

The Inclusion of Mobile-only Persons in the Finnish ICS

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based on the data of the European International Crime Survey (EU ICS), Gallup Europe*

Most surveys in the 2000 ICVS (International Crime Victimization Survey, the predecessor of EU ICS) were done by telephone, and this was the mode we used for the 2005 EU ICS surveys as well. Interviewers used computers from which they read the questions and recorded answers – a procedure known as computer assisted telephone interviewing (CATI). Telephone interviewing, and the CATI variant of it, has been increasingly used in victimisation surveys – for example, in Canada, the Netherlands, Switzerland, the USA, and England and Wales. For the ICVS, CATI has been accepted as a sound technique for countries where telephone penetration is high and this was the case in all member states of the European Union.

However, mobile telephony grows at an enormous pace, and, what is more, it seems to slowly replace fixed telephones in certain societal segments in developed countries. During the period between 1995 and 2003 (the latest full year for which data is available), the number of mobile telephone subscriptions increased by each year by an average 42% at EU level.

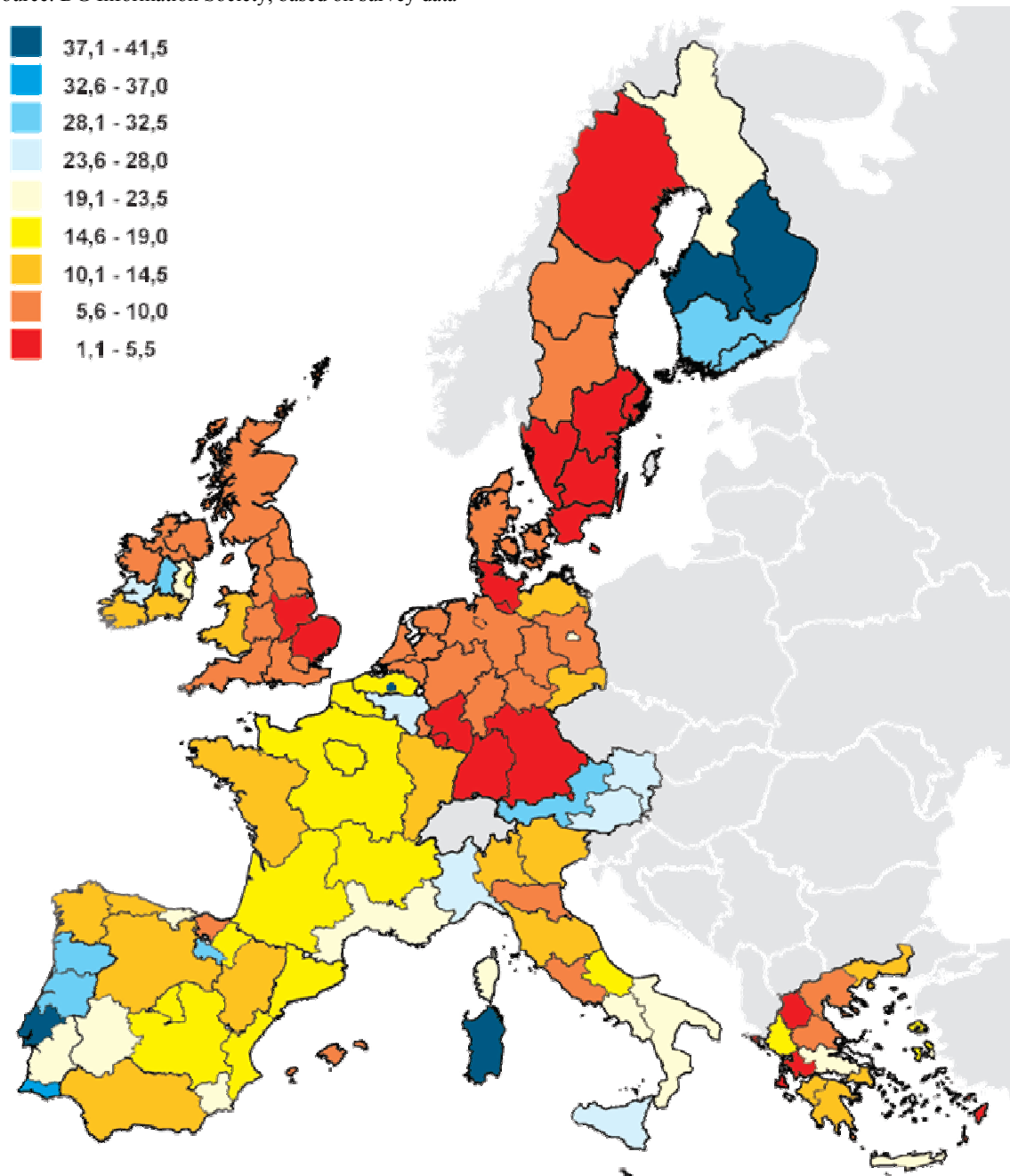
Our real concern is not the growing mobile penetration rate, but the increasing number of those who only have a mobile telephone and no landline telephone in their residence. Systematic data on this issue is generally not available; but we have sample-based estimations in most of the countries where such information exists.

COUNTRY	Mobile-only persons (%)	COUNTRY	Mobile-only persons (%)
Belgium	22	Luxembourg	6
Denmark	13	Hungary	13
Germany	7	Netherlands	9
Estonia	21	Austria	26
Greece	11	Poland	..
Spain	16	Portugal	33
France	14	Finland	35
Ireland	15	Sweden	5
Italy	13	United Kingdom	7

Looking at Europe in a finer resolution, it becomes apparent that even in those countries where the overall mobile only population is not extraordinarily high, there are regions where large proportion of potential respondents cannot be reached over landline telephones (such as Corsica, Sicily or the Brussels region).

Mobile-only households in EU regions

source: DG Information Society, based on survey data



For the EU ICS we called fixed line telephones in each country (with the exception of Poland where the fieldwork was carried out face-to-face). As of 2004-2005 the systematic inclusion

of mobile phones in pan-European telephone was not possible. In bullet points, the main burdens are¹:

- lack of lists, directories
- low sample efficiency in RDD
- lack of prefix geography
- lack of previous experience/methodology
- problems with contact evaluation (from the perspective of response rates and call-back rules)
- series of environmental effects (from risk of injury, through loss of attention, to limited privacy in public space, etc.)
- various other mode effects
- cost issues

Still, the EU ICS wanted to assess the potential impact of not covering mobile-only persons. In order to do this, we selected Finland. In Finland we have the largest proportion of mobile using households / persons not using fixed-telephones among the EU-15 countries. Equally important, that we could relatively easily access sample list of mobile only persons from Finnish sample providers, which cut short many of the sampling problems there. (In fact, we are not completely informed how the list was created or what are its exact limitations. It appears that the sample list was based on subscription numbers, and do not include pre-paid numbers. The provider of the list was XXXXX). For our experiment, a full mobile-only coverage was not a necessity, such list was satisfactory to assess the non-coverage effects on victimisation experience.

¹ see for example:

Callegaro, Mario and Teresio Poggio (2004). Where Can I Call You? The “Mobile Revolution” and Its Impact on Survey Research and Coverage Error: Discussing the Italian Case. Paper presented at: Recent Developments and Applications in Social Research Methodology: Sixth International Conference on Logic and Methodology. Amsterdam, The Netherlands.

Vehovar, Vasja. Patterns of Mobile Phone Usage and Their Impact on Participation in Mobile Phone Surveys. Paper presented at: Recent Developments and Applications in Social Research Methodology: Sixth International Conference on Logic and Methodology. Amsterdam, The Netherlands.;

Hancock, Laura (2005). Characteristics Related to Cell Phone Status: Why Generation Y Should Be Targeted. Paper presented at: American Association for Public Opinion Research: 60th Annual Conference. Miami Beach, Florida.

Callegaro, Mario, Trent D. Buskirk, Linda Piekarski, Vesa Kuusela, Vasja Vehovar, and Charlotte Steeh (2004). Calculating Response Rates for Mobile Phone Surveys. A Proposal of a Modified AAPOR Standard and Its Application to Three Case Studies. Paper presented at: Recent Developments and Applications in Social Research Methodology: Sixth International Conference on Logic and Methodology. Amsterdam, The Netherlands.

Demographic comparison

On the one hand, an ever-growing number of potential respondents are no longer reachable by normal phones. In other words, mobile phone ownership can affect the cost of fixed-line phone ownership, such that many people choose to rely only on mobile phones and do not own a fixed-line phone any longer. In this context, the problem for researchers comes into being with the finding that mobile phone and fixed-line phone users can differ not only by region, but also by important individual-level characteristics: We knew from earlier research that across countries, those who only own a mobile phone have a tendency to be a group of young, single, and moderately educated respondents. We were, however, not fully aware of striking differences we found when we compared the fixed line EU ICS sample with the mobile-only supplementary sample we collected afterwards.

Demographic characteristics of the unweighted fixed-line and mobile only samples

	Finland fixed line sample N= 2001	Finland mobile only sample N=499		Finland fixed line sample N= 2001	Finland mobile only sample N=499
SEX: male	32	44	ACTIVITY: working	39	61
SEX: female	68	56	ACTIVITY: looking for work	2	5
			ACTIVITY: homemaker	2	5
AGE: 16-29	5	62	ACTIVITY: retired, disabled	53	2
AGE: 30-59	44	37	ACTIVITY: student	4	26
AGE: 60+'	51	1	ACTIVITY: other	1	1
RESIDENCE: flat/apartment	43	52	INCOME: bottom 25%	20	24
RES.: a terraced house/row house	11	15	INCOME: 25-50%	17	20
RES.: detached/semi-detached house	42	29	INCOME: 50-75%	18	23
RES.: institution (hospital, etc.)	1	0	INCOME: top 25%	30	21
RES.: other	3	4	INCOME: refused	14	12
GOING OUT: almost every day	3	12	MARITAL: single (unmarried)	20	46
GOING OUT: at least once a week	17	39	MARITAL:married	50	24
GOING OUT: at least once a month	24	27	MARITAL:domestic partnership	5	25
GOING OUT: less often	43	21	MARITAL:divorced/separated	8	5
GOING OUT: never	14	1	MARITAL:widowed	15	0
			MARITAL:refuses to say	1	1

The table above clearly shows that the two populations in Finland are fundamentally different, mostly in their age characteristics. While we barely find a young respondent in the fixed telephone-based sample (5% are between 16 and 29 years of age), 62% of the mobile-only sample are made up by this segment. The other differences are largely the function of the sharp age difference: the mobile only sample is less likely to own a house, more likely to go

out, much more likely to be working and studying, they are somewhat less affluent, dominantly they are single.

Differences in victimisation experience

One can suspect that the victimisation characteristics of the mobile only sample might be very different from those we recruited over fixed line telephones. This indeed holds true, as the table below illustrates.

Victimisation characteristics of the unweighted fixed-line and mobile only samples

	Finland fixed line sample N= 2001	Finland mobile only sample N=499
prevalence rate 10 crimes (last five years)	37	60
prevalence rate 10 crimes (last year only)	10	21
5-year prevalence rate of different crimes		
THEFT OF CAR	3	5
THEFT FROM CAR	8	17
THEFT OF MOTORCYCLES	0	1
BICYCLE THEFT	13	24
BURGLARY / HOUSEBREAKING	8	4
ATTEMPTED BURGLARY / HOUSEBREAKING	3	3
ROBBERY	2	4
THEFT OF PERSONAL PROPERTY	9	16
SEXUAL INCIDENTS	2	8
ASSAULT AND TREATS	7	21
1-year prevalence rate of different crimes		
THEFT OF CAR	0	1
THEFT FROM CAR	1	5
THEFT OF MOTORCYCLES	0	0
BICYCLE THEFT	3	7
BURGLARY / HOUSEBREAKING	2	1
ATTEMPTED BURGLARY / HOUSEBREAKING	1	1
ROBBERY	0	1
THEFT OF PERSONAL PROPERTY	2	4
SEXUAL INCIDENTS	1	2
ASSAULT AND TREATS	2	4

Contact crimes (assaults, sexual incidents, theft of personal property, robbery) is much more frequently reported from the past five years by the mobile only sample compared to the fixed telephone sample. Also, some property crimes, such as bicycle theft and car-related theft are also more common among the mobile only persons, while only burglary occurs more often to the telephone sample. Consequently, both the 1-year and the 5-year overall prevalence rates are strikingly different, too: the mobile only sample is roughly twice as much likely to be victimised compared to the landline telephone owners. This is very significant difference.

Survey estimations

If the victimisation differences are so pronounced between the two populations, than the crime prevalence estimations that do not include the opinions of a significant population group (33-35% are mobile only in Finland, depending on data source) could heavily distort the EU ICS survey estimations.

But in EU ICS non-response weighting was applied, exactly to correct any significant deviations from the universe demographics. The question is whether or not such non-response weighting can be effective if a large and very specific part of the universe is not represented in the sample. Of course this is not necessarily a solely empirical question, but our current experiment allows for a direct comparison of estimations based on the fixed-only sample, and the extended, “full” sample.

Before we present the results of this comparison and draw a conclusion, we shortly describe the weighting process applied in EU ICS, and the weighting approach we used after unifying the two datasets. (We did not weight the mobile only sample separately, partly because we could not access any reliable universe data about this group, but also because our goal was not to provide estimations for this group only, but the whole Finnish population.)

EU ICS Weighting

A number of weighting variables were computed in EU ICS (fixed phone samples) to compensate for over- and undersampling, deliberate or otherwise, of particular groups within the population. The ICS had a sample of households and a sample of individuals from each household. Weights were developed by making the marginal distributions of the auxiliary variables in the sample conform to the population marginals and not the full joint distribution. *Raking* was implemented to solve the EU ICS weighting tasks. This procedure performs iterative proportional fitting in contingency table analysis. Weights were not trimmed as the regular EU ICS sample had artificially distorted capital city ratios (boosted to 800+) that had to be weighted back to the population targets – which could not be achieved with conservative weight trimming.

EU ICS national weights were computed to combine estimations from the capital city and national subsamples. As nonresponse rates vary by social segments and the household filter introduces selection bias towards the loners (and frequently the elderly) the sample characteristics will reflect such differences as well (i.e., there are usually less males and less young people in the samples than in the universe.) Therefore we applied a post stratification at the individual level, to control for the main demographic characteristics of the nations involved: age and gender². In addition, within the national subsample we continued to control for the NUTS Level 2 regional distribution in the post-stratification phase (at the sampling stage there already was a built-in control for geographically proportional selection of respondents). At the individual level EU ICS controlled selection (and victimisation) probability with weighting according to household size as well³. Finally, the capital city ratio was imputed as a post-stratification factor in the raking process.

² the groups for which EU ICS set weighting targets are: male 16-29, male 30-59, male 60+, female 16-29, female 30-59, female 60+

³ % of population living in 1-person, 2-persons, 3-persons, 4-persons, and 5 or more persons households

The "Full Sample" Weighting

The "full sample" denotes the unified datafile where we combined the 2001 cases we interviewed with landline telephones and the 499 cases coming from the mobile-only segment. It is self-evident that the two groups are non-overlapping, which simplifies the calculation of the estimates based on both groups. We essentially repeated the above described post stratification process with the "full sample" and included the mobile-only ratio as a final post-stratification factor (we decided to use the 0.33 target for mobile only persons). And this is indeed a full coverage sample⁴, as according to DG Information, the overall – fixed and mobile – coverage is 98% in Finland.

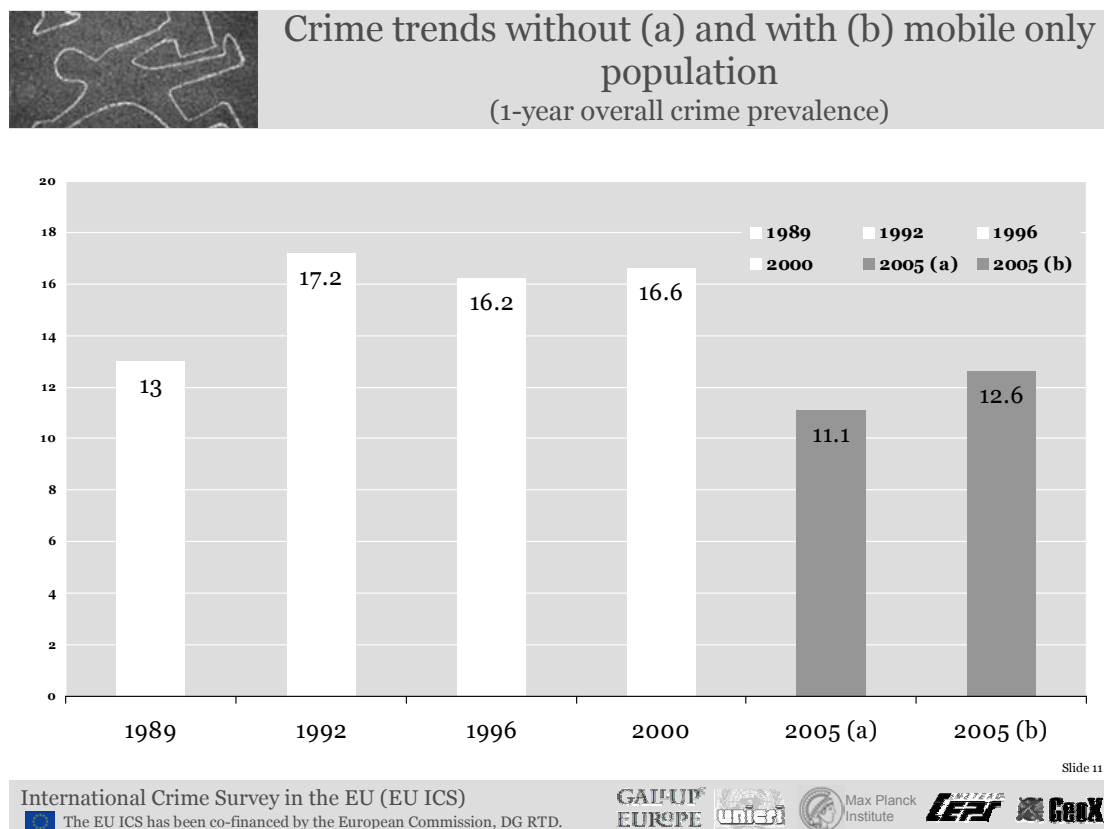
Now, the below table summarizes the differences of the weighted estimation based on the landline and the full sample. Somewhat surprisingly, the addition of the mobile only segment did not significantly change the overall victimisation rates we found in Finland: we detect a marginal 3- and 2-points increase in the overall 5-year and 1-year prevalence rates respectively.

	(A) Finland fixed line sample N= 2001 UNWEIGHTED	(B) Finland fixed line sample N= 2001 WEIGHTED	(C) Finland mobile only sample N=499 UNWEIGHTED	(D) Finland full sample N=2500 WEIGHTED	difference between (B) and (D) estimates
prevalence rate 10 crimes (last five years)	37	40	60	43	+3
prevalence rate 10 crimes (last year only)	10	11	21	13	+2
5-year prevalence rate of different crimes					
THEFT OF CAR	3	4	5	3	-1
THEFT FROM CAR	8	7	17	11	+4
THEFT OF MOTORCYCLES	0	0	1	0	0
BICYCLE THEFT	13	19	24	19	0
BURGLARY / HOUSEBREAKING	8	5	4	5	0
ATT. BURGLARY / HOUSEBREAKING	3	2	3	3	+1
ROBBERY	2	2	4	2	0
THEFT OF PERSONAL PROPERTY	9	9	16	9	0
SEXUAL INCIDENTS	2	2	8	3	+1
ASSAULT AND TREATS	7	7	21	10	+3
1-year prevalence rate of different crimes					
THEFT OF CAR	0	0	1	0	0
THEFT FROM CAR	1	1	5	2	+1
THEFT OF MOTORCYCLES	0	0	0	0	0
BICYCLE THEFT	3	5	7	5	0
BURGLARY / HOUSEBREACKING	2	1	1	1	0
ATT. BURGLARY / HOUSEBREACKING	1	0	1	0	0
ROBBERY	0	0	1	0	0
THEFT OF PERSONAL PROPERTY	2	2	4	2	0
SEXUAL INCIDENTS	1	1	2	1	0
ASSAULT AND TREATS	2	2	4	2	0

⁴ with the restriction that we do not fully know how the mobile-only sample was provided and what % of the mobile only population was represented in the sampling frame

While we see a clear increase in assault and threats (+3) as well as theft from car (+4) if we estimate the prevalence based on the full-coverage sample (that is, with mobile-only persons included), the differences are far from dramatic. The one-year prevalence rates do not even change.

When we first looked that the 2005 EU ICS results for Finland, we thought that the sudden decrease of crime victimisation (from 16,6 in 2000 to 11,1 in 2005) might be the result of the exclusion of the younger segments due to their full migration to mobile telephones. Our test proved that the decrease in victimisation level was not the result of the poor coverage of the most victimisation-prone social segments (however this also had a minor effect on estimations) but a real decrease in crime experience in Finland.



The bottom line is that post-stratification weighing was able (at least in this particular case) to produce estimations from the seriously incomplete sample that were very close to those based on the full-coverage sample. Finland being one of the most extreme cases, we are confident that, at least in this round of EU ICS the non-coverage of mobile only persons did not seriously affect the victimisation estimates in any of the participating countries.

However, the results are alarming: if the process of migration to the mobile-only model continues (and there seems no sign of stopping) the samples based on fixed-line telephones will become less and less satisfactory to estimate population characteristics. Social researchers and the survey industry has to work extremely hard to develop sampling, evaluation and weighting standards and practical solutions for the mobile telephony, otherwise telephone interviewing will soon become an obsolete tool of random social or even marketing surveys.