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EARNING AND SAVING COMPETENCES OF INDIVIDUALS IN A LOCAL COMMUNITY IN POLAND

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Earning and saving competences of individuals
in a local community in Poland

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Abstract

The aim of this paper is to identify variables that affect the capability of an individual to earn and save income. Our hypothesis is that besides demographic and human capital determinants, social, cultural and psychological variables affect strongly the individual's earning and saving competences. We test our hypothesis using a method of decision tree (Exhaustive search Chi – squared Automatic Interaction Detection) to identify the earning and saving competences of individuals in Poland. In the decision tree analysis we found factors that are conducive for earning and saving. These factors includes: fairness, attitude towards cheating at exams, tolerance towards persons of different religion and different skin color, trust in judges and scientists, social risk aversion, evaluating own health status, asking for advice. This theoretical approach is applied to micro data from a Survey on Civilization Competences of individuals in local communities conducted in July-September 2009 in five regions of Poland.

Keywords:
earning, saving, capability, competence, income, municipality

JEL:
D11, D12, D14

1. Introduction

Earning income and saving are important competences of an individual. Capability to earn income depends on the individual's level and quality of human capital (education, health and family background) as well as cultural, social and psychological characteristics of a person. These individual and social capabilities of earning can be measured by their influence on manifest variables like occupation or quintile groups of disposable income. Ability to save is a function of current and expected income and family needs as well as individual's subjective preferences, psyche and behavior.

In standard economic theory savings are determined by the consumption profile and consumption smoothing under income uncertainty (Keynesian concepts of propensity to consume and propensity to save, 1936; the life cycle hypothesis of Modigliani, 1954 and the permanent income theory of Friedman, 1957). The behavioral approach to saving draws on the subjective motives for saving formulated by Keynes in 1936: precaution, prudence, benefiting from interest rates, satisfaction from rising consumption, independence, entrepreneurship, bequeathing wealth and pure miserliness (see also Horioka, Watanabe, 1997). The standard theories of saving have been expanded in concepts of buffer stock saving (Carroll, 1997), the liquidity constraints and precautionary motive (Campbell, 1987, Deaton, 1991), bequest rules (Kotlikoff, 1989) and behavioral attitudes (Katona, 1975, Waerneryd, 1999).

The psychological approach to saving encompasses not only saving intentions formed by attitudes and motives, but also realization of saving intentions dependent on time horizon, expenditure control techniques, subjective satisfaction with available income and materialistic aspirations (Rabinovich and Webley, 2005). The capability to earn is also positively correlated with expectations or desires of a preferred income. Perception of personal income as insufficient for individual and family needs may stimulate decisions to increase earning capability by changing economic activity or occupation (Liberda 2007, Liberda, Peczkowski 2010).

In this paper, the authors identify the demographic, social, cultural and psychological variables that affect individual's capability to earn income and save. Our hypothesis is that besides demographic and human capital determinants, the social, cultural and psychological variables affect strongly the individual's ability to earn and save. We test our hypothesis using the method of decision tree to identify the earning and saving competences of individuals in Poland. We have chosen the Exhaustive search Chi – squared Automatic Interaction Detection proposed by Biggs, de Ville, Suen (1991).

The method provides finding the best split by merging similar pairs continuously until only a single pair remains. The set of categories with the largest significance is taken to the best split for that predictor variable. This process is followed for all predictor variables. The predictor that gives the best prediction is selected. The process repeats recursively until one of the stopping rules is triggered. This method provides the best estimates. Other methods such as the Chi – squared Automatic Interaction Detection proposed by Kass (1980), the Classification and Regression Trees (C&RT) of Breiman (1984) and Quick, Unbiased, Efficient, Statistical Tree (QUEST) described in Loh and Shih (1997) were tested as well.

This theoretical approach is applied to micro data from a Survey on Civilization Competences of individuals in local communities conducted in July-September 2009 in five regions of Poland. The survey is run by the Warsaw University, Poland, within the EEA and Norway grant. The analysis below concerns one local community Malogoszcz[1]. The interviews were conducted with one respondent at the age of 18 years or more in each of the randomly selected households. The analysis is representative at the community level with 500 respondents out of 11 735 (a total number of population in the community).

2. Demographic, human capital, social and cultural variables affecting capability to earn income – Answer Tree method

The analysis of personal income is treated as an introduction to the analysis of saving. Below are some basic determinants of personal income based on a theory: gender, education level, age.

In the fifth quintile income group only 5 percent are females. In case of the lowest quintile income group females compose the majority (60 percent). Second income group represents 46 percent of males and 54 percent of females. The higher quintile income group, the smaller share of females among representatives of the group.

Considering the quintile income group by the age structure, the majority (42 percent) of young people (34 years and younger) are in the third income quintile group while 73 percent of people at the age of 35 – 54 are in the fourth income quintile group. Respondents at the age of 55 and above account for the highest share in the first income quintile group (25 percent of the lowest income group).

Graph 1. Income quintile groups by gender
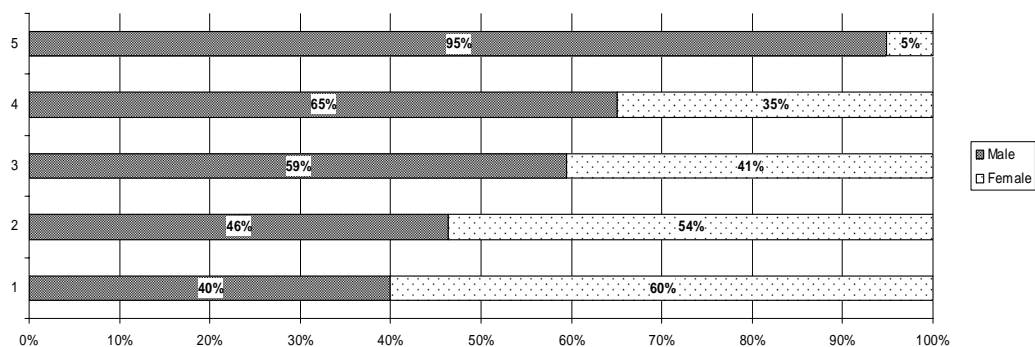
People with primary and vocational education belong mainly to the first income quintile group (74 percent). Almost half of the respondents (44 percent) with secondary education are in the third income quintile group, and 40 percent of them are in the fifth quintile income group. More than two thirds of respondents with tertiary education are in the fourth and fifth quintile income groups. There is no person with tertiary education in the first quintile income group. However, at the top of income distribution, the share of people with secondary education is higher than those with tertiary education (40 and 35 percent respectively).

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[1] Małogoszcz is a town and a community in southern part of Poland. The population in the community is 11.7 thousand. The community is the urban – rural.

Graph 2. Income quintile groups by age groups

Legend: Till 34, 35 - 54, Above 55

	Till 34	35 - 54	Above 55
5	26%	62%	13%
4	20%	73%	7%
3	42%	47%	11%
2	35%	53%	13%
1	18%	58%	25%
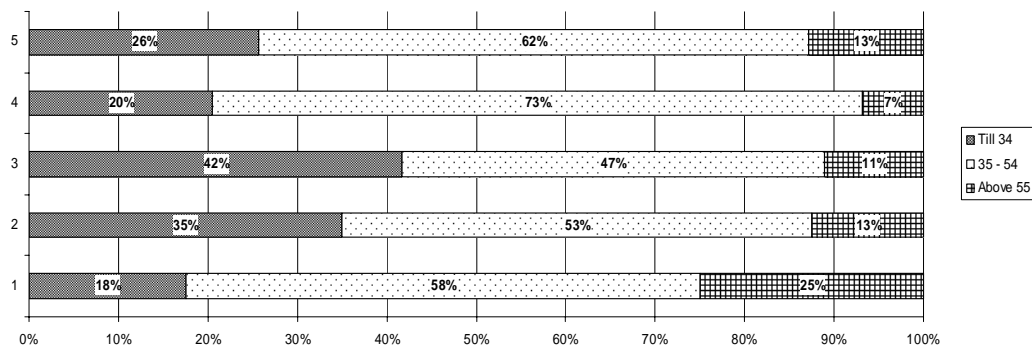
Graph 3. Income quintile groups by education level

Legend: Elementary/ Vocational, Secondary, Tertiary and above

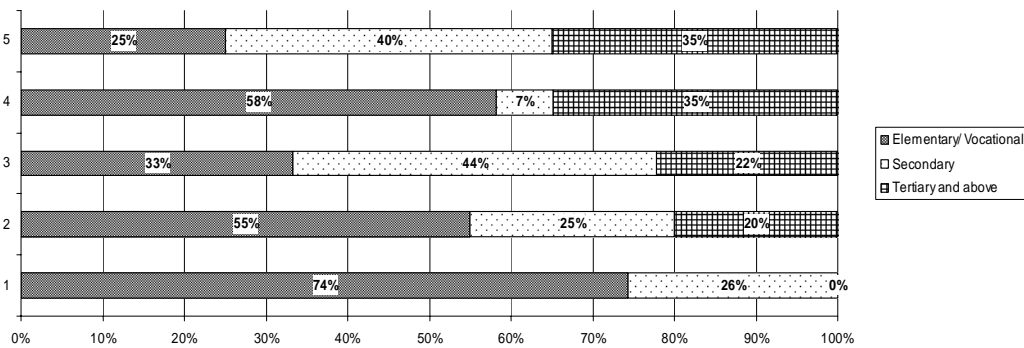|	Elementary/ Vocational	Secondary	Tertiary and above
5	25%	40%	35%
4	58%	7%	35%
3	33%	44%	22%
2	55%	25%	20%
1	74%	26%	0%

Graph 4. Income quintile groups by information whether they save or not

Legend: Yes, No

	Yes	No
5	44%	56%
4	65%	35%
3	36%	64%
2	35%	65%
1	15%	85%
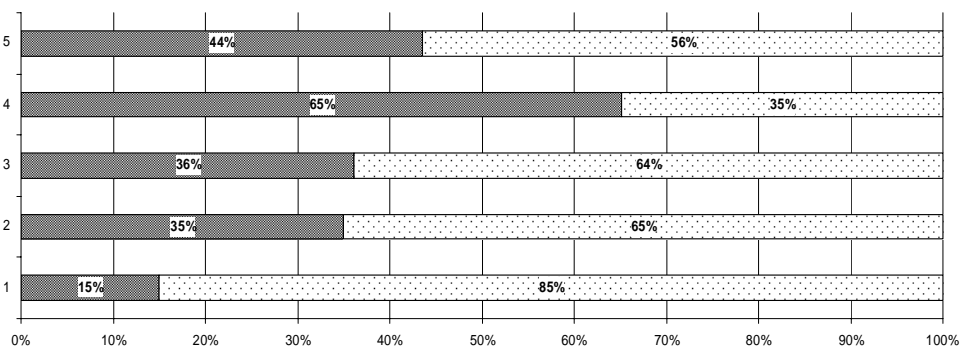
The share of persons who save is higher among people in the fourth quintile income group than in the fifth income quintile group. Only 15 percent of people from the first income quintile group do save.

Only 179 out of 500 respondents provide an answer to the question about income. Some responses may not reflect the real situation. The question about income is a difficult one. The risk estimate with all splits is 0.49162 indicating that if we use the decision rule based on the tree, we will classify 51 percent of cases correctly.

The answer tree for income groups covers 179 respondents who provide an answer to the question about income. The highest share of the group falls in the first quintile income group (48 cases – 27 percent), and 15 percent of all respondents is in the 5th quintile income group. The quintile income group is split into five child nodes, based on a variable describing *profession performed.* Respondents from *Technicians; Machine operators; Government representatives, officials and managers groups* (Node 1) are most likely to fall in the fifth quintile income group (about half of them), while only 10 percent of people performing such activities are likely to be in two lowest quintile income group. Craftsmen and workers; Office and financial services staff (Node 2) are more likely to fall in the second quintile income group (36 percent of cases) while 19 percent of them are in the fifth quintile income group. In the case of Service and selling staff (Node 3), around one half of the group is likely to be in the middle of income distribution (third and fourth quintile income groups, Node 3).

Respondents from Specialists in technical sciences, health and education (Node 4) are more likely to fall in the fourth quintile income group (46 percent of them), Farmers and fishermen, Ancillary workers (Node 5) are likely to fall in the first and second quintile income group (86 percent of cases). Analyzing the highest two income groups, 63 percent of Technicians; Machine operators; Government representatives, officials and managers and 58 percent of Specialists in technical sciences, health and education fall in the fourth and fifth income groups.

Node 1 (*Technicians; Machine operators; Government representatives, officials and managers)* is split into four child nodes, based on a variable *How often do you use computer for: Gaining information and knowledge.* This part of the analysis is statistically insignificant.

Node 2 (*Craftsmen and workers; Office and financial services staff)* is split into three child nodes (Nodes 11, 12 and 13), based on a variable about *the current situation on the labour market: working full – time.* The largest part of working full time *Craftsmen and workers; Office and financial services staff* falls in the second quintile income group (30 percent) while 25 percent of them are in the fifth quintile income group. Among *Craftsmen and workers; Office and financial services staff,* 79 percent work full time and those who work full time differ in trusting judges. Almost half of the group trusting judges or relatively mistrusting them belong to the fifth quintile income group (47 percent), and 24 percent belong to the fourth quintile income group. People who work full time but do not trust judges at all belong to the second quintile income group (50 percent).

Node 4 (*Specialists in technical sciences, health and education)* is split into three child nodes (Nodes 29, 30 and 31), based on a variable *Would you oppose if your daughter wanted to marry a person with religious beliefs other than yours.* People lacking religious tolerance are more likely to be in the third quintile income group while those performing more religious tolerance are more likely to fall in the fourth quintile income group.

Node 5 (*Farmers and fishermen and Ancillary workers)* is split into four child nodes (Nodes 32, 33, 34 and 35), based on a variable *Could you please estimate your trust in: Judges.* The half of *Farmers and fishermen and Ancillary workers* who trust judges (very strongly or rather strongly) is likely to be in the first quintile income group. People performing the same activities and rather strongly mistrusting judges are also likely to be in the first quintile income group (47 percent of cases). Most of the people feeling very strong mistrust are likely to be in the first income group too (70 percent of cases).

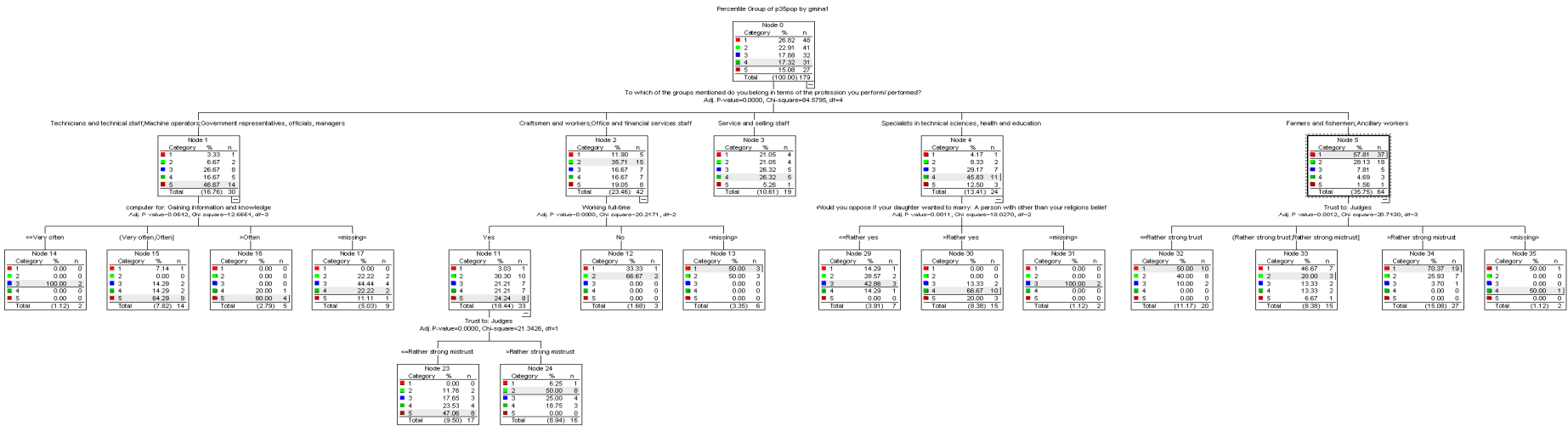## Graph 5. The answer tree for quintile income groups

Source: Data from Survey on Civilization Competences, 2009.

Graph 6. The answer tree for quintile income groups – first level
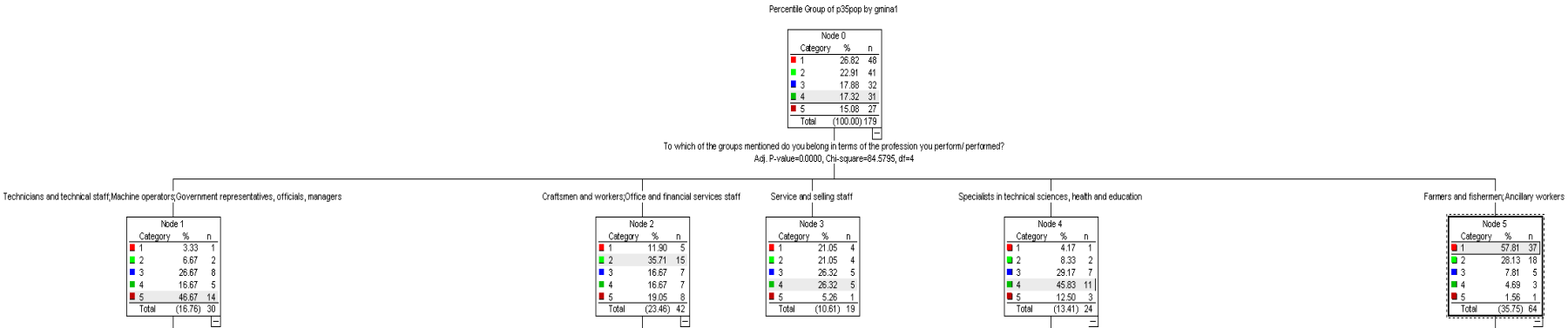
Source: Data from Survey on Civilization Competences, 2009.

Graph 7. The answer tree for quintile income groups – part of the second level (1)

Technicians and technical staff;Machine operators;Government representatives, officials, managers

Node 1

Category	%	n
1	3.33	1
2	6.67	2
3	26.67	8
4	16.67	5
5	46.67	14
Total	(16.76)	30

computer for: Gaining information and knowledge
Adj. P-value=0.0542, Chi-square=12.6654, df=3

<=Very often | (Very often,Often] | >Often | <missing>

Node 14

Category	%	n
1	0.00	0
2	0.00	0
3	100.00	2
4	0.00	0
5	0.00	0
Total	(1.12)	2

Node 15

Category	%	n
1	7.14	1
2	0.00	0
3	14.29	2
4	14.29	2
5	64.29	9
Total	(7.82)	14

Node 16

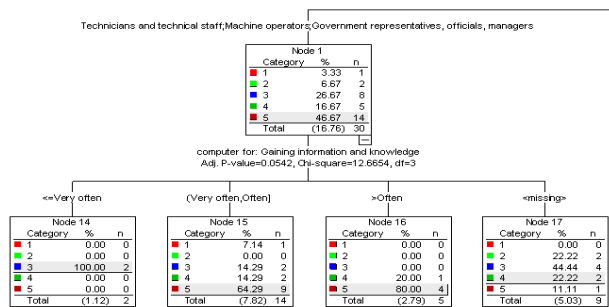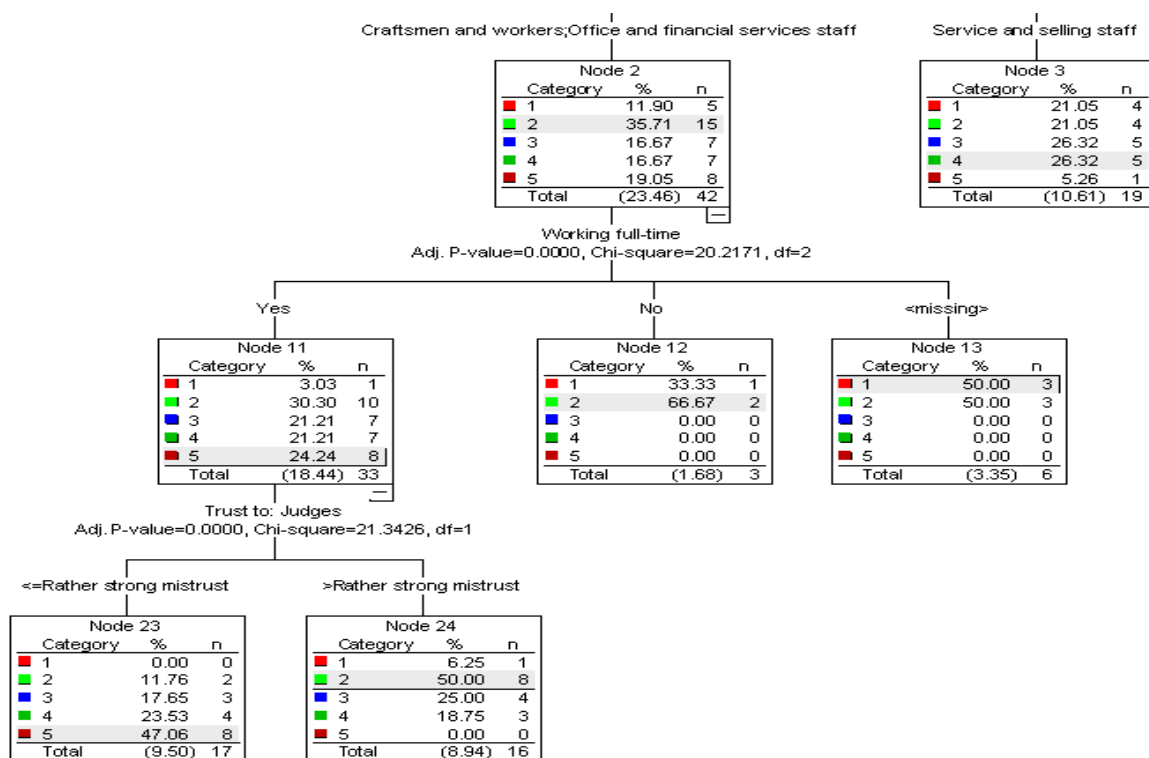| Category	%	n
1	0.00	0
2	0.00	0
3	0.00	0
4	20.00	1
5	80.00	4
Total	(2.79)	5

Node 17

Category	%	n
1	0.00	0
2	22.22	2
3	44.44	4
4	22.22	2
5	11.11	1
Total	(5.03)	9

Source: Data from Survey on Civilization Competences, 2009.

Graph 8. The answer tree for quintile income groups – part of the second level (2)

Craftsmen and workers;Office and financial services staff | Service and selling staff

Node 2

Category	%	n
1	11.90	5
2	35.71	15
3	16.67	7
4	16.67	7
5	19.05	8
Total	(23.46)	42

Node 3

Category	%	n
1	21.05	4
2	21.05	4
3	26.32	5
4	26.32	5
5	5.26	1
Total	(10.61)	19

Working full-time
Adj. P-value=0.0000, Chi-square=20.2171, df=2

Yes | No | <missing>

Node 11

Category	%	n
1	3.03	1
2	30.30	10
3	21.21	7
4	21.21	7
5	24.24	8
Total	(18.44)	33

Node 12

Category	%	n
1	33.33	1
2	66.67	2
3	0.00	0
4	0.00	0
5	0.00	0
Total	(1.68)	3

Node 13

Category	%	n
1	50.00	3
2	50.00	3
3	0.00	0
4	0.00	0
5	0.00	0
Total	(3.35)	6

Trust to: Judges
Adj. P-value=0.0000, Chi-square=21.3426, df=1

<=Rather strong mistrust | >Rather strong mistrust

Node 23

Category	%	n
1	0.00	0
2	11.76	2
3	17.65	3
4	23.53	4
5	47.06	8
Total	(9.50)	17

Node 24

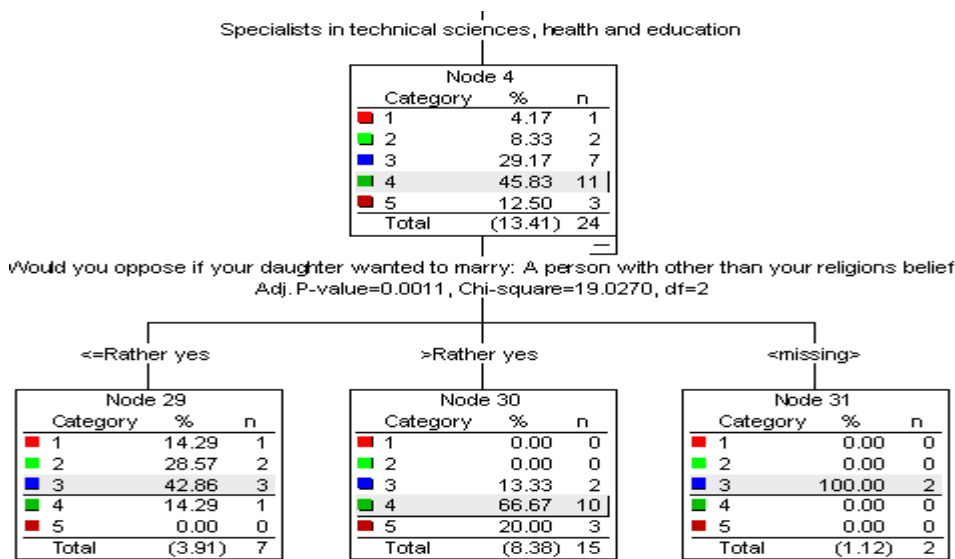| Category	%	n
1	6.25	1
2	50.00	8
3	25.00	4
4	18.75	3
5	0.00	0
Total	(8.94)	16

Source: Data from Survey on Civilization Competences, 2009.

It is interesting that people who strongly trust judges are in the same quintile income group as people who declare very strong mistrust for them. It shows that the income status does not strongly affect people's sentiments such as trust. It is worth mentioning again that *Farmers and fishermen and Ancillary workers* compose the poorest profession group (almost 85 percent of them belong to the first two income groups).
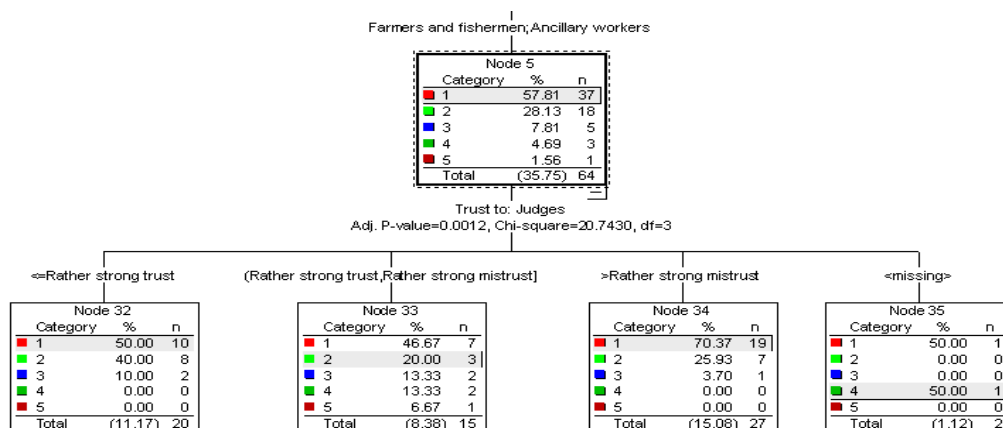
Graph 9. The answer tree for quintile income groups – part of the second level (3)

Specialists in technical sciences, health and education

Node 4		
Category	%	n
1	4.17	1
2	8.33	2
3	29.17	7
4	45.83	11
5	12.50	3
Total	(13.41)	24

Would you oppose if your daughter wanted to marry: A person with other than your religions belief
Adj. P-value=0.0011, Chi-square=19.0270, df=2

<=Rather yes

Node 29		
Category	%	n
1	14.29	1
2	28.57	2
3	42.86	3
4	14.29	1
5	0.00	0
Total	(3.91)	7

>Rather yes

Node 30		
Category	%	n
1	0.00	0
2	0.00	0
3	13.33	2
4	66.67	10
5	20.00	3
Total	(8.38)	15

<missing>

Node 31		
Category	%	n
1	0.00	0
2	0.00	0
3	100.00	2
4	0.00	0
5	0.00	0
Total	(1.12)	2

Source: Data from Survey on Civilization Competences, 2009.

Graph 10. The answer tree for quintile income groups – part of the second level (4)

Farmers and fishermen;Ancillary workers

Node 5		
Category	%	n
1	57.81	37
2	28.13	18
3	7.81	5
4	4.69	3
5	1.56	1
Total	(35.75)	64

Trust to: Judges
Adj. P-value=0.0012, Chi-square=20.7430, df=3

<=Rather strong trust

Node 32		
Category	%	n
1	50.00	10
2	40.00	8
3	10.00	2
4	0.00	0
5	0.00	0
Total	(11.17)	20

(Rather strong trust,Rather strong mistrust]

Node 33		
Category	%	n
1	46.67	7
2	20.00	3
3	13.33	2
4	13.33	2
5	6.67	1
Total	(8.38)	15

>Rather strong mistrust

Node 34		
Category	%	n
1	70.37	19
2	25.93	7
3	3.70	1
4	0.00	0
5	0.00	0
Total	(15.08)	27

<missing>

Node 35		
Category	%	n
1	50.00	1
2	0.00	0
3	0.00	0
4	50.00	1
5	0.00	0
Total	(1.12)	2

Source: Data from Survey on Civilization Competences, 2009.

## 3. Social, psychological and cultural variables affecting individual's capability to save

Goals for saving

In the survey, we asked respondents about the goals for saving. They could choose between seven main goals for saving: Retirement; Buying an apartment, house or land; Children's education; Domestic equipment, car; Holidays; Family celebrations and public or religious holidays; Unexpected expenses. Respondents gave yes/no answers to each of the categories.

In most cases, both men and women save money for unexpected expenses. More than 60 percent of men save money for domestic equipment or a car. For such a reason women save money only in a little more than 40 percent of cases. Very rarely do both genders save money for retirement and for buying an apartment, house or land. It is explained by the inter-temporal choice of consumption which is heavily discounted in a very distant future as

opposed to the present. Saving to buy a house or land is affected by a very high cost of a house in relation to a current income, which discourages people from saving for a house. Houses are bought on mortgage loans but people often do not perceive repayments of loans as saving.
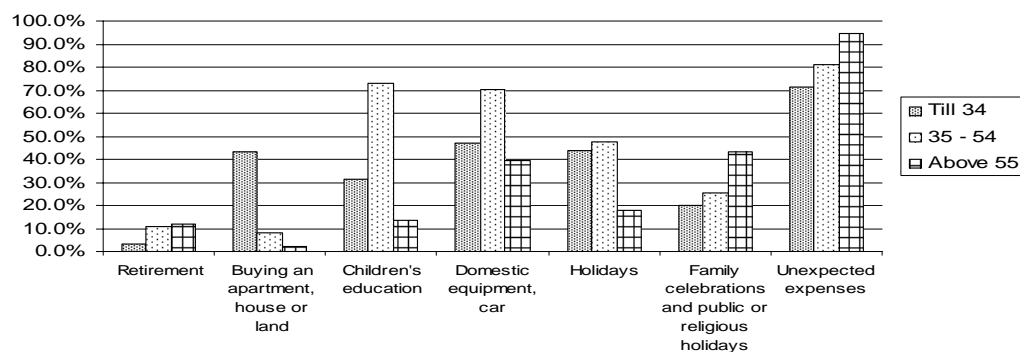
Graph 11. Goals for saving by gender
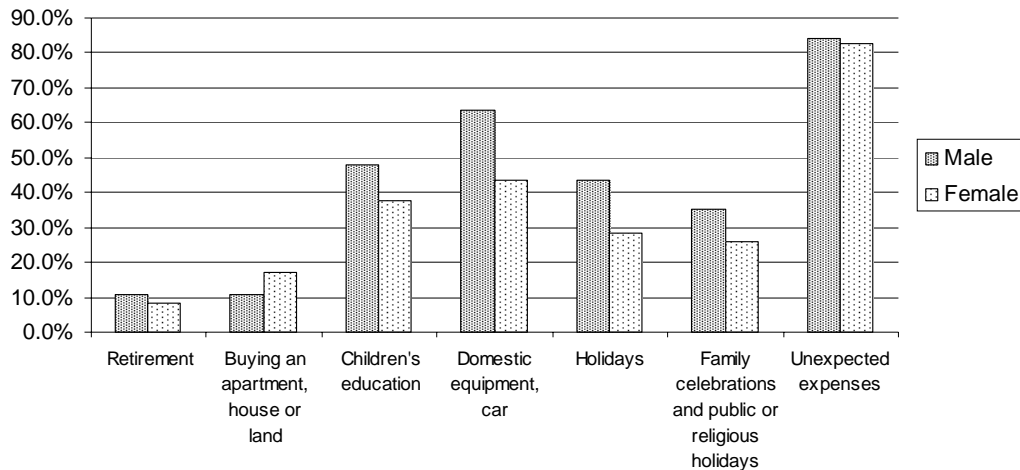
The age structure does not affect the goals for saving as may be expected due to the theory of saving. Few people save for retirement (Graph 18). The youngest people save (besides for unexpected expenses) for domestic equipment or a car. For people between the ages of 35 – 54, children's education and domestic equipment or a car are the main goals for saving. People at the age of 55 and above save relatively more often than others for family celebrations and public or religious holidays.

Among people with primary/vocational education, the main reason for saving is unexpected expenses (this is the highest rate – 94 percent of cases). Unexpected expenses are also the main reason for saving to two other groups of education level (secondary, and tertiary and above).

In case of different goals for saving by income groups, only people from the first quintile income group do not save for retirement. Only respondents from the first and fourth income group save for buying an apartment, house or land.
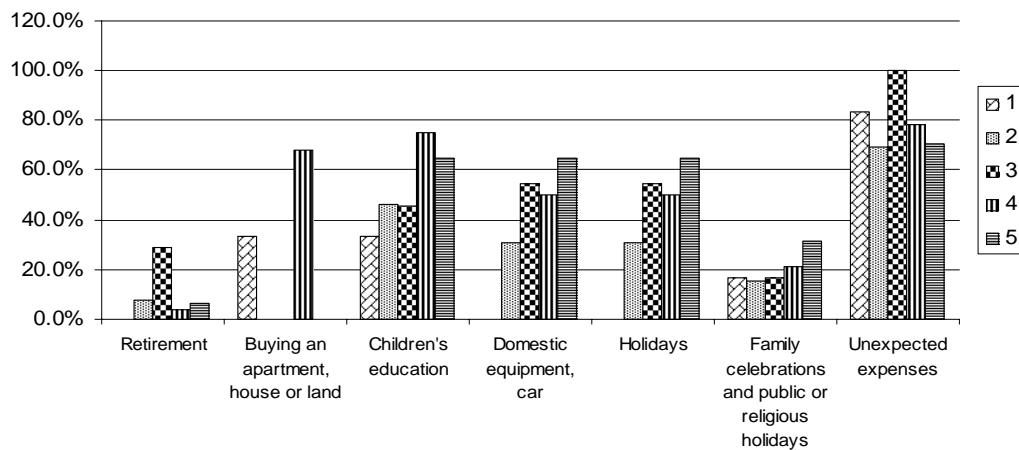
Graph 12. Goals for saving by age

Graph 13. Goals for saving by education level
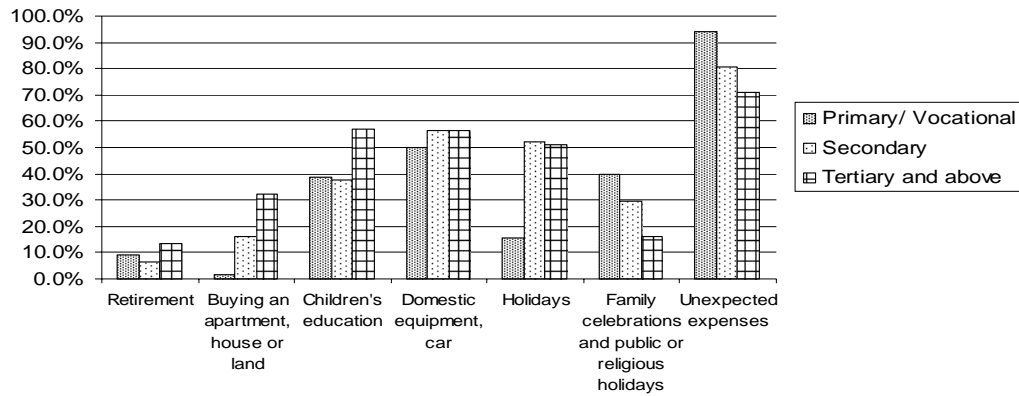
Graph 14. Goals for saving by income groups

Investment vehicles

In addition to asking about goals for saving we would like to know what kind of investment vehicles people usually choose. There were seven proposed ways of investing money, such as keeping money on deposit accounts; buying treasury bonds; buying units in investment funds or equities; buying life insurance with capital module; investing in voluntary pension plan; buying land or real estate; keeping money at home. Respondents gave yes/no answers to each of these categories. The survey was conducted in July-September 2009 which was a time of a world-wide financial crisis, but in Poland there was only a slowdown. Most respondents (men and women) choose keeping money on deposit accounts as a priority, and keeping money at home was their second choice. Only 7 percent of men were interested in buying treasury bonds. Life insurance is popular among women (7 percent), and none of men choose such a way of saving/investing.

All age groups of respondents choose keeping money on deposit accounts as a priority. Young people up to 34 years of age prefer keeping money on deposit accounts or at home, buying life insurance or real estate. No respondents from this group choose investing via investment funds or buying equities. This result looks strange, as young people are expected to invest in more modern financial vehicles than bank deposits. It may be explained by the fact that young people save mainly for a house and may keep money on a bank account to be able to take a mortgage loan.

Graph 15. Investment vehicles by gender
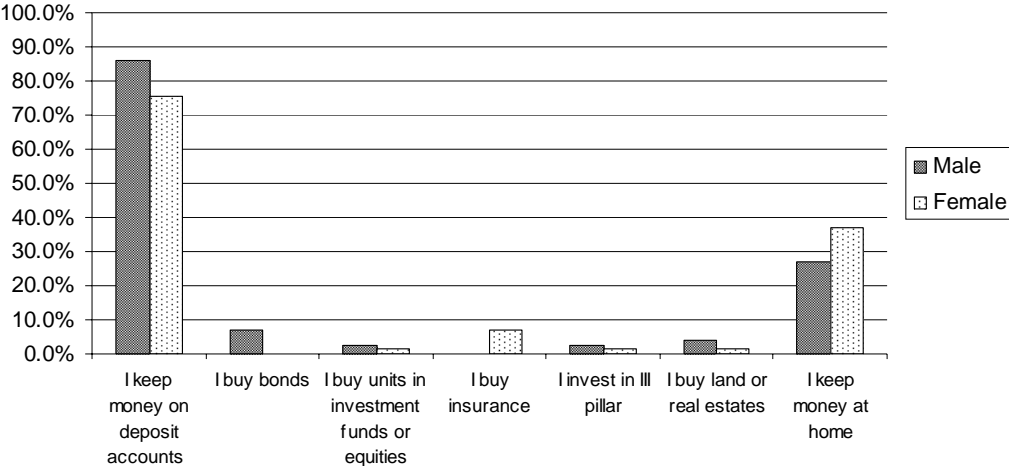
Graph 16. Investment vehicles by age
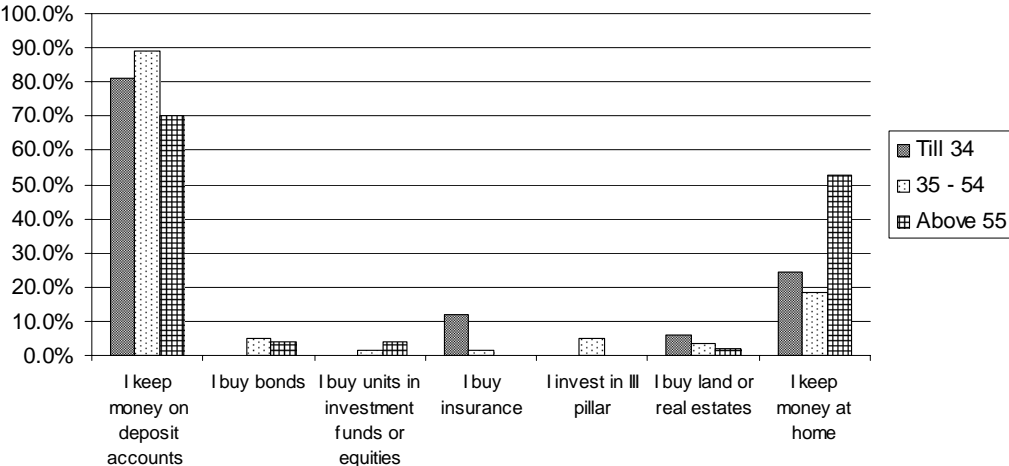
People at the age of 35 – 54 prefer keeping money on deposit accounts as well (89 percent). They invest their money in all financial instruments, although in case of life insurance or investment funds their investments are very small (2 percent in each case). People above 55 years of age more often than other groups keep money at home besides saving via deposit accounts.

Graph 17. Investment vehicles by education level
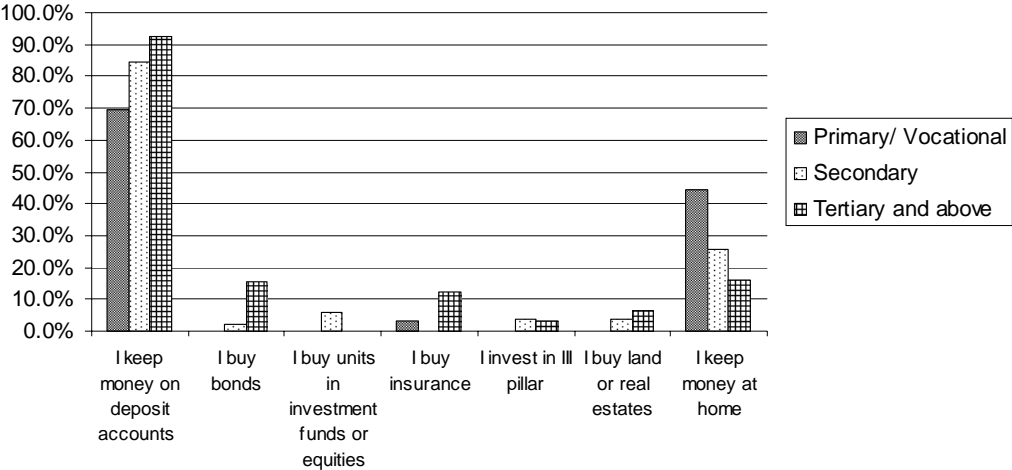
People with primary/vocational education do not invest money in treasury bonds, investment funds or equities, voluntary pension plans or buying real estates. Among people with secondary education life insurance is not popular. Other investment instruments are more popular, deposit accounts being the most common. People with tertiary education do not invest in investment funds or equities, which is in contrast to the expected behavior of this group.

The poorest (the first and second income quintile group) usually choose keeping money on deposit accounts or at home. The richest (the fourth and fifth income quintile groups) prefer buying treasury bonds, investment and pension funds as well as land. Their behavior towards investing in relatively safe financial instruments may be affected by higher funds at their disposal, hence the risk aversion.

In case of answer tree for saving, the risk estimate with all splits available is 0.212425, indicating that if we use the decision rule based on the tree, we will classify 79 percent of cases correctly. SE of Risk Estimate for this answer tree is 0.0183104.

Graph 18. Investment vehicles by income quintile groups
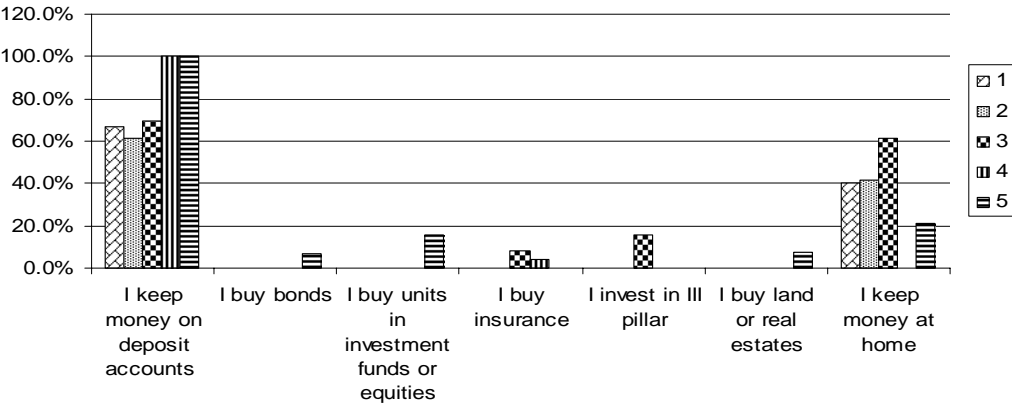
The answer tree for savings covers 499 respondents who provide an answer to the question about savings. The majority of the group responding to the question do not save (344 cases – 70 percent). The first split is based on a variable *To which of the groups mentioned do you belong in terms of the profession you perform/ performed?* The split is into 6 groups: Node 59 (*Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff*), Node 60 (*Farmers and fishermen*), Node 61 (*Government representatives, officials and managers; Specialists in technical sciences, health and education; Office and financial service staff*), Node 62 (*Machine operators*), Node 63 (*Armed forces*), Node 64 (*missing*).

The majority of respondents from Node 59 (*Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff*) do not save. Node 59 is split into six child nodes, based on a variable *From the list of activities that people may do, please respond if you would: Cheat at exams. Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff* who respond that they would cheat, save in 47 percent of cases. Those answering that they would rather not cheat save in a smaller share (44 percent, Node 166). People who feel that they would rather cheat (Node 165) during an exam do not save in 74 percent of cases.

The lowest share of savers is likely among people who declare that they would not absolutely cheat during the exam (only 13 percent of these people do save). The likely correlation between saving and cheating looks strange at first glance. Saving is treated as a decent activity and a far-sighted decision. Generally, people who save are perceived as rational and rather honest. Cheating at exams does not match this picture. But if cheating at exams helps people in reaching their life goals (a diploma, future higher income), it may be a sign of success for which they behave in an unacceptable way.

Node 165 (*Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff* providing "rather yes" answer for cheating at exams) is split based on the question about ways of looking for a job. People who read job advertisements in newspapers or in the Internet in 100 percent of cases do not save, and one third of people who do not read job advertisements do save. The group of people who do not provide an answer to this question (Node 186 missing) is split based on a question: *In case of making an important life decision and needing an advice of somebody, would you count on: Priest.* People who would rely on advice of a priest save more frequently than people who would not certainly rely on a priest's advice.

Node 166 (answer – rather no for cheating at exams) is split based on a question: *From what kind of sources did your household gain any money in the last 12 months: Own business.* Entrepreneurs save more frequently (75 percent). Those who didn't receive money from their own business in the last 12 months save in 42 percent (Node 172). Entrepreneurs save due to higher risk in running own business and lower income predictability in the future.

Node 172 is split based on a variable: *From the list of activities that people may do, please respond if you would forge somebody's signature.* Those who would certainly not forge the signature save more frequently, contrary to the results concerning cheating at the exam. It may mean that for *Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff* respondents forging signature is a greater offence than cheating.

Those who would absolutely not cheat at an exam (Node 167) do not save. Those without opinion on cheating, but who would count on help or advice of their neighbors (Node 175) usually do not save. Those who are indifferent as to whether they would cheat at an exam and who could not count on help or advice of their neighbors save in 35 percent (Node 176).

Graph 19. The answer tree for savings – part of the second level (1)
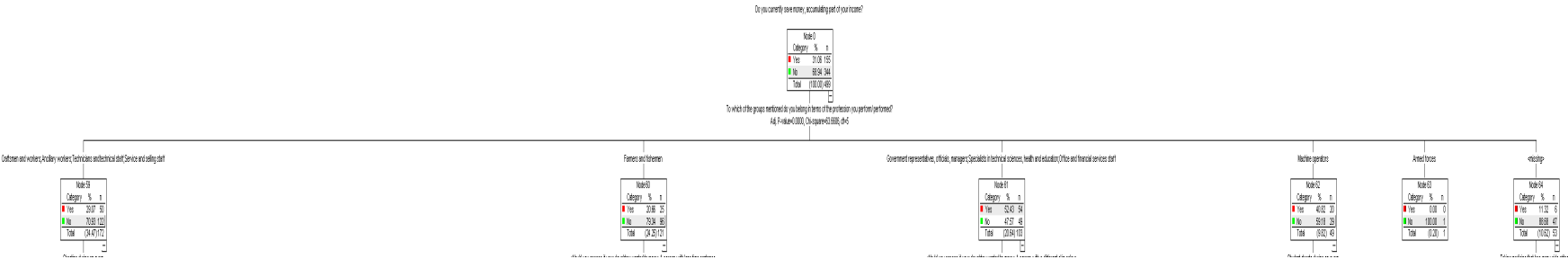
Source: Data from Survey on Civilization Competences, 2009.

Graph 20. The answer tree for savings – part of the second level (2)
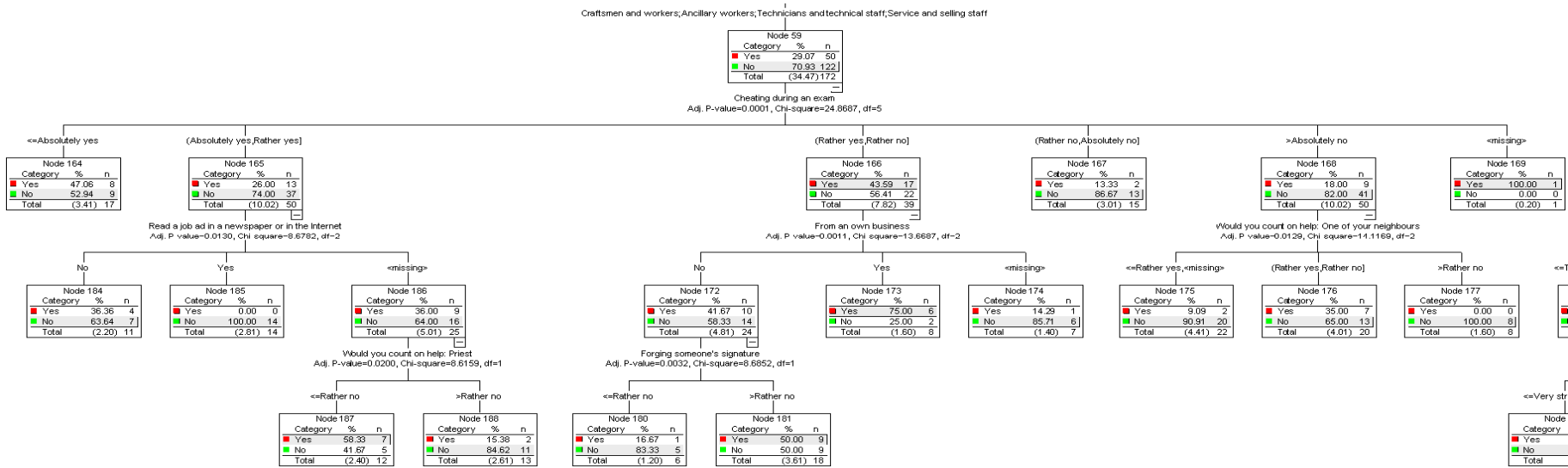
Source: Data from Survey on Civilization Competences, 2009.

The majority of respondents from *Farmers and fishermen* (Node 60) do not save (79 percent). Node 60 is split based on a variable: *Would you oppose if your daughter wanted to marry: A person with a judicia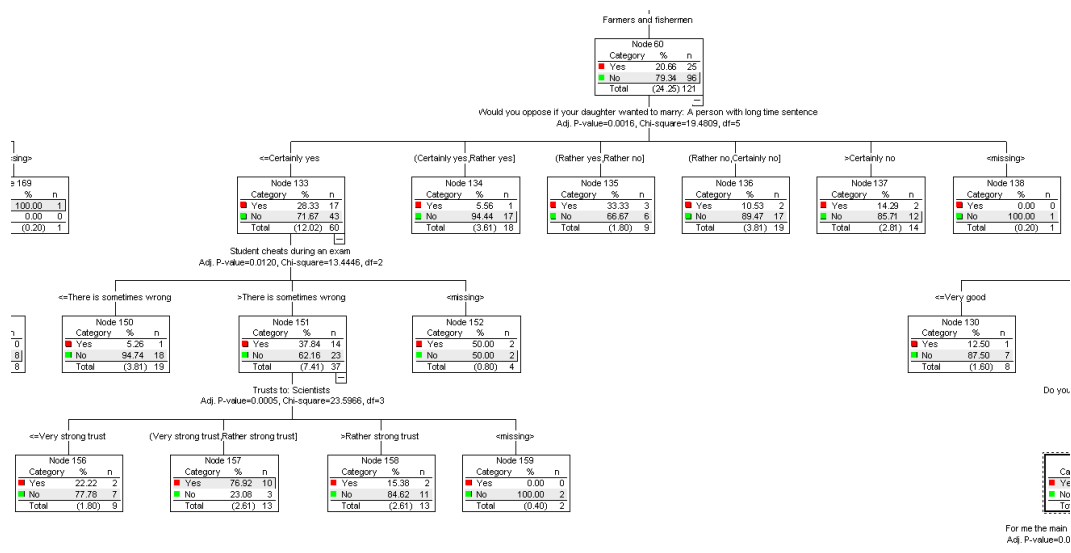l sentence.* The highest share of people who save (33 percent) is observed among those who respond that they would rather not oppose in such a situation (Node 135). Those who would certainly oppose (being less tolerant) (Node 133) save less frequently (28 percent).

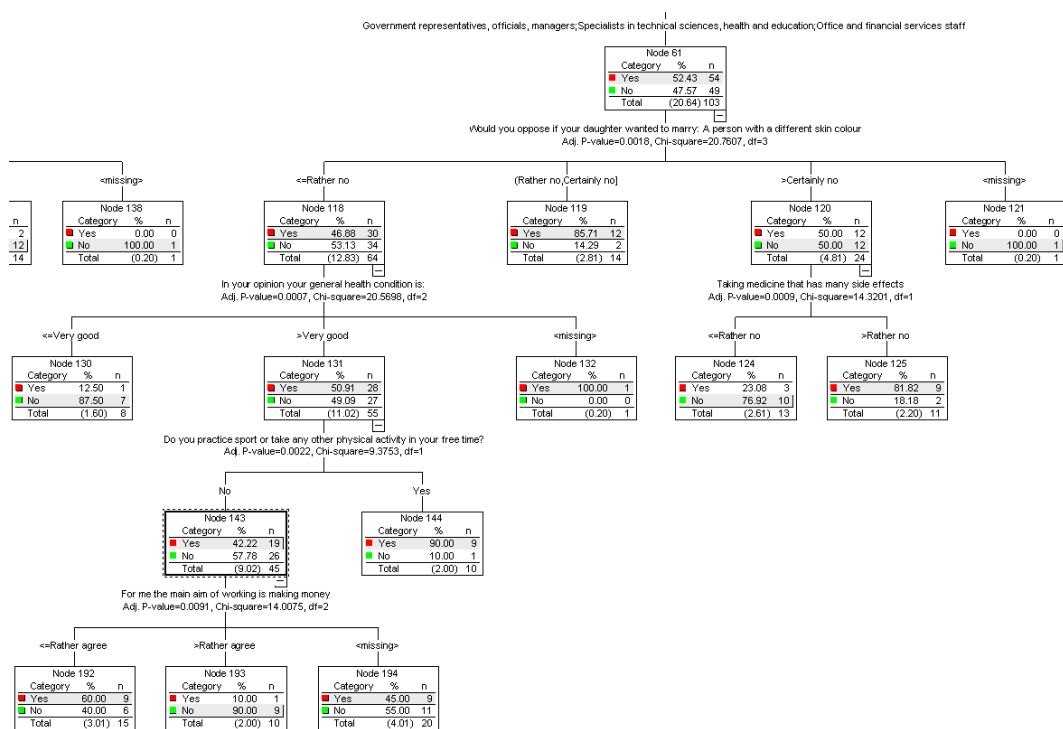Graph 21. The answer tree for savings – part of the second level (3)

The group of farmers who oppose their daughter marrying a person with a judicial sentence (Node 133) is split based on an evaluation of students cheating at exams. The majority in Node 151 of those who respond that there is almost always or always something wrong in cheating would not save (62 percent). Those who choose the answers that there is nothing wrong or that it is only sometimes wrong to cheat save in a very small percent of cases (Node 150). In this case those who perceive cheating by other people at exams as something wrong would save more than those who think that there is nothing wrong in students cheating at exams.

Node 151 (There is always something wrong in cheating at exams) is split based on a question: *Could you please estimate your trust in: Scientists.* Those who trust scientists rather strongly save more frequently (77 percent, Node 157) than others.

The Government representatives, officials and managers; Specialists in technical sciences, health and education; Office and financial services staff (Node 61) form a unique group of which the majority save (52 percent of people save). The Node 61 is split based on a variable: *Would you oppose if your daughter wanted to marry: A person with a different skin color.* Those who would oppose save less frequently (around 50% - Node 118) than those who would certainly not oppose marrying their daughter to a person with a different skin color (86 of them save – Node 119).

Graph 22. The answer tree for savings – part of the second level (4)

Government representatives, officials, managers;Specialists in technical sciences, health and education;Office and financial services staff

Node 61		
Category	%	n
■ Yes	52.43	54
■ No	47.57	49
Total	(20.64)	103

Would you oppose if your daughter wanted to marry: A person with a different skin colour
Adj. P-value=0.0018, Chi-square=20.7607, df=3

<missing>

n
2
12
14

<=Rather no

Node 138		
Category	%	n
■ Yes	0.00	0
■ No	100.00	1
Total	(0.20)	1

Node 118		
Category	%	n
■ Yes	46.88	30
■ No	53.13	34
Total	(12.83)	64

(Rather no,Certainly no]

Node 119		
Category	%	n
■ Yes	85.71	12
■ No	14.29	2
Total	(2.81)	14

>Certainly no

Node 120		
Category	%	n
■ Yes	50.00	12
■ No	50.00	12
Total	(4.81)	24

<missing>

Node 121		
Category	%	n
■ Yes	0.00	0
■ No	100.00	1
Total	(0.20)	1

In your opinion your general health condition is:
Adj. P-value=0.0007, Chi-square=20.5698, df=2

Taking medicine that has many side effects
Adj. P-value=0.0009, Chi-square=14.3201, df=1

<=Very good

Node 130		
Category	%	n
■ Yes	12.50	1
■ No	87.50	7
Total	(1.60)	8

>Very good

Node 131		
Category	%	n
■ Yes	50.91	28
■ No	49.09	27
Total	(11.02)	55

<missing>

Node 132		
Category	%	n
■ Yes	100.00	1
■ No	0.00	0
Total	(0.20)	1

<=Rather no

Node 124		
Category	%	n
■ Yes	23.08	3
■ No	76.92	10
Total	(2.61)	13

>Rather no

Node 125		
Category	%	n
■ Yes	81.82	9
■ No	18.18	2
Total	(2.20)	11

Do you practice sport or take any other physical activity in your free time?
Adj. P-value=0.0022, Chi-square=9.3753, df=1

No

Node 143		
Category	%	n
■ Yes	42.22	19
■ No	57.78	26
Total	(9.02)	45

Yes

Node 144		
Category	%	n
■ Yes	90.00	9
■ No	10.00	1
Total	(2.00)	10

For me the main aim of working is making money
Adj. P-value=0.0091, Chi-square=14.0075, df=2

<=Rather agree

Node 192		
Category	%	n
■ Yes	60.00	9
■ No	40.00	6
Total	(3.01)	15

>Rather agree

Node 193		
Category	%	n
■ Yes	10.00	1
■ No	90.00	9
Total	(2.00)	10

<missing>

Node 194		
Category	%	n
■ Yes	45.00	9
■ No	55.00	11
Total	(4.01)	20

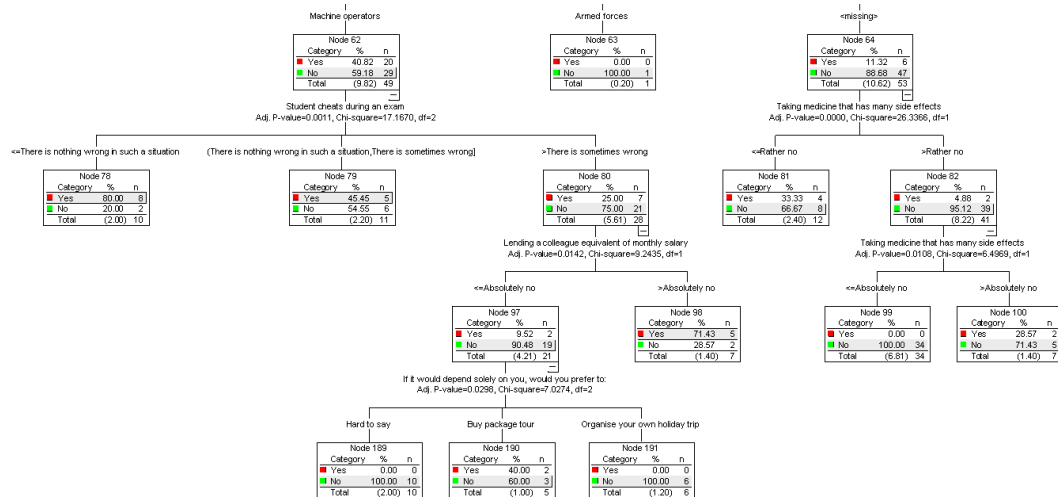Source: Data from Survey on Civilization Competences, 2009.

The group opposing their daughter to marry a person with a different skin color (Node 118) is split based on a question about the evaluation of general health condition of the responding person. People who judge their health as very good save only in 13 percent of cases (Node 130). Those who think that their health condition is good, less than good or bad save more frequently – in 51 percent of cases (Node 131). People who find their general health condition not good may think more about the future and increasing expenses for medical care, taking also into account that they might have less possibilities to earn money due to poor health. The group evaluating their health as not very good (Node 131) is split based on a variable: *Do you practice sports or perform any physical activity in your free time.* More active people save in 90 percent of cases (Node 144). Only 42 percent of inactive people (Node 143) save.

The group of people inactive in sports (Node 143) is split based on a variable: *the main reason for working: making money.* People who fully agree and rather agree with this statement save more frequently (Node 192, 60 percent) than those who do not agree (Node 193, 10 percent do save).

Going back to the question about opposing daughter marrying a person with a different skin color, people who do not have an opinion on this subject save in 50 percent of cases (Node 120).

This group of people (Node 120) is split based on a variable: *From the list of activities that people may do, please respond if you would: Take medicines with many side effects.* Those who respond that they would take medicine with many side effects save less frequently (23 percent of cases - Node 124) than those who would certainly not take such medicines (82 percent of them save – Node 125). It may signify that people who are more risk averse save more.

Graph 23. The answer tree for savings – part of the second level (5)

Source: Data from Survey on Civilization Competences, 2009.

Machine operators (Node 62) are the second profession group declaring saving. Node 62 is split based on an evaluation of students cheating at exams. The majority of those who respond that there is nothing wrong in cheating would save (80 percent – Node 78). Those who choose to answer that it is always wrong to cheat save in much smaller percent of cases (Node 80, 25 percent). Again, similarly to those who would cheat at exams themselves, those who do not perceive cheating by other people at exams as something wrong would save more.

The group believing that it is always wrong to cheat (Node 80) is split based on a variable: *From the list of activities that people may do, please respond if you would: Lend a friend the equivalent of monthly salary.* Those who do not have an opinion on this subject save in 71 percent (Node 98). Others save only in 10 percent (Node 97). The group of people who provide other answers than "hard to say" to a question about lending money (Node 97) is split based on a variable: *If it would depend solely on you, would you prefer to buy a package tour or organize the trip on your own.* Those who would buy a package tour save more frequently (40 percent - Node 190) than others.

4. Conclusions

In this paper we identified the demographic, human capital, social, cultural, and psychological variables that we claimed affect the individual's capability to earn income and save. The analysis was based on a survey of 500 respondents. The sample was randomly selected for one local municipality in Poland. We used a method of decision tree (Exhaustive search Chi – squared Automatic Interaction Detection) to identify the earning and saving competences of individuals in Poland.

The standard demographic and human capital determinants of earning and saving competences such as age, gender, education as well as goals for saving and financial instruments used to invest savings brought the expected results for income levels and saving decisions of particular groups of respondents.

Middle age groups (35-55 years), males and persons with tertiary education earn relatively more than others and they prevail in higher quintile income groups. They also declare saving more often than other groups (i.e. older and younger groups, females, secondary and primary educated respondents). Middle age groups, males and persons with tertiary education manifest quite traditional saving behaviors. They save money on deposit accounts more often than

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other groups but save less often than others for unexpected events. Instead, they save more often for domestic equipment, children's education, for holidays and for buying an apartment (only fourth quintile income group).

The results of the decision tree analysis have shown other economic, social, cultural and psychological factors that are conducive, neutral or not conducive for earning and saving. Using the decision tree we found factors which are not often identified in the context of saving. These are: fairness, tolerance, trust, social risk aversion, own health evaluation or readiness to ask for advice.

Earning competence is positively correlated with professions requiring high qualifications, entrepreneurship and with full-time employment. But trusting judges and religious tolerance are other important factors that are conducive for obtaining high income.

Some results are going against expectations, e.g. cheating at exams seems to be positively correlated with saving. On the other hand readiness to forge a signature is negatively correlated with saving. Tolerance towards persons of different religion, different skin color or towards persons with a judicial sentence is conducive for saving, as is trust in judges and scientists.

Socially based risk aversion, e.g. lending a friend the equivalent of a monthly salary, seems to be neutral to saving capabilities, though people who are not decisive at this point save more. Evaluating own health condition as very good rather deters savings, but those who evaluate their health status as less than good and also practice sports save more. Asking neighbors or priests for advice is conducive for saving as well as buying a vacation package tour instead of organizing a trip on her/his own.

Variables listed in the decision tree seem more significant for earning and saving competence than the standard demographic and human capital determinants such as age, gender or education level which did not appear in the answer tree although they were used as predictors. We then conclude that the earning and saving competence of an individual is based as much on social, cultural and psychological attitudes as on demographic and human capital variables. It is in line with Katona when saving capability is concerned but differs in the sphere of earning ability of a person.

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Appendix. Detailed information about the model (answer trees)

To identify the social, psychological and cultural variables that affect individual's capability to earn and save we chose variables from the survey as listed below. Two answer trees with two target variables, one for income and one for savings, were calculated. Predictors in both cases were the same (the full list below).

Target:

- **Quintile income group**

- **Do you currently save money from your income?**

Predictors (available in the article by Nodes)

Answer tree for income

- Node 0 – To which of the groups mentioned do you belong in terms of the profession you perform/ performed?
- Node 1 – Professions such as Government representatives, officials, managers; Technicians and technical staff; Machine operators;
- Node 2 – Professions such as Office and financial services staff; Craftsmen and workers
- Node 3 – Professions such as Service and selling staff
- Node 4 – Professions such as Specialists in technical sciences, health and education;
- Node 5 – Professions such as Farmers and fishermen; Ancillary workers
- Node 11 – What is your current professional situation? Working full-time - Yes
- Node 12 – What is your current professional situation? Working full-time - No
- Node 13 – What is your current professional situation? Working full-time - missing
- Node 14 – How often do you use the computer for: Gaining information and knowledge - Very often
- Node 15 – How often do you use the computer for: Gaining information and knowledge - Often
- Node 16 – How often do you use the computer for: Gaining information and knowledge - Seldom; Never; Hard to say
- Node 17 – How often do you use the computer for: Gaining information and knowledge - missing
- Node 23 – Could you please estimate your trust in: Judges - Very strong trust; Rather strong trust; Rather strong mistrust
- Node 24 – Could you please estimate your trust in: Judges - Very strong mistrust; Hard to say
- Node 29 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - Certainly yes; Rather yes
- Node 30 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - Rather no; Certainly no; Hard to say
- Node 31 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - missing
- Node 32 – Could you please estimate your trust in: Judges - Very strong trust; Rather strong trust;
- Node 33 – Could you please estimate your trust in: Judges - Rather strong mistrust
- Node 34 – Could you please estimate your trust in: Judges - Very strong mistrust; Hard to say
- Node 35 – Could you please estimate your trust in: Judges - missing

Answer tree for savings

- Node 0 – To which of the groups mentioned do you belong in terms of the profession you perform / performed?
- Node 59 – Professions such as Craftsmen and workers; Ancillary workers; Technicians and technical staff; Service and selling staff
- Node 60 – Professions such as Farmers and fishermen
- Node 61 – Professions such as Government representatives, officials and managers; Specialists in technical sciences, health and education; Office and financial service staff
- Node 62 – Professions such as Machine operators
- Node 63 – Professions such as Armed forces
- Node 64 – Professions such as missing
- Node 78 – From the list of activities that people may do, please respond if you would: Cheat at exams - There is nothing wrong with such a situation;

- Node 79 – From the list of activities that people may do, please respond if you would: Cheat at exams - It is sometimes wrong;
- Node 80 – From the list of activities that people may do, please respond if you would: Cheat at exams - It is almost always or always wrong; Hard to say
- Node 81 – From the list of activities that people may do, please respond if you would: Take medicine with many side effects. - Absolutely yes; Rather yes; Rather no
- Node 82 – From the list of activities that people may do, please respond if you would: Take medicine that with side effects - Absolutely no; Hard to say
- Node 97 – From the list of activities that people may do, please respond if you would: Lend a friend the equivalent of monthly salary- Absolutely yes; Rather yes; Rather no; Absolutely no
- Node 98 – From the list of activities that people may do, please respond if you would: Lend a friend the equivalent of monthly salary - Hard to say
- Node 99 – From the list of activities that people may do, please respond if you would: Take medicine with many side effects. - Absolutely yes; Rather yes; Rather no; Absolutely no
- Node 100 – From the list of activities that people may do, please respond if you would: Take medicine with many side effects - Hard to say
- Node 118 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - Certainly yes; Rather yes; Rather no
- Node 119 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - Certainly no
- Node 120 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - Hard to say
- Node 121 – Would you oppose if your daughter wanted to marry: a person with religious beliefs other than yours - missing
- Node 130 – In your opinion, your general health condition is - Very good
- Node 131 – In your opinion, your general health condition is - Good; Either good or bad; Bad; Very bad; Hard to say
- Node 132 – In your opinion, your general health condition is: missing
- Node 133 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence - Certainly yes
- Node 134 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence - Rather yes; Rather no; Certainly no; Hard to say
- Node 135 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence - Rather no; Certainly no; Hard to say
- Node 136 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence - Certainly no; Hard to say
- Node 137 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence - Hard to say
- Node 138 – Would you oppose if your daughter wanted to marry: A person with a judicial sentence – missing
- Node 143 - Do you practice sports or perform any other physical activity in your free time?- No
- Node 144 - Do you practice sports or perform any other physical activity in your free time?- Yes
- Node 150 – From the list of activities that people may do, please respond if you would: Cheat at exams - There is nothing wrong with such a situation; It is sometimes wrong
- Node 151 – From the list of activities that people may do, please respond if you would: Cheat at exams - It is almost always or always wrong; Hard to say
- Node 152 – From the list of activities that people may do, please respond if you would: Cheat at exams - missing
- Node 156 – Could you please estimate your trust in: Scientists - Very strong trust
- Node 157 – Could you please estimate your trust in: Scientists - Rather strong trust;
- Node 158 – Could you please estimate your trust in: Scientists - Rather strong mistrust; Very strong mistrust; Hard to say
- Node 159 – Could you please estimate your trust in: Scientists - missing
- Node 164 – From the list of activities that people may do, please respond if you would: Cheat at exams – Absolutely yes
- Node 165 – From the list of activities that people may do, please respond if you would: Cheat at exams – Rather yes

- Node 166 – From the list of activities that people may do, please respond if you would: Cheat at exams – Rather no
- Node 167 – From the list of activities that people may do, please respond if you would: Cheat at exams – Absolutely no
- Node 168 – From the list of activities that people may do, please respond if you would: Cheat at exams – Hard to say
- Node 169 – From the list of activities that people may do, please respond if you would: Cheat at exams – missing
- Node 172 – From what kind of sources did your household gain any money in the last 12 months – Own business - No
- Node 173 – From what kind of sources did your household gain any money in the last 12 months – Own business - Yes
- Node 174 – From what kind of sources did your household gain any money in the last 12 months – Own business - missing
- Node 175 – In case of making an important life decision and needing advice, would you count on: One of your neighbors - Certainly yes; Rather yes; missing
- Node 176 – In case of making an important life decision and needing advice, would you count on: One of your neighbors - Rather no
- Node 177 – In case of making an important life decision and needing advice, would you count on: One of your neighbors - Certainly no; Hard to say
- Node 180 – From the list of activities that people may do, please respond if you would forge somebody's signature - Certainly yes; Rather yes; Rather no
- Node 181 – From the list of activities that people may do, please respond if you would forge somebody's signature - Certainly no; Hard to say
- Node 184 – While searching for a job, people perform some activities. From the list below, could you please choose activities that you have performed during a job search: read job advertisements in newspapers or in the Internet - No
- Node 185 – While searching for a job, people perform some activities. From the list below could you please choose activities that you have performed during a job search: read job advertisements in newspapers or in the Internet - Yes
- Node 186 – While searching for a job, people perform some activities. From the list below could you please choose activities that you have performed during a job search: read job advertisements in newspapers or in the Internet - missing
- Node 187 – In case of making an important life decision and needing advice, would you count on: A priest - Certainly yes; Rather yes; Rather no
- Node 188 – In case of making an important life decision and needing advice, would you count on: One of your neighbors - Certainly no, Hard to say
- Node 192 – From the list of statements, please choose the ones that you agree or disagree with: For me the main aim of working is making money - Fully agree; Rather agree
- Node 193 - From the list of statements, please choose the ones that you agree or disagree with: For me the main aim of working is making money - Rather disagree; 4 - Fully disagree; 8 - Hard to say
- Node 194 - From the list of statements, please choose the ones that you agree or disagree with: For me the main aim of working is making money - missing

Predictors (not present in the article by question groups)

Predictors with choosing one answer:

- **What was the main reason for the last move?** (1 – Studies; 2 – Work; 3 - Family issues; 4 - Health issues; 5 - Receiving/ buying a new house/ flat; 6 – Others; 8 - Hard to say).
- **In the next 6 months do you intend to move to a place other than the one you live in?** (1 – Yes; 2 – No; 8 - Hard to say).
- **Are/ were you the owner or co-owner of the company or are/ were you employed in this company?** (1 – Owner or co-owner, 2 – Employee).
- **To what extent are you satisfied or dissatisfied with the work you currently perform?** (1 - Fully satisfied; 2 - Rather satisfied; 3 - Rather dissatisfied; 4 - Fully dissatisfied; 8 - Hard to say).
- **Have you participated in any courses or training related to the current work for the past 12 months, regardless of who financed them?** (1 – Yes, 2 – No).
- **Do you currently run your own registered business?** (1 – Yes, 2 – No).

▪ **What is your highest achieved level of education?** (1 – Primary; 2 - Low secondary; 3 – Vocational; 4 - Secondary vocational; 5 – Secondary; 6 - Post secondary non tertiary; 7 - Not finished tertiary; 8 - Bachelor/ engineer; 9 - MA/ medical; 10 – PhD).

▪ **In your opinion, do better educated people have a chance to get a better job in the future?** (1 - Absolutely yes; 2 - Rather yes; 3 - Rather no; 4 - Absolutely no; 8 - Hard to say).

▪ **In general do you think that:** (1 - You can trust almost all people; 2 - You can trust most people; 3 - You can not trust almost all people; 4 - You can not trust almost anyone; 8 - Hard to say).

▪ **In case of buying equities, you would purchase equities that:** (1 - You would buy equities, that give huge profit, but they are risky; 2 - You would buy equities that give small profit but they are safe; 8 - Hard to say).

▪ **Do you have voluntary life insurance?** (1 – Yes, 2 – No, 3 – Do not know).

▪ **Do you have accident insurance?** (1 – Yes, 2 – No).

▪ **Do you have voluntary health insurance?** (1 – Yes, 2 – No).

▪ **Is the apartment/ house you live in insured?** (1 – Yes, 2 – No, 8 – Do not know).

▪ **Do you have a mobile phone**? (1 – Yes, 2 – No).

▪ **Do you smoke?** (1 – Yes, 2 – No).

▪ **If it would depend solely on you, would you prefer to:** (1 – Organize a holiday trip on your own; 2 - Buy package tour; 8 – Hard to say).

Predictors with yes/ no answers to each of categories:

▪ **What is your current professional situation?** (B - I work part – time; C – I work occasionally; D – I am on maternity/ parental leave; E – I am retired/ on disability pension; F - I study; G – I do not work and do not search for a job; H – I do not work but search for a job).

▪ **While searching for a job, people perform some activities. From the list below could you please choose activities that you have performed during a job search** (A - I have registered in an employment office; B – I have registered in a private work agency; D – I have searched for work by connections; E - I have sent job applications to employers; F – I have attended professional training to gather more job skills; G – I have not taken any actions but I am waiting for some kind of proposals; H – I have decided to set up my own business).

▪ **From what kind of sources did your household gain any money in the last 12 months:** (A- Remuneration (from employment contract) of any household member; C -Working at a farm; D – Rent land and properties or owning deposits, equities, bonds, units, etc.; E – Pension; F - Disability pension; G - Unemployment benefit; H - Maintenance or family benefits; I – scholarship; J – Other benefits from social assistance). Provide yes/ no answers to each of categories.

Predictors with answers from the list of 1 - Fully agree; 2 - Rather agree; 3 - Rather disagree; 4 - Fully disagree; 8 - Hard to say to each of categories

▪ **From the list of statements, please choose the ones that you agree or disagree with** (A - In my work I set goals on my own to achieve them; C - Even in the most difficult situations I try to find the positive sides; D - If I have problems at work I can count on my family's support; E - At work I need to gain new experience).

Predictors with answers from the list of 1 - Certainly yes; 2 - Rather yes; 3 - Rather no; 4 - Certainly no; 8 - Hard to say to each of categories

▪ **In case of making an important life decision and needing advice, would you count on:** (A - Someone among relatives; B - Someone among your friends or acquaintances; E – Associate).

▪ **Would you oppose if your daughter wanted to marry:** (A- Foreigner; C - Person with religious beliefs other than yours; D - Atheist; E - Handicapped person).

▪ **To what extent these activities reflect you?** (A - I try to exercise regularly or perform physical activity; B - I eat a lot of vegetables and fruit; C - I eat meals at fixed hours; D - I go to a physician regularly to monitor my health).

▪ **From the list of activities that people may do, please respond if you would**: (A - Admit that your taste differs from the tastes of friends; D - Go on a two-week holiday abroad without booking a hotel; E - Move to a new city; F - Eat expired food products, that look good; I - Spend daily wage on slot machines; J - Take up a job where you earn only a commission on successful transactions).

Predictors with answers from the list of 1 - Very strong trust; 2 - Rather strong trust; 3 - Rather strong mistrust; 4 - Very strong mistrust; 8 - Hard to say to each of categories

▪ **Could you please estimate your trust in:** (A – Teachers; C - Politicians; E – Colleagues; F – Friends; G – Family; H – Journalists; I – Policemen)**.**

Predictors with answers from the list of 1 - There is nothing wrong in such a situation; 2 - It is sometimes wrong; 3 - It is almost always or always wrong; 8 - Hard to say to each of categories

▪ **In life there are various situations. In your opinion if:** (A - Someone is a free-rider, she/he goes without a valid ticket; B - Someone pays less taxes than they should; C - Someone buys items that are from theft; D - Someone gives bribes to an office worker to do business; E - Someone gives a bribe to a physician; F - Someone gives a bribe to a teacher; G - Someone accepts a bribe).

Predictors with answers from the list of 1 - Very often; 2 - Often; 3 - Seldom; 4 - Never; 8 - Hard to say to each of categories

▪ **How often do you use the computer for:** (A - Entertainment, such as computer games, watching movies; B - Writing various texts; C - Surfing in the Internet; E – Working).
▪ **The Internet may be used in many ways. Please estimate how often you use the Internet for:** (A – Entertainment; B - Immediate access to information; C – Access to online bank account; D – Gaining knowledge; E - Communicating with others by sending e-mail, instant messaging such as, for example, Gadu-Gadu or Skype; F – Calling; G – Shopping; H - Studying, taking online courses; I - Creating your own websites)**.**