income as well as overall overestimation of the level of personal finance knowledge by the majority of respondents (Orton, 2007).

## RESEARCH INSTRUMENT AND METHODS

A reliable test instrument that allows evaluating the level of personal finance literacy at secondary and college levels was developed by professors W. Walstad and K. Rebeck in 2005. The Financial Fitness for Life High School Test (Walstad & Rebeck, 2005) (further called FFFL test) includes 50 questions categorized into five content themes: The Economic Way of Thinking, Earning Income, Saving, Spending and Using Credit, and Money Management. The test items are also classified by cognitive levels as knowledge, comprehension, and application questions. The FFFL test is a valid and reliable instrument for analysis and, thus, was chosen for the purposes of this research. It was translated into Russian by the authors of the paper and was administered in Belarus in May of 2007 following standard test administrative procedures.

The FFFL test examiner's manual contains data on comparing results demonstrated by high school students without prior financial training to those who took a course in personal finance. In Belarus, personal finance courses are not part of high school curricula while university students get some basic financial knowledge through the required courses on general principles or introductory economics that allows analyzing the role of personal finance training in raising the level of financial literacy. The U.S. data serve as a point of reference for the comparative analysis among the countries. Our design is consistent with the existing research conducted in Japan using the same test instrument for high school and university students.

Data in Belarus was collected using cluster sampling. There are currently 31 state universities in Belarus. Only three of them have traditionally been classic universities, while the other 28 are former technical or pedagogical institutes, which have been granted the new title of 'University' only recently as part of educational reform. We invited colleagues from the three classic universities, Belarusian State University, Grodno State University, and Gomel State University, to participate in our project and received administrative permission from the first two. To control for regional differences, we sent out invitations to 30 high schools also from the areas surrounding Minsk and Grodno and got positive responses from 13 (43% response rate). Two state universities and 13 secondary public schools participated in the project, 790 total subjects, including 219 university and 571 high school students.

We empirically address the following questions:

* What is the level of personal finance literacy of high school and university students in Belarus?
* What was student performance by specific personal finance themes and by cognitive levels identified in the test instrument?
* On what personal finance themes and items did students demonstrate better (above 67%) or worse (below 33%) achievement?

* What were the differences and/or similarities in student performance in the U.S., Japan, and Belarus based on the data published in FFFL–HS Test Examiner's Manual (2005) for the U.S. sample; reported at the NCEE Annual conference in 2005 for the Japanese sample (Yamaoka, et. al. 2005), and obtained for the Belarusian sample in 2007.

## DATA ANALYSIS

Aggregate statistics for Belarusian, USA, and Japanese samples are presented in Table 1. As seen in Table 1, university students in Belarus showed higher degree of personal financial literacy than high school students (51.9% and 45.5% of correct responses respectively) while both Japanese university and high school students showed almost identical (57.2% and 57.3%) results on the test.

**Table 1**
**Aggregate Statistics**

| | Belarus | | USA | | Japan | |
|---|---|---|---|---|---|---|
| | High School | Universities | HS w/o PF | HS with PF | High School | Universities |
| Number of Institutions | 13 | 2 | 14 | 14 | 10 | 13 |
| Number of students | 571 | 219 | 335 | 524 | 1434 | 1074 |
| Mean score, raw | 22.7 | 26 | 22.3 | 27.8 | 28.6 | 28.6 |
| Mean score, % | 45.5 | 51.9 | 44.7 | 55.7 | 57.3 | 57.2 |

The results of Belarusian and U.S. high school students without personal finance training are similar which is somewhat unexpected given that Belarus is a country in transition with a relatively undeveloped financial system and some test items are U.S. specific. Japanese high school students did significantly better than both Belarusian and U.S. groups. The U.S. students who had a personal finance course did better than those who didn't have any special personal finance training (55.7 % and 44.7%) and also performed better than Belarusian university students and slightly worse than the Japanese university students.

Table 2 shows the distribution of the mean percentage of correct answers by themes for the samples from Belarus, Japan, and USA.

**Table 2**
**Mean Scores (%) by Theme**

| Themes | | Belarus | | USA | | Japan | |
|---|---|---|---|---|---|---|---|
| | | HS | University | HS w/o PF | HS w/PF | HS | University |
| 1. | Economic Way of Thinking | 51.0 | 56.3 | 53.3 | 63.8 | 57.7 | 58.2 |
| 2. | Earning Income | 55.6 | 63.1 | 52.2 | 64.2 | 73.3 | 74.4 |
| 3. | Saving | 37.4 | 41.7 | 35.4 | 44.2 | 46.3 | 41.5 |
| 4. | Spending and Using Credit | 42.4 | 49.6 | 37.9 | 53.2 | 55.9 | 56.9 |
| 5. | Money Management | 40.8 | 49.0 | 44.7 | 53.0 | 53.5 | 54.7 |

As seen in Table 2, the "Saving" theme appeared to be the most difficult part of the test for all students across the three countries with the average percent of correct answers being less than 50%. The best results were demonstrated on the theme "Earning Income" also being consistent for all three countries. This could be explained by the fact that students usually have either part-time jobs or temporary summer jobs, providing them with first-hand experience in these areas; they are interviewed for those jobs, pay taxes and social security contributions, and all these experiences can help answer questions related to the theme of "Earning Income". Students of that age may also be in the process of deciding what career to pursue or what major to chose, thus, they most likely discuss questions related to entrepreneurship, lifetime income, competitive job markets, and human capital with their parents, teachers, and friends.

On the other hand, savings is a more complicated concept because students usually have low disposable incomes, and their propensity to save is close to zero. They keep some of the money in checking accounts but they do not have sufficient skills in investing money in stocks, bonds, or real estate; managing saving accounts and calculating compound interest. Even if some of those topics are discussed in class, students do not feel any urgency in comprehending liquidity risk or criteria for successful investments. In addition, it may also be the case that students are not exposed to household discussions of this issue as frequently as they may be exposed to such discussions of other financial topics. Thus, we probably can conclude that theme "Earning Income" is more appealing to high school and university students while "Saving" is not quite relevant for those age groups.

In Table 3 the numbers of items with lower and higher percentage of correct answers among the three countries are summarized. We see that Belarusian high school students demonstrated results similar to American students who did not receive personal finance instruction; Japanese high school students outperformed both American and Belarusian groups. The test results of Belarusian university students were somewhat similar to the results of Japanese university students. The sample of American students who received personal finance training had the lowest number of scores below 33% and 50%. High school and university

students in Belarus had respectively 11 and 12 mean scores below 33%. The largest difference within the country groups in performance above 67% was in the Belarusian sample. Japanese university and high school students answered approximately the same number of questions above 67% which is substantially higher than in the other two countries.

**Table 3**
**Number of Questions with Lower and Higher Percentage of Correct Answers**

| Percent Correct by Question | Belarus | | USA | | Japan | |
|---|---|---|---|---|---|---|
| | HS | University | HS w/o PF | HS w/PF | HS | University |
| Below 33% | 11 | 12 | 14 | 3 | 10 | 8 |
| Below 50% | 30 | 21 | 32 | 18 | 20 | 20 |
| Above 67% | 6 | 15 | 6 | 13 | 20 | 19 |

While the differences in performance among Belarusian and the U.S. students may be a result of economic or financial training, the comparable performance of Japanese high school and university students is an interesting phenomenon that the Japanese researchers hypothetically attribute to student learning through mass media and family sources (Yamaoka et. al., 2005).
The following two tables present test questions grouped by the percentage of correct responses below 33% and above 67% across all test themes and countries.

**Table 4**
**Test Questions with the Mean Score Below 33%**

| | Belarus | | USA | | Japan | |
|---|---|---|---|---|---|---|
| Themes | High school | University | High School w/o PF | High School w/PF | High school | University |
| Economic way of thinking | 5 | 3, 5 | 1, 3, 5 | 3 | 1, 3, 10 | 1, 3, 10 |
| 2. Earning Income | 13 | 13 | | | | |
| 3. Saving | 21, 24, 26, 29 | 21, 26, 29 | 21, 22, 23, 24, 26, 28 | 21, 28 | 24, 26, 28 | 22, 24, 26, 28 |
| 4. Spending and Using Credit | 34, 36, 38, 40 | 34, 36, 38, 40 | 33, 34, 38, 40 | | 32, 34, 38, | 38 |
| 5. Money management | 49 | 44, 49 | 49 | | 47 | |
| Total # of Qs | 11(22%) | 12(24%) | 14(28%) | 3(6%) | 10(20%) | 8(16%) |

**Table 5**
**Test Questions with the Mean Score Above 67%**

| | Belarus | | USA | | Japan | |
|---|---|---|---|---|---|---|
| Themes | High school | University | High School w/o PF | High School w/PF | High school | University |
| Economic way of thinking | 6, 7, 9 | 4, 6, 7, 9 | 2, 4, 6, 7 | 2, 4, 6, 7 | 2, 4, 5, 7, 9 | 2, 4, 5, 7, 9, |
| 2. Earning Income | 14, 20 | 14, 15, 16, 18, 20 | 11, 14 | 11, 14, 17, 20 | 11, 12, 13, 14, 17, 18, 20 | 11, 12, 13, 14, 17, 18, 20 |
| 3. Saving | | 30 | | 27, 30 | 25, 30 | |
| 4. Spending and Using Credit | 31 | 31, 32, 37, 39 | | 31, 39 | 31, 33, 39, 40 | 31, 33, 39, 40 |
| 5. Money management | | 41 | | 45 | 43, 45 | 43, 45, 46 |
| Total # of Qs | 6 (12%) | 15 (30%) | 6 (12%) | 13 (26%) | 20 (40%) | 19 (38%) |

Data in Table 4 show that the number of questions in this category drops substantially (from #14 to #3) for the US students with and without Personal Finance instruction but stays approximately the same in Belarus and Japan and highly correlates between university and high school students. Questions on opportunity cost (#3), the rule of 72 (#24), liquidity risk (#26), credit bureau (#34), and unauthorized use of credit cards (#38) were the most difficult for high school and university students in all three countries except for the U.S. students who took a personal finance course.

Test results revealed that there are specific questions particularly challenging for each country. Belarusian students had difficulties answering questions related to job interviews (#13), common stocks (#29), risk of loan default (#36), and debit cards (#44). It may sound surprising that 62.7% of high school and 59.8% (Table 6) of university students believe it is appropriate for an employer to ask job applicants about disabilities but it reflects the reality in Belarus. Relatively high percentage of students doesn't see the connection between interest rates and nonpayment of a loan or the difference between debit and credit cards that may be explained by the specifics of the country's financial instruments and practices. The majority of Belarusian students have a misconception that common stocks secure dividends while only about 20% of the U.S. students think this is true. This may be explained by immaturity of the stock market in Belarus.

Table 5 shows that Japanese high school and university students demonstrated noticeably better results (20 and 19 respectively, with 17 identical questions) with both U.S. and Belarus students in the "above 67%" category. Further, Belarusian high school students and the U.S. students without FFFL training had only 6 out of 50 correct responses with the average score

above 67% although Belarusian university students and the U.S. students with FFFL course demonstrated much better results (15 and 13 questions respectively).

Though the increase in the number of correct answers is about the same, the composition is different. Analysis of the questions content reveals that in Belarus, university students did better on concepts introduced in economics courses, i.e. marginal benefits and marginal costs (#4), human capital (#15), demand for labor and wage determination (#16), cost of credit (#37), disposable income (#41) while the U.S. students who took personal finance courses performed better on questions related to specific financial knowledge, for example, areas of fast growing jobs (#17), risk and reward relationship (#27), and checking account management (#45). This could imply that economics courses can improve financial literacy but personal finance training is essential for learning some specific concepts.

Questions on opportunity cost of dropping high school (#7), characteristics of entrepreneurs (#14), net pay and tax deductions (#20), investment criteria (#30), advantages of using credit (#31), and pyramid schemes (#39) did not create many problems for the students in any of the three countries.

Data in Table 6 is introduced to analyze similarities and differences of students' responses for each question by countries. We show more specific information about the distribution of responses to each test question.

Comparison of percentages of correct answers shows similarity in student responses within countries but relatively big differences across countries. Correlation coefficients of correct responses between groups are: $r_b = 0.92$ for Belarus, $r_j = 0.97$ for Japan, and $r_u = 0.91$ for the U.S. Cross country correlation coefficient between percentages of correct responses for Belarusian university students and US students with personal finance is $r_{bu} = 0.48$; for Belarusian and Japanese university students is $r_{bj} = 0.45$; and for U.S. students with personal finance and Japanese university students is $r_{uj} = 0.56$. These results suggest that country differences play a considerable role in the response pattern and, furthermore, the distribution data give some insights about the misconceptions students have on various personal finance topics.

For example, students from all three countries had difficulties identifying opportunity cost (#3) and referred to all forgone opportunities rather than the best one which shows incomplete understanding of the concept. However, 44% of Japanese university students and 39% of high school students demonstrated complete confusion by selecting the good itself as its opportunity cost.

Before administering the test we identified a number of questions (#12, 13, 19, 34, 38, 40, and 44) potentially knotty for the Belarusian group because of their U.S. specific content, such as functions of credit bureaus, types of financial institutions, usage of checks, or social security contribution. Analysis of the response distribution supports our expectations for all questions but #12 (ways of finding out about job opportunities) and #19 (who pays social security contributions).

**Table 6: Percentage Response to Each Alternative**

| | Alternatives | | | | | | Alternatives | | | | | | Alternatives | | | | | | Alternatives | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ## | | 1 | 2 | 3 | 4 | ## | | 1 | 2 | 3 | 4 | ## | | 1 | 2 | 3 | 4 | ## | | 1 | 2 |
| 1 | BU | 15.5 | 57.1 | 20.5 | 6.8 | 14 | BU | 3.2 | 86.3 | 8.2 | 2.3 | 27 | BU | 4.6 | 54.8 | 13.2 | 27.4 | 39 | BU | 4.6 | 11.4 |
| | BHS | 21.5 | 43.8 | 29.3 | 5.4 | | BHS | 5.8 | 79.3 | 11 | 3.9 | | BHS | 8.2 | 50.1 | 16.3 | 25.4 | | BHS | 7.5 | 19.3 |
| | US+PF | 24 | 58 | 12 | 6 | | US+PF | 4 | 86 | 9 | 2 | | US+PF | 11 | 69 | 9 | 11 | | US+PF | 7 | 17 |
| | US-PF | 46 | 17 | 29 | 8 | | US-PF | 6 | 76 | 13 | 5 | | US-PF | 10 | 51 | 21 | 18 | | US-PF | 13 | 22 |
| | JU | 37.1 | 27.1 | 32.8 | 3 | | JU | 4.7 | 77.1 | 15.4 | 2.4 | | JU | 11.5 | 56.2 | 11.9 | 19 | | JU | 2.1 | 3.5 |
| | JHS | 42 | 23.8 | 31.2 | 3.1 | | JHS | 4.7 | 80.9 | 12.2 | 2.2 | | JHS | 8.1 | 63.8 | 10.3 | 17.8 | | JHS | 2.9 | 3.6 |
| 2 | BU | 15.1 | 32.9 | 43.8 | 8.2 | 15 | BU | 4.1 | 80.4 | 1.4 | 14.2 | 28 | BU | 41.1 | 12.3 | 30.1 | 16.4 | 40 | BU | 13.2 | 58.4 |
| | BHS | 19.4 | 24 | 49.4 | 7.2 | | BHS | 10.5 | 55.7 | 4 | 29.8 | | BHS | 40.8 | 18.1 | 26.8 | 14.3 | | BHS | 13.7 | 40.9 |
| | US+PF | 1 | 4 | 94 | 1 | | US+PF | 13 | 54 | 8 | 25 | | US+PF | 22 | 18 | 37 | 23 | | US+PF | 25 | 19 |
| | US-PF | 3 | 8 | 88 | 1 | | US-PF | 16 | 42 | 6 | 35 | | US-PF | 20 | 25 | 34 | 20 | | US-PF | 30 | 25 |
| | JU | 4.3 | 13.4 | 79.4 | 2.7 | | JU | 12.1 | 66.8 | 8.1 | 12.5 | | JU | 25.3 | 14 | 46.2 | 12.4 | | JU | 6 | 6.1 |
| | JHS | 4.6 | 13.8 | 79.5 | 2 | | JHS | 10.8 | 65.1 | 9.9 | 14.1 | | JHS | 32 | 13.6 | 42.5 | 11.9 | | JHS | 7.5 | 7.4 |
| 3 | BU | 5.9 | 16 | 25.6 | 52.5 | 16 | BU | 11 | 6.4 | 72.6 | 10 | 29 | BU | 15.5 | 10.5 | 58.9 | 15.1 | 41 | BU | 3.2 | 12.3 |
| | BHS | 11.4 | 22.4 | 33.1 | 33.1 | | BHS | 13.8 | 10.3 | 58.5 | 17.3 | | BHS | 22.8 | 18.2 | 42.9 | 16.1 | | BHS | 11 | 23.3 |
| | US+PF | 7 | 12 | 30 | 50 | | US+PF | 21 | 15 | 56 | 9 | | US+PF | 55 | 17 | 17 | 10 | | US+PF | 24 | 23 |
| | US-PF | 15 | 25 | 14 | 46 | | US-PF | 25 | 16 | 49 | 11 | | US-PF | 48 | 15 | 21 | 16 | | US-PF | 27 | 23 |
| | JU | 3.8 | 44.1 | 14.2 | 36.8 | | JU | 25.1 | 15.4 | 47 | 11.8 | | JU | 41.1 | 15.3 | 35.7 | 6.4 | | JU | 29.5 | 14.9 |
| | JHS | 3.6 | 38.7 | 13.5 | 44.2 | | JHS | 18.3 | 12.1 | 59.3 | 10.3 | | JHS | 43.8 | 9.8 | 41.4 | 5 | | JHS | 26.6 | 19.5 |
| 4 | BU | 70.8 | 6.4 | 9.1 | 13.7 | 17 | BU | 38.8 | 6.4 | 0 | 54.8 | 30 | BU | 10.5 | 6.4 | 73.1 | 10 | 42 | BU | 9.1 | 10.5 |
| | BHS | 52.9 | 10.3 | 13.8 | 22.9 | | BHS | 47.6 | 15 | 4.2 | 33.2 | | BHS | 14.3 | 16.4 | 55.3 | 14 | | BHS | 14.9 | 15.6 |
| | US+PF | 82 | 6 | 7 | 6 | | US+PF | 71 | 7 | 9 | 12 | | US+PF | 10 | 6 | 74 | 10 | | US+PF | 9 | 13 |
| | US-PF | 80 | 7 | 10 | 3 | | US-PF | 57 | 13 | 17 | 13 | | US-PF | 18 | 13 | 54 | 15 | | US-PF | 12 | 14 |
| | JU | 85.2 | 4 | 4.2 | 6.5 | | JU | 76.8 | 5.1 | 6 | 11.6 | | JU | 8.1 | 13.1 | 64.1 | 12.7 | | JU | 8 | 11.5 |
| | JHS | 85.1 | 3.8 | 5.7 | 5.4 | | JHS | 81.3 | 4 | 7.2 | 7.5 | | JHS | 6.8 | 14.4 | 67.9 | 10.9 | | JHS | 8.5 | 10.8 |
| 5 | BU | 5.9 | 54.8 | 10.5 | 28.8 | 18 | BU | 8.2 | 5.9 | 11.9 | 74 | 31 | BU | 4.1 | 1.8 | 4.6 | 89.5 | 43 | BU | 25.6 | 37.9 |
| | BHS | 10.9 | 43.8 | 20.5 | 24.9 | | BHS | 5.8 | 9.3 | 20.5 | 64.4 | | BHS | 7.5 | 10.5 | 9.1 | 72.9 | | BHS | 19 | 36.1 |
| | US+PF | 14 | 27 | 19 | 41 | | US+PF | 8 | 12 | 27 | 54 | | US+PF | 6 | 12 | 7 | 75 | | US+PF | 17 | 61 |
| | US-PF | 15 | 23 | 30 | 31 | | US-PF | 11 | 15 | 32 | 42 | | US-PF | 11 | 19 | 10 | 61 | | US-PF | 26 | 44 |
| | JU | 3.1 | 14 | 14.7 | 67.6 | | JU | 5.1 | 4.1 | 10.1 | 79.5 | | JU | 3.3 | 6.1 | 5.1 | 84.4 | | JU | 9.1 | 81.8 |
| | JHS | 3.4 | 11 | 14.3 | 71.6 | | JHS | 8.2 | 6.7 | 11.9 | 73.2 | | JHS | 3.5 | 7.8 | 4.8 | 83.9 | | JHS | 10.2 | 82.1 |
| 6 | BU | 9.1 | 1.4 | 12.8 | 76.7 | 19 | BU | 8.7 | 11.4 | 66.7 | 13.2 | 32 | BU | 21 | 3.7 | 72.6 | 2.7 | 44 | BU | 15.5 | 32.9 |
| | BHS | 8.1 | 3 | 14 | 75 | | BHS | 12.5 | 13.7 | 48.9 | 24.9 | | BHS | 29 | 13.4 | 51.5 | 6.1 | | BHS | 13.5 | 37.3 |
| | US+PF | 7 | 4 | 9 | 80 | | US+PF | 23 | 12 | 50 | 16 | | US+PF | 22 | 9 | 63 | 6 | | US+PF | 8 | 62 |
| | US-PF | 6 | 4 | 7 | 83 | | US-PF | 27 | 9 | 37 | 28 | | US-PF | 25 | 16 | 51 | 8 | | US-PF | 10 | 51 |
| | JU | 2.6 | 3.3 | 32.1 | 61.8 | | JU | 15.1 | 20.7 | 59.7 | 4.1 | | JU | 46.9 | 8 | 38.4 | 5.5 | | JU | 29.2 | 34.6 |
| | JHS | 3.5 | 4.5 | 29.6 | 62.3 | | JHS | 15.5 | 31.2 | 48.8 | 4.4 | | JHS | 51.7 | 10 | 31.4 | 6.8 | | JHS | 30.6 | 34.2 |
| 7 | BU | 78.1 | 4.1 | 2.7 | 15.1 | 20 | BU | 77.2 | 12.8 | 4.6 | 5.5 | 33 | BU | 1.4 | 61.6 | 11.4 | 25.6 | 45 | BU | 23.3 | 5 |
| | BHS | 79 | 5.5 | 3.7 | 11.8 | | BHS | 74.6 | 13.6 | 6.5 | 5.3 | | BHS | 8.4 | 54.5 | 17.4 | 19.7 | | BHS | 18.9 | 19.2 |
| | US+PF | 84 | 5 | 6 | 5 | | US+PF | 78 | 8 | 7 | 6 | | US+PF | 7 | 34 | 38 | 22 | | US+PF | 18 | 7 |
| | US-PF | 78 | 7 | 9 | 6 | | US-PF | 66 | 13 | 10 | 11 | | US-PF | 9 | 16 | 43 | 31 | | US-PF | 23 | 8 |
| | JU | 87.5 | 3.4 | 4.7 | 4.4 | | JU | 77.4 | 10.1 | 6.1 | 5.5 | | JU | 2.1 | 88.4 | 7.1 | 1 | | JU | 8.5 | 8.8 |
| | JHS | 81.6 | 6.2 | 5.6 | 6.5 | | JHS | 77.5 | 10.8 | 6.7 | 4.9 | | JHS | 3.1 | 86.9 | 8 | 1.9 | | JHS | 11.3 | 8.3 |
| 8 | BU | 19.2 | 6.8 | 61.2 | 12.8 | 21 | BU | 3.2 | 9.1 | 15.1 | 72.6 | 34 | BU | 34.7 | 28.8 | 26.5 | 10 | 46 | BU | 48.9 | 23.3 |
| | BHS | 22.1 | 13.3 | 40.8 | 23.8 | | BHS | 7.2 | 13.9 | 19.1 | 59.8 | | BHS | 31 | 28.6 | 29.9 | 10.5 | | BHS | 42.9 | 24.2 |
| | US+PF | 4 | 17 | 62 | 17 | | US+PF | 7 | 13 | 32 | 49 | | US+PF | 28 | 16 | 41 | 16 | | US+PF | 60 | 22 |
| | US-PF | 7 | 18 | 56 | 19 | | US-PF | 11 | 17 | 23 | 50 | | US-PF | 30 | 16 | 27 | 27 | | US-PF | 57 | 18 |
| | JU | 15.1 | 18 | 50.7 | 15.9 | | JU | 8.1 | 16.9 | 33.4 | 40 | | JU | 7.7 | 39.9 | 33.3 | 17.2 | | JU | 67.7 | 7.4 |
| | JHS | 18.3 | 18.5 | 50.1 | 13.1 | | JHS | 7.3 | 20.9 | 36.1 | 35.7 | | JHS | 6.6 | 38.2 | 32.7 | 22.5 | | JHS | 59.2 | 11.9 |
| 9 | BU | 5.5 | 73.5 | 11.9 | 9.1 | 22 | BU | 1.8 | 15.5 | 28.8 | 53.9 | 35 | BU | 55.7 | 10.5 | 17.8 | 16 | 47 | BU | 2.3 | 22.4 |
| | BHS | 8.6 | 67.8 | 7.4 | 16.3 | | BHS | 7.2 | 24.7 | 23.6 | 44.5 | | BHS | 49.6 | 13.7 | 23.1 | 13.7 | | BHS | 11 | 32.9 |
| | US+PF | 15 | 52 | 12 | 20 | | US+PF | 9 | 33 | 24 | 33 | | US+PF | 64 | 19 | 7 | 10 | | US+PF | 5 | 19 |
| | US-PF | 8 | 38 | 21 | 32 | | US-PF | 13 | 37 | 27 | 23 | | US-PF | 57 | 19 | 14 | 10 | | US-PF | 9 | 20 |
| | JU | 4 | 80.2 | 4.4 | 11.3 | | JU | 17.2 | 28.6 | 20.8 | 33.4 | | JU | 52.1 | 40.4 | 2.7 | 3.2 | | JU | 8.4 | 26.4 |
| | JHS | 5.1 | 77.7 | 5 | 12.2 | | JHS | 10.7 | 24.1 | 19.9 | 45.3 | | JHS | 51.8 | 39.7 | 4.5 | 4 | | JHS | 10.6 | 26.5 |
| 10 | BU | 6.4 | 12.8 | 33.8 | 47 | 23 | BU | 17.4 | 13.7 | 11 | 58 | 36 | BU | 21 | 11.9 | 26.9 | 40.2 | 48 | BU | 16.4 | 24.7 |
| | BHS | 7.5 | 19.1 | 29.9 | 43.4 | | BHS | 23.7 | 19.2 | 16.8 | 40.3 | | BHS | 23.2 | 23.2 | 27.3 | 26.3 | | BHS | 15.6 | 25 |
| | US+PF | 8 | 8 | 28 | 56 | | US+PF | 23 | 24 | 9 | 44 | | US+PF | 13 | 19 | 53 | 14 | | US+PF | 6 | 27 |
| | US-PF | 10 | 10 | 33 | 48 | | US-PF | 28 | 29 | 11 | 32 | | US-PF | 13 | 25 | 44 | 18 | | US-PF | 9 | 25 |
| | JU | 8.2 | 17.1 | 45.6 | 28.4 | | JU | 10.6 | 41.8 | 4 | 42.3 | | JU | 18.3 | 14.5 | 49.9 | 15.3 | | JU | 11.1 | 44.8 |
| | JHS | 7.6 | 10.8 | 50 | 31.6 | | JHS | 8.7 | 37.7 | 5.4 | 48.2 | | JHS | 14.2 | 17.2 | 49.8 | 18.8 | | JHS | 11.2 | 46.2 |
| 11 | BU | 63.5 | 27.9 | 5.5 | 3.2 | 24 | BU | 18.3 | 33.8 | 41.6 | 6.4 | 37 | BU | 10.5 | 68.9 | 5.5 | 15.1 | 49 | BU | 22.8 | 5.9 |
| | BHS | 63.6 | 25.9 | 6.3 | 4.2 | | BHS | 16 | 32.4 | 43.9 | 7.7 | | BHS | 15.8 | 53.9 | 15.1 | 15.2 | | BHS | 22.9 | 16.3 |
| | US+PF | 76 | 6 | 2 | 15 | | US+PF | 22 | 34 | 36 | 8 | | US+PF | 15 | 46 | 19 | 21 | | US+PF | 35 | 18 |
| | US-PF | 68 | 6 | 4 | 22 | | US-PF | 21 | 25 | 40 | 14 | | US-PF | 19 | 36 | 22 | 23 | | US-PF | 25 | 23 |
| | JU | 93.5 | 3.5 | 1.1 | 1.5 | | JU | 13.4 | 26.2 | 48.4 | 10 | | JU | 13.3 | 47.7 | 9.6 | 27.5 | | JU | 57 | 6.7 |
| | JHS | 89.5 | 5.4 | 2.6 | 2.4 | | JHS | 15.2 | 28.3 | 46.8 | 9.7 | | JHS | 12.6 | 44.4 | 11.9 | 31.2 | | JHS | 58.3 | 9.8 |
| 12 | BU | 22.4 | 2.3 | 28.3 | 47 | 25 | BU | 5.5 | 55.7 | 18.7 | 20.1 | 38 | BU | 3.7 | 21 | 21.5 | 53.9 | 50 | BU | 27.4 | 54.8 |
| | BHS | 16.2 | 8.2 | 35.6 | 39.9 | | BHS | 8.8 | 52.4 | 21.1 | 17.8 | | BHS | 10.2 | 25.7 | 28.6 | 35.5 | | BHS | 18.7 | 44.1 |
| | US+PF | 8 | 20 | 21 | 52 | | US+PF | 11 | 45 | 29 | 15 | | US+PF | 48 | 13 | 26 | 14 | | US+PF | 15 | 55 |
| | US-PF | 6 | 22 | 33 | 39 | | US-PF | 7 | 48 | 28 | 16 | | US-PF | 16 | 16 | 43 | 25 | | US-PF | 15 | 49 |
| | JU | 2.4 | 2.3 | 4.6 | 90.2 | | JU | 5.3 | 76.3 | 8.3 | 8.7 | | JU | 26.9 | 31.8 | 9.3 | 29.9 | | JU | 13.3 | 64.3 |
| | JHS | 3.2 | 3.2 | 7 | 86.6 | | JHS | 5 | 78.1 | 9.1 | 7.8 | | JHS | 24.8 | 37.6 | 8.5 | 29.1 | | JHS | 14.5 | 60.8 |
| 13 | BU | 12.3 | 3.7 | 24.2 | 59.8 | 26 | BU | 16 | 19.2 | 16.4 | 48.4 | | | | | | | | | | |
| | BHS | 8.9 | 4.7 | 23.6 | 62.7 | | BHS | 16.6 | 20.7 | 17.2 | 45.5 | | | | | | | | | | |
| | US+PF | 4 | 3 | 65 | 27 | | US+PF | 36 | 16 | 19 | 29 | | | | | | | | | | |
| | US-PF | 9 | 3 | 46 | 41 | | US-PF | 30 | 19 | 17 | 34 | | | | | | | | | | |
| | JU | 2 | 2.5 | 75.8 | 19.5 | | JU | 18.4 | 15.4 | 4.5 | 60.5 | | | | | | | | | | |
| | JHS | 4.5 | 5.6 | 70.4 | 19.4 | | JHS | 19.5 | 15.2 | 4.6 | 60.7 | | | | | | | | | | |

As seen from Table 6, 58.4% of Belarusian university and 40.9% of high school students think that commercial banks charge the highest interest rates (#40). Since the distribution of answers between the other three options is quite even, we infer that this could be interpreted as a lack of basic knowledge about the U.S. financial institutions, such as payday loan companies or credit unions, which do not exist in Belarus. Moreover, 34.7% of university and 31% of high school students answered that a credit bureau extends loans to qualified buyers (#34) mistaking it for a banking institution.

The most revealing example is question #38 that addresses issues of liability for fraudulent charges on a credit card. Only 3.7% of university students (the lowest percentage of correct answers for all groups of students) and 10.2% of high school students chose the correct answer that the liability is limited to $50, while respectively 53.9% and 35.5% of them think that credit card holders are fully liable for the stolen amount.

Having said that, we still feel it was reasonable not to modify and adjust FFFL test for administering to Belarusian students for several reasons. Firstly, these topics are discussed in translated economics textbooks widely used in Belarus. Secondly, these issues are becoming more applicable as Belarus is being integrated into international financial systems. And, finally, it allows conducting cross country comparisons.

**Table 7: Difference in Percentages of Correct Answers between the Groups (t-statistics in parenthesis)**

| | Belarus | USA | Japan |
|---|---|---|---|
| Mean | 6.50**(4.93) | 11.04**(10.38) | -0.18 (-0.26) |
| Median | 5.20 | 10.00 | 0.20 |
| St.Dev. | 9.28 | 7.52 | 4.92 |
| Range | 33.50 | 44.00 | 24.29 |
| Minimum | -8.82 | -3.00 | -13.30 |
| Maximum | 24.67 | 41.00 | 10.90 |

Negative sign means high school students without personal finance training had higher percentage of correct answers than university students or students with personal finance training.
** Value is statistically significant.

Descriptive statistics for further analysis of the differences in percentages of correct answers for high school students without personal finance and university students and U.S. high school students with personal finance training for the three countries is presented in Table 7.

Data in Table 7 show positive mean difference of the percentage of correct answers between groups for two countries but Japan. On the average, university students and high school

students with personal finance training have higher percentage of correct responses. The highest average mean difference of 11.04% of correct answers is for the U.S. samples. It is statistically significant Mean difference for the Belarusian groups is 6.5%, which is also statistically significant. Unlike the other two countries, mean difference of -0.182 for the Japanese samples is negative and not statistically significant. In spite of the similarities between Belarusian and U.S. groups in positive mean differences we would like to emphasize nonexistence of correlation for the test items. Correlation coefficients between differences by items for Belarus and U.S. is $r_{bu}$ =-0.003, for Belarus and Japan is $r_{bj}$ = 0.06, for USA and Japan is $r_{uj}$ = 0.10. Belarusian university students and U.S. high school students with personal finance outperformed high school students in their countries but on different test questions. Mean difference of 11.04% of correct answers for American groups is significantly higher than 6.5% mean difference for Belarusian students. These statistics support our assumption that teaching specific personal finance topics will increase the level of financial literacy more than teaching general economic courses that are mandatory in Belarusian universities. Maximum positive differences for Belarusian and American students are 24.67% (human capital, #15) and 41% (becoming a millionaire, #1) respectively. Maximum negative differences are -8.82% (lifetime income, #17) and -3% (choice, # 6 and market price risk, #25).

Table 8 includes frequency distributions of the differences in percentage of correct answers for Belarus and U.S. respectively. Figures 1a and 1b present histograms of these distributions.

**Table 8**
**Frequency Distributions of the Differences in Percentage of Correct Answers for Belarus and USA**

| Belarus | | USA | |
|---|---|---|---|
| Change in % of correct answers | Frequency | Change in % of correct answers | Frequency |
| [-10, -5) | 6 | [-5, 0) | 2 |
| [-5, 0) | 9 | [ 0, 5) | 5 |
| [ 0, 5) | 10 | [5, 10) | 21 |
| [5, 10) | 8 | [10, 15) | 12 |
| [10, 15) | 5 | [15, 20) | 8 |
| [15, 20) | 7 | [20, 25) | 0 |
| [20,25) | 5 | [25, 30) | 0 |
| | | [30,35) | 1 |
| | | [35.40) | 0 |
| | | [40,45) | 1 |

As seen from Table 8 and Figures 1a and 1b, Belarusian high school students had higher percentage of correct answers than university students on 15 questions (#2, 3, 7, 11, 17, 21, 26, 29, 34, 36, 38, 40, 44, 48, and 49). For all questions but two (#7 and 11) the students of both levels showed results below 50%. On 6 questions (#2, 3, 17, 29, 38, and 40) out of the given

above 15 questions the difference was more than 5%. For questions 7 and 11 mean difference is negligible. U.S. students without personal finance outperformed students with personal finance training only in 2 cases out of 50 (#6 and 25) and the difference was only 3%. On the two questions about becoming a millionaire (#1) and unauthorized use of credit cards (#38) difference in percentage of correct answers for American students was greater than 30%. Both of them require special knowledge that students most likely get through a special course on personal finance.

**Figures 1a and 1b**
**Percent Changes of Correct Answers for Belarusian and U.S. Students**

**Figure 1a**

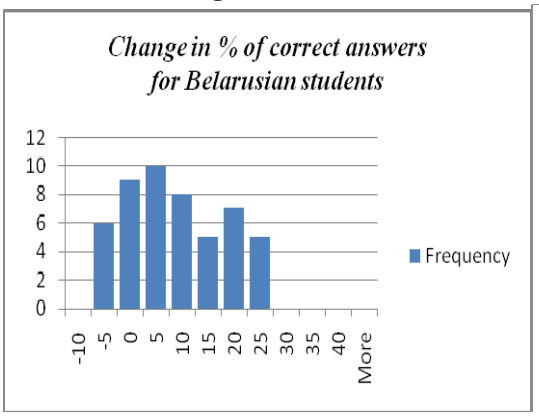
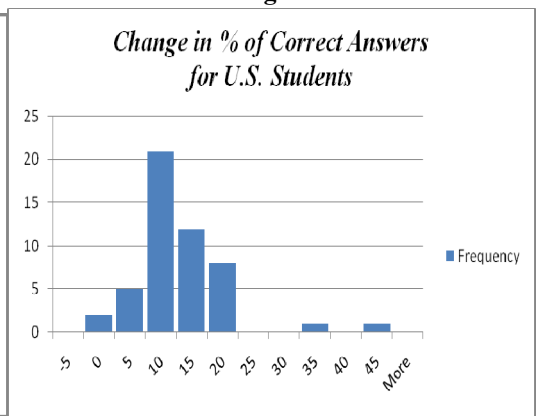



**Figure 1b**




Results by cognitive levels, themes and countries are presented in Table 9. The mean percentages of correct responses of Belarusian students are very similar at the knowledge and application levels: 43.8%, 54.9% and 48.3%, 54.3% correspondingly. These results are somewhat comparable to the U.S. results but rather different from the results of Japanese students. In summary, results of Belarusian university students by cognitive levels can be expressed as follows: Knowledge ≥ Application > Comprehension.

For American students with personal financial instruction, according to Japanese researchers (Yamaoka et. al., 2005), cognitive levels ranking is Application > Comprehension > Knowledge, while for Japanese university students the results are different: Knowledge > Comprehension > Application. Both Belarusian and Japanese university students showed the best results at the knowledge level. Their scores are even higher than demonstrated by the U.S. students with personal finance instruction. On the other hand, American students were better at the application level. Belarusian high school students showed the following results: Application > Knowledge ≥ Comprehension demonstrating substantially lower scores on the test items classified as knowledge level compared to the university students but higher than the U.S. counterparts.

**Table 9**
**Test Results by Cognitive Level**

| ## | Themes and Items | Knowledge | | | | | | Comprehension | | | | | | Applications | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **BHS** | **BU** | **USA - PF** | **USA +PF** | **JHS** | **JUN** | **BHS** | **BU** | **USA - PF** | **USA +PF** | **JHS** | **JUN** | **BHS** | **BU** | **USA - PF** | **USA +PF** | **JHS** | **JUN** |
| | **The Economic Way of Thinking** | 43.4 | 47 | 48 | 56 | 31.6 | 28.4 | 50.3 | 56.9 | 52.2 | 64.5 | 60.8 | 51.1 | 55 | 58.2 | 55.3 | 65.3 | 60.1 | 62.3 |
| 1 1 | Becoming a Milliner | | | | | | | 43.8 | 57.1 | 17 | 58 | 23.8 | 27.1 | | | | | | |
| 2 | Financial Success | | | | | | | 49.4 | 43.8 | 88 | 94 | 79.5 | 79.4 | | | | | | |
| 3 | Opportunity Cost | | | | | | | | | | | | | 33.1 | 25.6 | 14 | 30 | 13.5 | 14.2 |
| 4 | Cost and Benefit | | | | | | | | | | | | | 52.9 | 70.8 | 80 | 82 | 85.1 | 85.2 |
| 5 | A Free Lunch | | | | | | | 24.9 | 28.8 | 31 | 41 | 71.6 | 67.6 | | | | | | |
| 6 | Choice | | | | | | | 75 | 76.7 | 83 | 80 | 62.3 | 61.8 | | | | | | |
| 7 | Opportunity Cost | | | | | | | | | | | | | 79 | 78.1 | 78 | 84 | 81.6 | 87.5 |
| 8 | Scarcity | | | | | | | 40.8 | 61.2 | 56 | 62 | 50.1 | 50.7 | | | | | | |
| 9 | Human Resource | | | | | | | 67.8 | 73.5 | 38 | 52 | 77.7 | 80.2 | | | | | | |
| 10 | Decision-making Process | 43.4 | 47 | 48 | 56 | 31.6 | 28.4 | | | | | | | | | | | | |
| | **Earning Income** | 51.3 | 61.4 | 43.4 | 56.2 | 71 | 74.6 | 55.5 | 58 | 63.3 | 75.7 | 80.3 | 82.1 | 66.6 | 74.9 | 57.5 | 67 | 68.4 | 62.2 |
| 11 | Getting a Job | | | | | | | 63.6 | 63.5 | 68 | 76 | 89.5 | 93.5 | | | | | | |
| 12 | Looking for a Job | 39.9 | 47 | 39 | 52 | 86.6 | 90.2 | | | | | | | | | | | | |
| 13 | Job Interview | | | | | | | 23.6 | 24.2 | 46 | 55 | 70.4 | 75.8 | | | | | | |
| 14 | Entrepreneur | | | | | | | 79.3 | 86.3 | 75 | 86 | 80.9 | 77.1 | | | | | | |
| 15 | Human Capital | 55.7 | 80.4 | 42 | 54 | 65.1 | 66.8 | | | | | | | | | | | | |
| 16 | Competitive Job Market | | | | | | | | | | | | | 58.5 | 72.6 | 49 | 56 | 59.3 | 47 |
| 17 | Lifetime Income | 47.6 | 38.8 | 57 | 71 | 81.3 | 76.8 | | | | | | | | | | | | |
| 18 | Net Pay | 64.5 | 74 | 42 | 54 | 73.2 | 79.5 | | | | | | | | | | | | |
| 19 | Social Security Contributions | 48.9 | 66.7 | 37 | 50 | 48.8 | 59.7 | | | | | | | | | | | | |
| 20 | Deduction and Net Pay | | | | | | | | | | | | | 74.6 | 77.2 | 66 | 78 | 77.5 | 77.4 |
| | **Saving** | 48.1 | 57.1 | 37 | 48 | 49.9 | 44.7 | 33.6 | 35.9 | 38.7 | 46.8 | 48.2 | 44.6 | 38.5 | 43.9 | 24 | 33.5 | 36.8 | 29.1 |
| 21 | Opp. Cost of Cmpnd % | | | | | | | 19.1 | 15.1 | 23 | 32 | 36.1 | 33.4 | | | | | | |
| 22 | The Power of Cmpnd % | | | | | | | | | | | | | 44.5 | 53.9 | 23 | 33 | 45.3 | 32 |
| 23 | The Power of Cmpnd % | | | | | | | 40.3 | 58 | 32 | 44 | 48.2 | 42.3 | | | | | | |
| 24 | The Rule of 72 | | | | | | | | | | | | | 32.4 | 33.8 | 25 | 34 | 28.3 | 26.2 |
| 25 | Market Price Risk | | | | | | | 52.4 | 55.7 | 48 | 45 | 78.1 | 76.3 | | | | | | |
| 26 | Liquidity Risk | | | | | | | 16.6 | 16 | 30 | 36 | 19.5 | 18.4 | | | | | | |
| 27 | Risk and Reward | | | | | | | 50.1 | 54.8 | 51 | 69 | 63.8 | 56.2 | | | | | | |
| 28 | The Real and Nominal RR | 40.8 | 41.1 | 20 | 22 | 32 | 25.3 | | | | | | | | | | | | |
| 29 | Common Stock | | | | | | | 22.8 | 15.5 | 48 | 55 | 43.8 | 41.1 | | | | | | |
| 30 | Criteria of Investment | 55.3 | 73.1 | 54 | 74 | 67.9 | 64.1 | | | | | | | | | | | | |
| | **Spending and Using Credit** | 42.3 | 44.1 | 21.5 | 37.5 | 59.8 | 60.8 | 46.2 | 55 | 45.5 | 57.5 | 55.1 | 57.7 | 31.3 | 38.9 | 32 | 57.5 | 54.4 | 50.8 |
| 31 | The Advantage of Using Credit | | | | | | | 72.9 | 89.5 | 61 | 75 | 83.9 | 84.4 | | | | | | |
| 32 | Loan Transaction | | | | | | | 51.5 | 72.6 | 51 | 63 | 38.4 | 31.4 | | | | | | |
| 33 | Judging of Creditworthiness | 54.5 | 61.6 | 16 | 34 | 86.9 | 88.4 | | | | | | | | | | | | |
| 34 | A Credit Bureau | 30 | 26.5 | 27 | 41 | 32.7 | 33.3 | | | | | | | | | | | | |
| 35 | Paying Back a Loan | | | | | | | 49.6 | 55.7 | 57 | 64 | 51.8 | 52.1 | | | | | | |
| 36 | Risk of Loan Default | | | | | | | 27.3 | 26.9 | 44 | 53 | 49.8 | 49.8 | | | | | | |
| 37 | The Cost of a Loan | | | | | | | 53.9 | 69 | 36 | 46 | 44.4 | 47.7 | | | | | | |
| 38 | Unauthorized Use of a Credit | | | | | | | | | | | | | 10.2 | 3.7 | 16 | 48 | 24.8 | 26.9 |
| 39 | A Pyramid Scheme | | | | | | | | | | | | | 52.4 | 74 | 48 | 67 | 84 | 74.7 |
| 40 | A Payday Loan Company | | | | | | | 21.9 | 16.4 | 24 | 44 | 69.2 | 73.5 | | | | | | |
| | **Money Management** | 43.7 | 53.1 | 43 | 51 | 62.9 | 63.6 | 35 | 42.6 | 40.5 | 49 | 44.8 | 47.3 | 46.8 | 53.9 | 57.5 | 65 | 52.3 | 51.9 |
| 41 | Disposable Income | 56.4 | 74.9 | 37 | 42 | 44.1 | 44.5 | | | | | | | | | | | | |
| 42 | Net Worth | 39.4 | 50.7 | 34 | 41 | 66.2 | 60.3 | | | | | | | | | | | | |
| 43 | Pay Yourself First | 36.1 | 37.9 | 44 | 61 | 82.1 | 81.8 | | | | | | | | | | | | |
| 44 | A Debit Card | | | | | | | 37.3 | 32.9 | 51 | 62 | 34.2 | 34.6 | | | | | | |
| 45 | Balance at a Bank | | | | | | | | | | | | | 50.3 | 64.9 | 59 | 69 | 70 | 70.5 |
| 46 | A Type of Insurance (TI) | 42.9 | 48.9 | 57 | 60 | 59.2 | 67.6 | | | | | | | | | | | | |
| 47 | A TI for Autos | | | | | | | 35.7 | 59.8 | 37 | 44 | 25.9 | 33.2 | | | | | | |
| 48 | A Deductible | | | | | | | | | | | | | 43.3 | 42.9 | 56 | 61 | 33.3 | 34.7 |
| 49 | Another TI for Autos | | | | | | | 22.9 | 22.8 | 25 | 35 | 58.3 | 57 | | | | | | |
| 50 | Life Insurance | | | | | | | 44.1 | 54.8 | 49 | 55 | 60.8 | 64.3 | | | | | | |
| | **Mean % Correct Answers** | 43.8 | 54.9 | 39.6 | 50.8 | 61.3 | 61.9 | 43.5 | 49.2 | 46.8 | 57.4 | 56.2 | 56.6 | 48.3 | 54.3 | 46.7 | 58.4 | 54.9 | 52.3 |

As pointed out in our comments to Table 7, the mean difference for the U.S. data was 11.045% and 6.5% for Belarus. Data in Table 9 show that for the U.S. students the mean differences are 11.2% by knowledge level, 10.6% by comprehension level, and 11.7% by application level while for Belarus corresponding numbers are 11.1%, 5.7%, and 6%. These data reflect the well-known fact that Belarusian university education is traditionally oriented to teaching at the knowledge cognitive level that continues to resemble the ex-soviet approach of teaching theoretical rather than practical skills.

At the knowledge level, Belarusian university students outperformed American students with personal financial instruction on all themes but "The economic way of thinking". However, this theme includes only a single question (#10) which doesn't provide ample grounds for the analysis. Furthermore, Japanese students also demonstrated low performance (28.4%) on this question related to decision making process though, in general, they showed substantially higher results at the knowledge level (61.3% and 61.9%).

At the comprehension level, American students achieved considerably higher results compared to Belarusian students for all themes. At the application level, Belarusian students performed better than American on the themes "Earning income" and "Saving". For the other three themes American students demonstrated higher results than Belarusian. The data from Table 8 also suggest that theme "Saving" was the most complicated for the students of all three countries. The best performance students showed for the theme "Earning income". It is worth mentioning, though, that uneven distribution of test questions across cognitive levels imposes certain limitations on the statistical analysis.

## CONCLUSIONS

Financial education is essential for preparing young people to solve and analyze real world problems. To address the challenges of rapid globalization, internationalization of the world business communities it is particularly important for a transitional country with underdeveloped financial system to offer high quality personal finance education programs. The findings of the study provide information that can be useful for educators while developing recommendations on how to improve student performance in personal finance and economics, and to empower them with the knowledge and skills necessary to efficiently function efficiently in the global community.

We have shown that, on average, Belarusian university students performed better than high school students and Belarusian high school students demonstrated similar level of achievement with American high school students without personal finance instruction which was somewhat unexpected given that Belarus is a country in transition with a relatively undeveloped financial system and some test items are quite U.S. specific. Japanese university and high school students showed almost identical results on the test and outperformed both Belarusian and American students. The U.S. students with FFFL instruction did better than those who didn't

have any special personal finance training, better than Belarusian university students and slightly worse than the Japanese university students.

Students across the three countries demonstrated the highest achievement on topic Earning Income and the lowest achievement on topic Saving. We identified questions of equal difficulty and found that they were similarly challenging for students regardless of their country of origin. We found stronger correlation of student correct responses within countries and rather low correlation across countries.

Data analysis at cognitive levels showed that Belarusian and Japanese students had higher scores at the knowledge level while U.S. students showed better results at the application level. On the contrary, the application level questions were the most difficult for Belarusian and Japanese students while the knowledge level questions created the most problems for the U.S. students.

These results suggest that country differences, type of instruction, and relevance of test questions play considerable role in the response pattern. Our research analysis suggests the necessity of personal finance training at both secondary and higher levels of education; it also confirms that targeted training in personal finance contributes to improvement of test performance regardless of the student grade level. Taking into account that general economic education courses are mandatory at Belarusian universities, adding requirements for personal finance training would help increase the level of both economic and financial literacy. We believe that economic and personal finance instruction should complement rather than substitute each other in this process.

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