Public opinion polls and estimates in some European countries.
Non-coverage bias in telephone surveys

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Abstract
Currently, only a few publications of politically related surveys examine the potential of non-coverage bias (Keeter 2006; Brick et al. 2007; Pew 2008). Brick et al. (2007) point out that "the cell respondents were less likely to say they read the editorials on most days" and among voting two variables shows no significant differences between phone status. Keeter (2006) reports that **c**ell **p**hone **o**nly "CPO voters thus far appear to be only slightly more liberal or Democratic in their orientation". During the 2008 presidential election, Pew (2008) observed similar patterns. Drawing from the results this study seeks to replicate similar objectives.Data were obtained from the European Social Survey (ESS4) for 2008/9. The ESS4 (third release) includes 49,195 cases. The regression models predicted 'nonvoting', 'disinterested in politics', 'left political orientation', 'were not reading newspapers about politics and current affairs' and 'were not watching news or programs about politics and current affairs'. The reported ratios of odds were adjusted to account for group differences in gender, age, education, employment status, household income, occupational class, household size, being born in the country, and subjective urbanisation.

Key Words: Telephone Survey – non-coverage bias – mobile only – political-related estimates

1. Background and Research Question

Almost all households have telephone access in the EU27 (95%) by way of a mobile phone, a fixed phone or both. The penetration rates in 15 old Member States of the EU appear to be significantly higher (97% vs. 91%) than those in the 12 new Member States (Eurobarometer 2008a). 71% of the households have fixed telephone access, 24% have only mobile telephone access, and 57% have both mobile and fixed telephone access (The European Opinion Research Group 2008a). The number of households that have only mobile phone access is mostly higher in new European Union Member States except for Finland. In 14 old European Union Member States more than half of the households have access to both mobile and fixed telephone access. Households that have no phone average to about 3%, but this figure is much higher (15%-30%) in Bulgaria, Russia, and Ukraine (Hüfken 2009). In less than 3 years, the percentage of adults without fixed telephone access increased. Further, following the liberalization of the European telephone market and the technological advances, some mobile telephone users, particularly those in the old Member States, have substituted a mobile telephone for their residential fixed telephone (Eurostat 2008; Bijwaard et al. 2008). The conditions of the telephone market in the new (mostly east) European Member States are quite different

(Bijwaard et al. 2008, Vagliasindi et al. 2006). The penetration of mobile only into these states might not have been caused by a fixed phone substitution.

For survey researcher, the mobile substitution has potential implications for the representativeness of most current random digit dial (RDD) household telephone surveys, because the sampling frames for these surveys have traditionally been limited to fixed telephone access (Lavrakas 2007). Non-coverage of households without fixed telephones access (Groves, Kahn 1979; Thornberry, Massey 1988; Trewin, Lee 1988; Smith 1990, Anderson et al. 1998) and without mobile phone access (Blumberg et al. 2006; Keeter et al. 2007; Brick et al. 2007; Link et al. 2007; Delnevo et al. 2008; Blumberg, Luke 2009) has always been a subject matter of research to examine the potential non-coverage bias. With mobile substitution, however, the characteristics of the non-fixed telephone population may keep changing. At present, the number of adults without fixed telephone access is on the increase, which may be attributed to changing lifestyle preferences (Castells et al. 2006; Ehlen, Ehlen 2007). This is particularly so with the adults from the old Member States of the European Union (The European Opinion Research Group 2008b).

Currently, only a few publications of politically related surveys examine the potential of non-coverage bias (Keeter 2006; Brick et al. 2007; Pew 2008). Brick et al. (2007) point out that "the cell respondents were less likely to say they read the editorials on most days" and among voting[1] two variables shows no significant differences between phone status. Keeter (2006) reports that **c**ell **p**hone **o**nly "CPO voters thus far appear to be only slightly more liberal or Democratic in their orientation". During the 2008 presidential election, Pew (2008) observed similar patterns. Further, in most European countries, random digit dial household telephone surveys were conducted without cell phone numbers (e.g. Huddy et al. 2005; Oliver, Ha 2007; Faas et al. 2008). Drawing from the results of Brick et al. (2007) and Keeter (2006), this study seeks to replicate similar objectives. Further, we aim to investigate whether the patterns of telephone coverage in public opinion polls estimates vary by countries. Additionally, the results in 15 European countries are proofed against many demographic and socioeconomic covariates.

2. Data and Analysis

2.1 Study population
The analyses are based on the European Social Survey (ESS 4) for 2008/09. Probability sampling from all private residents aged 15 years and older was applied in all countries. The ESS includes 49,195 cases. The response rate varied from 45.7% in Croatia to 77.7% in Israel (NSD 2010) the average for the entire sample being 62.9%. Data from face to face interviews are analyzed from Belgium (BE), Switzerland (CH), Germany (DE), Denmark (DK), Spain (ES), Finland (FI), France (FR), United Kingdom (GB), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Russia (RU), Sweden (SE), and Slovenia (SI). Owing to the availability of telephone access in households, persons under the age of 18 years were excluded from the survey to minimize the number of respondents who live at home and do not have their own household. Additionally, 52 respondents were excluded as there was no information on their telephone status and

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[1] "Did you vote in the 2000 Presidential election, when George Bush ran against Al Gore? Yes, voted; No, didn't vote. Do you intend to vote in the 2004 Presidential election this coming November? Yes, No."

1765 respondents were excluded as these individuals were not entitled to vote. These exclusions reduced the sample size to 26,647 participants. The distribution of the study variables for each country can be obtained from the author.

2.2 Measures
The telephone status was measured by the following two questions: (i) 'Is there a fixed-line telephone in (your part of) this accommodation? (Interviewer note: 'your part of' refers to separate household living in the same building, not rooms within a household.) and (ii) 'Do you personally have a personal mobile telephone?' Eligible responses were 'yes', 'no' and 'Don't know'. Based on the answers to these questions, the telephone status was coded as 'mobile only', and 'no' phone in the household. Households which have fixed and/ or additionally mobile access were categorized as 'fix'.

Five indicators which are standard tools for public opinion research and comparative studies on attitudes towards politics and political behaviour were used: the left-right scale (Inglehart, Klingemann 1976; Huber, Inglehart 1995), interest in politics (e. g. DelliCarpini, Keeter 1996; Visser et al. 2007), time spent in reading about politics and current affairs in newspapers, time spent in watching news or programs about politics and current affairs (e.g. Brick et al. 2007; Pew 2008) and voting in last [country] national election. These five indicators had been incorporated in large-scale cross national surveys, such as Eurobarometer, European Election Studies, the World Value Survey and the European Social Survey. The indicators used here are different only with regard to the wording of the question and answer categories. The frequently applied 'political interest' and the 'left-right scale' contain mostly a midpoint. The choice of a response format makes a difference in terms of data quality (Kroh 2007). Regarding left-right political orientation in ESS3, the respondents were asked thus: 'In politics people sometimes talk of "left" and "right". Using this card, where would you place yourself on this scale, where 0 mean the left and 10 mean the right?' The cut-off points of 4 and less for the whole sample were combined into one group, which is hereafter referred to as 'left orientation' (Huber, Inglehart 1995). An internal proofing of the results with ESS3 data reproduced patterns reported by Huber and Inglehart (1995).

Political interest was measured by questioning thus: 'How interested would you say you are in politics – are you… ,'very interested', 'quite interested', 'hardly interested', or, 'not at all interested'?, (Don't know)'. The responses were dichotomised into 'interested' ('very interested' and 'quite interested') vs. 'disinterested' ('hardly interested' and 'or, not at all interested'). The media use was measured by the following two questions: (i) 'On an average weekday, how much time, in total, do you spend reading the newspapers? And how much of this time is spent reading about politics and current affairs?' (ii) 'And again on an average weekday, how much of your time watching television is spent watching news or programs about politics and current affairs?' Valid responses for both Newspaper and TV questions were 'No time at all', 'Less than ½ hour', '½ hour to 1 hour', 'More than 1 hour', 'Up to 1½ hours', 'More than 1½ hours', 'Up to 2 hours', 'More than 2 hours', 'Up to 2½ hours', 'More than 2½ hours', 'Up to 3 hours', 'More than 3 hours', (Don't know)'. Responses relating to the question on 'Reading the newspaper and watching TV about politics and current affairs' were dichotomised into 'no time at all' and 'more than ½ hour'. As regards 'voting in the last election' respondents were asked thus: 'Some people don't vote nowadays for one reason or another. Did you vote in the last [country] national [This refers to the last election of a country's primary legislative assembly] election in [month/year]? However, as the score

was not normally distributed, the calculations were done using logistic models, instead of linear regression models. For this purpose, the score was dichotomised.

The respondent's characteristics were: sex, age, general education, currently in paid work, household net income, household size, being born outside the country, and subjective urbanization. Subjective urbanization was measured by questioning: 'Which phrase on this card best describes the area where you live? 'Valid responses were 'a big city', 'the suburbs or outskirts of a big city', 'a country village', 'a farm or home in the country side', '(don't know)'. Education was coded according to the International Standard Classification of Education (UNESCO 1997). For analyses, recoding was made for education, and urbanization. Respondent's highest level of education was within the range of 'not completed primary education' and 'second stage of tertiary education' on a 7-point scale. The subjects were divided into two groups: (i) lower secondary, second stage of basic education, primary education, first stage of basic education or not completed primary education; (ii) secondary, post secondary, first stage of tertiary or second stage of tertiary education. To evaluate income information, respondents were initially shown a card on which weekly, monthly, and annual wage intervals were given, each marked with a letter. The respondents were then asked this question: 'Using this card, if add up the income from all sources, which letter describes your household's total net income? If you don't know the exact figure, please give an estimate. Use the part of the card that you know best: weekly, monthly or annual income.' The country specific median, based on the categorized annual household net income, was used.

2.3 Analysis

Prevalence estimates are presented for all voters (all): voters with mobile telephone (mobile only), voters with fixed phone (who may or may not have additional mobile phone access (fix), and voters without any telephone access (none). Moreover, it is shown how the mobile only access within the last four years in selected European countries. The analyses were conducted separately for each country. A weight (dweight) has been applied for all bivariate analyses to correct for design effects due to sampling design in countries where not all individuals in the population have an identical selection probability (Häder, Lynn 2007; Lynn et al. 2007).

Next, a similar comparison was then made between mobile only adults and adults with fixed access in the household on five key indicators of politically related behavior and attitudes separately for each country. Finally, to determine whether non-coverage of households without fixed telephone access results in bias for general population telephone surveys of adults' politically related behavior and attitudes, prevalence differences between general voters and voters with fixed phone access were also examined.

The regression models predicted nonvoting, disinterested in politics, left political orientations, not reading newspapers about politics, and not watching news or programs about politics and current affairs. The reported ratios of odds were adjusted to account for group differences in gender, age, education, employment status, household income, household size, being born in the country, and subjective urbanization. Moreover, some of these variables were chosen because they were used to adjust the sampling weights of random digit dialed (RDD) or modified RDD sample (Kalsbeek, Agans 2007). Statistically significant adjusted ratios of odds indicate that telephone status still account for variance in the measures of the five politically related indicators after controlled for other characteristics. The statistical significance of the differences between general adults, and adults with mobile only, and fixed phone computed at 95% confidence

intervals (CIs) from the standard error of the difference between the two groups. The standard error was calculated assuming a binomial normal distribution and non-independence of the two groups was accounted for by incorporating their covariance. All analyses are carried out using the statistical software PASW 18.0.

3.0 Results

3.1 Proportion of telephone status and the trend of mobile only access
Figure 1 show marked differences between phone status in the countries under study. The number of voters which had access to only mobile telephone varied from 4.7% in Germany to 63.4% in Finland. The proportion of households without telephones, with an average of less than one percent is very low in old European countries. As shown in Figure 2, in less than 3 years, the percentage of the voters with mobile only access increased in 11 out of 15 countries.

3.2 Bias Estimates from landline telephone surveys
When data from landline telephone surveys were unadjusted, bias estimates for non-voters was about 2.5 percentage point (range = 0.5-8.1), for hardly or not at all interested in politics bias estimates was about 2 percentage point (range = 0.4-6.0), for voters with left political orientation bias estimates was lower than 1 percentage point (range = 0.1-3.9), for 'no time at all' in reading about politics and current affairs bias estimates was about 2 percentage point (range = 0.0-4.7), for 'no time at all' in watching news or programs about politics and current affairs bias estimates was lower than 1 percentage point (range = 0.1-2.7) across the countries. Estimates for politically related behavior and attitudes derived for voters with fixed phone access showed relatively small differences from estimates for general voters (Table 1 to 5). The non-coverage of voters without fixed telephone access (the CPO voters) in RDD or RLD surveys would result in statistically significant biased estimates for politically related behavior and attitudes in some countries.

Figure 1: Proportions of telephone status of the voters in 28 European countries (ESS 2008/09, Round 4; (N=49,195)

■ none   ■ only fixed   ■ double   ■ only mobile
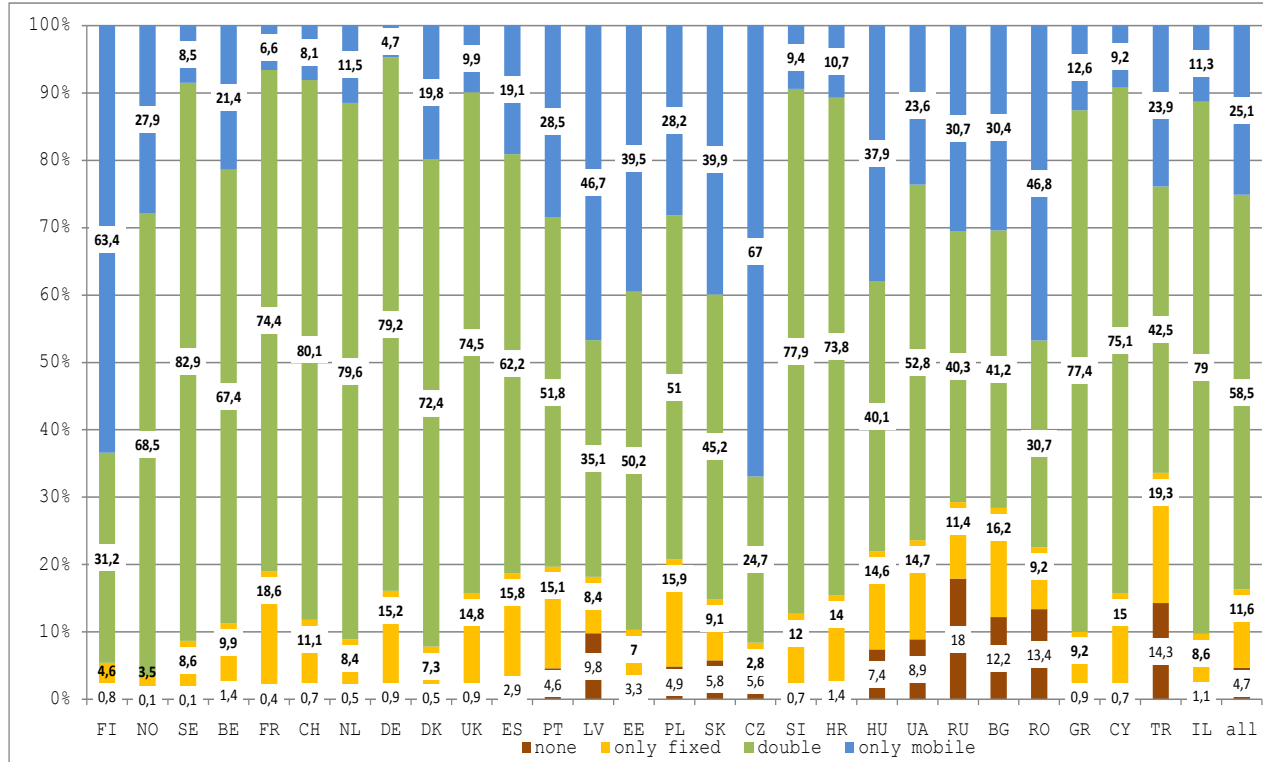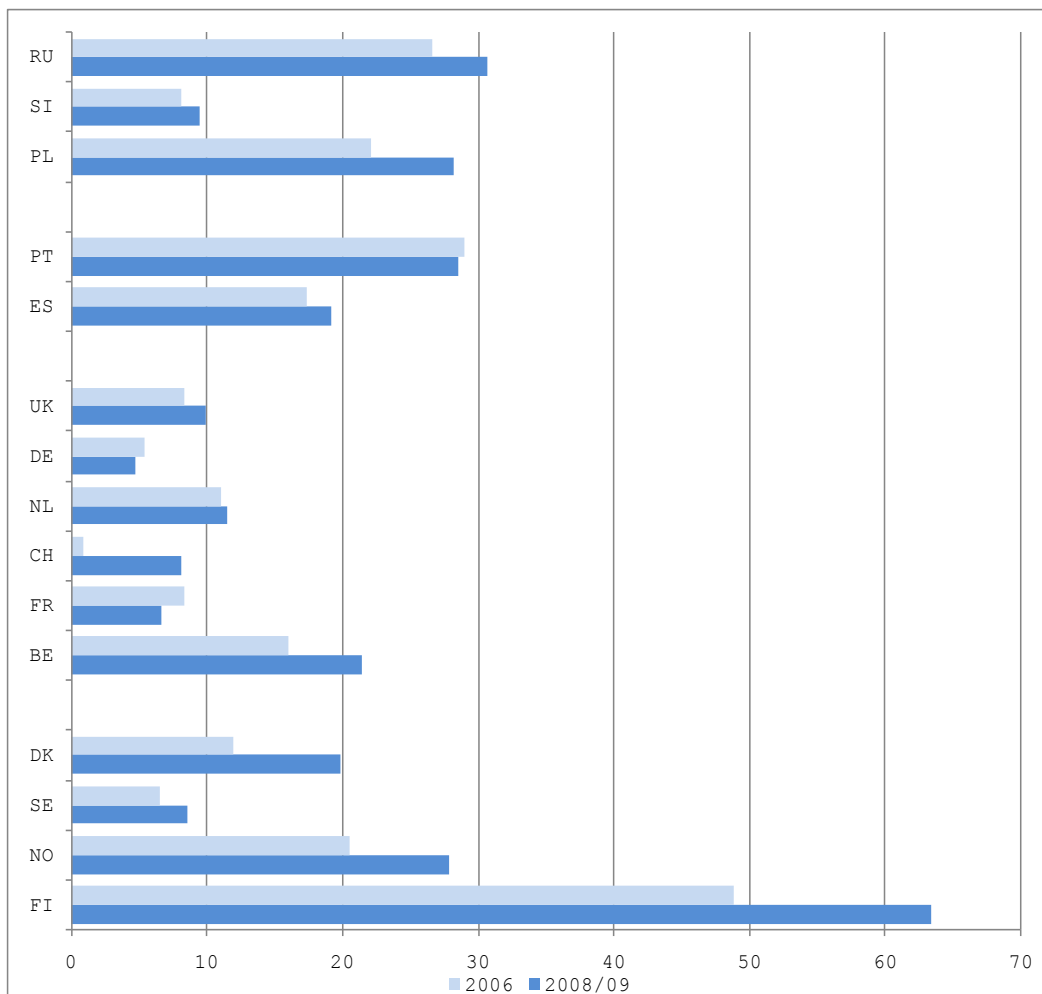
Figure 2: Proportions of mobile only access of the voters in selected European countries (in %)

3.2 Bias Estimates from landline telephone surveys

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3.3 Logistic regression results for selected topics

Even when adjusted to account for demographic and socioeconomic covariates, the logistic regression analyses reveal that, relative to general voters, the odds of non-voting

are significantly lower in the case of voters with fixed telephone access in ten countries. These correlations are particularly in old European Union Member States. The logistic regression analyses (Table 1) reveal that, relative to general voters, the odds of non-voters are lower in the case of voters with fixed phone access, in Finland (odds ratio (OR) = 0.71, 95 percent confidence interval (CI): 0.52-0.98), Great Britain (OR 0.69, 95% CI 0.49-0.96), the Netherlands (0.36, 95% CI 0.24-0.53), Switzerland (0.62, 95% CI 0.41-0.94), Germany (0.51, 95% CI 0.34-0.78), France (0.61, 95% CI 0.40-0.94), Spain (0.62, 95% CI 0.48-0.81), Portugal (0.67, 95% CI 0.50-0.78), Poland (0.69, 95% CI 0.53-0.90), and Russia (0.70, 95% CI 0.57-0.87).

Relative to general voters, the odds of hardly or not at all interested in politics (Table 2) is lower in the case of voters without fixed telephone access, in Finland (OR 0.80, 95% CI 0.65-0.99), Germany (0.53, 95% CI 0.36-0.79), Spain (0.65, 95% CI 0.50-0.86), and Russia (0.65, 95% CI 0.54-0.78). The odds of left political orientation (Table 3), relative to general voters, is lower in the case of voters without fixed telephone access, in Finland (OR 0.70, 95% CI 0.54-0.90), and in France (0.60, 95% CI 0.40-0.90).

Table 1: Prevalence rates and relative odds of non voters, by household telephone status: ESS 2008/09

	all	fix			mobile only		
	%	%	OR	95% CI[a]	%	OR	95% CI[b]
nordic							
DK	5,1	4,1	0.57	(0.31-1.05)	9,2	1.66	(0.90-3.08)
SE	8,8	7,4	0.71	(0.40-1.25)	23,2	1.34	(0.76-2.36)
FI	18,8	10,7	**0.71**	**(0.52-0.98)**	20,1	**1.40**	**(1.02-1.93)**
NO	14,1	11,2	0.73	(0.49-1.07)	21,6	1.37	(0.93-2.01)
anglo-sax							
GB	29,0	26,0	**0.69**	**(0.49-0.96)**	53,1	1.33	(0.94-1.86)
continental							
NL	13,3	10,5	**0.36**	**(0.24-0.53)**	32,8	**2.65**	**(1.77-3.97)**
CH	35,0	32,6	**0.62**	**(0.41-0.94)**	58,3	1.50	(0.98-2.30)
DE	16,1	14,9	**0.51**	**(0.34-0.78)**	34,2	**1.64**	**(1.05-2.57)**
FR	22,4	20,9	**0.61**	**(0.40-0.94)**	41,5	**1.61**	**(1.05-2.47)**
BE	7,8	7,2	0.82	(0.50-1.34)	9,0	1.07	(0.63-1.82)
south							
ES	18,2	16,0	**0.62**	**(0.48-0,81)**	23,5	**1.37**	**(1.03-1.81)**
PT	26,4	22,7	**0.67**	**(0.50-0.78)**	32,4	**1.38**	**(1.09-1.76)**
east							
PL	27,1	23,3	**0.69**	**(0.53-0.90)**	31,3	1.25	(0.95-1.66)
RU	26,1	23,1	**0.70**	**(0.57-0.87)**	29,5	**1.28**	**(1.01-1.62)**
SI	26,5	26,0	0.91	(0.59-1.39)	31,0	1.03	(0.66-1.61)

Note. CI=confidence interval; OR= odds ratio. + (n<0.5%).
[a]Odds ratios were adjusted for the variables in Table 1. General adults were the referent group.
[b]Odds ratios were adjusted for the variables in Table 1. Adults with fixed phone access were the referent group.
Confidence intervals that do not cross 1 are shown in bold type.

Based on the reception of political messages from the mass media, relative to general voters, the odds of 'no time at all' in reading about politics and current affairs (Table 4) is lower in the case of voters without fixed telephone access, in Finland (OR 0.58, 95% CI

0.40-0.84), the Netherlands (0.61, 95% CI 0.43-0.86), Germany (0.64, 95% CI 0.43-0.95), Belgium (0.69, 95% CI 0.53-0.90), Spain (0.51, 95% CI 0.40-0.65), and Russia (0.67, 95% CI 0.55-0.81), and greater in United Kingdom (1.37, 95% CI 1.01-1.89) and in watching news or programs about politics and current affairs (Table 5) the odds of 'no time at all' is relative to general voters, lower in the case of voters without fixed telephone access, in Spain (0.57, 95% CI 0.41-0.79), and Russia (0.57, 95% CI 0.42-0.76), and greater in Switzerland (2.08, 95% CI 1.10-3.94).

Table 2: Prevalence rates and relative odds of hardly or not at all interested in politics, by household telephone status: ESS 2008/09

	all		fix			mobile only		
	%		%	OR	95% CI[a]	%	OR	95% CI[b]
nordic								
DK	34,7		32,5	0.90	(0.66-1.23)	43,7	1.12	(0.82-1.53)
SE	35,3		35,5	1.24	(0.80-1.90)	33,3	0.81	(0.52-1.24)
FI	24,0		20,1	**0.70**	**(0.54-0.90)**	25,9	**1.40**	**(1.08-1.82)**
NO	32,9		32,4	0.91	(0.67-1.23)	34,0	1.09	(0.81-1.17)
anglo-sax								
GB	29,1		28,9	0.96	(0.66-1.39)	31,1	1.07	(0.73-1.57)
continental								
NL	31,9		31,2	0.81	(0.57-1.16)	37,8	1.26	(0.88-1.80)
CH	34,6		34,3	0.99	(0.63-1.53)	39,6	1.00	(0.64-1.58)
DE	39,3		38,7	0.67	(0.44-1.00)	51,6	1.41	(0.91-2.18)
FR	37,9		37,0	**0.60**	**(0.40-0.90)**	50,9	**1.59**	**(1.05-2.40)**
BE	32,5		31,8	1.04	(0.78-1.37)	34,6	0.96	(0.71-1.28)
south								
ES	45,2		44,7	0.95	(0.75-1,21)	46,0	0.97	(0.76-1.24)
PT	44,1		42,8	0.88	(0.69-1.13)	46,9	1.12	(0.86-1.45)
east								
PL	19,7		19,8	0.93	(0.67-1.28)	19,7	1.12	(0.80-1.57)
RU	19,0		19,6	0.97	(0.73-1.31)	14,7	0.84	(0.59-1.19)
SI	37,9		38,5	1.36	(0.84-2.20)	33,3	0.78	(0.48-1.27)

Note. CI=confidence interval; OR= odds ratio. + (n<0.5%).
[a]Odds ratios were adjusted for the variables in Table 1. General adults were the referent group.
[b]Odds ratios were adjusted for the variables in Table 1. Adults with fixed phone access were the referent group.
Confidence intervals that do not cross 1 are shown in bold type.

Table 3: Prevalence rates and relative odds of left political orientation, by household telephone status: ESS 2008/09

	all		fix			mobile only		
	%		% OR	95% CI[a]		%	OR	95% CI[b]
nordic								
DK	26,4		25,3 0.97	(0.69-1.36)		31,0	1.03	(0.73-1.45)
SE	41,0		40,7 1.38	(0.91-2.09)		44,2	1.70	(0.46-1.07)
FI	50,1		45,5 **0.80**	**(0.65-0.99)**		52,5	1.22	(0.98-1.51)
NO	49,9		48,2 1.17	(0.87-1.57)		54,2	1.85	(0.63-1.14)
anglo-sax								
GB	42,1		40,7 0.93	(0.67-1.29)		52,9	1.02	(0.73-1.42)
continental								
NL	31,9		30,5 0.76	(0.53-1.08)		39,7	2.18	(0.82-1.69)
CH	38,2		37,1 0.86	(0.57-1.28)		52,5	1.27	(0.83-1.93)
DE	35,4		34,0 **0.53**	**(0.36-0.79)**		56,0	**1.61**	**(1.06-2.45)**
FR	46,5		45,5 0.77	(0.51-1.15)		57,6	1.25	(0.83-1.89)
BE	50,4		48,2 0.81	(0.62-1.06)		56,3	1.13	(0.86-1.49)
south								
ES	73,3		71,3 **0.65**	**(0.50-0,86)**		77,8	**1.33**	**(1.01-1.76)**
PT	71,0		69,9 0.85	(0.67-1.07)		70,4	1.05	(0.82-1.34)
east								
PL	55,8		53,0 0.88	(0.69-1.13)		58,3	0.95	(0.73-1.23)
RU	50,8		44,8 **0.65**	**(0.54-0.78)**		54,7	**1.38**	**(1.12-1.70)**
SI	49,6		49,2 1.00	(0.67-1.49)		54,3	1.04	(0.69-1.57)

Note. CI=confidence interval; OR= odds ratio. + (n<0.5%).

[a]Odds ratios were adjusted for the variables in Table 1. General adults were the referent group.
[b]Odds ratios were adjusted for the variables in Table 1. Adults with fixed phone access were the referent group.
Confidence intervals that do not cross 1 are shown in bold type.

Even when adjusted to account for demographic and socioeconomic covariates, the logistic regression analyses reveal that, relative to voters with fixed phone access, voters with mobile only access had significantly greater odds of non voters in Finland (OR 1.40, 95% CI 1.02-1.93), the Netherlands (OR 2.65, 95% CI 1.77-3.97), Germany (OR 1.64, 95% CI 1.05-2.57), France (OR 1.61, 95% CI 1.05-2.47), Spain (OR 1.37, 95% CI 1.03-1.81), Portugal (OR 1.38, 95% CI 1.09-1.76), and Russia (OR 1.28, 95% CI 1.01-1.62).

Relative to voters with fixed phone access, voters with mobile only access had significantly greater odds of hardly or not at all interested in politics Germany (1.61, 95% CI 1.06-2.45), Spain (1.33, 95% CI 1.01-1.76), and Russia (1.12, 95% CI 1.12-1.70), and had greater odds of left political orientations in Finland (1.40, 95% CI 1.08-1.82), and France (1.59, 95% CI 1.05-2.40).

Table 4: Prevalence rates and relative odds of 'no time at all' in reading about politics and current affairs, by household telephone status: ESS 2008/09

	all		fix			mobile only	
	%	%	OR	95% CI[a]	%	OR	95% CI[b]
nordic							
DK	26,8	25,4	1.21	(0.87-1.69)	31,6	0.31	(0.56-1.10)
SE	17,1	16,1	0.99	(0.61-1.60)	27,5	0.75	(0.60-1.58)
FI	11,5	7,4	**0.58**	**(0.40-0.84)**	13,5	**1.66**	**(1.14-2.43)**
NO	9,1	8,5	1.19	(0.74-1.92)	10,8	0.83	(0.52-1.34)
anglo-sax							
GB	44,8	44,3	**1.37**	**(1.01-1.89)**	49,5	0.72	(0.52-1.00)
continental							
NL	26,0	23,6	**0.61**	**(0.43-0.86)**	43,4	**1.65**	**(1.16-2.35)**
CH	17,5	17,5	1.26	(0.77-2.11)	19,2	0.83	(0.50-1.40)
DE	23,2	22,0	**0.64**	**(0.43-0.95)**	43,5	1.35	(0.89-2.06)
FR	46,9	46,2	0.95	(0.64-1.41)	55,1	0,97	(0.65-1.45)
BE	50,0	46,8	**0.69**	**(0.53-0.90)**	60,8	**1.45**	**(1.10-1.91)**
south							
ES	54,5	51,0	**0.51**	**(0.40-0,65)**	63,5	**1.73**	**(1.34-2.22)**
PT	53,5	53,1	0.86	(0.70-1.07)	50,9	1.09	(0.87-1.37)
east							
PL	48,6	45,2	0.80	(0.63-1.01)	51,8	1.10	(0.86-1.42)
RU	53,7	49,0	**0.67**	**(0.55-0.81)**	55,8	**1.12**	**(1.04-1.59)**
SI	35,7	35,9	1.19	(0.79-1.79)	35,3	0.85	(0.56-1.30)

Note. CI=confidence interval; OR= odds ratio. + (n<0.5%).
[a]Odds ratios were adjusted for the variables in Table 1. General adults were the referent group.
[b]Odds ratios were adjusted for the variables in Table 1. Adults with fixed phone access were the referent group.
Confidence intervals that do not cross 1 are shown in bold type.

Based on the reception of political messages from the mass media, relative to voters with fixed phone access, voters with mobile only access had significantly greater odds of 'no time at all' in reading about politics and current affairs in Germany (1.61, 95% CI 1.06-2.45), Spain (1.33, 95% CI 1.01-1.76), and Russia (1.12, 95% CI 1.12-1.70), greater odds of 'no time at all' in watching news or programs about politics and current affairs in Germany (1.61, 95% CI 1.06-2.45), Spain (1.33, 95% CI 1.01-1.76), and Russia (1.12, 95% CI 1.12-1.70).

Table 5: Prevalence rates and relative odds of 'no time at all' in watching news or programs about politics and current affairs, by household telephone status: ESS 2008/09

all		fix			mobile only		
%		%	OR	95% CI[a]	%	OR	95% CI[b]
nordic							
DK	2,4	1,9	0.62	(0.25-1.52)	4,1	1.31	(0.56-1.45)
SE	8,4	7,9	1.33	(0.73-2.41)	16,7	0.75	(0.60-1.07)
FI	6,6	5,4	1.11	(0.70-1.76)	7,2	0.86	(1.14-1.51)
NO	3,7	3,2	1.15	(0.57-2.28)	5,3	0.87	(0.52-1.14)
anglo-sax							
GB	12,5	11,2	0.83	(0.56-1.24)	22,7	1.17	(0.52-1.42)
continental							
NL	5,6	5,2	1.07	(0.57-2.01)	7,4	0.70	(1.16-2.35)
CH	12,9	13,2	**2.08**	**(1.10-3.94)**	10,1	**0.49**	**(0.25-0.94)**
DE	6,5	6,2	0.89	(0.49-1.60)	12,1	0.97	(0.51-1.84)
FR	11,2	10,8	0.70	(0.41-1.21)	16,9	1,38	(0.80-2.39)
BE	9,5	8,7	1.01	(0.67-1.54)	12,7	1.00	(0.65-1.53)
south							
ES	9,5	7,8	**0.57**	**(0.41-0,79)**	12,9	**1.53**	**(1.01-2.19)**
PT	7,1	6,7	1.01	(0.69-1.48)	6,7	0.81	(0.52-1.25)
East							
PL	8,9	7,8	0.79	(0.53-1.17)	9,7	1.00	(0.65-1.54)
RU	11,7	9,0	**0.57**	**(0.42-0.76)**	14,0	**1.51**	**(1.09-2.10)**
SI	9,0	8,9	1.03	(0.53-1.98)	10,3	1.02	(0.53-1.97)

Note. CI=confidence interval; OR= odds ratio. + (n<0.5%).
[a]Odds ratios were adjusted for the variables in Table 1. General adults were the referent group.
[b]Odds ratios were adjusted for the variables in Table 1. Adults with fixed phone access were the referent group.
Confidence intervals that do not cross 1 are shown in bold type.

4. Conclusions and Future Directions

This study is the first to utilise data from a large-scale probability sample of face-to-face survey in 15 European countries to study the relation between mobile only access and without any phone access in the household may bias estimates derived from politically related variables. We used five subjective assessments of political behavior and attitudes; time spent in reading about politics and current affairs in newspapers, time spent in watching news or programs about politics and current affairs, voting in last national election, interest in politics and the left-right scale. These indicators are vital in the discussion in public opinion and political social sciences.

Despite changes in telephony over the past 15 years and the growth of the mobile-only population, the results are partly similar to those of the previous studies (Keeter 2006; Brick et al. 2008). Brick et al. (2007) pointed out: 'non-coverage of households without any phone access and especially with mobile only access continues to introduce bias in general population telephone surveys of adults.' The main result is that there is clear tendency across all countries in politically related non-coverage error in terms of rising. Nevertheless, contrary to the results of the reported studies (Keeter 2006; Brick et al. 2007; Pew 2008): our measures show significant differences between vote and phone status. The reported ratios of odds were adjusted to account for group differences in gender, age, education, employment status, household net income, household size, being born in the country, and subjective urbanization. The non-coverage of voters without

fixed telephone access in RDD or in random digit dialed (RDD) or modified RDD telephone surveys would result in statistically significant biased estimates for non voters in ten countries (Finland, Great Britain, the Netherlands, Switzerland, Germany, France, Spain, Portugal, Poland, and Russia), for lack of interest in politics we could observed significant biased estimates in four countries (Finland, Germany, Spain, and Russia), and for left political orientation we could observed biased estimates in Finland and France. Based on the reception of political messages from the mass media, statistically significant biased estimates of no time at all' in reading about politics and current affairs could observed in seven countries (Finland, United Kingdom, the Netherlands, Germany, Belgium, Spain, and Russia), and of 'no time at all' in watching news or programs about politics and current affairs in three countries (Switzerland, Spain, and Russia). The situation in the old European Member States and the new European States is quite different. Perhaps the telephone status and the substitution of mobile for the fixed phone access and the political behavior and attitudes are so distinctive (Castells et al. 2006; Ehlen, Ehlen 2007) may be that they vary in several ways.

Some possible limitations of the study that could influence the observed patterns need to be elaborated. The ESS presents an outstanding opportunity to investigate cross-national patterns of politically related topics as the survey seeks answers for the same questions in all the countries. It is acknowledged that there are many issues which may affect the comparability of cross-national surveys, such as non-response, response error, respondent classification etc. The adults classified as 'mobile only' in this study cannot be completely eliminated by randomly dialling personal mobile telephone numbers. The assignment of mobile telephone status to voters in this research was not based merely on the presence of mobile phone access in the household; it was based on the ownership of the respondent. Further, information on their primary use (personal or business) was not measured. Also, the question was not so worded as to define what a 'mobile telephone' means. As a result, some respondents may confuse cordless fixed-line telephones with mobile telephones, thereby misreporting that their phone was a mobile telephone (Link et al. 2007).

Following are the key findings of this study and their implications. The non-coverage bias is a combination of two things: the number of households without any telephone access and the degree by which the characteristics of telephone households differ from those of non-telephone households. Furthermore, all households with fixed phone access do not have mobile access and the characteristics of mobile only households differ from those of fixed telephone households. In other words, non-coverage bias in surveys can be significant only when the causes of mobile only access and no phone access correlate highly with the survey variables. Non-coverage is perhaps preferred in some countries to enlarge the frame with cell-phone-numbers and thus reduce error. In other countries, currently there is no valid reason to reject the coverage of general population. But, close and continuous monitoring of telephone ownership in this rapidly changing technological environment will be necessary to validate this conclusion firmly. But nevertheless, public opinion researcher need to address related statistical issues such as how to blend the results of cell phone surveys with the results of traditional surveys, as they tend to reach different population subgroups (Morkrzycki, Keeter, and Kennedy 2009) and examine for residential mobility (Ansolabehere, Schaffner 2010) in European countries.

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