Explorations of welfare and well-being
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Chapter 3
The under-reporting of incomes in Russian households

3.1 Introduction

Measuring the value of production in a country is very difficult. Official statistics only look at the size of the monetized economy and hence miss the value of non-monetized activities, such as bartering and home-production of goods and services. Even conservative estimates of the value of non-monetized activities value the non-monetized economy at at least 25% of the official economy for Russia (see Rose and McAllister (1996) and the previous chapter). Quite apart from measuring the value of non-monetized activities, it is also hard to get an estimate of the size of the monetized economy, the average monetary income of individuals in a country. For one, Russian individuals are unlikely to report how much they earn in money for second and third jobs, if only out of fear of tax-authorities. It is even more unlikely that individuals will report the money they earn with illegal activities. The income that individuals report to earn may therefore under-estimate the value of their productive activities. For Russia the under-estimation may be considerable. Indeed, in the previous chapter it was shown that for 1991 individuals failed to report a large part of their unofficial incomes and the analyses showed that it was likely that individuals underreported their incomes for 1993-1995.

The ensuing under-estimates of incomes in Russia pose three major problems.

First, it makes the official estimates of the size and growth of the economy unreliable (see e.g. Granville et al. (1996) and Ellman (1997) on the
problems with official statistics).

Second, it makes it very difficult to assess how many individuals live in poverty. As a result, the estimates of poverty vary from 85% of the population to only 6% of the population (Benson (1996)). Although we believe that the high rate of dissatisfaction with financial circumstances, and indeed with life as a whole, suggests that poverty is more than a marginal problem, the under-reporting of income and economic activities makes a thorough investigation difficult.

Third, the under-reporting of incomes makes it hard to assess the degree of inequality in Russia: official figures suggest inequality has been rising rapidly in Russia (see e.g. Doyle (1996)). As these results are based on reported income levels, such conclusions seem weakly founded when one considers the possibility of under-reporting of incomes.

In an attempt to find the extent to which reported incomes underestimate the value of produced goods and services in Russia, we compare two measures of income. The first estimate of income is the answer to the question what the total amount of income earned during the last month from all sources is. It is called reported income.

The second measure of income is derived by asking respondents how much an employer would have to pay them to work full-time for him, thus requiring all other money-earning activities to be stopped. Individuals should accept an offer for a full-time job, if it yields an income equal to or higher than the worth of all their current activities. The amount they would therefore need to be offered should be equal to the monetary value of all the activities a respondent performs during a month. We call this income one-job equivalent income (o.j.e.). By asking how much income in total they would need to accept a one-job equivalent, we get a second estimate of the total earnings of the respondent.

The outcomes of the two measures, reported income and one-job equivalent income, are compared in several ways. We report the average incomes for these two types of incomes. Also analyzed is the relationship between them. In essence we attempt to see whether the second measure of income yields reasonable results which fit in a theoretical framework.

The chapter proceeds as follows. The following section more formally introduces the two income concepts and shows their theoretical relationships. Section 3 shows the data results and analyses the empirical regularities found between the various instruments. The fourth section concludes.
3.2 Theory

Consider the economic activities an individual can undertake. The material goods and services an individual has access to can come from the following sources:

- An individual may obtain a monetary income from his official job (in Russia: where his labor book is).
- An individual may obtain other incomes from a secondary and other jobs. These secondary jobs may be legal or illegal.
- An individual may obtain goods and services by exchanging goods and services with other persons (bartering) or by producing goods himself, e.g., by growing his own food.

Apart from these material goods and services, an individual also obtains more esoteric goods, such as 'pride in his job', 'job-security', 'a feeling of doing something worthwhile', etc. Such goods, which we call amenities, are characteristics of activities: for some activities these amenities may be more pleasant than others. For illegal or highly dangerous activities, such amenities are likely to be valued negatively: an individual would rather not have these amenities (such as 'risk to one's health'). The same holds for the nuisance of having several workplaces and/or types of work. An individual may well be willing to give up some of his income if he could avoid negative amenities, and may well be prepared to pay something to have positive amenities. Positive amenities are therefore also worth something to individuals. The current activities of individuals therefore yield a flow of material goods and services and a flow of amenities, both of which are worth money. With this in mind, consider the two following questions:

1. "What is the total amount of income you have obtained last month from all sources before taxes?"

2. "If someone would want to employ you full-time, which required you to stop all other money-earning activities, how much before tax, cash income would he have to pay you each month at present prices?"

\[^{1}\text{For a general discussion of how to measure the value of amenities, see e.g. Van Praag and Frijters (1997, 1998). For a detailed discussion on how to value non-monetary activities, such as housework, see e.g. Dow and Juster (1985).}\]
The first question should equal the actual total monetary income an individual earns, namely total personal income. This should be the sum-total of all the incomes of the first and second jobs and incomes from illegal activities. We may however expect, for the reasons outlined in the introduction, that an individual is unwilling to reveal his true monetary income. Note that even if the question were answered truthfully, the value of bartering and self-production are not included in this measure.

The second question should then be the value of all the activities an individual performs during a month. This will include three elements.

Firstly, it will include the sum-total of all incomes, whether reported or not and whether illegal or not. The second element is the value of bartering and self-production. This may well be a substantial part of the economy (see e.g. Rose and McAllister (1996) and Frijters and Van Praag (1995) for estimates of the size of the barter economy).

The third element is the monetary value of the amenities enjoyed in the current activities minus the monetary value of the amenities imagined in the new job. We don’t know what amenities the individual imagines in the new job, but it seems likely that the respondent will on average imagine them to be better than those in his present jobs: if an individual at present performs several jobs which are illegal and dangerous, or at least require him to move frequently from one job-site to another, a single job in one place will offer much better amenities. By accepting one job to replace all others, an individual will also reduce the uncertainty inherent to secondary jobs and the danger of illegal jobs. If this is the case, an individual will be willing to accept a lower income in the imagined one-job equivalent than he currently receives in his current jobs. Hence we assume that the measure of one-job equivalent income will usually be an under-estimate of the total value of goods, services and amenities at present, but that it will be considerably larger than reported income. Only if an individual thinks that the job amenities in the new job would be much worse than in his current job(s), an individual will require a much higher income than he receives at present to switch to the new job. Current job satisfaction is however quite low in Russia\(^2\), which makes it unlikely that respondents will imagine the new job to be much worse than their current job. We thus expect one-job equivalent incomes to under-estimate the true value of all the goods and services an individual enjoys. The insecurity about the imagined job-amenities in the new job however remains a weak spot of the

\(^2\)From the data set used in this paper, average job-satisfaction is about 6.2 on a scale of 1-10 in Russia. As a comparison: average job-satisfaction is about 7.42 for the respondents in the 1992 West-German GSOEP panel.
second question module.$^3$

### 3.3 Results

The data are from the fourth wave of the Russian National Panel survey$^4$ held in 1997. In the fourth wave some 2071 respondents were interviewed, of which only 1004 reported positive amounts on both income questions. There was some non-random attrition from year to year. Those who had reported higher incomes in previous waves were more likely to non-respond. However, as reweighting the observations according to reported incomes in the previous waves did not significantly change the results, we report here the results on unweighted observations. Some summary statistics of the variables are presented in Table 1:

<table>
<thead>
<tr>
<th>Variable</th>
<th>mean</th>
<th>10% percentile</th>
<th>50% percentile</th>
<th>90% percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>reported income ($y_0$)</td>
<td>705</td>
<td>220</td>
<td>500</td>
<td>1500</td>
</tr>
<tr>
<td>income needed to switch ($y_1$)</td>
<td>1974</td>
<td>600</td>
<td>1500</td>
<td>4000</td>
</tr>
<tr>
<td>$y_1/y_0$</td>
<td>3.88</td>
<td>1.35</td>
<td>2.55</td>
<td>6.67</td>
</tr>
</tbody>
</table>

*answers are reported in thousands of Roubles*

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3. there is no real way out of this: if we start specifying all the job-amenities, there is a danger that the respondents becomes aware of the fact that we are asking for the value of his present jobs. The question would also become too complex for many respondents. If we specify the new job to be 'like your current job', we have the problem that individuals with more than one job may not be able to answer this question.

4. This survey has been designed and initiated by W. Saris of the University of Amsterdam and funded by the NWO, the Dutch Foundation for Scientific Research (NWO). The survey was conducted by Anna Andreenkova and the Institute for Comparative Social Studies in Moscow.
10% of the survey population reports to earn less than 220,000 Roubles, the median reported income is at 500,000 Roubles and 10% reports to earn more than 1,500,000 Roubles.

The average reported income is 705,000 Roubles per month, which contrasts starkly with one-job-equivalent income. First the mean of o.j.e. income is nearly three times as high; Second, all comparable quantiles are larger.

As we can see from the ratio $y_1/y_0$, 90% of the respondents wanted more than 35% more than their present reported income in order to switch to one job and 50% wanted more than 155% more. In fact, only 4% of the respondents reported to want less to switch to a new job than their current reported incomes.

Comparing the extent of income-inequality according to the two measures, we use the standard deviation of the logarithm of income as an indicator of inequality. It turns out that the standard deviation of reported income equals 0.771 and the standard deviation of one-job equivalent incomes equals 0.738. As a comparison, the standard deviation of reported income in the year 1991 was 0.54 (previous chapter). Our conclusion is twofold. First, reported income inequality is of the same order as that with respect to one-job-equivalent income. Second, income inequality has risen from 1991, both when we assume that reported incomes approximated one-job-equivalent incomes much closer in 1991, but also in the case that reported income and the one-job-equivalent in 1991 were of the same relative importance as in 1997.

If we look closer at the relationship between the two measures of income by regressing the two measures on each other, we find the following table:
The under-reporting of incomes in Russian households

Table 2: The inter-relationship between two income measures

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>$y_i/y_0$</th>
<th>t-values</th>
<th>$y_i$</th>
<th>t-val</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.10</td>
<td>18.4</td>
<td>-660.06</td>
<td>1.1</td>
</tr>
<tr>
<td>$y_0$</td>
<td>-0.002</td>
<td>6.0</td>
<td>1.99</td>
<td>7.8</td>
</tr>
<tr>
<td>$y_0*y_0/10000$</td>
<td></td>
<td></td>
<td>-1.54</td>
<td>2.3</td>
</tr>
<tr>
<td>age</td>
<td></td>
<td></td>
<td>34.07</td>
<td>1.4</td>
</tr>
<tr>
<td>age*age</td>
<td></td>
<td></td>
<td>-0.35</td>
<td>1.4</td>
</tr>
<tr>
<td>education in years</td>
<td></td>
<td></td>
<td>34.6</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Amenity dummies:
1=yes, 0=no

easy to find new job? 320.41 2.0
like the current job? 209.42 1.2

R$^2$ 0.04 0.19
N 1004 1004

Gender was found to be insignificant in all regressions in previous specifications and was hence dropped. Two amenities insignificant and thus dropped was ‘pride in the main job’ and whether an individual thought his job was ‘secure’. Income is reported in 1000’s of Roubles.

Table 2 (continued)

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>lny$_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.30</td>
</tr>
<tr>
<td>ln($y_0$)</td>
<td>0.53</td>
</tr>
<tr>
<td>ln(age)</td>
<td>1.94</td>
</tr>
<tr>
<td>ln$^2$(age)</td>
<td>-0.26</td>
</tr>
<tr>
<td>ln(education in years)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Amenity dummies:
1=yes, 0=no

easy to find new job? 0.08 1.8
like the current job? 0.03 0.6

R$^2$ 0.31
N 1004
We see from the results on the ratio $y_1/y_0$ that the under-reporting of incomes is more severe for individuals who report a low income than for those who report a high income, as can be expected.

In the table we regress $y_1$ on $y_0$ and $\ln y_0$ on $\ln y_1$. We prefer the logarithmic version and will comment on that. From the table we may see that there holds that

$$\ln \left( \frac{y_1}{y_0} \right) = 0.30 - 0.47 \ln y_0 + 1.94 \ln age - 0.26 \ln^2 age + 0.05 \ln educ + \ldots$$

It follows that the relative difference between the income concepts falls with rising reported income. Second, there is a strong age effect where the ratio is the highest at the age of 42. Higher educated people seem to be more involved in secondary activities.

As to job amenities, two job amenities were maintained in the regressions. The first denotes whether an individuals thinks it is easy to find a new job. The second denotes whether an individual likes his current job or not. As such, these amenities describe the amenities an individual enjoys at present. The results indicate that individuals who can easily find another job want about 8% more on average to switch to a new job. The individual who likes his current job needs another 3% more to switch to a new job. Both results seem quite plausible: if an individual likes his current job or thinks he can easily find another, he wants more money to switch to a new job. The relationship between one-job equivalent income and reported income seems quite plausible. The fact that the results on the regression of $y_1$ and of $\ln y_1$ are qualitatively very similar suggests that the found relationship is somewhat robust.

In Table 3, alternative interpretations of the one-job-equivalent income question are tested:

The variable denoting the answer to the question “How does your salary compare to others who do similar work” was included to allow for the possibility that one-job-equivalent income equals the income individuals think they deserve or ought to have. In that case we would have expected individuals who answered that their income was lower than others with similar work to report a high one-job-equivalent income (conditional upon actual income), for they would have wanted a relatively higher increase. We see that the answers are not only insignificant, but also that the sign is opposite to what would be expected: individuals who already obtain more than others with similar jobs want more to switch. Individuals who earn less are willing to leave for less, which seems plausible. Hence it seems unlikely that the one-job-equivalent income equals the income that individuals think they deserve.
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Table 3: alternative explanations of one-job-equivalent income

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>ln(y1)</th>
<th>t-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.101</td>
<td>0.1</td>
</tr>
<tr>
<td>ln(y0)</td>
<td>0.551</td>
<td>19.2</td>
</tr>
<tr>
<td>ln(age)</td>
<td>2.167</td>
<td>2.3</td>
</tr>
<tr>
<td>ln²(age)</td>
<td>-0.301</td>
<td>2.3</td>
</tr>
<tr>
<td>Opinions: Salary compared to others</td>
<td>0.063</td>
<td>1.4</td>
</tr>
<tr>
<td>Financial situation of household</td>
<td>-0.035</td>
<td>3.0</td>
</tr>
<tr>
<td>compared to average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1=very bad, .. , 10=very good)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.312</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>1004</td>
<td></td>
</tr>
</tbody>
</table>

not shown are two (insignificant) dummies indicating whether an opinion question is missing.

If one-job-equivalent income includes the value of non-monetized activities, which we hypothesize, then it seems likely that individuals with a very bad financial position would engage more in these non-monetized activities than individuals in a good financial position. In order to check this, the answer to the question “How do you think the financial situation of your family compares to the average Russian family” was included. If one-job-equivalent income includes the value of non-monetized activities such as bartering, home production and housework, we would expect individuals who think their financial situation is very bad to report relatively higher levels of one-job-equivalent income, conditional upon reported income. As one can see, this is indeed the case, suggesting that individuals in a ‘very bad’ financial condition are more often involved in non-monetary activities. If we would not condition on reported income, we would of course expect individuals who report to be in a bad financial condition to have lower levels of one-job-equivalent income, which is indeed the case (if we drop reported income from the specification of Table 3, we get almost exactly the opposite significant coefficient for the comparative financial situation of the family).
3.4 Conclusions

In this chapter we tried to assess the degree of under-reporting of income with the use of the 1997 wave of the Russian National panel. Respondents were posed two questions designed to elicit their total monetary and non-monetary income from all activities. The first question was simply how much they earned in total and we expected this question to underestimate the true income of the respondent. The second question was how much money the respondent would have to be paid to work full-time for another employer, requiring all money earning activities to be stopped. We call this income the one-job equivalent income. The ensuing income measure, which includes the incomes of all legal and illegal activities, bartering activities and home production, was found to be some 190% higher on average than reported income and was higher than reported income for 96% of all respondents. The problem of under-reporting was found to be especially large for highly educated respondents and for respondents who claimed to earn virtually nothing. In short, the one-job equivalent incomes calculated from the second question are much higher than reported income, but seem to have a plausible relationship with reported income, individual characteristics, and job amenities.

Another point is the question what this implies for estimates of Russian national income. If we take the extreme stand that the difference between one-job equivalent and reported income is non-declared income and/or income in kind, it would imply that national income is about three times as high as the sum total of official incomes. Setting income from barter and self-production at a guesstimate of 20%, it would imply an informal-but monetized - economy of about 40% of the total economy, whereby only 40% of the total economy is reflected in reported income.

Before these estimates and their implications can be trusted however, the question module should be tested in circumstances where one would not expect a high degree of under-reporting: in societies where tax-eviation is less prevalent and the unofficial economy is smaller, one would expect the second question to yield only marginally higher incomes than the first question. If this turns out not to be the case, then the reliability of the one-job equivalent is doubtful. Extending the analysis to other countries would therefore also give us more information about the reliability of one-job equivalent income in Russia.

The results, if reliable, have several implications. First, they suggest that aggregate income estimates and poverty estimates based on official income data will severely underestimate the level of economic activity and severely over-estimate poverty levels in Russia. Our results would suggest
that the value of economic activities in the Russian economy is almost three times larger than the sum of reported incomes would indicate. As to the inequality of incomes in Russia, we found to our surprise that there is very little difference between the inequality in reported incomes and one-job equivalent incomes. It seems that the benefits from bartering, illegal activity and home production, are also very unevenly spread.

A final issue is what the results in this chapter tell us about the poverty results in the previous chapter. The problem here is that we have to compare two different income concepts. The Income Evaluation Question and the derived Leyden Poverty Line consider financial income, by whatever means obtained. The income concept in this chapter also includes non-monetized activities and is hence much wider: without knowing what part of the one-job-equivalent income is due to financial income and what is due to non-monetized production, we cannot ascertain how much reported income underestimates financial income. If non-monetized activities would make up about 20% of the total economy though, which would seem a high estimate considering the importance of bartering in 1991 and the results of Rose and McAllister (1996), financial income would be twice as high as reported income. Hence, the actual Leyden poverty figure for 1993-1995 are likely to be lower than the estimates in the previous chapter, though we may note that they would still be around 50% even if reported incomes are only 50% of true financial incomes.
Conclusions

Chapter 4