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Leif Appelgren*

Abstract

This paper deals with an experiment by the Swedish Tax Agency to test the effect of information to taxpayers regarding different audit strategies[1]. The experiment involved approximately 900 sole proprietors, divided into three groups, where one was informed that audits would focus on taxpayers declaring the lowest income, i.e. according to a rational audit strategy. Another group was told that audits would be made at random whereas the third was a control group. The effect of strategy information was measured as the change in declared income between years. The principal finding was that declared income increased significantly more in the rational-audit-strategy group than in the control group.

INTRODUCTION AND THEORY

Tax audit theory prescribes that the audit risk should decrease with declared income, thus giving the taxpayer an incentive to reduce the fraud amount in order to reduce the risk of detection and sanctions. The objective of this paper is to study whether taxpayers in reality behave as predicted by theory.

Tax audits have a direct effect, i.e. that fraud is detected, resulting in the collection of tax and penalties. The audits also have an indirect deterrent effect, i.e. rational taxpayers are made aware that they may be audited and therefore adapt their behaviour to the expected degree of auditing.

One specific difficulty in the design of audits is in modelling how the deterrent effect depends on the actions of the auditor. A natural starting point is to assume that the taxpayer behaves rationally, in other words, maximizes his expected utility. This approach leads to the model introduced by Gary Becker (1968), which is based on the assumption that a crime is committed if the expected utility of the crime exceeds the expected cost of the sanction.

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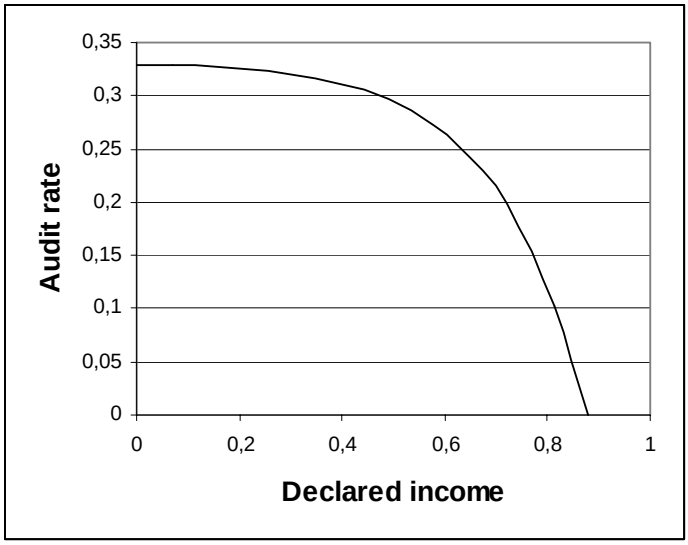
[1] The results have been briefly described in Swedish in Appelgren (2006)

The Becker model was first applied to tax fraud by Allingham & Sandmo (1973), who used a concave utility function, i.e. one with decreasing marginal utility, in order to determine the optimal amount of fraud when the audit rate is constant and known to the taxpayer. Other applications, which also included the behaviour of the auditor, have been studied by Reinganum & Wilde (1986) and Erard & Feinstein (1994). The theoretical tax fraud models are well described in a survey by Andreoni, Erard & Feinstein (1998).

Reinganum & Wilde (1986) studied the optimal allocation of audit resources to a homogenous group of taxpayers when the cost per audit is given. Such a homogenous group may consist of craftsmen in one-man enterprises or taxi companies with one car. An important assumption is that the only information available to the auditor regarding the individual taxpayer is the declared income. In addition, the auditor knows the distribution of true income, for instance from earlier random audits.

In the model developed by Erard & Feinstein (1994), the cost of an audit is replaced by a constraint that the number of audits is given. The authors also improved the model by introducing the concept of a known fraction of honest taxpayers, i.e. taxpayers who always declare their true income. The remaining taxpayers are assumed to behave rationally. The model has been further developed by Appelgren (2003).

Figure 1: A typical optimal audit-rate function



The basis of the models developed by Reinganum & Wilde and Erard & Feinstein is that the auditor observes declared income only and bases his audit decision on this observation. The models lead to an optimal audit-rate function which decreases with declared income, as illustrated in Figure 1.

PREVIOUS EMPIRICAL RESEARCH

The effects of information about audit activity have been studied previously in field experiments in Minnesota, USA, the United Kingdom and Australia. The limited number of experiments is probably due to high costs and confidentiality issues involved in the use of actual taxpayer data. In the Minnesota and UK experiments, the

effect of tax advisors (paid preparers) is studied since this may have influence on the effect of audit information.

In the Minnesota experiment (Blumenthal et al, 2001), taxpayers were informed that their tax returns would be audited; this led to significantly higher declared incomes for high-opportunity groups (taxpayers with business or farm income) with low and medium incomes. The same effect was not noted for high income earners. A possible explanation for this surprising result is that high-income earners increased their use of tax advisors under the threat of audit, and that those advisors were able to identify legal means for tax evasion, leading to lower declared income.

In the UK experiment (Hasseldine et al, 2007), more than 7,300 small enterprises were studied. They were considered to belong to a high-risk group, with a turnover just below the limit above which a more detailed tax reporting would be required. The companies were divided into six groups, one control group and five groups which received different letters characterised by the terms *"Enabling"*, "*Citizenship", "Increased audit", "Audit/penalties" and "Preselected audit"*. The principal result was that significantly higher turnover and net profit were reported in the three audit-related groups than in the control group. The monetary profit effects amounted to GBP 176 – 770 in the three groups compared to the control group.

The Australian experiment (Wenzel & Taylor, 2004) was carried out on 9,000 taxpayers in order to measure the effect of a specific form (Rental Property Schedule, RPS) for itemizing deductions made in conjunction with rental property income. The main result of the study was that when the RPS was used to account towards the tax office for the deduction claims, it reduced deductions with 5-7.5%. A mere warning letter or a schedule for personal use only had no effect on cost deductions. The tone of letter was either "soft" or "hard", where the latter included an audit threat. Overall, the tone of letter had no effect, but it had a positive effect (smaller deductions) on taxpayers who received the RPS for the first time, whereas it had a negative effect on taxpayers who had received the schedule before.

The results in the studies above concerning the effect of audit information are mixed. The effect is clearly positive in the UK study, mainly positive in the Minnesota study and small in the Australian study. A reason for the mixed results may be that the taxpayer has an ex ante assessment concerning the audit risk, and if the audit letter merely confirms this assessment, the effect will be small.

RESEARCH QUESTION

All the models described above assume that the taxpayer is rational and tries to select the amount of tax fraud in order to maximize his expected utility. With an audit rate decreasing with increasing declared income, the taxpayer has an incentive to increase his declared income, i.e. decrease the amount of fraud, in order to reduce the audit risk. In order to obtain this effect, the auditor must inform the taxpayers about the rational audit strategy with decreasing audit rate.

It is not obvious that taxpayers behave as rationally as the theoretical models assume. The scope of this paper is to study whether real-world taxpayers adapt to information about a decreasing audit rate by reducing the fraud amount. More specifically, the main research question is:

Does information about a rational audit strategy with a decreasing audit rate reduce tax fraud as compared to information about a random audit strategy?

TEST DESIGN

This paper concerns an empirical test of the effect of information to taxpayers concerning different audit strategies. The test was carried out by the Linköping Regional Office of the Swedish Tax Agency in 2003-2004 on approximately 900 sole proprietors. The primary objective was to investigate whether information to taxpayers about a near-optimal audit strategy reduces tax fraud compared to information about a more conventional audit strategy, i.e. pure random audits. Information concerning the use of tax advisors/paid preparers was not collected.

The opportunities for tax evasion for individuals with income from employment are limited in Sweden as employers supply the tax authorities with statements on employee remuneration. It is therefore natural to perform an experiment on a group of enterprises. In order to obtain a large homogenous group, sole proprietors mainly in craft trades were selected.

The test was conducted on sole proprietors without employees and with little or no income from employment (maximum SEK 10,000 in the year 2002, where 1 SEK is approximately equal to 0.1 Euro). These owners were supposed to support themselves with their business. Further, the sample was limited to men below the age of 55 in order to concentrate on a high risk group (younger men are more fraudulent than women and older men). The trades included were craftsmen in the building industry, auto-repair craftsmen and hairdressers. Those trades were selected by the Tax Agency as they are the largest groups of sole proprietorships.

According to the theoretical work referred to above, the optimal audit strategy for a homogeneous group of taxpayers is to concentrate audits on those who declare the lowest income. In the experiment, however, the total net cash flow of the household was used instead as the basis for audit selection. Net cash flow is defined as declared income after tax, adjusted for non-cash items like depreciation and allocation to tax allocation reserves, as well as for cash items not included in income such as amortisation and new borrowing.

Three groups were studied, each with around 300 firms.

A. Rational Group	The members were informed by mail that audits would concentrate on taxpayers who declare the lowest net cash flow (Appendix 1)
B. Random Group	The members were informed by mail that taxpayers to be audited would be selected at random (Appendix 2)
C. Control Group	The members received no information

The three groups were geographically separated within the region, which encompasses the counties of Östergötland and Jönköping. Without such separation, there might be confusion if two colleagues were to find out that they had received different information regarding the upcoming tax audit.

Information was sent out during the second half of 2003 in order for it to affect the accounting for the remainder of the year and the tax return in May 2004. The Tax

Agency expected a possible negative reaction to the audit letters, especially from the Rational Group. Therefore, a service phone number was provided in the audit letters. The Tax Agency registered a total of only 11 phone calls, none of which with negative or critical content.

The effect of the strategy information in the audit letters was measured by comparing declared income for 2003 with declared income for 2002. The hypothesis was that the Rational Group would show a larger increase compared to the Control Group, and that the Random Group would fall between the other two since all information to taxpayers regarding audits is assumed to have a certain deterrent effect.

In the analysis, it was evident that additional delimitations should have been made in the selection of taxpayers. First, firms with income from employment in the year 2003 should have been excluded, in consistency with the exclusion of such firms in 2002. Moreover, a number of firms had used subcontractors extensively, and it can be argued that they should have been excluded like firms with employees.

As Sweden has a loss-carry-forward system, firms showing a loss in 2002 may have had losses in previous years which are included in the 2002 loss. In addition, the result in 2003 includes a carry-forward of the loss shown in 2002. Therefore, firms showing negative income in 2002 should be excluded.

The results reported below refer to data where firms with employment income exceeding SEK 10,000 in 2003 as well as firms with negative income in 2002 have been excluded. Regarding subcontractors, we present results from two sets of data, one excluding firms using subcontractors and one including such firms.

The data set included the Swedish Industry Classification Code (SNI) for each firm. It is evident from Tables 1 and 2 that the construction industry is predominant in the data.

An assumption behind the experiment is that all taxpayers belong to a homogenous group with random variations in income change between years and with randomly varying response to the audit letters. However, an analysis of the distribution of income change (Appendix 3) indicates that the population may consist of two distinct sub-groups, one “honest” group with a smaller standard deviation in income change and a smaller response to the audit letters, and one “fraudulent” group with a larger standard deviation in income change and a stronger response to the audit letters. This sub-group hypothesis has not been taken into account in the analysis below but would be of great interest as a subject for further research.

Table 1. Industry classification of participating firms, excluding firms with subcontractors

Industry	SNI code	Rational Group	Random Group	Control Group
Manufacture of metal products, machinery and equipment	28, 29	0	0	0
Demolition of buildings, earth moving	451	6	13	19
Construction of buildings etc	452	40	54	41
Installation (electric, plumbing etc)	453	16	20	13
Painting, plastering, floor and wall covering, glazing etc	454	39	48	28
Renting of construction/demolition equipment with operator	455	4	6	18
Auto repair	502	6	5	8
Hairdressers	93021	7	12	15
Total number of taxpayers		118	158	142

Table 2. Industry classification of participating firms, including firms with subcontractors

Industry	SNI code	Rational Group	Random Group	Control Group
Manufacture of metal products, machinery and equipment	28, 29	1	0	2
Demolition of buildings, earth moving	451	16	25	24
Construction of buildings etc	452	71	91	71
Installation (electric, plumbing etc)	453	47	35	30
Painting, plastering, floor and wall covering, glazing etc	454	79	76	65
Renting of construction/demolition equipment with operator	455	9	8	25
Auto repair	502	12	12	12
Hairdressers	93021	13	22	22
Total number of taxpayers		248	269	251

STATISTICAL ANALYSIS

The standard deviation of income change

In the preparations for the experiment, we expected that the standard deviation in income change between the two years would not exceed 25% of the average income. If two groups are compared, the standard deviation in the difference increases by the square root of 2, i.e. up to 35%. With 300 firms in each group, the standard deviation of the average income is reduced by the square root of 300, i.e. to approximately

2.0%. If a change in audit strategy would result in a change in declared income by 4%, the change would be statistically significant at the 5% level.

Actual data for the three groups are shown in Tables 3 and 4. The expectation regarding the standard deviation was apparently wrong, as the standard deviation was 35-50% of the average income instead of 25%. Furthermore, the size of the groups was reduced due to the additional limitations made above. Therefore, the difference in income change between groups had to be between 6 and 10% in order to be statistically significant.

Table 3. Average income, average income change and standard deviation in income change, excluding firms with subcontractors

Amounts in SEK 1000	Group size	Average income 2002	Average increase 2002-2003	Standard deviation	Relative standard deviation
Rational Group	118	134	27.2	50	37%
Random Group	158	150	17.0	58	39%
Control Group	142	149	13.4	56	38%

Table 4. Average income, average income change and standard deviation in income change, including firms with subcontractors

Amounts in SEK 1000	Group size	Average income 2002	Average increase 2002-2003	Standard deviation	Relative standard deviation
Rational Group	248	154	19.5	77	50%
Random Group	269	164	14.0	55	34%
Control Group	251	157	11.6	54	34%

Testing

The results of a simple statistical test are shown in Tables 5 and 6, where the hypothesis tested is that two group have the same mean. The distribution of the difference in average income is approximately normal with an estimated standard deviation *s* calculated from

$$s^2 = s_1^2/n_1 + s_2^2/n_2$$

where s_i and n_i are the sample size and the estimated standard deviation of the compared groups, respectively.

Table 5. Data for testing the difference in average income change between groups, excluding firms with subcontractors

Amounts in SEK 1000	Difference in average income change Δm	$\Delta m/s$	Significance level
Rational Group vs Control Group	13.8	2.10	3.6%
Random Group vs Control Group	3.6	0.55	58%
Rational Group vs Random Group	10.2	1.56	12%

In the *Subcontractors Excluded* case, shown in Table 5, the Rational Group shows a larger income change compared to the Control Group, significant on the 4% level. This indicates that information concerning the "near-optimal" audit strategy has had the intended effect of reducing tax fraud and thereby increasing declared income.

In regard to the income change, the Random Group falls between the two other groups. However, the Random Group does not show a significantly higher income change than the Control Group, nor does it show a significantly lower income change than the Rational Group. The groups have thus been too small to permit any clear conclusions as to whether the results are due to the effect of information in general or to the effect of information on the near-optimal audit strategy.

For the case of *Subcontractors Included* (Table 6), no significant income changes have been obtained, probably because those groups are less homogenous and therefore show larger standard deviations.

Table 6. Data for testing the difference in average income change between groups, including firms with subcontractors

Amounts in SEK 1000	Difference in average income change Δm	$\Delta m/s$	Significance level
Rational Group vs Control Group	7.9	1.33	18%
Random Group vs Control Group	2.4	0.50	62%
Rational Group vs Random Group	5.5	0.93	35%

From Tables 5 and 6, we find that the monetary effect of the rational strategy compared to the control group is SEK 7,900 – 13,800. This can be compared to the results of the UK study (Hasseldine et al, 2007), where the effect of the three audit letters, converted to Swedish currency, amounted to SEK 2,600 – 11,500. Thus the effect is of the same order of magnitude.

Profit before tax allocations

The data supplied by the Tax Agency also included profit before depreciation and other tax allocations. This measure of income should be closer to the "true" result of the business since it is not affected by the adjustments that the taxpayer can make in order to reduce his tax burden or show a smoother income pattern over time. This measure is also closer to the net-cash-flow measure used for audit selection in the Rational case.

The Swedish tax system allows for two main instruments for income tax management. First, tax depreciation is very liberal for machinery and equipment with up to 20% depreciation on cost or 30% depreciation on depreciated value. Second, 25% of income may be allocated to a tax allocation reserve and retained there for a six–year period.

The most striking difference compared with the income measure used in Tables 3 and 4 is much larger standard deviations in profit change between years, SEK 100,000 – 180,000 as compared to SEK 50,000 – 77,000 in Tables 3 and 4. This indicates that tax allocations are actively used to equalize declared income between years.

The highest standard deviations are observed for the Rational Group. This is due to a few extreme outliers, with negative income changes exceeding SEK 500,000. Excluding the extreme outliers, statistically significant differences between the Rational Group and the Control Group are found at the 5% level for subcontractors excluded as well as included. When subcontractors are included, the Rational Group is even found to be significantly better than the Random Group.

Median tests

In addition to the tests above, using the average income/profit increase between years, we have also studied the median of the income/profit increase since this parameter is independent of extreme outliers. In three of the four cases, the Rational Group is significantly better than the Control Group, thus the results are quite similar to those obtained from using the increase in average income/profit.

Test summary

Comparisons have been drawn for the three groups in eight combinations (average/ median, income/profit, with/without subcontractors). In addition, the average profit case has been studied with and without extreme outliers. Thus, ten cases in all have been evaluated. In nine of these, the ordering of the three groups was as expected, i.e, with the greatest changes between years for the Rational Group and the smallest changes for the Control Group.

Table 7. Significance level for eight tests

Significance level	Rational Group vs Control Group	Rational Group vs Random Group
Subcontr. Excluded		
Average income change	3.6%	12%
Average profit change, extreme outliers excluded	3%	45%
Median income change	12%	25%
Median profit change	5.0%	91%
Subcontr. Included		
Average income change	18%	35%
Average profit change, extreme outliers excluded	0.4%	0.7%
Median income change	1.9%	13%
Median profit change	1.0%	19%

In six of the eight cases, the income/profit increase was significantly larger for the Rational Group than for the Control Group. In view of the limited volume of data in the study, however, it cannot be determined with statistical significance whether this result is due to the quality of the rational audit strategy or to the audit information in general.

DISCUSSION AND CONCLUSIONS

Method of measurement

The selected method of measuring changes in tax-fraud behaviour by changes in declared income or profit between years, is low in cost but has several drawbacks. Income and profit changes may have other causes, such as changes in business volume, changes in profitability, investment, sale of assets etc. The data include several firms with zero sales in one or both years, those firms were not excluded as the low declared sales volume may be due to large-scale fraud.

A better measure of fraud would possibly be obtained with random audits but this method is much more costly. As shown below, random audits were made in the Random Group, but unfortunately not in the other groups. It should be remarked that

audits do not discover all fraud, especially not hidden income which is kept out of the accounts.

The quality of the study may have been affected by the use of net household cash flow as a parameter for the audit strategy when the effect of the strategy is measured as the change in declared income. A taxpayer with a high net household cash flow, perhaps due to employment income from his spouse, has no incentive to reduce any fraudulent behaviour as he does not expect to become audited. On the other hand, the incentive works as intended for taxpayers with a low net household cash flow.

Main conclusions

The statistical tests indicate strongly that information concerning the use of rational, "near-optimal" audit strategies is superior to information concerning random audits and that audit information is general is superior to no information.

It can be stated with statistical significance that information concerning the rational audit strategy reduces tax fraud compared to no information.

The results are well in line with the Minnesota and UK experiments. Similar results should be expected if the study would be repeated in other countries where sole proprietors make self-assessments for income tax purposes. .

Other results

According to Appendix 3, it seems possible that a separation into two sub-groups provides a realistic model, where one sub-group is less sensitive to audit-strategy information (thus less fraudulent) whereas the second sub-group is more sensitive to audit-strategy information (thus more fraudulent).

In Appendix 4, we find that the indirect effect of changing from random to rational audits is smaller than the direct effect, contrary to the experience of the author. A possible reason is that the audit rate in the study is higher than normal, resulting in larger direct effects. As the taxpayer is not informed of the high audit rate, the behaviour does not change as much as if the taxpayer had been aware of this fact.

Further research

It would be desirable to conduct new experiments on a larger scale in order to obtain statistically significant differences between the rational and random groups. It would also be helpful to use more specific information regarding actual audit rates. Disclosing such information is against the policy of the Swedish Tax Agency, however.

The hypothesis that the groups consist of two distinct sub-groups, one stable and less fraudulent and one volatile and more fraudulent, would be very interesting to follow up on a larger set of empirical data.

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APPENDIX 1: LETTER TO MEMBERS OF THE RATIONAL GROUP

Riksskatteverket (Swedish Tax Agency)
NN
Each year the Linköping Regional Office of the Swedish Tax Agency conducts various activities for purposes of information and control so that the tax assessment will be as correct as possible. In some cases we provide advance notice that a certain type of control will be carried out. You are part of a group of randomly selected business proprietors who are being informed at this early stage that their income-tax returns to be submitted in 2004 may be audited.

Which returns will be audited?
After the tax returns have been filed, we will select the returns be audited. Your return is one of those subject to a possible special audit, where we will select the returns of taxpayers with the lowest net cash flow.

In order to determine your net cash flow, we examine the data that you have provided in your tax return and the remuneration statements received by the Tax Agency. We then calculate how much money you have received and how much you have paid out. The difference between what you have received and what you have paid out is your

net cash flow. In the enclosure to this letter, you can see a sample calculation of net cash flow.

If most of the taxpayers in the group have a lower net cash flow than you, your tax return will not be audited. On the other hand, if your tax return is one of those with the lowest net cash flow, it will be selected for audit.

There need not be any error
There need not be any error in your tax return just because you have a low net cash flow. But a low net cash flow may be an indication of unreported income.

This audit concerns your business income. If you also have income from employment or capital, your tax return may be audited for other reasons – in that case there would be no difference between your tax return and all others.

Advance notice
Normally an audit comes as a surprise. We now want to test what happens when let taxpayers know before they file their tax returns how we will select which returns will be audited. We hope that as a result more taxpayers will file correct returns in the first place.

If you have questions regarding this letter, please call NN at XX.

Best regards
Bertil Olofson
Director, Linköping Regional Office, Swedish Tax Agency

APPENDIX 2: LETTER TO MEMBERS OF THE RANDOM GROUP

Riksskatteverket (Swedish Tax Agency)
NN
Each year the Linköping Regional Office of the Swedish Tax Agency conducts various activities for purposes of information and control so that the tax assessment will be as correct as possible. In some cases we provide advance notice that a certain type of control will be carried out. You are part of a group of randomly selected business proprietors who are being informed at this early stage that their income-tax returns to be submitted in 2004 may be audited.

Which returns will be audited?
After the tax returns have been submitted, we will select the ones to be audited. Your return is one of those subject to a possible special audit, where we will select a number of returns for closer examination on a totally random basis.

This audit concerns your business income. If you also have income from employment or capital, your tax return may be audited for other reasons – in that case there would be no difference between your tax return and all others.

Advance notice
Normally an audit comes as a surprise. We now want to test what happens when let taxpayers know before they file their tax returns how we will select which returns will be audited. We hope that as a result more taxpayers will file correct returns in the first place.

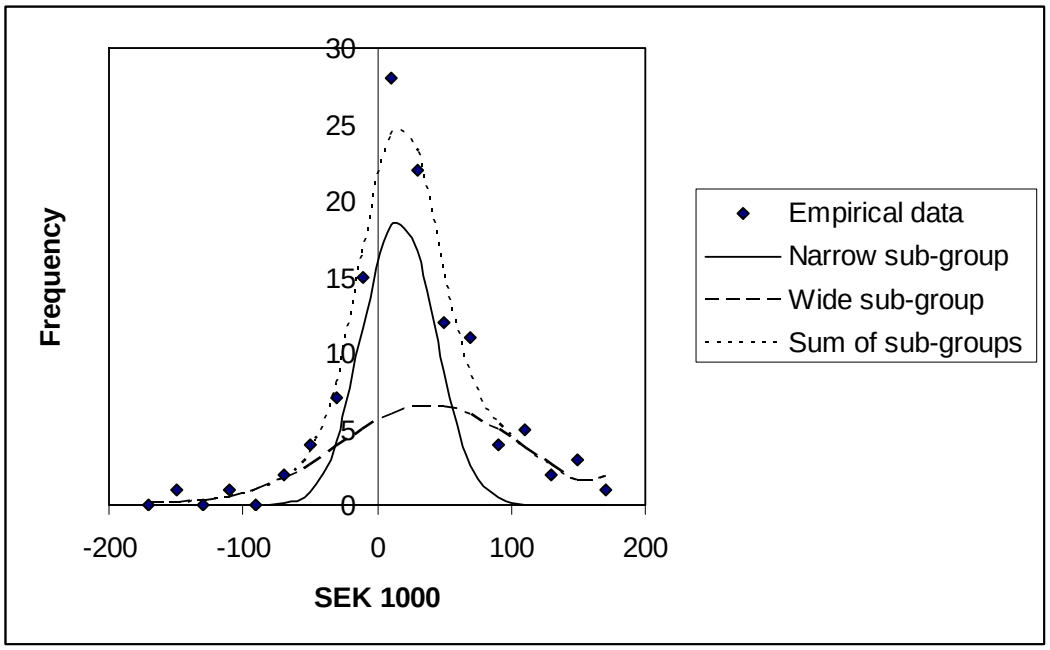
If you have questions regarding this letter, please call NN at XX.

Best regards
Bertil Olofson
Director, Linköping Regional Office, Swedish Tax Agency

APPENDIX 3: DISTRIBUTION OF INCOME CHANGE BETWEEN YEARS

The distributions of income change for the *Rational* and *Control* groups in the case *Subcontractors Excluded* are shown in Figures A3:1 and A3:2. Is the income change between 2002 and 2003 normally distributed?

Figure A3:1. Distribution of income change for the Rational Group, Subcontractors Excluded



In a normal distribution, the ratio between standard deviation and the quartile distance, i.e. the distance between the third and the first quartile, is 0.74. In Table A3:1, we compute this ratio for the six cases. It is apparent that in all cases except *Subcontractors Excluded/Rational*, the distribution is far from normal, with extreme outliers causing an abnormally high standard deviation. A χ^2 test for the three cases *Subcontractors Excluded* confirms that the distribution is not normal for the *Random* and *Control* cases.

Figure A3:2. Distribution of income change for the Control Group, Subcontractors Excluded

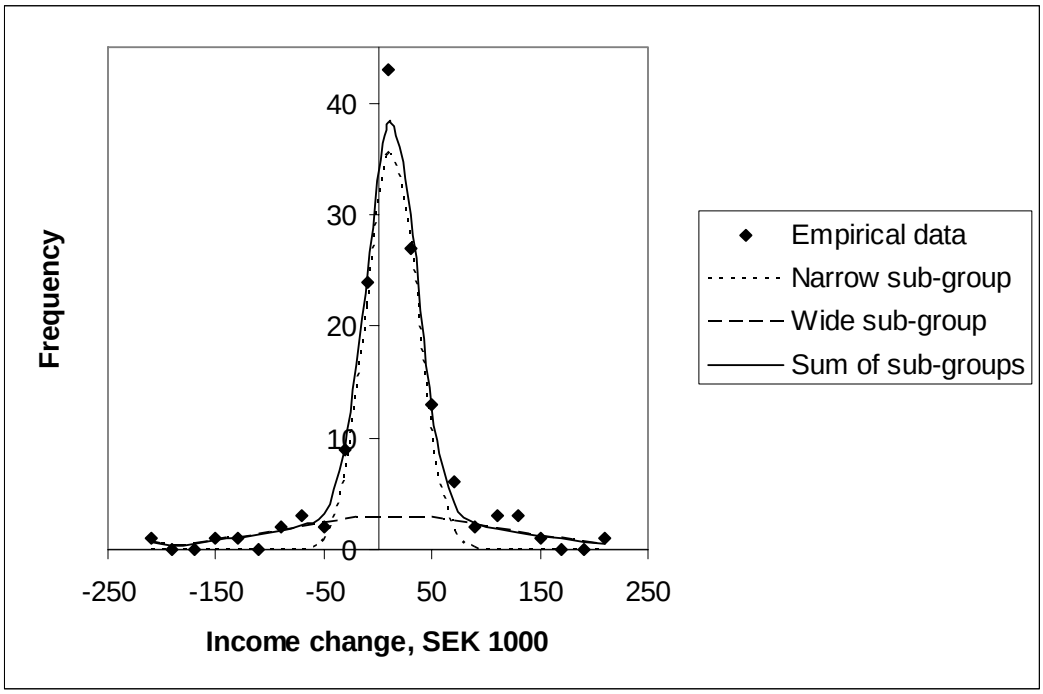


Table A3:1. Comparison between standard deviation and quartile distance

Amounts in SEK 1000	Group	Standard dev.	Quartile distance	Ratio
Subcontractors Excluded	Rational	50	56	0.89
	Random	58	48	1.21
	Control	56	36	1.56
Subcontractors Included	Rational	77	56	1.37
	Random	55	53	1.04
	Control	54	42	1.29

A possible approximation of the income change distribution is that each group consists of two normally distributed sub-groups, one with a small standard deviation (narrow group) and one with a large standard deviation (wide group). The best fit for two normal distributions has been determined with a maximum-likelihood model with five parameters (two mean values, two standard deviations and one relative weight factor. The results for the case of *Subcontractors Excluded* are presented in Table A3:2 below.

Table A3:2. Maximum likelihood estimates for two normally distributed sub-groups, subcontractors excluded

	Narrow sub-group			Wide sub-group		
Amounts in SEK 1000	Mean	Standard deviation	Weight factor	Mean	Standard deviation	Weight factor
Rational Group	16.6	26.2	0.539	39.5	66.1	0.461
Random Group	12.9	21.2	0.678	20.7	93.5	0.322
Control Group	12.9	22.4	0.734	15.7	101.4	0.266

It is striking that the mean values and standard deviations for the three narrow sub-groups are so similar. This finding gives rise to a hypothesis that the populations consist of two distinct groups, one with stable income from year to year and one with volatile income. When information regarding future audits is supplied, the members of the volatile group respond with an increase in declared income, i.e. there is a reduction in fraud.

It must be emphasised that the above results are quite uncertain because of the limited size of the groups. The same results were not obtained for the case *Subcontractors Included*, possibly because those groups are less homogenous.

APPENDIX 4: DIRECT AND INDIRECT EFFECTS

The Swedish Tax Agency has carried out audits according to its announced strategies, i.e. on taxpayers with the lowest net household cash flow in the Rational Group and randomly in the Random Group. No audits were conducted in the Control Group. An equal number of audits were made in the Rational and Random groups. They resulted in SEK 846,000 and SEK 260,000 respectively in increased taxes and tax penalties. Thus the direct effect of a transition from random to rational audits is SEK 586,000, a strong indicator that the latter strategy is considerably more efficient than random auditing.

The direct effect should be compared to the indirect, deterrent effect, which for the case of *Subcontractors Excluded* is an average income increase amounting to SEK 10,200 according to Table 7, i.e. SEK 1,204,000 for 118 taxpayers. With the Swedish local tax rate around 30%, the indirect effect on public revenues would be about SEK 360,000. The corresponding numbers for the case of *Subcontractors Included* are SEK 5,500 for 248 taxpayers, with a revenue effect of roughly SEK 410,000.

Since the Tax Agency did not exclude taxpayers with subcontractors in the selection of audit targets, the comparison should be made with the case *Subcontractors Included*. The direct effect of switching from random to rational audits, SEK 586,000, should thus be compared to the indirect effect of SEK 410,000.