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Unreported Income, Education and Subjective Well-Being

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INSTITUTE OF ECONOMICS
HUNGARIAN ACADEMY OF SCIENCES

MŰHELYTANULMÁNYOK **DISCUSSION PAPERS**

MT-**DP – 2010/27**

Unreported Income, Education and Subjective Well-Being

GYÖRGY MOLNÁR – ZSUZSA KAPITÁNY

INSTITUTE OF ECONOMICS, HUNGARIAN ACADEMY OF SCIENCES
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Unreported Income, Education and Subjective Well-Being

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Unreported Income, Education and Subjective Well-Being

György Molnár – Zsuzsa Kapitány

Abstract

There are two fairly widespread economic beliefs in Hungary that we investigate in this study and try to confirm or reject. People mostly see poverty and marginal labour market status as indicators of laziness and own tax evasion behaviour. People believe that the actual income of the poor and of people with disadvantageous labour market status is considerably more than that they declare. Analogous belief among highly educated people is that people with diploma have relatively less undeclared income than the others.

In this study we make an attempt to identify relative unreported income of different social groups, using survey information on subjective well-being. In this attempt we apply the connection between reported satisfaction and actual income. We cannot exactly prove that the unreported income of the poor is relatively not higher than the unreported income of others, but our results make this statement very plausible. What we can show is that taking part in informal activity is not an option, but a forced choice for the majority of the poor. Unemployed, day-workers, public workers, and people living on welfare do not have considerable undeclared income, or if they had some this is accompanied by such self-exploitation that this offsets the effect of undeclared income on subjective well-being.

We can also prove that people with diploma are in a much better and more advantageous situation than the others. Their economic, social and financial status has a considerable and positive effect on their subjective well-being. It is suggested and likely true that they have relatively more undeclared income than people without diploma. After controlling for income, activity, employment status, health state, social inclusion and relationships the education differences do not have an effect on subjective well-being, except higher education has a further, significant and considerable effect on subjective well-being.

Keywords: subjective well-being, unreported income, informal income, education, unemployment, non-employment, subjective health

JEL: D1, D12, D31, I10, I20, I30, J20, J60

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Nem bevallott jövedelem, oktatás és szubjektív jóllét

Molnár György – Kapitány Zsuzsa

Összefoglaló

A tanulmány két, Magyarországon széleskörűen elterjedt közgazdasági vélekedést próbál megerősíteni vagy megcáfolni. Sokan gondolják úgy, hogy a szegénység és a hátrányos foglalkoztatási helyzet hátterében a lustaság és az adóelkerülés áll, a szegények és a marginális munkaerő-piaci helyzetben lévők valódi jövedelme sokkal magasabb a hivatalosan bevallottnál. A másik vélekedés szerint, amely a magasabb iskolai végzettséggel rendelkezőkre jellemző, a diplomások be nem jelentett jövedelme arányaiban alacsonyabb, mint a diplomával nem rendelkezőké.

A tanulmányban különböző társadalmi csoportok be nem jelentett jövedelmének egymáshoz viszonyított arányát próbáljuk felmérni a szubjektív jóllétre vonatkozó felmérésekből származó információk segítségével. Számításaink során a kinyilvánított elégedettség és a valódi jövedelem közötti összefüggést használjuk fel. Bár nem sikerült kétséget kizáróan bebizonyítani, mégis úgy tűnik, hogy a szegények be nem vallott jövedelme arányaiban nem magasabb más csoportokénál. Az viszont egyértelműen látszik, hogy részvételük a rejtett gazdaságban – a többségük számára – nem szabad és önkéntes választás, hanem kényszer eredménye. A munkanélkülieknek, alkalmi munkából élőknek, közfoglalkoztatottaknak és segélyezetteknek nincs kiemelkedően magas be nem jelentett jövedelmük, vagy ha mégis jelentősebb be nem jelentett jövedelemmel rendelkeznek, akkor ez olyan mértékű önkizsákmányolással jár, ami semlegesíti a többlet jövedelemnek az elégedettségre gyakorolt hatását.

Szintén bizonyítjuk, hogy a diplomások a diplomával nem rendelkezőkhöz képest sokkal kedvezőbb és előnyösebb helyzetben vannak. Gazdasági, társadalmi és pénzügyi helyzetük jelentős pozitív hatást gyakorol szubjektív jóllétükre. Így arra következtethetünk, hogy nem bevallott jövedelmük arányaiban magasabb, mint az alacsonyabb végzettségűeké. A jövedelem, az aktivitás, a munkaerő-piaci helyzet, az egészségi állapot valamint a társadalmi beágyazottság és társadalmi kapcsolatok hatásának kiszűrése után az iskolai végzettségnek csak a diplomával rendelkezők esetén volt további, jelentős hatása a jóllétre.

Tárgyszavak: szubjektív jóllét, nem bevallott jövedelem, informális jövedelem, iskolai végzettség, foglalkoztatottság, szubjektív egészségi állapot

JEL: D1, D12, D31, I10, I20, I30, J20, J60

1. INTRODUCTION

During the last two decades, policymakers and researchers have devoted substantial energy to develop a better understanding of the causes and effects of economic activity within the informal economy. However, the nature of the informal sector makes it difficult to accurately measure indicators, such as income, labor market status, or social inclusion and relations. Economic policy, which is based on interpretation of these indicators can be inefficient or even harmful, and sometimes uses common beliefs about informal economy in decision making.

There are two fairly widespread beliefs even among researchers about informal activity and unreported income, which two beliefs we have investigated and we would have liked to confirm or reject. People mostly see poverty and marginal labor market status as indicators of laziness and own tax evasion behavior. People believe that the actual income of the poor and of people with disadvantageous labor market status is considerably more than that they declare. That is, they have relatively more undeclared income than the others. Analogous belief among highly educated people is that people with diploma have relatively less undeclared income than the others.

In this study – which is the first stage of a research project – we make an attempt to identify relative unreported income of different social groups, mentioned in the previous two paragraphs, using survey information on subjective well-being. Already at this point we have to make clear some terminological questions. We differentiate declared/undeclared income from reported/unreported income. Declared income is the 'white' income, which is declared to the tax office (if it is necessary), or is paid officially, in a controlled way (pension, social support, etc). Reported income is a somewhat broader category, that part of income which is measured in the household income surveys. As we will see, one part of the population reports even their undeclared income in the survey. What we can investigate is the ratio between the reported and the actual disposable income.

Utilizing the fact – what is widely accepted by researchers using subjective well-being approach – that actual income is one of the major factors for improving subjective well-being we compare the reported income per actual income ratios of different groups. We have to admit that we could neither confirm, nor exactly reject the two above mentioned beliefs, but our results make the verity of these beliefs somewhat implausible.

We cannot exactly prove that the unreported income of the poor is relatively not higher than the unreported income of others. We do not even prove that people with diploma really have more undeclared income than people without. However, we can unambiguously prove that taking part in informal activity is not an option, but a forced choice for the majority of the

poor. And this decision– step into the informal economy, forced by the employers – has a considerable negative effect on subjective well-being of these people.

It is well-known in the literature that subjective well-being is lower among less educated and higher among highly educated people. We can also prove that people with diploma are in a much better and more advantageous situation than the others. Their economic, social and financial status has a considerable and positive effect on their subjective well-being. It is suggested and likely true that they have relatively more undeclared income than the others.

The central variable of studies looking at life satisfaction – as a proxy of subjective well-being – is derived from the question: "All things considered to what extent are you satisfied or dissatisfied with your life in general?" The answers to this question have strong relations not only with income, but also with labor market status, education, health, marital status and several other variables. When identifying the effect of income we have to take into account the effect of these other variables.

In the next chapter we briefly review the literature on the effects of income and our research strategy. In Chapter 3 we present the most important and relevant literature on the effects of labor market status and education on subjective well-being. This is followed by a short description of our database in Chapter 4. Chapter 5 presents our calculations and findings. Chapter 6 concludes.

2. THE EFFECTS OF INCOME ON SUBJECTIVE WELL-BEING AND OUR RESEARCH STRATEGY

International comparisons of countries focusing mostly on GDP are supplemented by new success indicators and subjective variables as well. Studies analyzing subjective well-being have a large number of evidence that money (own and others') really does matter and income (reported and unreported) has an important and significant effect on subjective well-being.

These studies (for example Clark, Frijters, and Shields (2008) provide a very comprehensive review of the relationship between income and subjective well-being) suggest positive but diminishing returns to income, and that poor health, unemployment, and lack of social contact are all strongly and negatively associated with subjective well-being. They also highlight the importance of relative income effects, and show that additional income may not increase well-being if those in the reference or comparison group also gain similar income increase. High aspirations and unreal expectations have a negative effect on subjective well-being. Aspirations are determined in part by past incomes, implying adaptation to higher levels of income (see Di Tella, Haisken-De New and MacCulloch (2007)). Perceptions of changes in financial status (namely, the subjective mobility or immobility) have stronger predictive power

than actual income (see Haller and Hadler (2006)). Data on transition countries suggest a much larger role for income in subjective well-being than in developed countries (see Easterlin (2009)).

In normative public economics it is very important to know how fast marginal utility of income declines as income increases. Layard, Mayraz and Nickell (2008) estimate the elasticity of marginal utility with respect to income. Using four large cross-sectional surveys of subjective well-being and two panel surveys – the GSOP (German Socio-Economic Panel Survey) and the BHPS (British Household Panel Survey) – their conclusions relate to time series between 1972 and 2005, and their data cover over 50 mainly developed countries. In each of the six very different surveys they were able to estimate the elasticity of marginal utility with respect to income, and they obtained very similar results from each survey. Estimating the elasticity of marginal utility of log household income they found a striking uniformity (linearity) in the estimates obtained from totally different surveys. This similarity in spite of the great differences between countries and surveys used, as well as the differences between the questionnaires in the different surveys is very surprising. They confirmed the (cardinal) assumption that marginal utility of income declines as income increases.

Following the simpler equation of Layard, Mayraz and Nickell (2008) we suppose that reported life-satisfaction[1] is a linear function of utility and the following stylized relationship holds between life-satisfaction, income and other variables:

(1) $s_i = \alpha \log y_i + \sum_j \beta_j x_{ij} + \gamma + \varepsilon$, where i = 1, ..., N stands for the observations,

s is life-satisfaction (or shortly satisfaction), y is actual income[2], x_j variables are other factors influencing satisfaction, α, β and γ are parameters and ε is the error term.

For the sake of simplicity the population is divided into the groups, A and B:

$\{1, ..., N\} = A \cup B$, where $A \cap B = \varnothing$.

Let's denote the reported income by $\tilde{y}$. We suppose that the concealment of actual income is linear and the reported income per actual income ratio – what we call underreporting ratio – is uniform within the two population groups. (Of course the underreporting ratios *between* the two groups are different – that is the question that we would like to investigate!) Under these two conditions we can write:

(2) $\tilde{y}_i = \left[\delta_i(A,B)\lambda_A + (1-\delta_i(A,B)\lambda_B)\right] y_i$, where λ_A, $\lambda_B \leq 1$, $\lambda_A \neq \lambda_B$ are parameters,

[1] Layard et al. use the term 'happiness', but our question – as in the most cases the questions of surveys analysed by them – was about life satisfaction. Some authors use these two terms as interchangable.
[2] As it is usual in the subjective well-being literature, income refers here to household net equalised income. This income category approaches best the disposable income, which influences directly subjective well-being.

$\delta_i(A,B) = \begin{cases} 1, \text{if } i \in A \\ 0, \text{if } i \in B \end{cases}$ is the indicator variable of group *A*.

That is $\tilde{y}_i = \lambda_A y_i$, if observation *i* belongs to group *A*, and $\tilde{y}_i = \lambda_B y_i$ if *i* belongs to *B*.

Consequently

(3) $\log \tilde{y}_i = \delta_i(A,B)\log \lambda_A + (1-\delta_i(A,B))\log \lambda_B + \log y_i$

Expressing $\log y_i$ from (3) and inserting it into (1) we get:

(4) $s_i = \alpha \log \tilde{y}_i + \alpha \log \frac{\lambda_B}{\lambda_A}\delta_i(A,B) - \alpha \log \lambda_B + \sum_j \beta_j x_{ij} + \gamma + \varepsilon$

However, we do not know the λ parameters and cannot estimate equation (4). What we can estimate from our survey observations is the following equation:

(5) $s_i = \alpha \log \tilde{y}_i + \beta_A \delta_i(A,B) + \sum_j \beta_j x_{ij} + \gamma + \varepsilon$,

where β_A is the coefficient of the indicator variable of group *A*. Writing equation (5) in this way we assume that the indicator variable of group *A* – that is $\delta(A,B)$ – does not appear within variables x_j. This is a very strong assumption, we return to it shortly.

Denote by $\hat{\alpha}, \hat{\beta}_j$ and $\hat{\gamma}$ the parameters estimated from equation (1) (in fact we cannot estimate this equation), while by $\tilde{\alpha}, \tilde{\beta}_A, \tilde{\beta}_j$ and $\tilde{\gamma}$ the parameters estimated from (5).

Based on (1), (4) and (5) we get:

(6) $\hat{\alpha} = \tilde{\alpha}$, $\hat{\beta}_j = \tilde{\beta}_j$, *j*=1,...,J

(7) $\tilde{\alpha} \log \frac{\lambda_B}{\lambda_A} = \tilde{\beta}_A$, and

(8) $\hat{\gamma} - \tilde{\alpha} \log \lambda_B = \tilde{\gamma}$

This means that – under our assumptions – we can identify the $\hat{\alpha}$ and $\hat{\beta}_j$ variables. The constant of the equation and the underreporting ratios of the groups are not identifiable, but from equation (7) we can determine the *relative underreporting ratios* of the two groups:

(9) $\frac{\lambda_B}{\lambda_A} = \exp \frac{\tilde{\beta}_A}{\tilde{\alpha}}$

$\tilde{\alpha} > 0$, because satisfaction positively depends on income, consequently:

(10) $\tilde{\beta}_A > 0 \Leftrightarrow \lambda_B > \lambda_A$

In other words, if (and only if) the indicator variable of group *A* is positive in the estimation of equation, then the reported income per actual income ratio is lower in group *A* than in group *B*. That is, in group *A*, the underreporting is greater than in group *B* and we can exactly determine the quotient of the two underreporting ratios (relative underreporting).

However – as we have mentioned already – this relationship holds only in the case if $\delta_i(A,B)$ does not appear in equation (1) within variables x_j, that is, belonging to group *A* has no direct effect on subjective well-being, only through income underreporting.

Raising this assumption we cannot determine the underreporting quotient λ_B/λ_A. Let the first *x* variable to be the indicator variable of group *A*:

(11) $x_1 = \delta(A,B)$

In this case instead of (5) we get:

(5)' $s_i = \alpha \log \tilde{y}_i + \beta_A x_1 + \sum_{j=2}^{J} \beta_j x_{ij} + \gamma + \varepsilon$

So, in equation (6) for *j*=1 doesn't hold the $\hat{\beta}_j = \tilde{\beta}_j$ equality and instead of (7) we can write:

(7)' $\tilde{\alpha} \log \frac{\lambda_B}{\lambda_A} + \hat{\beta}_1 = \tilde{\beta}_A$, that is

(12) $\frac{\lambda_B}{\lambda_A} = \exp \frac{\tilde{\beta}_A - \hat{\beta}_1}{\tilde{\alpha}}$

From this equation we cannot identify neither the λ_B/λ_A quotient, nor $\hat{\beta}_1$. However, in some cases we can draw conclusions, even if it is not so strict in statistical sense. For example, if $\tilde{\beta}_A > 0$ and it is logically straightforward, or we know well from the empirical findings of the literature that $\hat{\beta}_1 \leq 0$, then $\lambda_B > \lambda_A$ holds.

Take as an example of the first belief, what we have mentioned in the introduction: in case of unemployed the reported income per actual income ratio is lower than that of other groups of the society, because they get unemployment benefit and beside it they have income from the hidden economy. Estimating satisfaction, if we found that the coefficient of unemployment is positive, then we could confirm the mentioned belief. But the situation is the opposite: we will see that this coefficient is negative. In this case we can say only that our computations do not support the mentioned supposition.

But we have further – not trouble free in statistical sense – possibilities. Let us turn back again to our formulas. If we know from other studies that in countries where the informal economy is not so widespread than in Hungary, the usual value of $\hat{\beta}_1$ is far lower than what we have found for $\tilde{\beta}_A$, then we could find it plausible that $\lambda_B > \lambda_A$. In the next chapter we present some papers demonstrating this case, and we collect coefficients from these studies for comparing them with our results (see the Appendix).

A further strategy can be that we look after such variables which explain the effects what make $\hat{\beta}_1$ significantly non-zero in the estimation. Of course this exercise can be mainly logically based.

According to these considerations, in the next chapter we shortly present the most important literature on the effects of labor market status and education on subjective well-being.

3. EFFECTS OF LABOUR MARKET STATUS AND EDUCATION ON SUBJECTIVE WELL-BEING – LITERATURE REVIEW

Recent studies using panel data (GSOEP, BHPS, and RLMS)[3] conclude that changes in actual incomes are correlated with changes in subjective well-being. Income has a larger effect in transitional economies than in developed countries. In addition, the slope of the income–subjective well-being relationship is not necessarily the same between groups. (See Clark et al. (2008), Frijters et al. (2004), Lelkes (2006), Senik (2005, 2006).)

Unemployment among economic variables and bad health among demographic variables were found to have a depressing and negative effect on subjective well-being. (See for example Blanchflower (2006, 2008), Hayo (2007), Haller and Hadler (2006), Winkelmann (2009), Finkelstein et al. (2008).) With regard to education Hayo (2007) finds for both Eastern Europe and Western countries that more educated persons tend to be more satisfied. The result is only robust for people with a university degree after applying the statistical reduction process. (For further details see the Appendix.)

Blanchflower (2008) provided a very detailed empirical study on determinants of subjective well-being using numerous international datasets for reviewing cross-country evidence on satisfaction. Usually, the measure of satisfaction is higher for those with higher income, for the more educated, for married people, and lower for the unemployed. Noteworthy, that the paper provides very useful analytical parameters for international

[3] GSOEP: German Socio-Economic Panel, BHPS: British Household Panel, RLMS: Russian Longitudinal Monitoring Survey

comparison. For example, using data of the European Quality of life Survey (p. 58-59) the model has lower coefficients both for education and (in absolute value) for unemployment – after controlling for income – than our Hungarian equivalents (taking into account that Blanchflower (2008) uses a 11-level scale; see the Appendix).

We have to make an important distinction between the influence on the unemployed and the informally employed positions as well. If somebody is unemployed, but he can work informally, and can get undeclared income at least, we have to note that this situation is not a real unemployment status. In this case the negative effect of being unemployed is modified, or does not exist at all.

Not having a job when you are not able to work (because of your age, poor health, chronic disease, physical or mental disability) may have a significant, sometimes enormously negative effect on subjective well-being. However, these people might choose (voluntary or involuntary) not to work, and may improve their well-being by other kind of activities, which may make them more satisfied.

Not having a job when you want to work and you are able to work is a major source of low subjective well-being. This very stressed and non-endurable situation may lead to the forced choice of being informally employed, and this situation also may decrease or increase the levels of subjective well-being compared to most other labor market states. Although an informal job helps people cope, the formal sector provides better prospects.

Earlier and new empirical studies on subjective well-being – for example Clark (2003, 2009), Clark et al. (2009) – consistently show a large negative effect of individual unemployment on subjective well-being. Clark (2003) also found that – for those working – having an unemployed partner is also detrimental to well-being, but for the unemployed partner it is beneficial. Clark (2009), Clark et al. (2009) suggest that others' unemployment has a variety of different effects on subjective well-being. First, it reduces subjective well-being of those who move from employment into unemployment. It affects the subjective well-being of those who remain in employment, and it affects the well-being of the existing unemployed. Clark et al. (2009) also serves analytical parameters for international comparison. In its Table we can find that the effect of unemployment – measured on a 10-step scale – is less in absolute value than our Hungarian equivalent (see Appendix).

The majority of empirical studies have found a considerable and positive impact of education on subjective well-being: higher level of education increases well-being (for example, Blanchflower (2008), Di Tella, MacCulloch and Oswald (2001), Castriota (2006), or Hayo and Seifert (2003)). They get robust effects of education proxies, indicating that higher educated people are more satisfied with their economic situation, even after controlling for income and wealth effects.

The first possible explanation for this, is that highly educated people have on average more interesting jobs and more active and stimulating cultural lives than the average. Education is a signal: schooling experience reveals information. In addition, people get indirect utility from prestige. Education is also positively correlated with earnings. Education has positive effect on health as well, since more educated people are supposed to have less unhealthy habits and visit their doctor more in time.

Numerous empirical studies show significant, but weak correlation or even negative relationship between education and subjective well-being (for example Frey and Stutzer (2002), Clark and Oswald (1994, 1996)). After controlling for income, higher educated people report lower level of satisfaction. Education may contribute to subjective well-being, but it has been found that the highly educated are more distressed than less well educated people when they are unemployed. The dispersion of incomes also increases with education, so the comparison with people who have the same education level but higher salary can produce a negative effect on subjective well-being.

Education is an investment, and if the average education level of a society rises, the relative advantage of better education declines. Returns on education are higher where access to education is lower. Furthermore, where the expansion of education has led to a fast increase in the qualifications of the labor supply but has not been followed by an equal increase in the demand for skills, thus contributing to educational mismatch, it can also produce a negative effect on subjective well-being.

Comparative static and dynamic analysis among countries shows that higher levels of education are correlated with higher levels of happiness in Russia and Latin-America (see Graham and Fitzpatrick (2002), Graham and Pettinato (2002)). This is also true for the developed economies, but the relationship is quite weak. For Latin-America, income effects over-ride those of education, but when income is left out of the regression, Graham and Pettinato (2002) find that education is positively and significantly correlated with happiness levels. They also find that the only breakdown of education categories that produces significant results is between completed high school and completed university education.

However, confirming some earlier findings and differing from others, Powdthavee (2003) finds that education levels are negatively associated with the respondent's quality of life in South Africa. One interpretation of this is that a high education level also leads to high aspiration levels, and if these aspirations are not met by current incomes they are likely to result in a lower reported subjective well-being by the respondent. Similarly, Headey, Muffels and Wooden (2004) and Caporale, Georgellis and Tsitsianis (2009) find negative coefficients for education in some countries (see the Appendix). Lee and Oguzoglu (2007) find also a relationship with a negative sign in case of men with at least bachelor degree.

Heady, Muffels and Wooden (2004) – calculating on TÁRKI's panel data – finds that in Hungary the relationship between education and subjective well-being is much more stronger than in the developed western-type economies, and the relationship is positive (for their coefficients see the Appendix).

Based on Ferrer-i-Carbonell's (2005) analysis, numerous studies assume that the relationship between education and satisfaction is linear. These analyses use the number of years spent in school for measuring education level, and the average income of people with same education level is used for reference income. This specification is unusable in the majority of cases, and we can get more applicable and understandable results using non-linear relationship with at least four or more education categories in our calculations.

Summing up, according to the previous literature, the relationship between education and subjective well-being is not unambiguous. After controlling income and filtering out other effects (labor market status, health status, and social relationships) usually we did not get a strong and unambiguously positive effect of education on subjective well-being.

4. DATA AND DESCRIPTIVE STATISTICS

Our database is the Hungarian version of the *European Union Statistics on Income and Living Conditions* (henceforth EU-SILC) survey, what is a household panel with a four-year long rotating period. The first wave of Hungarian EU-SILC was conducted in 2005. The questionnaire has a standardized common part (covering among others data on income, activity, education and health status), which can be extended by country-specific questions. As a result of the cooperation between the Hungarian Central Statistical Office and the Institute of Economics, in 2006 (the second wave) this extension contained also some subjective questions, especially the previously quoted question on life satisfaction.

For our computations we have used the two-year long panel of the first two waves, basically the data of the second year, which was asked in May 2006. The personal information, among others the information on life satisfaction, education, and health status refer to this moment. The income and activity information are retrospective, referring to 2005.

The panel contained 5,037 households in 2005 and 5122 households in 2006, with 13,367 persons. Only persons over 16 years were questioned, so the sample size was 11,030.

With the exception of entrepreneurial incomes only the gross values of income were asked, net income was produced by us, applying the rules of taxation and social contribution. *Personal level incomes* contain the following items: wages and salaries, including fringe benefits, non-agricultural self-employment income, income from occasional work, tips,

different kinds of pensions, child-care allowances, unemployment and other personal benefits and scholarships.

Comparing the different information of the survey it became clear that one part of the questioned population – mainly belonging to the lower income categories – gave an account also of his/her undeclared income. For example, only 8% of people living only from occasional work and day labor answered that they were paying personal income tax. Among those who earned some money also from occasional work beside their unemployment benefit nobody has paid personal income tax. So, our income data contain undeclared income. Our topic is that part of the total income which remained unreported also in the survey.

Total household income is the sum of personal level and household level incomes. The most important household level income types are the net yield of agricultural activities, consumption from own production, family based child-care support and different kinds of capital income. In order to allow comparisons of households of different sizes and compositions, household income was equalized using the OECD equivalence scale: the first adult in the household was assigned a weight of 1, all other adults 0.7 and each child (below age 15) was assigned a weight of 0.5. Household income divided by the number of equivalent adults is household equivalent income.

In our computations we have used two different income categories: the household equivalent income and the personal level income of active earners (employed and self-employed). We considered somebody to be active earner if her/his main activity is an earning activity both at the date of the interview in 2006 and at least for one month in 2005. From this respect self-employed are considered as employed.

Table 1

Distribution of the population over 16 years according to life satisfaction, 2006 (N=10,877 and 4,455 persons, respectively)

	Total population	Active earners
Very dissatisfied	11	8
Fairly dissatisfied	18	16
Neither satisfied nor dissatisfied	43	47
Fairly satisfied	23	25
Very satisfied	4	4
Total	100	100

Notes:
1. The question was the following: All things considered to what extent are you satisfied or dissatisfied with your life in general?
2. Somebody was considered as active earner if she/he had an earning activity – as main activity – both in the time of the survey and at least for one month during 2005.
3. Because of rounding errors the column sums do not always add up to 100.

During the interviews almost everybody (99%) answered the question on life satisfaction. Our final sample size was 10,877 after omitting those who did not answer this question and who reported unreal low income. Their distribution according to life satisfaction is presented in Table 1. In a scale of 1 to 5 where 1 is 'very dissatisfied' and 5 is 'very satisfied', the population average is 2.9. This value is a little bit higher than the average life satisfaction in 2003 (2.7). The average satisfaction of the employed is 3.0. [4]

Table 2 presents the distribution of the population according to their highest attained educational level, while Table 3 shows their relative income levels.

Table 2

Distribution of the population over 16 years according to attained education level (N=10877 and 4455 persons, respectively)

	Total population	Active earners
Primary school, or lower	32	13
Vocational school	26	33
Secondary school	28	32
Lower tertiary (college)	9	14
Higher tertiary (university, PhD)	6	8
Total	100	100

Table 3

Relative income of the population over 16 years according to attained education level (income of population with secondary education = 100)

	Total population	Active earners
Primary school, or lower	71	69
Vocational school	79	79
Secondary school	100	100
Lower tertiary (college)	128	142
Higher tertiary (university, PhD)	158	176
Total tertiary (college+university)	140	155
Total	91	101

Notes: In the *Total population* column income is defined as the household equivalent income, while in the case of *Active earners* their personal level income is used.

The distribution of personal level income is more unequal than the distribution of household equivalent income, because this latter is influenced also by the household size. Our data affirm what has been found in this respect in the literature (see e.g. Strauss and de la Maisonneuve 2007): considering equivalent income the advantage of professionals to persons

[4] We are using unweighted data. The difference between the results using weighted or unweighted data would be minimal.

having only secondary education is 40%, while in the case of personal income is 55%. In the case of population with university degree this advantage is even higher. Therefore, our starting question is whether the large income advantage of the professionals is real, or only virtual, due to the different unreported income ratios.

5. ESTIMATION OF SUBJECTIVE WELL-BEING

In this chapter we estimate reported life satisfaction using ordered logit regression. Our explanatory variables include reported income, employment status, education, and other variables having effect on satisfaction. To interpret the results presented in the tables, we focus on the sign and the relative size of the coefficients. The larger a positive coefficient is, the higher the probability that a person belonging to the given group is more satisfied with her or his life.

In the first subchapter we present population level models, while in the second we confine ourselves to the active earners.

5.1 POPULATION LEVEL MODELS

The three applied models are presented in Table 4. We step by step widen the number of our explanatory variables. In accordance with the strategy outlined at the end of Chapter 2, in this way we can follow which explanatory variables are superseded by other variables.

In the first model we use only the most fundamental explanatory variables: log income, indicator variables of highest attained education, labor market position, and age. We note that the *gender* variable proved not to be significant in our models.

Looking at the first item of column (1) we can see that the expected value of satisfaction (answers to the satisfaction question were transformed to a scale of 1 to 5, from *very dissatisfied* to *very satisfied*) increases by 0.8 if log income increases by one unit. For the sake of comparison we mention that log income varies in a narrow scale: the difference between the log of the median and the 10^{th} percentile of income is only 0.6. This means that income is an important factor of satisfaction, but its effect is not very large.

Table 4

Estimation of life satisfaction of the population over 16 years, 2006
Ordered logit estimates (N=10877)

	(1)	(2)	(3)
Log(household equalised inc. in 2005)	0.80 (0.06)**	0.73 (0.06)**	0.62 (0.06)**
Attained education: vocational school	0.13 (0.05)*	0.06 (0.05)	-0.01 (0.05)
Attained education: secondary school	0.32 (0.06)**	0.20 (0.06)**	0.09 (0.06)
Attained education: lower tertiary	0.71 (0.08)**	0.56 (0.08)**	0.39 (0.09)**
Attained education: upper tertiary	1.17 (0.10)**	0.93 (0.10)**	0.74 (0.10)**
Student	0.89 (0.11)**	0.81 (0.11)**	0.69 (0.11)**
Person on paid child-care	0.44 (0.10)**	0.40 (0.11)**	0.35 (0.11)**
Old-age, widow pensioner	0.17 (0.08)*	0.31 (0.08)**	0.31 (0.08)**
Disability pensioner	-0.49 (0.07)**	0.14 (0.08)+	0.14 (0.08)+
Unemployed	-0.77 (0.10)**	-0.73 (0.11)**	-0.55 (0.11)**
Other non-employed	-0.67 (0.16)**	-0.48 (0.16)**	-0.44 (0.16)**
Day labourer, or doing community service	-0.45 (0.15)**	-0.53 (0.16)**	-0.40 (0.15)**
Age (measured in decades)	-0.30 (0.07)**	-0.15 (0.07)*	-0.09 (0.07)
Age squared	0.02 (0.01)**	0.02 (0.01)**	0.02 (0.01)**
Subjective health status: bad		0.92 (0.11)**	0.83 (0.11)**
Subjective health status: fair		1.59 (0.11)**	1.46 (0.11)**
Subjective health status: good		2.07 (0.12)**	1.88 (0.12)**
Subjective health status: very good		2.80 (0.14)**	2.60 (0.14)**
Household contains one couple			0.46 (0.05)**
Household contains more couples			0.63 (0.17)**
Financial difficulties in childhood:			
- almost always			-0.22 (0.06)**
- never			0.22 (0.06)**
2 months < longest unemp period ≤ 2 years			-0.20 (0.05)**
Longest unemployed period > 2 years			-0.53 (0.14)**
Reason for unmet need for med. treatment [A] - too expensive			-0.55 (0.19)**
- too far to travel/no means of transport			-1.31 (0.35)**
Contacts with relatives			
- day to day			0.37 (0.09)**
- at least every month			0.26 (0.08)**
Contacts with friends			
- day to day			0.34 (0.08)**
- at least every month			0.21 (0.06)**
In the last year has not attended any cultural or sport event			-0.24 (0.05)**
In the last year at least every month did some voluntary work			0.29 (0.09)**
Pseudo R^2	0.0558	0.0787	0.0907

Notes: Robust standard errors adjusted for clustering on households in parentheses.
+ significant at 10% level,* significant at 5% level, ** significant at 1% levels.
Reference groups in order of the relevant blocks: attained education level is elementary school or lower; active earner; subjective health status is very bad; unmet need for medical treatment: see note [A]; there is no pair (married or life-partners) in the household; frequency of financial difficulties in the childhood was between the two extremes, or did not answer; contacts with relatives/friends are less frequent, or have no relatives/friends.
[A] The question was the following: What was the main reason for unmet need for medical examination or treatment, if such situation occurred in the last year? In addition to those who had no unmet need for medical treatment contains those cases where the cause was the following: fear, time shortage, got onto a waiting list, other.

After controlling for reported income the satisfaction difference between people with low education is very small. The expected value of satisfaction of skilled workers exceeds only by 0.1 the satisfaction of people with only elementary education. The next step on the education ladder between vocational and secondary school yields only further 0.2 points. However, individuals with college and university degree have much higher satisfaction level. The satisfaction difference between persons having university degree and persons attaining only vocational school is more than one satisfaction level, after filtering out the effect of income and activity differences.

In accordance with our theoretical considerations delineated in Chapter 2 we have two possible explanations (or any combination of them):

- The first possibility is that – to the contrary of the belief mentioned in the introduction – persons with higher education have relatively higher undeclared income than the others.
- The other possibility is that education has an extra, in this simple model non-investigated effect on satisfaction.

Reflecting to this second issue and based on the suggestions of the literature reviewed in Chapter 3, we include further explanatory variables, which are correlated with the attained education level. It is possible that the extra effect on satisfaction is caused actually by them and not by the education level.

But before doing this, we investigate the effect of respondent's activity on satisfaction. Students compared to active earners (this is our reference group) are particularly satisfied. Because of the age of respondents is older than sixteen years, the majority of students are secondary school or high school graduates. The relatively worse economic position of families with younger children is compensated by the pleasure of taking care of the little ones, and this pleasure increases satisfaction. People living at the edges of activity and inactivity (unemployed, disability pensioners, day-laborers, community workers) report much lower satisfaction than active earners or old-age pensioners. 'Other non-employed' also belong to this group. These people are not retired, they do not work, they do not study, they do not take care of kids, and they do not even call themselves unemployed. Their dissatisfaction – ceteris paribus – is considerably high.

Analyzing the monthly activity data of our database we can see that unemployed, other non-employed, occasional and community workers usually are the same people in different periods of their activity career. Our findings about people living at the edge of activity and inactivity are in keeping with the findings of Molnár and Kapitány (2006, 2008).

These results do not support the first belief of the introduction. Again, we have the same two possibilities delineated in the case of education:

- Contrary to popular belief unemployed, other non-employed and occasional workers have relatively less undeclared income than the others.
- To be unemployed has an extra, in this simple model non-investigated negative effect on satisfaction.

In the second model we expand our explanatory variables with the health status. Highly educated people's lifestyle is healthier, they have healthier work circumstances, and therefore it is assumable that filtering out the effect of health variable may decrease the surplus of their satisfaction. We have chosen to use subjective assessment of health state, and this variable is ordinally scaled on a four point scale, ranging from 'excellent' to 'very poor'. As the subjective assessment of health state has very strong correlation with subjective well-being, not surprisingly, we can find here the highest coefficients. Comparing life-satisfaction of health state 'excellent' to satisfaction of people with health state 'very poor' the difference is almost three units, independently of other variables.

This very strong correlation is advantageous for us, despite the fact that the direction of causality is questionable between health status and subjective well-being. We find that subjective health status has a considerable impact on the effect of education on satisfaction. Surprisingly, this phenomenon is more observable in case of low educated people, and less observable among highly educated ones. Satisfaction of skilled workers with vocational school education – after controlling for income, activity, age and health – does not differ from the satisfaction of people with elementary school education. Higher satisfaction level of skilled workers compared to the satisfaction level of people with elementary school is explained by the better health of the skilled workers. This can be the result of their easier job, or less self-exploitation.

This phenomenon is very important from our point of view: it demonstrates the viability of our research approach. We can argue that taking into account the health state of respondents does not change significantly the extra satisfaction of people with high school diploma compared to the satisfaction of secondary school graduates.

The health status has changed also the coefficient of disability pensioners which was significantly negative in the first model. However, their lower satisfaction level is explained by their health status. Because of the absence of the subjective health status variable we could not find this effect in Molnár and Kapitány (2006, 2008).

In the third model we introduce further variables. The most important group of them is the group of 'social inclusion' variables. We can assume that social embeddedness is much stronger in case of high school graduates, and the 'social capital' represented by their social

connections lead to material and other advantages. These advantages make the higher satisfaction level of highly educated people more reasonable. Other indicators used here are the stability of family life and the variable of intergenerational impacts.

Within the framework of our database we measure the stability of family life with the presence of a pair in the household. (We do not have any kind of information about divorce.) People living in a household with a pair are more satisfied than the others. Furthermore, the family members of that pair are also more satisfied than the average. Additionally, satisfaction of multigenerational households with pairs is higher than the average.

Childhood situation also has an effect on subjective well-being. In the first wave of EU-SILC panel we have several questions concerning family situation in the childhood of the respondents. Among them financial situation of the childhood family has the most important effect on subjective well-being. Concerning financial difficulties in childhood we have five possible responds: there were financial difficulties almost permanently, frequently, several times, rarely, or not at all. Both the bottom and the top of the scale affect satisfaction of adulthood.

Size, property, and quality of social inclusion and relationships of the respondents were also carefully investigated.

It is very important to know, for example, the period of time spent in unemployment. Not only the present, but even the previously experienced unemployment influences satisfaction, if its duration reached 3 months. We can assume that highly educated can get job much easier than the low educated. One single, but longer time duration spent in unemployment has stronger effect on subjective well-being than several shorter time periods together. Being unemployed for more than two years leads to considerable extra dissatisfaction.

It is connected to the health status but reflects also social exclusion if somebody needed healthcare, but she is not able to go to a physician because it is too expensive, or mainly because she is living at such a place from where it is hard to reach a clinic (or dentist). The coefficient of this factor is extremely large, showing the problems of living in remote settlements with poor public transportation possibilities.

The next segment of social embeddedness is represented by different social connections: relationships with family, with relatives and friends. Subjective well-being is usually higher among socially active people. The size of extra satisfaction depends on the frequency and stability of these relationships. Surprisingly, connections between relatives and connections between friends correlate, but both of them have independent effect on satisfaction.

People with higher education and wide social relationships may have more stimulating and richer cultural life. Quality of life is measurable by the number of visited cultural and social events (theatre, movie, opera, museums, concerts, sport events). Subjective well-being is much

lower among people who have not taken part in this kind of events at least for a year. From the other side, doing regularly voluntary work increases satisfaction.

What are the effects of including these new variables on the coefficients of income, education and activity?

- The direct effect of income on satisfaction decreased. This shows that social embeddedness (or looking from the other side, social exclusion) also has a direct effect on available income.
- In case of vocational school educated people the health variable, and in case of secondary school educated people the social inclusion variables compensate and offset the direct effect of education on satisfaction, the coefficient of secondary education is not significant in the third model.
- Surplus satisfaction of highly educated people decreased in a small quantity, but subjective well-being is still considerably higher among them. We could not find further factors which would diminish the satisfaction surplus of highly educated.
- On the effect of social exclusion variables the negative coefficients of unemployed and occasional workers somewhat decreased in absolute value, but their significant relative dissatisfaction remained.

All of the above mentioned findings confirm our conclusion: we can state that – based on the analysis of indicators with effects on satisfaction – it is absolutely unlikely that the ratio of unreported and actual income of people with secondary school would be higher than the same ratio of people with diploma. We did not find such surplus satisfaction at people without diploma what could significantly decrease the satisfaction advantage of people with diploma. Opposing, we can find considerable surplus satisfaction at people with diploma. Beside unreported income we did not find such other indicators what could explain the surplus satisfaction of people with diploma. In all likelihood, the people with diploma have relatively more undeclared income than the people without diploma.

Turning to our other problem, the supposed extra unreported income of unemployed, occasional and community workers is not supported by our results. Their satisfaction remains lower than that of other activity groups, even if we filter out the effect of income, education, health status, family stability, social relations and exclusion. This shows that being unemployed or living as a day laborer in most cases is not a utility maximizing choice but a forced decision.

5.2. ESTIMATING SUBJECTIVE WELL-BEING OF ACTIVE EARNERS

Working with total population and with equalized household income instead of personal earnings may fade out some effects if we investigate the extension of income advantage of highly educated people. To avoid this possibility we examine separately the subpopulation of active earners. In this case activity categories in the models are substituted by employment categories: employees including members of cooperatives, self-employed, and the group of day-workers and community workers. The results of the three analogous models are presented in Table 5. On this smaller and less inhomogeneous sample some of our previous variables became insignificant.

Table 5

Estimation of life satisfaction of active earners, 2006

Ordered logit estimates (N=4455)

	(1)	(2)	(3)
Log(household equalized inc. in 2005)	0.55 (0.09)**	0.52 (0.09)**	0.51 (0.09)**
Log(personal income in 2005)	0.28 (0.06)**	0.30 (0.6)**	0.27 (0.06)**
Attained education: vocational school	0.20 (0.09)*	0.10 (0.09)	0.03 (0.09)
Attained education: secondary school	0.39 (0.10)**	0.23 (0.10)*	0.11 (0.10)
Attained education: lower tertiary	0.81 (0.12)**	0.66 (0.12)**	0.48 (0.13)**
Attained education: upper tertiary	1.26 (0.14)**	1.01 (0.14)**	0.82 (0.15)**
Entrepreneur	0.46 (0.11)**	0.50 (0.11)**	0.45 (0.11)**
Day labourer, or doing community service	-0.66 (0.25)**	-0.69 (0.25)**	-0.55 (0.25)*
Subjective health status: fair		0.42 (0.15)**	0.33 (0.15)**
Subjective health status: good		0.95 (0.15)**	0.80 (0.15)**
Subjective health status: very good		1.59 (0.17)**	1.43 (0.18)**
Reason for unmet need for medical treatment:			
- too expensive			-0.74 (0.32) *
- too far to travel/no means of transport			-3.88 (1.09) **
Have been unemployed for at least 2 months			-0.20 (0.07) **
Household contains one couple			0.62 (0.08) **
Household contains more couples			0.71 (0.21) **
Financial difficulties in childhood:			
- almost always			-0.19 (0.06) +
- never			0.25 (0.08) **
In the last year has not attended any cultural or sport event			-0.28 (0.07) **
Pseudo R^2	0.0446	0.0618	0.0741

Notes: Robust standard errors adjusted for clustering on households in parentheses.
+ significant at 10% level,* significant at 5% level, ** significant at 1% levels.
Reference groups in order of the relevant blocks: attained education level is elementary school or lower; employee; subjective health status is bad or very bad; had not unmet need for medical treatment, or the cause differs from those listed in the table; there is no pair (married or life-partners) in the household; frequency of financial difficulties in the childhood was between the two extremes, or did not answer.

Findings of Table 5 confirm our previous results. Using the subgroup of employed people, both the household equivalent income, and the personal income have significant effect on satisfaction. It is noteworthy that according to our knowledge, this kind of analysis – where these two kinds of income are used together – is unknown in the subjective well-being literature. This significant and simultaneous effect of these two kinds of income is very surprising, since their correlation is quite high: 0.66. One of the explanations of this phenomenon can be the following. Household equivalent income is serving and covering the household's expenses and implies/inducts increases in subjective well-being of every member of the household. The personal income can be a measure of the personal acknowledgement, prestige, and success of individuals at their workplaces, and that explains the extra surplus in satisfaction.

In all of the three models satisfaction is higher among self-employed, and we can find almost the same coefficients in the three models. We can assume that – in case of the self-employed – the undeclared income plays an important role in satisfaction. Satisfaction of day-workers and community workers is considerably lower than that of employees, the reference category. This category contains people who are sometimes unemployed, who have undeclared income, or who are given employment as community workers from time to time. This result also confirms our previous findings (see again Molnár and Kapitány (2006) and (2008)): the unemployed, the day-workers, the community workers do not have considerable unreported income, in some extent their undeclared income is reported in the surveys.

Similarly, as in the case of the whole population, introducing the health state variable the satisfaction difference – between the primary school educated and the vocational school educated – disappears. Introducing further variables in the third model cancels the satisfaction difference between secondary school educated and lower educated, and satisfaction surplus of people with diploma decreases, but remains on a considerably high level. So, we can confirm the results of the previous subchapter.

6. CONCLUSIONS

Hungary is one of the countries where the hidden economy is widespread and sizable: high unemployment and non-employment rates, too few taxpayers, too small tax base, weak tax administration, widespread corruption. It is difficult to accurately measure indicators, such as actual income, labor market status, or social inclusion and relations. Economic policy, which is based on interpretation of these indicators is inefficient and sometimes uses common beliefs about informal economy in decision making.

People in Hungary usually think that actual income of the poor and of people with disadvantageous labor market status is considerably more than that they declare, that is, they have relatively more undeclared income than the others. Highly educated people in Hungary also think that people with diploma have relatively less undeclared income than the others. In this study we have made an attempt to identify the presence of relative unreported income of these two social groups. Using the subjective well-being approach we analyzed and compared the ratio of unreported income per actual income of different social groups of the Hungarian society.

Studies analyzing life satisfaction – as a proxy of subjective well-being – have identified strong relation with income. Rising income is one of the major factors for improving subjective well-being. It means that in case of secondary school educated people – who are assumed to have relatively high undeclared income – we should have found non-explainable surplus satisfaction. However, we did not find any surplus in their satisfaction, but we found considerable surplus in the satisfaction of highly educated people: the higher the education, the higher the satisfaction level.

One of the possible explanations of this phenomenon can be that high education itself has an indirect effect on subjective well-being through other variables connected to education. These variables connected to education and having effect on subjective well-being were systematically investigated in our analysis. We can state that introducing health variable, the satisfaction difference between secondary school educated and lower educated disappears. Introducing further variables measuring social inclusion and relationships, the satisfaction difference between the vocational school educated and the secondary school educated is negligible.

After controlling for income, activity, employment status, health state, social inclusion and relationships the education differences did not have an effect on subjective well-being, except higher education had a further, significant and considerable effect on subjective well-being. It means unambiguously, that in case of highly educated there are some further variables increasing their satisfaction. The relatively high undeclared income of people with high education can be one of these possible variables.

We prove that taking part in informal activity is not an option, but a forced choice for the majority of the people with marginal labor market status. And this forced decision – step into the informal economy – has a considerable negative effect on their subjective well-being. People living at the edges of activity and inactivity (unemployed, disability pensioners, day-laborers, community workers) report much lower satisfaction than active earners or pensioners.

Based on our findings we could confirm our previous statement that unemployed, day-workers, public workers, and people living on welfare do not have considerable undeclared income. If they had some this is accompanied by such self-exploitation that this offsets the effect of undeclared income on subjective well-being.

Our attempt to identify relative unreported income per actual income ratio of different social groups – using survey data on subjective well-being – led us to numerous findings, but we did not get exact results in statistical sense.

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APPENDIX

Coefficients of unemployment and education in the estimation of subjective well-being in some papers

Paper	Unemployment	Education
1. Blanchflower (2008) 0-10 scale, EQL survey, 27 countries	-0.54	no schooling -0.282 16-19 years 0.14 20+ years 0.185
2. Caporale et al. (2009) European Social Survey (ESS) 19 European countries		low secondary -0.003 high secondary -0.027 tertiary -0.020
3. Clark et al. (2009) 0-10 scale, GSOEP	Men -1.169 Women -0.431	
4. Gwozdz and Sousa-Poza (2009) 0-10 scale, GSOEP	-0.881	medium 0.080 high 0.141
5. Hayo (2007) 1-3 scale, 7 Eastern European countries Income quartiles	-0.68	vocational 0.13 secondary 0.21 university 0.50
6. Headey, Muffels and Wooden (2004) 0-100 scale, education in years HILDA, BHPS, GSOEP, TÁRKI panels	Australia -2.81 Britain -4.72 Germany -9.16 Hungary -9.89	Australia -0.52 Britain -0.39 Germany 0.15 Hungary 1.26

Notes: Reference categories: 1: other labour market activity; ≤15 years of schooling. 2: primary or less education. 3: employed. 4: employed; low. 5: full-time employee; primary school. 6: In OLS regression unemployed dummy and education in years.

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