The endless baby-boomer generation: Cohort differences in participation in political discussions in nine European countries in the period 1976-2008

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1. INTRODUCTION

Political involvement and participation are crucial aspects of social capital development, of civil society and social stability (Putman 1995). In a generational change perspective, we observe in Europe a large gap between 'optimistic' arguments that focus on the intense educational development of younger birth cohorts and 'pessimistic' ones that follow Putnam's ideas of declining participation in civil society and worries about a lack of political involvement and knowledge (Hooghe 2004; Hooghe and Dassonneville 2013; Putnam 2000; Fieldhouse et al. 2007). The young seem to become less involved in politics (Li and Marsh 2008; O'Toole et al. 2003), at least after controlling for education. The first baby-boomers were and remain more active than the "X-generation" and the following ones. Ken Roberts (2012) anticipates the consequences of the 'end of the long baby-boomer generation'. This means notably the emergence of a new generation less politically involved. This 'end' can be seen as paradoxical since the firsts baby-boomers, who are almost at age 70 today, are endlessly very active politically, and continue to have a central role in this domain. In this respect there is no "end" of the baby-boomers' specificity, even if their followers experience the end of a cohort trend of increasing political activism. In France, notably, there has long been observed a decrease in the involvement of the young generations in politics, but the debate focused more on a possible age effect of youth delay in a process of early socialization to politics followed by a catch up effect later in life (Muxel 1991).[1] The implicit idea of such models is that this withdrawal from politics is temporary and followed by further re-investment and commitment in politics. Conversely, other scholars stress on the persistence of characteristics acquired during socialization over the life course (Alwin and Krosnick 1991; Alwin and Krosnick 1991; Dassonneville et al. 2012; Glenn 1980; Jennings and Markus 1984;

[1] The authors mention a 'moratoire politique', a moratorium in politics that derives from Erik Erikson's (1950, 1955) development stage theory of psychosocial moratorium of the young.

Neundorf et al. 2012; Prior 2010; Sears 1981). After a period of initial socialization and of transition in politics, temporary experiences transform in permanent traits (Bréchon 2011).

Several previous studies already examined changes in political involvement (Blais et al. 2004; Inglehart 1990; Neundorf et al. 2012; Prior 2010; Van den Broek 1996; Van Deth 1990; Van Deth 1991; Van Deth and Elff 2000; Van Deth and Elff 2004). These studies however could not systematize cohort dynamics. Studying change, one can focus on change over the life course (age effects), change over generations (cohort effects) and change over time (period effects) (Firebaugh 1997; Glenn 2005). Period effects happen to all people, regardless of their age and year of birth. A factor that might cause period effects in political participation for example are elections. By age effects one has to think for example of a declining health over time. Cohort effects generally arise during socialization. People seem to be more sensitive to the contextual conditions during the first phase of their lives (Becker 2000).

Our aim here is twofold. At first, important cohort fluctuations in participation in political discussions exist but have not been sufficiently underlined as an important source of change. We make use of recent improvements of the APC methodology to have a better assessment of these cohort-based changes. Thereafter, we search for appropriate explanations for these cohort fluctuations with contextual elements of cohort specific socialization and life conditions.

Our first aim thus is to analyse differences between cohorts. Differences between cohorts are important elements for the understanding of social change (Ryder 1965). As said, many characteristics are established in the first phase of adult life in the context of transition from adolescence to adulthood and thereafter people are much more stable (Alwin and Krosnick 1991; Becker 2000; Dassonneville et al. 2012; Glenn 1980; Jennings and Markus 1984; Neundorf et al. 2012; Prior 2010; Roberts 2012; Sears 1981). Technically this means that differences between cohorts arise by the interaction of period and age effects (Crockett and Voas 2006; Glenn 1980). As a consequence, societal changes occur with the apparition of new cohorts sharing new social characteristics and with the further replacement of older by more recent cohorts (Firebaugh 1992; Inglehart 1977; Inglehart 1990; Mannheim 1952

[1928]; Ryder 1965). Especially political attitudes are known to be very cohort dependent. Dependent on the socialization context, generations develop differential packages of ideas.

Our study is focused on participation in political discussions in Europe. Other scholars have analysed the cohort dynamics of electoral turnout (Wass 2007), electoral volatility (Dassonneville 2012), political interest (Hadjar and Schlapbach 2009), and political leadership (Chauvel 2010), party membership and extra-institutional participation (petition, demonstrations, etc.) in politics (Grasso 2014). Van Deth and Elff found specific cohort patterns for likelihood to frequently discuss politics and likelihood to never discuss politics: participation seems to generally increase over the cohorts (controlled for education and gender and with period on the higher level) but they did not focus on nonlinear cohort fluctuations. As said, our first contribution here is to re-examine findings with respect to differences between cohorts in participation in political discussions with control of age and period effects as they are taken into account by recent age-period-cohort models (Yang and Land 2013). We hereto make use of a new model able to detect cohort nonlinearities pertaining specifically to the cohort variable and that cannot be explained by the simple combination of age and period. This linear/nonlinear question is central in the tradition of cohort analysis (Mason and Wolfinger 2001): "cohort effects" (as well as the age and the period ones) have two dimensions, a linear one and a non-linear one. The linear dimension expresses for instance the increasing level of living that younger cohorts enjoy, when progressive long term economic growth happens; the non-linear one expresses, when it exists, that some cohorts are specifically above or below the general cohort trend. In France for instance, the cohort born in 1950, is particularly lucky in terms of income (Chauvel and Schroeder 2014), having at the same age a systematic +10% in their income compared to cohorts born 15 years before or after. The contemporary literature on age-period-cohort shows that it is impossible to identify long term trends so that they are unequivocally attributed to period or cohort. Conversely, the cohort "bumps" (the specific empirical divergence of cohorts to the predicted values resulting from the age and period effects they belong to), when they exist, can be clearly identified. Our main interest thus is not the long term linear change that cannot be identified (Firebaugh 1997; Glenn 1989; Glenn 1994; Mason et al. 1973; Yang and Land 2008; Luo 2013). Indeed on the long range, it is empirically equivalent to say that with period change all the population receive 1% more each year versus with cohort change each cohort receives 1% more. A linear growth is not cohort or period specific for APC models. On the contrary, with our method, which adds appropriate constraints, the non-linear changes in these three variables are identifiable in a unique and robust manner. This method focuses on cohort fluctuations and non-linear dynamics where some cohorts are drifting away from the linear trend and others face relapses compared to the cohort linear dynamics. In political participation, cohort bumps or fluctuations of that type have been already detected (Putnam 2000; Becker 2000; Grasso 2014) but our aim is to improve their detection with larger samples and explanation in a comparative perspective.

Our second contribution will include firstly a test of *individual* level explanations for cohort effects. For example level of education could be an important factor in the understanding of changing political behaviour over time (Dalton 1984; Hadjar and Schlapbach 2009). Education can be seen as a major resource for political socialization (Dassonneville et al. 2013; Galston 2004; Hooghe and Dassonneville 2011; Torney-Purta 2002) and obviously level of education strongly varies over cohorts (Smith 1993; Wilson et al. 2011). Results of previous studies show positive effects (Blais et al. 2004; Hadjar and Schlapbach 2009; Nie et al. 1996; Putnam 2000). Although these of course are less likely to explain cohort differences, other explanatory variables we take into account are gender and family structure. We know there are important gender differences in political participation (Blais et al. 2004; Hadjar and Schlapbach 2009; Neundorf et al. 2012; Van Deth and Elff 2004). We take into account marital status as well. Neundorf et al. find (2012) that getting married does not directly affect the degree of political interest while others (Blais et al. 2004; Denver 2008; Stoker and Jennings 1995) hypothesize a positive effect of having a partner. A priori, the degree to which these three factors changed over cohorts and the extent to which these factors actually influence political participation could have an impact on the cohort fluctuations. We secondly try to explain change over birth cohorts with two *contextual* factors that express the specific context of cohort socialization. After all, as said, people are especially susceptible to adopt durable traits while being young. The first contextual factor is the economic situation at the moment a cohort entered the labour market. In comparison to other birth cohorts we take into account, the early baby boom generation entered the labour market in a period of affluence. Affluence is not simply an increase in opportunities and a lower risk of unemployment and poverty, it also develops possibilities of self-expression and need of higher level of fulfilment. This is the general Inglehart (1977) expression of a post-materialist need for political participation. Therefore, we take into account the economic context at age 25. Beyond Inglehart, many authors underline the relation between economic downturns and youth problems pervasively observed (Chauvel and Schröder 2014; Therborn 2014; De Lange *et al*. 2014). The second contextual explanation results from differences between cohorts in relative size. In the Easterlin (1961) tradition, confirmed by Easterlin et al. (1993), the larger a birth cohort, the stronger its risk to face scarcity of employment, poverty, and social problems resulting from population overcrowding. This could be true in economics but could be less appropriate in political terms where numbers and social density count: the 'protest generation' is as well a large generation, benefitting in social morphologic terms (Durkheim 1964 [1893]) from a larger 'social volume' and 'moral density' that increase interdependence, opportunities for integration, and ultimately communication. From this perspective it could be expected that the larger a cohort, the stronger its opportunities of collective mobilization and of political discussion of its own interest.

2. DATA AND MEASUREMENTS

We use the *Mannheim Eurobarometer Trend File* (Schmitt and Scholz 2005) which contains 78 surveys and which ends in 2002. We added *Eurobarometer* surveys conducted until the end of 2008. Nine countries (presented in the graphs under their International standard organisation ISO code) are selected on the base of their seniority in the survey: France (fr), Belgium (be), Netherlands (nl), West Germany (de), Italy (it), Luxembourg (lu), Denmark (dk), Ireland (ie) and Great Britain (uk). We remove people who are younger than 20 and people who are older than 69 at the moment of interview from the data. After this deletion the number of respondents is between sixty and seventy thousand for all countries except Luxembourg (which has almost 30,000 respondents).

People are asked ‘When you get together with friends, would you say you discuss political matters frequently, occasionally, or never?’. Since it is impossible to say how often ‘frequently’ and ’occasionally’ exactly are, we decide to contrast the people who answered ‘never’ to the others.[2]

We measure education by age at which people left school. We construct the following three categories and include them as dummies: people who left school before reaching the age of seventeen, people who left school while being seventeen, eighteen or nineteen years old, and people who left school while being at least twenty years old. Since we only include people aged 20+, this third group also includes the ones who are still studying. We also use dummy variables for sex (reference is male), and marital status (single/divorced/separated/widowed=0, married/cohabiting=1).

Economic situation in the period of labour market entrance is measured by the detrended relative value of the logged gross domestic product per capita in real terms (constant purchasing power parity dollars 1995) when the cohort is 25 years old. The source is the Penn world tables version 7.1.

Cohort size is obtained from the World Health Organisation Mortality database that provides the size of the different cohorts of the countries which are the base of the calculations of the populations at risk by age groups. We take into account the detrended relative size of the birth cohort in the resident population.

Figure 1 and 2 are based on all available information for the period 1976-2008. In order to make it possible to compare our APC models with and without controls, we based these models on the same groups of people. This means that in the models without controls we do not take into account people

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[2] Additional analyses in which the frequently discussers are contrasted to the occasionally and never discussers show similar results. We estimated the same models with a continuous dependent variable as well. The best solution would be to make use of an ordinal logistic regression specification, but due to the limitations in the general linear model glm with constrains in Stata we did not have this opportunity.

with missing values on at least one of the controls. This deletion reduces the number of cases by about seven per cent.

3. METHODS

The method we apply here is the APCD (Age Period Cohort - Detrended) model that is designed to disentangle the effects of age, period and cohort.[3] This model is a modernization of a former one developed by Holford (1983): both are designed to retrieve nonlinear cohort coefficients. There, the cohort effect reflects the divergence from the linear trend and retains a cohort curvature expressing the specificity of some cohorts compared to others. The aim of the APCD is to detect cohort bumps expressing the additional information brought by birth cohort to the model with only age and period (Chauvel 2013, Chancel 2014, Chauvel and Schröder 2014). It detects and measures the intensity of the deviation from the linear cohort trend. Compared to the former Holford propositions, this one accepts control variables, can handle a large variety of specifications, and provides confidence intervals of estimators, statistical tests and criteria able to help in the cohort diagnosis.

We generalize here a former OLS type APC model (Chauvel and Schröder 2014) in a logit one. For each country, we consider a dependent variable y_i^{apc} that denotes the existence (0/1) of participation in political discussions for individual i of age a, in period p and then belonging to cohort c = p – a. Categorical time effect variables pertaining to age effects α_a, period effects π_p, and cohort effects γ_c, are then indexed by age a, period p and cohort c. To provide accurate controls at the individual level, we consider j covariates $x_{i,j}$ (which can be continuous or binary). Including appropriate constraints, the APCD model with the following expression has a unique and identifiable solution:

[3] The APCD is available as a Stata ado-file. It can be downloaded by typing ‘ssc install apcd’ in Stata.

$$\begin{cases} logitPr\left(y_i^{apc}=1\right) = \alpha_a + \pi_p + \gamma_c + \alpha_0 rescale(a) + \gamma_0 rescale(c) + \beta_0 + \sum_j \beta_j x_{i,j} + \varepsilon_i \\ \begin{cases} \sum_a \alpha_a = \sum_p \pi_p = \sum_c \gamma_c = 0 \\ slope_a(\alpha_a) = slope_p(\pi_p) = slope_c(\gamma_c) = 0 \\ with\ p = c + a\ and\ restricted\ to\ c_{min} < c < c_{max} \end{cases} \end{cases}$$

(APCD)

β_0 is the constant, we consider j control variables $x_{i,j}$ related to β_j coefficients, α_a is the age effect vector indexed by age group a, π_p is the period vector and γ_c is the cohort vector. These vectors exclusively reflect the *non-linear* effect of age, period and cohort, as we assign two sets of constraints: each vector sums up to zero and has a slope of zero. These vectors are null when the age, period or cohort effects are linear.[4] The terms α_0Rescale(a) and γ_0Rescale(c) absorb the linear trends; Rescale is a transformation that standardizes the coefficients α_0 and γ_0: it transforms age from the initial code a_{min} to a_{max} to the interval -1 to +1. Since the first and last cohorts appear just once in the model (the oldest age group of the first period and the youngest of the last), their coefficients are less stable; we therefore exclude them. This model is thus an expression of the traditional Mason and Smith (1985) APC model, including controls, having a logit specification and following the Holford (1983) idea that cohort is detrended in the sense that constraints impose zero slopes on age, period and cohort α_a π_p and γ_c coefficients, while linear trends are absorbed by α_0Rescale(a) and γ_0Rescale(c). A comparison of the results between the APCD model without and then with control variables (for instance education, marital status, etc.) delivers a diagnosis on the degree to which cohort effects are the consequence of changes in population characteristics or not (see results on Appendix 1).

The detrended cohort effect coefficients γ_c are zero when cohort effects are absent. In this case, cohorts do not deviate from age and period characteristics; then the APCD model provides no improvement compared to a simple age and period model (AP) with first and last cohorts omitted, which consists of:

[4] The constraint $Slope_a(\alpha_a)=0$ means the trend of the age effect is zero and is true only if Σ_a [(2a - a_{min} - a_{max}) α_a] = 0. This constraint is easily expressed as a linear equation of coefficients.

$$\begin{cases} logitPr\left(y_i^{ap} = 1\right) \ = \alpha_a + \pi_p + \alpha_0 rescale(a) + \pi_0 rescale(p) + \beta_0 + \sum_j \beta_j x_{i,j} + \varepsilon_i \\ \qquad \begin{cases} \sum_a \alpha_a = \sum_p \pi_p = 0 \\ slope_a(\alpha_a) \ = slope_p(\pi_p) = 0 \\ restricted\ to\ c_{min} < c < c_{max} \end{cases} \end{cases}$$

(AP)

If at least one γ_c coefficient is significantly different from zero however, then a simple AP model is insufficient. In this case, some cohorts are above or below the expected trend resulting from the simple addition of age and period dynamics. Thus to retain appropriate parsimonious models, comparing the Raftery's (1986) BIC of the (AP) and of the (APCD) is a diagnosis on the relevance of nonlinear cohort effects (Appendix 2).

Other APC techniques converge to similar results. In Appendix 3 we present results of more usual models: the Hierarchic APC (HAPC) developed by Yang and Land (2008) and the APC-IE intrinsic estimator model (Yang et al 2008). They converge in the shape, intensity and significance to the similar results and confirm our strategy. This APCD technique has an additional interesting property: since for all the countries we have a slope-zero baseline for cohort dynamics comparison, cohort bumps (the nonlinear component we focus on here) are easily comparable. We propose then a post-APCD analysis: we will run a linear OLS regression with the detrended cohort coefficients (derived from the APCD-model with controls) as dependent variable and the detrended relative size of the birth cohort in the resident population and detrended relative value of the logged GDP (gross domestic product) per capita in real terms (constant purchasing power parity dollars 1995) when the cohort is 25 year old as independent variables. For 12 cohorts in 9 countries we dispose of these three factors from 1950 (for cohort 1925-'29) to 2009 (cohort 1980-'84). We then retain cohorts born from 1925-'29 to 1980-'84.

4. RESULTS

Next to the APC-analyses, more descriptive ways of analysing the cohort effect provide important insights. Since the APCD models are designed to detect nonlinear cohort effects, it is important to first describe the actual trends.

Bivariately, in all countries, we see a positive effect of year of birth until the cohorts born around 1950 and then a decline in participation in political discussion. In some countries the effect of year of birth is stagnant for the people born after 1950, and in other countries we see a negative effect. There thus is a peak in political discussion for those born in the late 1940 or early 1950.

Next we analyse effects of age, period and cohorts visually. To this end, we present a "synthetic cohort" figure and a "cohort diagram"[5]. To smooth the changes, we use 10 year groupings of periods and cohorts. Synthetic cohort figures make it possible to see differences between birth cohorts *given* certain periods. In order to compare people with different years of birth but with similar ages, one should look at different points on the lines. The synthetic cohort figure thus shows the developments in political participation for different birth cohorts over the survey years. Cohort diagrams make it possible to see differences between birth cohorts *given* certain ages. So, what does the age group 20-29 look like in case they are born between 1950 and 1959, what does it look like in case they are born between 1960 and 1969, etc. To follow people belonging to a certain cohort over the years, one has to move the eyes only up and down.

[Figure 1 about here]

[Figure 2 about here]

In the synthetic cohort figure, the cohorts born in the 1940s and 1950s are higher in the political participation indicator while older and younger cohorts are less active in political discussions. These

[5] This "synthetic cohort" tool is a common descriptive method in demography, sociology and epidemiology (Mason and Fienberg 1985; Preston et al. 2001). The horizontal axis represents age and the vertical one a dependent variable (such as intensity of political participation). Curves represent the trajectory of birth cohort groups, so we can observe the differences in aging process. The cohort diagram is an alternative where cohort is on the horizontal axis, and the curves present age groups, so we can compare different cohorts when they have the same age.

changes give some sense to Becker's typology of generations retained by Van den Broek (1996) and then reworked by Van Deth and Elff (2004): the 'pre-war generation' (born before 1930), 'silent generation' (from birth cohort 1931 to 1940), 'protest generation' (born between 1941 to 1955), 'lost generation' (born from 1956 to 1970) and 'pragmatic generation' (born after 1970). These typologies have been precised and systematized by Grasso (2014:66). For our purpose, these typologies are too much detailed since 'pre-war' and 'silent' generations are in a continuous dynamic structure before the top, and the 'lost' and 'pragmatic' arrive after when the slope is negative. In general, we observe nonlinear continuities, such as bumps, more than strong ruptures. In our nine countries, the 'protest generation' reached a top in political participation and the following ones experienced a relapse. This relapse is rather surprising since we know these cohorts are more educated than the previous ones and since education is known to positively influence political participation.

The synthetic cohort graph confirms as well that the level of participation in political discussion of a cohort is relatively stable and the cohort relative rankings are generally stable over time. 'The stable relative position versus other birth cohorts', as Van den Broek (1996) puts is, can be seen. Not the absolute but the relative position on a variable is characteristic of a cohort. The cohort diagram shows the cohort to cohort dynamics where the cohorts born after 1950 are stagnating or even declining in political discussion at a given age. Two other elements appear: in terms of period effects, from the 1980s to the 1990s, all birth cohorts experience an increase in their political involvement. This period effect could result either of the context of the 1980s that was less propitious for political involvement, or of the political revival of the 1990s where the fall of the wall and the opening of a new era of development of Europe could have given more room and matter for political discussions. In the cohort diagram we see an age effect as well: until the age of 50-59, political involvement generally increases. These two graphs confirm that the cohorts of young adults in the 1960s and 1970s have always been specifically active. In a theory of socialisation related to Karl Mannheim (1952 [1928]), these cohorts who benefitted from a specific period of political socialisation such as May 1968 in France, or the context of the sixties in the western world (Mead 1070) benefitted from better opportunities of political socialisation.

Now we turn to our APCD-methods so that we can get to know more about the significances of the cohort effects, so that we can take into account control variables, and so that we can identify the nonlinearities in the three time variables (age, period, and cohort). We first discuss the effects of the control variables and then look to the cohort diagnosis.

In all countries we see the same picture: the highest educated people are most likely to discuss politics and the lowest educated are least likely. In all countries the differences between educational categories are significant at $p<0.001$. The largest differences between the two extreme educational groups can be seen in Luxembourg followed by Great Britain and the smallest difference can be seen in Denmark followed by West-Germany. In every country the gender gap is in the same direction, with men being more likely to discuss politics than women, with significant gaps at $p<0.001$. The gender gap is largest in Italy followed by West-Germany and smallest in the Netherlands followed by Great Britain. The case of marital status is more ambiguous. In six of our nine countries (Belgium, Netherlands, West-Germany, Luxembourg, Ireland, Great Britain) there appears to be a significant difference between those living with partner (married and cohabiting people) and the others who are less participative. The difference between both groups is largest in West-Germany and smallest in Great Britain. For participation in political discussions, level of education apparently is the most important explanatory variable.

Now we turn to the degree to which people born in different years differ in terms of frequence of political discussion. The figures show the cohort effects with the confidence intervals. As said, the deviation of the cohorts from the linear trends is shown.

[Figure 3 about here]

In all countries we detect similar bumps: the middle birth cohorts pertaining to the early baby boom generation are furthest above the linear trend everywhere. This is in line with what we saw in figures 1 and 2. Anyway, the APCD method is able to provide deeper insights. First, the descriptive method of figure 1 and 2 is acceptable for the European level sample, but the collapse by country give less obvious results due to smaller samples. Second, The model delivers by-country non-linear trajectories with their confidence intervals so that we can compare the shapes and make the difference between flatter countries such as Denmark or Germany and more bumpy ones such as France or Netherlands. Third, we can include controls for relevant variables (at first education but also demographic characteristics) that could *a priori* explain the fluctuations. The model is able to confirm the intrinsic specificity of birth cohorts in terms of political participation.

The APCD results confirm that in most countries the cohort of 1945 is most politically participative. In Belgium and Germany the cohort of 1950 is most participative and in Italy the cohorts of 1950/1955. In Luxembourg the difference between the most and least participative cohorts is largest. Note that the confidence intervals are also much larger due to the relatively small sample size in this country. The cohort of 1945 is 0.30 above the linear trend and the cohort of 1915 is 0.40 below the linear trend. In France, the difference between the most and least participative cohorts is large as well. Also here the cohorts of 1915 and 1945 are respectively the least and most likely to participate in political discussions. The accompanying coefficients are -0.33 and 0.31. The bumps are relatively small in the Netherlands and especially in Denmark. In Denmark the coefficients of the two extreme cohorts are -0.19 and 0.23.

Although in all countries the middle cohorts are most politically active, the shapes of the lines are not completely similar. In some countries it is really one cohort that stands out (for example in the case of Great Britain) while in other countries there are multiple cohorts that stand out to the same degree (for example in the case of West-Germany). In most countries political participation continuously rises over the cohorts until the most politically active cohort and thereafter continuously declines over the cohorts.

We tested whether there are similarities in shapes in order to build a typology. Clustering tools such as the Ward CAH however are unable to detect specific types of countries. Apparently there are no real types but a continuum of shapes without obvious contrasts between groups of countries.

Controlling for level of education, marital status and gender hardly changes the cohort effects. The shapes of the continuous and dotted lines in figure 3 are very similar. This means that the composition of the different birth cohorts in terms of education, gender ratio or family structure is not the source of the bump of the early baby boom generation. In other words, the cohort nonlinearities in political discussions do not derive from individual characteristics (even in terms of education) but from other sources, such as cohort specific contexts.

Now we turn to the other two explanatory factors.

[Table 1 about here]

We provide a post estimation regression of the cohort APCD coefficients found in the model with control variables. A set of 9 countries times 12 cohorts coefficients (108 cells) regressed on cohort size and on economic situation at age 25 appears to provide a good explanation of the bumps we observe for the early baby boomer cohorts (see Appendix 4 for details).[6] The two explanatory variables play a significant role in the cohort differences in political participation. The explanation resulting from cohort size seems strongest, but with a sign opposed to the one Easterlin should have anticipated: large cohorts are more politically active. Then large cohorts experiencing better economic situations at the entry in the labour market, as it is the case of the early baby boom generation in many European countries, might benefit from better political socialization. Conversely, relatively smaller cohorts, victims of economic recession, risk a decline in political participation.

5. CONCLUSION AND DISCUSSION

[6] The height of the variance inflation factor (1.19) shows that the model does not suffer from multicollinearity.

This paper described and explained differences between birth cohorts in participation in political discussions in France, Belgium, Netherlands, Germany, Italy, Luxembourg, Denmark, Ireland and Great Britain in the period 1980-2006. Using descriptive and new APC methods, we found clear differences between cohorts in political participation. In general people born around 1950, the early baby boom generation, are most likely to discuss politics and the farther away a birth cohort from this peak year, the less politically participative. This picture is very similar in the different European countries of our set. Although the shapes and effect sizes differ a little bit over the nine countries, people born between 1945 and 1955 are everywhere on the top of a wave of stronger participation in political discussions. Apparently, the early baby boom generation is not only special with respect to health and labour market success (Becker 2000; Buchholz et al. 2009; Roberts 2012), they are also special with respect to political participation.

With respect to the individual level variables we make use of, we see that they cannot explain the cohort bumps: higher education is not the explanation of the specificity of the early baby boomers even if in all countries education matters strongly for participation in political discussions. We also find men to be more likely to discuss politics in all countries. Marital status plays a less obvious role. In six of the nine countries there is a significant effect in which the married and cohabiting people participate more. Taking into account these three independent variables does almost not change the shape of the cohort effects.

Explanations for cohort differences that appear to be useful are cohort size and economic situation at the time of entry into adulthood. In comparison to older and younger cohorts, members of the early baby boom generation matured in a period of strong welfare states (Roberts 2012), rapid economic growth and increasing affluence (Van den Broek 1996). They started their professional lives in times of labour market upgrading and in times of full employment and had a low risk of youth unemployment as a consequence. Older and younger cohorts entered the labour market in a context of scarcity or economic slowdown that could come with stronger relative frustration, more competition within the cohort and less opportunities for solidarity and political commitment in universities, businesses and in the civil society sphere. These cohorts are characterized as well by a smaller relative size, which diminishes their potential political impact. This result converges with the Kahn and Mason (1987) critique of the Easterlin 'political alienation effect': cohort crowding is not associated with a decline in political participation, but with an increase. This means that the Easterlin argument could be complex: the cohort crowding impairs the economic context of a large cohort but at the same time this size gives more room for efficient mobilisation. The worst case is the one of small cohorts entering adult life in a period of economic slowdown, which is precisely the case of the cohorts born before 1925 and of those born after 1965.

Further research must invest more this mystery of the clear over-involvement of the early baby boomers in politics, and complete the demographic and economic explanation we propose here. Next to financial security, another important factor for example could be *existential* security. Because they were born just after World War II, baby boomers experienced much more existential security than older cohorts who faced the European crisis and war in childhood and early adulthood. According to the theory of Inglehart (1977), this existential security could make people more politically active. Future research is also encouraged to test whether changing patterns of media consumption can explain cohort differences. Media is important because consumption changed strongly over time (Glenn 1994; Knulst and Kraaykamp 1998; Samuel 1996) and because discussing politics without having some information about it is hardly possible and ultimately, all political information we have comes from media sources. With a R-square of 0.29 there is room for other explanations, but the fact that many European countries affect similar shapes with a convergence of explanation show an interesting example of how social generations can be influenced by the context of their socialization. Fifty years after Ryder's (1965) seminal paper, cohort analyses continue to offer useful insights. One of these results is the importance of cohort effects where the 'political moratorium of the young' is not an age effect that is absorbed with aging but a cohort effect that could affect the participation of the post 1950s birth cohorts forever.

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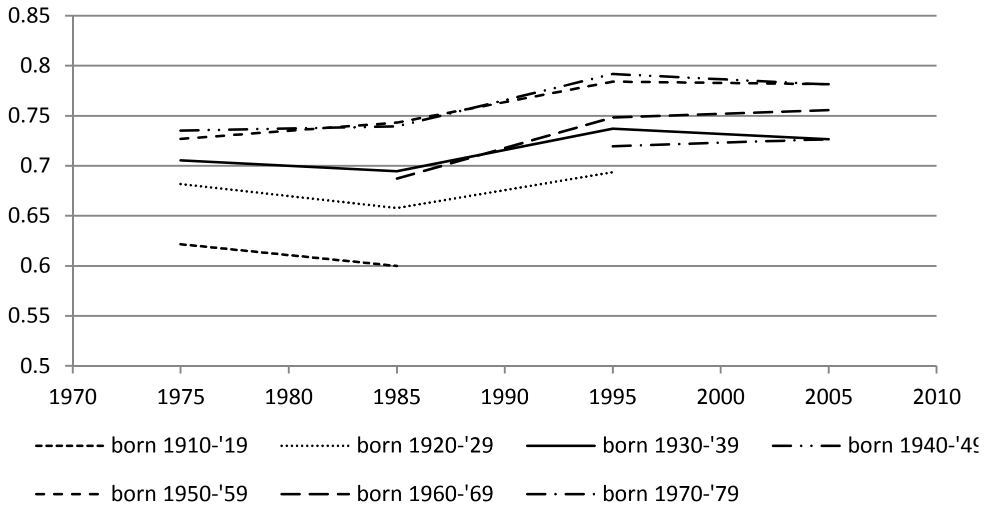
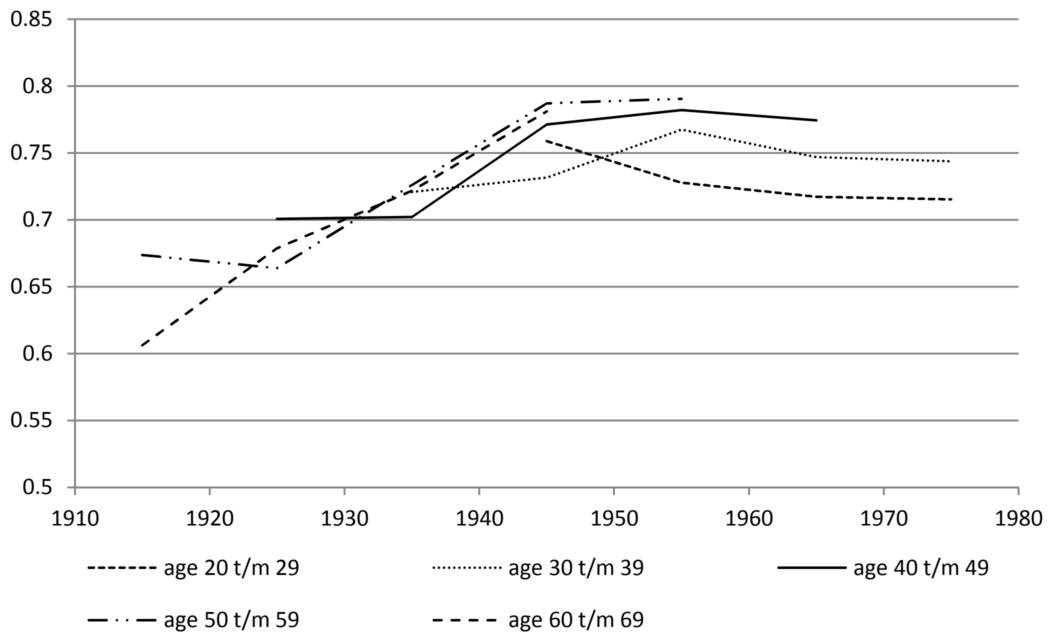
Figure 1 Birth cohort and political discussions: Synthetic cohorts in all countries



Y-axis: proportion of people that says to occasionally or frequently discuss politics (instead of never); X-axis: periods in decades; lines are birth cohort groups

Source: Eurobarometer 1976-2008, countries included: FR/BE/NL/DE/IT/LU/DK/IE/GB, N=535,883

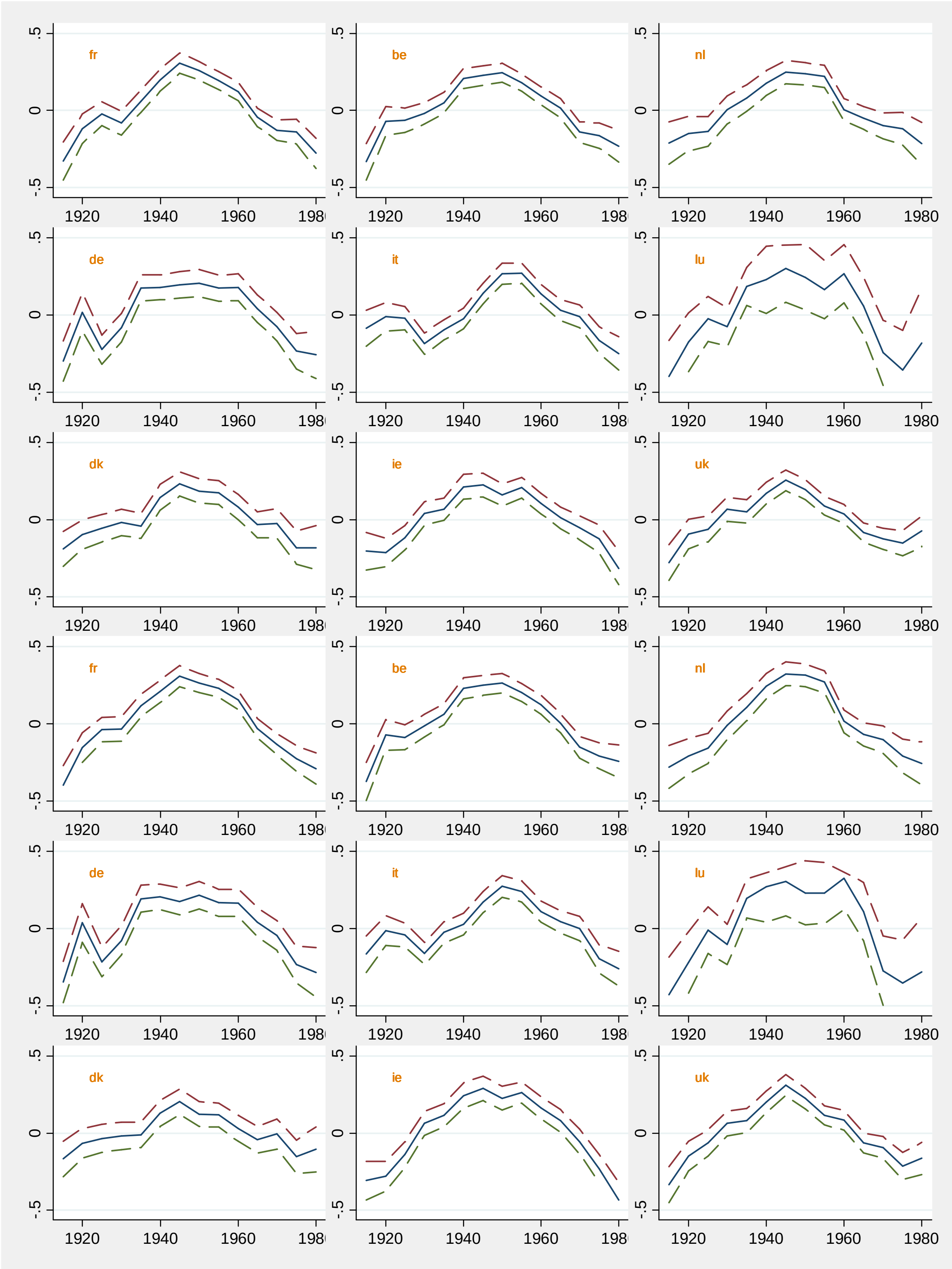
Figure 2 Birth cohort and political discussions: Cohort diagram in all countries



Y-axis: proportion of people that says to occasionally or frequently discuss politics (instead of never); X-axis: birth cohorts in decades; lines are age groups

Source: Eurobarometer 1976-2008, countries included: FR/BE/NL/DE/IT/LU/DK/IE/GB, N=535,883

Figure 3 Effect of cohort (APCD) on frequency of political discussion (occasionally or frequently instead of never)



Full lines: estimates, dashed lines; Grey lines: confidence intervals
Above: without controls, below: with controls of level of education, sex, and marital status.
Source: Eurobarometer 1980-2006

Table 1 Linear OLS regression of cohort effects found in the APCD-model with controls by detrended economic situation at age 25 and relative detrended demographic size of the cohort

	Coef.		Robust SE
Cohort size	.581	***	.127
GDP	.505	**	.188
Constant	.000		.014

* p<0.050, ** p<0.010, *** p<0.001, N=108

Appendix 1 - Logistic APCD models on frequency of political discussion (occasionally or frequently instead of never) (source: Eurobarometer 1980-2006) without/with controls

APCD without controls

	fr:b	fr:se	be:b	be:se	nl:b	nl:se	de:b	de:se	it:b	it:se	lu:b	lu:se	dk:b	dk:se	ie:b	ie:se	uk:b	uk:se
Cohort 1915	-0.328	0.064	-0.333	0.060	-0.209	0.070	-0.299	0.066	-0.086	0.059	-0.398	0.119	-0.189	0.058	-0.204	0.062	-0.280	0.059
Cohort 1920	-0.118	0.048	-0.071	0.049	-0.149	0.057	0.018	0.063	-0.011	0.048	-0.176	0.097	-0.096	0.048	-0.214	0.047	-0.092	0.049
Cohort 1925	-0.021	0.040	-0.063	0.040	-0.136	0.049	-0.223	0.048	-0.021	0.038	-0.025	0.075	-0.055	0.045	-0.118	0.041	-0.061	0.042
Cohort 1930	-0.082	0.039	-0.018	0.036	0.003	0.046	-0.083	0.047	-0.186	0.035	-0.076	0.063	-0.017	0.044	0.040	0.039	0.067	0.041
Cohort 1935	0.061	0.037	0.051	0.034	0.080	0.044	0.175	0.043	-0.096	0.034	0.185	0.063	-0.042	0.041	0.069	0.037	0.052	0.039
Cohort 1940	0.196	0.037	0.206	0.033	0.177	0.041	0.179	0.041	-0.023	0.034	0.229	0.111	0.144	0.043	0.212	0.041	0.172	0.035
Cohort 1945	0.306	0.034	0.227	0.032	0.249	0.039	0.196	0.044	0.140	0.034	0.302	0.112	0.232	0.041	0.224	0.039	0.255	0.034
Cohort 1950	0.257	0.031	0.245	0.031	0.238	0.036	0.207	0.044	0.267	0.035	0.245	0.109	0.186	0.040	0.160	0.037	0.195	0.033
Cohort 1955	0.194	0.029	0.180	0.029	0.221	0.036	0.174	0.043	0.270	0.033	0.164	0.096	0.175	0.039	0.207	0.034	0.090	0.031
Cohort 1960	0.122	0.030	0.095	0.030	0.005	0.036	0.180	0.044	0.136	0.033	0.269	0.096	0.082	0.042	0.104	0.035	0.036	0.031
Cohort 1965	-0.044	0.030	0.017	0.031	-0.049	0.037	0.041	0.046	0.031	0.035	0.060	0.095	-0.033	0.043	0.012	0.036	-0.083	0.032
Cohort 1970	-0.127	0.033	-0.140	0.035	-0.099	0.043	-0.074	0.047	-0.009	0.037	-0.244	0.108	-0.024	0.048	-0.053	0.039	-0.124	0.034
Cohort 1975	-0.138	0.041	-0.163	0.041	-0.118	0.054	-0.233	0.059	-0.163	0.044	-0.356	0.131	-0.181	0.054	-0.126	0.045	-0.153	0.042
Cohort 1980	-0.278	0.050	-0.232	0.052	-0.214	0.070	-0.258	0.078	-0.250	0.056	-0.180	0.180	-0.182	0.072	-0.316	0.055	-0.075	0.051
Age 20	-0.043	0.025	-0.057	0.025	-0.085	0.032	-0.092	0.038	-0.136	0.027	-0.096	0.067	-0.093	0.034	-0.106	0.027	-0.164	0.026
Age 25	0.001	0.024	-0.021	0.024	-0.009	0.030	0.002	0.035	0.027	0.027	0.027	0.060	-0.044	0.032	-0.075	0.027	-0.007	0.026
Age 30	-0.024	0.025	0.005	0.026	0.026	0.030	-0.031	0.036	-0.027	0.029	-0.069	0.069	0.035	0.033	0.063	0.028	0.102	0.026
Age 35	0.050	0.027	-0.005	0.027	0.097	0.032	0.012	0.038	0.056	0.030	0.030	0.078	0.008	0.035	0.014	0.032	0.025	0.028
Age 40	0.018	0.031	0.012	0.029	-0.013	0.034	0.026	0.039	0.008	0.030	0.159	0.093	0.130	0.039	0.150	0.037	0.069	0.031
Age 45	0.018	0.032	0.098	0.029	0.019	0.037	0.110	0.042	0.087	0.031	0.149	0.098	0.078	0.039	0.077	0.036	0.046	0.032
Age 50	0.037	0.032	0.084	0.030	0.029	0.039	0.115	0.040	0.107	0.031	-0.078	0.103	0.035	0.039	0.025	0.038	-0.002	0.034
Age 55	-0.030	0.032	0.015	0.029	-0.027	0.037	0.005	0.040	0.092	0.030	-0.068	0.097	-0.088	0.038	-0.049	0.038	0.080	0.033
Age 60	0.034	0.032	-0.060	0.029	0.026	0.036	0.035	0.037	-0.039	0.030	-0.065	0.093	0.010	0.035	-0.012	0.036	-0.020	0.031
Age 65	-0.061	0.030	-0.072	0.030	-0.064	0.038	-0.182	0.036	-0.176	0.030	0.011	0.094	-0.070	0.037	-0.088	0.033	-0.130	0.031
Period 1975	0.187	0.021	-0.061	0.020	0.081	0.025	-0.126	0.027	0.205	0.021	0.063	0.043	0.028	0.024	-0.063	0.021	-0.071	0.023
Period 1980	-0.103	0.023	-0.030	0.022	0.111	0.027	0.086	0.030	-0.212	0.021	0.068	0.043	-0.132	0.025	0.083	0.023	-0.020	0.024
Period 1985	-0.080	0.022	0.030	0.022	0.026	0.027	0.077	0.033	-0.357	0.023	-0.189	0.042	0.003	0.027	0.023	0.023	0.064	0.024
Period 1990	-0.120	0.021	0.098	0.021	-0.120	0.026	0.164	0.030	0.103	0.023	0.067	0.042	0.180	0.028	0.027	0.022	0.236	0.022
Period 1995	0.098	0.024	0.148	0.022	-0.292	0.026	-0.189	0.029	0.405	0.026	-0.106	0.040	-0.016	0.029	-0.125	0.023	-0.135	0.023
Period 2000	-0.121	0.023	-0.193	0.022	-0.205	0.028	-0.089	0.030	0.137	0.025	0.049	0.044	-0.026	0.030	0.040	0.024	-0.167	0.023
Period 2005	0.139	0.023	0.009	0.021	0.398	0.029	0.079	0.031	-0.281	0.023	0.048	0.056	-0.036	0.031	0.015	0.025	0.094	0.023
Rescacoh	0.582	0.053	1.295	0.050	0.981	0.066	0.739	0.069	1.374	0.052	-0.004	0.122	1.178	0.064	-0.012	0.056	-0.241	0.055
Rescaage	0.194	0.030	0.559	0.028	0.385	0.036	0.252	0.039	0.468	0.030	-0.053	0.077	0.409	0.037	0.137	0.034	0.018	0.031
Constant	0.740	0.012	0.397	0.011	1.391	0.015	1.604	0.015	0.835	0.012	0.986	0.025	1.386	0.014	0.514	0.012	0.738	0.012

APCD with controls: education (reference = tertiary education), gender (reference = male), marital status (reference = widower, divorced, bachelor with no partner, etc)

	fr:b	fr:se	be:b	be:se	nl:b	nl:se	de:b	de:se	it:b	it:se	lu:b	lu:se	dk:b	dk:se	ie:b	ie:se	uk:b	uk:se
Cohort 1915	-0.398	0.065	-0.373	0.063	-0.278	0.071	-0.347	0.068	-0.166	0.061	-0.427	0.124	-0.167	0.059	-0.308	0.063	-0.333	0.059
Cohort 1920	-0.153	0.049	-0.071	0.050	-0.209	0.059	0.036	0.064	-0.014	0.049	-0.220	0.101	-0.065	0.049	-0.280	0.049	-0.150	0.049
Cohort 1925	-0.036	0.041	-0.087	0.041	-0.157	0.050	-0.215	0.049	-0.043	0.039	-0.011	0.078	-0.034	0.046	-0.139	0.042	-0.063	0.043
Cohort 1930	-0.032	0.040	-0.011	0.037	-0.009	0.047	-0.078	0.048	-0.161	0.037	-0.101	0.066	-0.018	0.045	0.063	0.040	0.063	0.041
Cohort 1935	0.119	0.037	0.064	0.035	0.109	0.045	0.194	0.044	-0.026	0.035	0.195	0.065	-0.011	0.042	0.116	0.038	0.082	0.039
Cohort 1940	0.212	0.038	0.230	0.035	0.246	0.042	0.206	0.042	0.028	0.036	0.271	0.118	0.128	0.044	0.244	0.042	0.202	0.036
Cohort 1945	0.309	0.035	0.250	0.033	0.325	0.039	0.176	0.045	0.171	0.035	0.305	0.114	0.204	0.042	0.290	0.041	0.311	0.035
Cohort 1950	0.265	0.032	0.264	0.033	0.316	0.037	0.217	0.046	0.273	0.036	0.231	0.106	0.123	0.041	0.227	0.039	0.224	0.034
Cohort 1955	0.231	0.030	0.203	0.029	0.272	0.037	0.167	0.045	0.240	0.035	0.231	0.100	0.118	0.040	0.263	0.035	0.115	0.032
Cohort 1960	0.154	0.031	0.125	0.031	0.017	0.037	0.166	0.046	0.109	0.035	0.325	0.101	0.031	0.043	0.165	0.036	0.083	0.032
Cohort 1965	-0.028	0.032	0.005	0.032	-0.067	0.038	0.041	0.048	0.044	0.037	0.110	0.097	-0.044	0.044	0.080	0.037	-0.064	0.033
Cohort 1970	-0.132	0.035	-0.151	0.036	-0.100	0.044	-0.046	0.049	0.001	0.040	-0.274	0.115	-0.006	0.049	-0.056	0.041	-0.093	0.036
Cohort 1975	-0.224	0.042	-0.207	0.043	-0.207	0.055	-0.234	0.061	-0.196	0.046	-0.352	0.141	-0.154	0.055	-0.232	0.048	-0.213	0.045
Cohort 1980	-0.289	0.052	-0.241	0.054	-0.257	0.072	-0.283	0.081	-0.261	0.058	-0.282	0.184	-0.105	0.074	-0.433	0.059	-0.164	0.053
Age 20	-0.042	0.026	-0.037	0.026	-0.070	0.033	-0.023	0.040	-0.185	0.030	-0.071	0.078	-0.089	0.035	-0.087	0.030	-0.135	0.027
Age 25	0.004	0.025	-0.017	0.025	0.001	0.030	0.022	0.036	0.017	0.028	0.056	0.062	-0.048	0.033	-0.042	0.028	0.006	0.027
Age 30	-0.028	0.026	0.001	0.027	0.024	0.031	-0.036	0.037	-0.002	0.031	-0.051	0.075	0.031	0.034	0.068	0.029	0.099	0.027
Age 35	0.040	0.028	-0.013	0.029	0.080	0.033	-0.030	0.040	0.082	0.031	-0.005	0.084	0.018	0.036	-0.015	0.033	0.020	0.029
Age 40	0.026	0.031	0.014	0.030	-0.025	0.035	-0.016	0.040	0.063	0.032	0.095	0.094	0.123	0.040	0.124	0.038	0.037	0.032
Age 45	0.033	0.033	0.073	0.031	0.015	0.038	0.066	0.043	0.087	0.033	0.119	0.103	0.078	0.040	0.041	0.038	0.017	0.033
Age 50	0.016	0.032	0.064	0.032	0.012	0.039	0.070	0.041	0.106	0.033	-0.072	0.107	0.031	0.040	0.008	0.039	-0.021	0.035
Age 55	-0.018	0.032	0.014	0.030	-0.009	0.037	0.002	0.041	0.081	0.031	-0.049	0.095	-0.078	0.039	-0.035	0.039	0.092	0.033
Age 60	0.033	0.032	-0.049	0.030	0.020	0.036	0.061	0.038	-0.091	0.031	-0.049	0.095	-0.004	0.036	-0.001	0.038	-0.025	0.031
Age 65	-0.063	0.031	-0.051	0.031	-0.049	0.039	-0.116	0.037	-0.158	0.031	0.029	0.103	-0.062	0.038	-0.061	0.034	-0.091	0.031
Period 1975	0.163	0.021	-0.060	0.020	0.116	0.025	-0.137	0.028	0.209	0.022	0.085	0.045	0.012	0.024	-0.071	0.022	-0.063	0.024
Period 1980	-0.076	0.023	-0.004	0.023	0.084	0.028	0.085	0.031	-0.210	0.022	0.069	0.045	-0.058	0.025	0.100	0.023	-0.022	0.024
Period 1985	-0.086	0.023	0.006	0.023	-0.034	0.027	0.073	0.034	-0.351	0.024	-0.213	0.044	0.025	0.028	0.015	0.023	0.041	0.024
Period 1990	-0.117	0.022	0.060	0.022	-0.097	0.027	0.211	0.031	0.104	0.024	0.079	0.044	0.084	0.029	0.023	0.023	0.246	0.023
Period 1995	0.107	0.024	0.179	0.023	-0.271	0.027	-0.210	0.030	0.390	0.027	-0.125	0.042	-0.061	0.029	-0.120	0.024	-0.147	0.024
Period 2000	-0.119	0.023	-0.177	0.022	-0.146	0.029	-0.104	0.031	0.106	0.026	0.014	0.046	-0.016	0.031	0.031	0.025	-0.121	0.023
Period 2005	0.128	0.023	-0.003	0.022	0.348	0.030	0.083	0.032	-0.249	0.024	0.092	0.058	0.013	0.031	0.020	0.026	0.066	0.024
Rescacoh	0.002	0.056	0.756	0.053	0.419	0.069	0.413	0.072	0.856	0.056	-0.533	0.135	0.065	0.073	-0.481	0.060	-0.648	0.057
Rescaage	0.217	0.030	0.573	0.029	0.369	0.037	0.249	0.040	0.521	0.032	-0.049	0.079	-0.004	0.040	0.136	0.035	0.012	0.032
Education (high=ref)																		
Middle	-0.731	0.028	-0.763	0.026	-0.752	0.033	-0.665	0.049	-0.494	0.035	-0.794	0.118	-0.566	0.036	-0.836	0.045	-0.745	0.042
Low	-1.364	0.029	-1.330	0.028	-1.262	0.033	-1.221	0.046	-1.295	0.032	-1.495	0.115	-1.035	0.033	-1.445	0.046	-1.481	0.037
Sex	-0.555	0.020	-0.628	0.020	-0.199	0.024	-0.943	0.028	-0.993	0.022	-0.701	0.077	-0.514	0.026	-0.861	0.024	-0.513	0.021
Married/cohabiting (other=ref)	0.028	0.023	0.119	0.023	0.125	0.029	0.307	0.029	-0.010	0.026	0.262	0.091	0.012	0.030	0.142	0.028	0.066	0.024
Constant	1.832	0.030	1.403	0.028	2.128	0.034	2.857	0.049	2.250	0.035	2.144	0.116	2.141	0.035	1.913	0.046	2.124	0.040

Appendix 2 – A BIC comparison of models

	(A)	(AP)	(APC)	Saturated
fr	74350.8	74172.9	74033.4	74417.1
be	77463.2	76528.7	76433.9	76826.3
nl	60008.3	59632.8	59590.8	59977.8
de	51134.6	50890.7	50903.3	51287.7
it	74586.2	72782.4	72674.7	73055.9
lu	28755.5	28777.0	28746.5	29101.4
dk	56965.7	56374.0	56378.4	56771.4
ie	73884.2	73886.6	73803.7	74191.0
uk	73053.7	72753.2	72723.9	73109.8

Here we compare the BIC of several models to detect the most parsimonious solutions. The lowest BIC, provided that the gap exceeds 4 units, denotes the best models. Age alone (A) and the full-interactions saturated models are never relevant. In most of the case, the introduction of cohort effects improves the model, exception with Germany and Denmark where age and period effects (AP) with no cohort bumps are sufficient.

Appendix 3 – Results provided by APC-IE and by HAPC (both are in Logit specification and with no control variables)

A3-a Detailed results provided by APC-IE

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fr

Intrinsic estimator of APC effects                  No. of obs      =     60018
Optimization     : ML                               Residual df     =     59988
                                                    Scale parameter =         1
Deviance         =  73734.25257                     (1/df) Deviance =   1.22915
Pearson          =  60026.05033                     (1/df) Pearson  =  1.000634

Variance function: V(u) = u*(1-u/1)                 [Binomial]
Link function    : g(u) = ln(u/(1-u))               [Logit]

                                                    AIC             =  1.229535
Log likelihood   = -36867.12629                     BIC             = -586277.7
```

poldisc	Coef.	OIM Std. Err.	z	P>|z|	[95% Conf.	Interval]
age_20	.0836665	.0259449	3.22	0.001	.0328154	.1345176
age_25	.0607936	.0242976	2.50	0.012	.0131713	.108416
age_30	.0013341	.0246278	0.05	0.957	-.0469355	.0496038
age_35	.0645524	.0262045	2.46	0.014	.0131925	.1159122
age_40	.0035724	.0285434	0.13	0.900	-.0523716	.0595165
age_45	-.0102651	.0300183	-0.34	0.732	-.0690999	.0485696
age_50	-.0230529	.0298542	-0.77	0.440	-.0815661	.0354604
age_55	-.0557764	.0305415	-1.83	0.068	-.1156366	.0040837
age_60	-.0236493	.0317621	-0.74	0.457	-.0859019	.0386034
age_65	-.1011753	.031219	-3.24	0.001	-.1623635	-.0399871
period_1975	.0215393	.0230552	0.93	0.350	-.023648	.0667267
period_1980	-.2172181	.0226112	-9.61	0.000	-.2615353	-.172901
period_1985	-.1678575	.0211101	-7.95	0.000	-.2092325	-.1264825
period_1990	-.1189308	.0202563	-5.87	0.000	-.1586323	-.0792292
period_1995	.1680702	.0220899	7.61	0.000	.1247748	.2113657
period_2000	-.0070358	.0222891	-0.32	0.752	-.0507216	.03665
period_2005	.3214327	.0294653	10.91	0.000	.2636818	.3791836
cohort_1910	-.3070672	.0739061	-4.15	0.000	-.4519204	-.162214
cohort_1915	-.2573226	.0619401	-4.15	0.000	-.378723	-.1359222
cohort_1920	-.0472828	.0465767	-1.02	0.310	-.1385715	.0440059
cohort_1925	.0207306	.038415	0.54	0.589	-.0545615	.0960227
cohort_1930	-.0700064	.0376355	-1.86	0.063	-.1437706	.0037579
cohort_1935	.0790986	.035665	2.22	0.027	.0091964	.1490008
cohort_1940	.2176169	.035359	6.15	0.000	.1483145	.2869193
cohort_1945	.3199873	.0329769	9.70	0.000	.2553537	.3846209
cohort_1950	.3005908	.0304001	9.89	0.000	.2410077	.3601739
cohort_1955	.2320409	.0286108	8.11	0.000	.1759648	.2881171
cohort_1960	.1406133	.0291167	4.83	0.000	.0835456	.197681
cohort_1965	-.0326316	.0293364	-1.11	0.266	-.0901299	.0248667
cohort_1970	-.0756562	.0321505	-2.35	0.019	-.13867	-.0126424
cohort_1975	-.1267623	.0394097	-3.22	0.001	-.204004	-.0495207
cohort_1980	-.2702205	.0499981	-5.40	0.000	-.3682149	-.1722261
cohort_1985	-.1237288	.1047338	-1.18	0.237	-.3290033	.0815457
_cons	.7192615	.0131617	54.65	0.000	.6934651	.7450579

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be

Intrinsic estimator of APC effects                  No. of obs      =     57959
Optimization     : ML                               Residual df     =     57929
                                                    Scale parameter =         1
Deviance         =   76116.3476                     (1/df) Deviance =  1.313959
Pearson          =  57959.20281                     (1/df) Pearson  =  1.000521

Variance function: V(u) = u*(1-u/1)                 [Binomial]
Link function    : g(u) = ln(u/(1-u))               [Logit]

                                                    AIC             =  1.314314
Log likelihood   =  -38058.1738                     BIC             = -559219.4
```

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------------------------------------------------------------------------------
             |                 OIM
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |   .0419832   .0255799     1.64   0.101    -.0081526    .0921189
      age_25 |   .0580859   .0249167     2.33   0.020       .00925    .1069218
      age_30 |   .0360728   .0255271     1.41   0.158    -.0139594     .086105
      age_35 |   .0062803   .0260899     0.24   0.810    -.0448549    .0574155
      age_40 |   .0149087   .0265704     0.56   0.575    -.0371682    .0669857
      age_45 |   .0774104   .0274762     2.82   0.005     .0235581    .1312627
      age_50 |   .0455509   .0282575     1.61   0.107    -.0098327    .1009345
      age_55 |  -.0622407   .0285234    -2.18   0.029    -.1181455   -.0063359
      age_60 |  -.0928704   .0290337    -3.20   0.001    -.1497753   -.0359655
      age_65 |  -.1251811   .0306363    -4.09   0.000    -.1852272   -.0651351
 period_1975 |  -.4569215   .0229593   -19.90   0.000    -.5019209   -.4119221
 period_1980 |  -.3263217   .0218845   -14.91   0.000    -.3692146   -.2834289
 period_1985 |  -.1216135   .0200645    -6.06   0.000    -.1609391   -.0822879
 period_1990 |    .104236   .0196837     5.30   0.000     .0656566    .1428154
 period_1995 |   .2850264   .0214205    13.31   0.000     .2430429    .3270099
 period_2000 |   .1044205   .0217268     4.81   0.000     .0618367    .1470043
 period_2005 |   .4111738   .0277733    14.80   0.000     .3567391    .4656086
 cohort_1910 |  -.3240639   .0808322    -4.01   0.000     -.482492   -.1656358
 cohort_1915 |  -.3514488   .0605278    -5.81   0.000    -.4700811   -.2328164
 cohort_1920 |  -.0599638   .0456108    -1.31   0.189    -.1493594    .0294318
 cohort_1925 |  -.0466806   .0387466    -1.20   0.228    -.1226225    .0292614
 cohort_1930 |  -.0213487   .0356953    -0.60   0.550    -.0913102    .0486129
 cohort_1935 |   .0768616   .0337699     2.28   0.023     .0106738    .1430494
 cohort_1940 |   .2248252   .0322932     6.96   0.000     .1615317    .2881186
 cohort_1945 |   .2828252   .0316414     8.94   0.000     .2208091    .3448412
 cohort_1950 |   .2833726   .0307169     9.23   0.000     .2231686    .3435765
 cohort_1955 |   .2323197   .0278016     8.36   0.000     .1778295    .2868099
 cohort_1960 |   .1355158   .0283264     4.78   0.000     .0799971    .1910345
 cohort_1965 |   .0750402   .0292803     2.56   0.010      .017652    .1324285
 cohort_1970 |  -.0930637   .0329467    -2.82   0.005     -.157638   -.0284893
 cohort_1975 |  -.0986988   .0398249    -2.48   0.013    -.1767543   -.0206434
 cohort_1980 |  -.1964392   .0516103    -3.81   0.000    -.2975935   -.0952849
 cohort_1985 |  -.1190529   .1068518    -1.11   0.265    -.3284785    .0903727
       _cons |    .339625   .0133079    25.52   0.000     .3135419     .365708
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nl

Intrinsic estimator of APC effects                 No. of obs      =     60286
Optimization     : ML                              Residual df     =     60256
                                                   Scale parameter =         1
Deviance         =  59273.95952                    (1/df) Deviance =  .9837022
Pearson          =  60300.69232                    (1/df) Pearson  =  1.000742

Variance function: V(u) = u*(1-u/1)                [Binomial]
Link function    : g(u) = ln(u/(1-u))              [Logit]

                                                   AIC             =  .9842079
Log likelihood   = -29636.97976                    BIC             = -603955.1

------------------------------------------------------------------------------
             |                 OIM
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |  -.0260843   .0322063    -0.81   0.418    -.0892075    .0370389
      age_25 |   .0603317   .0293075     2.06   0.040     .0028902    .1177733
      age_30 |   .0575739   .0285336     2.02   0.044     .0016491    .1134987
      age_35 |   .1240404    .029659     4.18   0.000     .0659098    .1821709
      age_40 |  -.0099002   .0311933    -0.32   0.751     -.071038    .0512376
      age_45 |  -.0101401   .0337837    -0.30   0.764    -.0763549    .0560747
      age_50 |  -.0123911   .0353675    -0.35   0.726    -.0817101    .0569279
      age_55 |  -.0747186    .035058    -2.13   0.033     -.143431   -.0060063
      age_60 |  -.0383146   .0352818    -1.09   0.277    -.1074656    .0308364
      age_65 |  -.0703971   .0383311    -1.84   0.066    -.1455247    .0047305
 period_1975 |  -.2628813   .0267339    -9.83   0.000    -.3152787   -.2104838
 period_1980 |  -.0913752   .0262969    -3.47   0.001    -.1429162   -.0398343
 period_1985 |  -.0901374   .0246239    -3.66   0.000    -.1383993   -.0418755
 period_1990 |  -.0908206    .023684    -3.83   0.000    -.1372404   -.0444008
 period_1995 |   -.168557   .0240877    -7.00   0.000     -.215768   -.1213459
 period_2000 |  -.0197463   .0259291    -0.76   0.446    -.0705664    .0310737
 period_2005 |   .7235178   .0390873    18.51   0.000     .6469081    .8001275
 cohort_1910 |  -.1822511   .0886362    -2.06   0.040    -.3559748   -.0085274
 cohort_1915 |  -.1313027   .0665408    -1.97   0.048    -.2617203   -.0008851
 cohort_1920 |   -.033594   .0539533    -0.62   0.534    -.1393405    .0721526
 cohort_1925 |  -.0746221   .0466685    -1.60   0.110    -.1660906    .0168464
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 cohort_1930 |   .0377907   .0445031     0.85   0.396    -.0494336    .1250151
 cohort_1935 |   .1101551   .0425261     2.59   0.010     .0268054    .1935048
 cohort_1940 |   .2436063   .0401667     6.06   0.000     .1648809    .3223316
 cohort_1945 |   .3278682   .0381874     8.59   0.000     .2530222    .4027141
 cohort_1950 |   .3103211   .0360581     8.61   0.000     .2396486    .3809937
 cohort_1955 |   .3025163    .035182     8.60   0.000     .2335608    .3714718
 cohort_1960 |   .0880664   .0349514     2.52   0.012     .0195629    .1565699
 cohort_1965 |  -.0044316   .0361802    -0.12   0.903    -.0753435    .0664803
 cohort_1970 |  -.0337764   .0406714    -0.83   0.406    -.1134908    .0459381
 cohort_1975 |  -.0076029   .0521615    -0.15   0.884    -.1098375    .0946317
 cohort_1980 |  -.1241286   .0711743    -1.74   0.081    -.2636277    .0153705
 cohort_1985 |  -.8286148   .1797071    -4.61   0.000    -1.180834   -.4763953
       _cons |   1.305779   .0179028    72.94   0.000     1.270691    1.340868
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de

Intrinsic estimator of APC effects                 No. of obs      =     58644
Optimization     : ML                              Residual df     =     58614
                                                   Scale parameter =         1
Deviance         =  50572.30835                    (1/df) Deviance =  .8628025
Pearson          =  58628.27182                    (1/df) Pearson  =  1.000243

Variance function: V(u) = u*(1-u/1)                [Binomial]
Link function    : g(u) = ln(u/(1-u))              [Logit]

                                                   AIC             =  .8633843
Log likelihood   = -25286.15418                    BIC             = -592964.9

------------------------------------------------------------------------------
             |                 OIM
    poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |   .0297628   .0367832     0.81   0.418    -.0423309    .1018565
      age_25 |   .1197342   .0338916     3.53   0.000     .0533079    .1861605
      age_30 |   .0120017   .0342646     0.35   0.726    -.0551557    .0791591
      age_35 |   .0353367   .0346144     1.02   0.307    -.0325063    .1031797
      age_40 |    .024168   .0353683     0.68   0.494    -.0451525    .0934885
      age_45 |   .0713891   .0369658     1.93   0.053    -.0010624    .1438407
      age_50 |   .0242461   .0368483     0.66   0.511    -.0479754    .0964675
      age_55 |  -.0359878   .0372643    -0.97   0.334    -.1090245     .037049
      age_60 |  -.0521586   .0353697    -1.47   0.140    -.1214819    .0171647
      age_65 |  -.2284923   .0357945    -6.38   0.000    -.2986483   -.1583362
 period_1975 |  -.3735044   .0287902   -12.97   0.000    -.4299322   -.3170767
 period_1980 |  -.0832068   .0286957    -2.90   0.004    -.1394493   -.0269644
 period_1985 |    .003236   .0270828     0.12   0.905    -.0498452    .0563173
 period_1990 |    .185807   .0274657     6.77   0.000     .1319751    .2396388
 period_1995 |  -.0941867   .0269129    -3.50   0.000     -.146935   -.0414385
 period_2000 |   .0631721    .028927     2.18   0.029     .0064762     .119868
 period_2005 |    .298683   .0383835     7.78   0.000     .2234527    .3739133
 cohort_1910 |  -.2444011   .0825749    -2.96   0.003    -.4062449   -.0825573
 cohort_1915 |  -.2042919   .0628121    -3.25   0.001    -.3274012   -.0811825
 cohort_1920 |   .0349599   .0546342     0.64   0.522    -.0721211    .1420409
 cohort_1925 |  -.1596874   .0446964    -3.57   0.000    -.2472908    -.072084
 cohort_1930 |  -.0433845   .0438978    -0.99   0.323    -.1294226    .0426536
 cohort_1935 |   .1646393   .0415843     3.96   0.000     .0831355     .246143
 cohort_1940 |   .1937827   .0389466     4.98   0.000     .1174487    .2701167
 cohort_1945 |   .2496426   .0419388     5.95   0.000     .1674441    .3318411
 cohort_1950 |    .275425   .0417383     6.60   0.000     .1936195    .3572306
 cohort_1955 |   .2187437   .0403388     5.42   0.000     .1396812    .2978062
 cohort_1960 |   .2299392   .0400609     5.74   0.000     .1514213    .3084571
 cohort_1965 |   .0851261   .0406171     2.10   0.036      .005518    .1647342
 cohort_1970 |  -.0213333   .0434842    -0.49   0.624    -.1065609    .0638942
 cohort_1975 |  -.2014412   .0562576    -3.58   0.000    -.3117042   -.0911783
 cohort_1980 |  -.1511164   .0752256    -2.01   0.045     -.298556   -.0036769
 cohort_1985 |  -.4266026   .1374931    -3.10   0.002    -.6960841   -.1571211
       _cons |   1.571463   .0164465    95.55   0.000     1.539228    1.603697
------------------------------------------------------------------------------
*****************************************************
it

Intrinsic estimator of APC effects                 No. of obs      =     60697
Optimization     : ML                              Residual df     =     60667
                                                   Scale parameter =         1
Deviance         =   72356.8984                    (1/df) Deviance =   1.19269
Pearson          =  60651.78847                    (1/df) Pearson  =  .9997493

Variance function: V(u) = u*(1-u/1)                [Binomial]
Link function    : g(u) = ln(u/(1-u))              [Logit]
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```
                                                  AIC             =  1.193089
Log likelihood   =  -36178.4492                   BIC             = -595808.2

------------------------------------------------------------------------------
             |                 OIM
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |   .0649053   .0277569     2.34   0.019     .0105027    .1193079
      age_25 |   .1438714   .0268097     5.37   0.000     .0913254    .1964175
      age_30 |   .0415682   .0279946     1.48   0.138    -.0133003    .0964367
      age_35 |   .0788058   .0277279     2.84   0.004     .0244601    .1331515
      age_40 |  -.0037308   .0276243    -0.14   0.893    -.0578734    .0504118
      age_45 |   .0423933   .0287774     1.47   0.141    -.0140094    .0987959
      age_50 |   .0355917   .0290382     1.23   0.220    -.0213221    .0925056
      age_55 |   .0109554   .0281778     0.39   0.697     -.044272    .0661828
      age_60 |  -.1424841   .0295112    -4.83   0.000     -.200325   -.0846432
      age_65 |  -.2718763   .0297884    -9.13   0.000    -.3302605   -.2134921
 period_1975 |  -.2250778   .0227939    -9.87   0.000     -.269753   -.1804026
 period_1980 |  -.4344998   .0212253   -20.47   0.000    -.4761005    -.392899
 period_1985 |   -.485618   .0202155   -24.02   0.000    -.5252396   -.4459964
 period_1990 |   .0775733   .0211259     3.67   0.000     .0361672    .1189793
 period_1995 |   .5558319   .0248047    22.41   0.000     .5072155    .6044483
 period_2000 |   .4167834   .0246747    16.89   0.000     .3684218     .465145
 period_2005 |   .0950069   .0280442     3.39   0.001     .0400414    .1499725
 cohort_1910 |  -.2387165   .0800465    -2.98   0.003    -.3956046   -.0818283
 cohort_1915 |  -.1302494   .0568222    -2.29   0.022    -.2416188   -.0188801
 cohort_1920 |  -.0257649   .0435466    -0.59   0.554    -.1111147    .0595848
 cohort_1925 |  -.0627109   .0367426    -1.71   0.088    -.1347251    .0093032
 cohort_1930 |  -.2030811   .0344129    -5.90   0.000    -.2705292    -.135633
 cohort_1935 |  -.1118274    .033082    -3.38   0.001    -.1766668    -.046988
 cohort_1940 |  -.0065746   .0322282    -0.20   0.838    -.0697408    .0565915
 cohort_1945 |   .1747005   .0331737     5.27   0.000     .1096812    .2397199
 cohort_1950 |   .3307405   .0332414     9.95   0.000     .2655886    .3958924
 cohort_1955 |   .3343422   .0315581    10.59   0.000     .2724895    .3961949
 cohort_1960 |   .1964612   .0310204     6.33   0.000     .1356623      .25726
 cohort_1965 |   .0776325   .0321082     2.42   0.016     .0147015    .1405635
 cohort_1970 |   .0682785   .0355266     1.92   0.055    -.0013522    .1379093
 cohort_1975 |  -.0240678   .0423993    -0.57   0.570    -.1071688    .0590332
 cohort_1980 |  -.1148518   .0554907    -2.07   0.038    -.2236117    -.006092
 cohort_1985 |   -.264311    .109499    -2.41   0.016    -.4789251   -.0496969
       _cons |   .7732532   .0135772    56.95   0.000     .7466425     .799864
------------------------------------------------------------------------------
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lu

Intrinsic estimator of APC effects                No. of obs      =     25407
Optimization     : ML                             Residual df     =     25377
                                                  Scale parameter =         1
Deviance         =  28433.41458                   (1/df) Deviance =   1.12044
Pearson          =  25411.70239                   (1/df) Pearson  =  1.001367

Variance function: V(u) = u*(1-u/1)               [Binomial]
Link function    : g(u) = ln(u/(1-u))             [Logit]

                                                  AIC             =  1.121479
Log likelihood   = -14216.70729                   BIC             = -228959.9

------------------------------------------------------------------------------
             |                 OIM
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |  -.0805502   .0481183    -1.67   0.094    -.1748603    .0137598
      age_25 |    .013634    .045148     0.30   0.763    -.0748544    .1021224
      age_30 |   -.075069   .0439951    -1.71   0.088    -.1612977    .0111598
      age_35 |  -.0034846   .0424007    -0.08   0.935    -.0865885    .0796193
      age_40 |   -.028118   .0441489    -0.64   0.524    -.1146483    .0584123
      age_45 |    .037184   .0466501     0.80   0.425    -.0542486    .1286165
      age_50 |   .0664384   .0491042     1.35   0.176     -.029804    .1626808
      age_55 |    .026399   .0491605     0.54   0.591    -.0699537    .1227518
      age_60 |  -.0294835   .0500188    -0.59   0.556    -.1275186    .0685516
      age_65 |   .0730499   .0527004     1.39   0.166     -.030241    .1763408
 period_1975 |   .0529725   .0461115     1.15   0.251    -.0374044    .1433494
 period_1980 |   .0096309    .042258     0.23   0.820    -.0731933    .0924552
 period_1985 |  -.1646977   .0390205    -4.22   0.000    -.2411764   -.0882189
 period_1990 |   .1155184   .0350977     3.29   0.001     .0467282    .1843087
 period_1995 |  -.1003686   .0308807    -3.25   0.001    -.1608936   -.0398435
 period_2000 |   .0053724   .0330318     0.16   0.871    -.0593688    .0701136
 period_2005 |   .0815719   .0446816     1.83   0.068    -.0060025    .1691464
 cohort_1910 |   .1820813   .1750039     1.04   0.298    -.1609201    .5250827
 cohort_1915 |  -.4269701   .1062052    -4.02   0.000    -.6351285   -.2188116
```

```
   cohort_1920 |  -.1999594   .0872192    -2.29   0.022    -.3709059    -.029013
   cohort_1925 |  -.0894281   .0736476    -1.21   0.225    -.2337748    .0549186
   cohort_1930 |  -.1378759   .0625952    -2.20   0.028    -.2605602   -.0151916
   cohort_1935 |   .1812265   .0612743     2.96   0.003     .0611311    .3013219
   cohort_1940 |   .1895636   .0567867     3.34   0.001     .0782636    .3008635
   cohort_1945 |   .3633312   .0571057     6.36   0.000     .2514062    .4752563
   cohort_1950 |   .3423266    .053944     6.35   0.000     .2365983    .4480549
   cohort_1955 |   .3533812   .0496741     7.11   0.000     .2560219    .4507406
   cohort_1960 |   .2644717   .0485689     5.45   0.000     .1692784    .3596649
   cohort_1965 |   .0040066    .046881     0.09   0.932    -.0878785    .0958917
   cohort_1970 |  -.1431364   .0492025    -2.91   0.004    -.2395715   -.0467013
   cohort_1975 |  -.2467676   .0581514    -4.24   0.000    -.3607423   -.1327929
   cohort_1980 |   -.393287   .0796703    -4.94   0.000    -.5494378   -.2371362
   cohort_1985 |  -.2429643   .1688526    -1.44   0.150    -.5739093    .0879808
         _cons |   .9911792   .0234811    42.21   0.000     .9451571    1.037201
------------------------------------------------------------------------------
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dk

Intrinsic estimator of APC effects                  No. of obs      =     58129
Optimization     : ML                               Residual df     =     58099
                                                    Scale parameter =         1
Deviance         =   56050.4767                     (1/df) Deviance =  .9647408
Pearson          =  58144.60075                     (1/df) Pearson  =  1.000785

Variance function: V(u) = u*(1-u/1)                 [Binomial]
Link function    : g(u) = ln(u/(1-u))               [Logit]

                                                    AIC             =  .9652751
Log likelihood   = -28025.23835                     BIC             =   -581320

------------------------------------------------------------------------------
             |                 OIM
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      age_20 |   .0986084   .0324253     3.04   0.002      .035056    .1621609
      age_25 |   .1205315   .0307452     3.92   0.000     .0602721     .180791
      age_30 |   .0863167   .0310435     2.78   0.005     .0254725    .1471609
      age_35 |   .0423748   .0318223     1.33   0.183    -.0199957    .1047454
      age_40 |   .1270354   .0339764     3.74   0.000     .0604428     .193628
      age_45 |   .0376637   .0346913     1.09   0.278      -.03033    .1056574
      age_50 |  -.0475002   .0345847    -1.37   0.170     -.115285    .0202847
      age_55 |  -.1471009   .0345556    -4.26   0.000    -.2148287   -.0793732
      age_60 |  -.1170004   .0335458    -3.49   0.000    -.1827489   -.0512519
      age_65 |  -.2009291   .0353273    -5.69   0.000    -.2701694   -.1316888
 period_1975 |  -.3618651   .0263165   -13.75   0.000    -.4134446   -.3102857
 period_1980 |  -.3767438   .0251308   -14.99   0.000    -.4259993   -.3274884
 period_1985 |  -.1265259   .0247626    -5.11   0.000    -.1750597   -.0779922
 period_1990 |   .1862795   .0257653     7.23   0.000     .1357804    .2367786
 period_1995 |   .1309532   .0264275     4.96   0.000     .0791562    .1827502
 period_2000 |   .2326821   .0279933     8.31   0.000     .1778162     .287548
 period_2005 |   .3152201   .0353137     8.93   0.000     .2460066    .3844336
 cohort_1910 |  -.4317189   .0817585    -5.28   0.000    -.5919627   -.2714751
 cohort_1915 |  -.1869526   .0581972    -3.21   0.001    -.3010171   -.0728881
 cohort_1920 |   -.087636   .0478922    -1.83   0.067    -.1815029    .0062309
 cohort_1925 |  -.0374295   .0446705    -0.84   0.402    -.1249822    .0501231
 cohort_1930 |   .0215595   .0430307     0.50   0.616    -.0627792    .1058982
 cohort_1935 |   .0008437   .0400969     0.02   0.983    -.0777448    .0794322
 cohort_1940 |   .1860418   .0381969     4.87   0.000     .1111773    .2609064
 cohort_1945 |   .3167872   .0370117     8.56   0.000     .2442456    .3893288
 cohort_1950 |   .2504441   .0367124     6.82   0.000     .1784891    .3223991
 cohort_1955 |   .2648229   .0362832     7.30   0.000     .1937091    .3359367
 cohort_1960 |   .1501138   .0376182     3.99   0.000     .0763835    .2238442
 cohort_1965 |   .0554877   .0374931     1.48   0.139    -.0179974    .1289729
 cohort_1970 |   .0586935   .0432742     1.36   0.175    -.0261224    .1435094
 cohort_1975 |  -.1164344   .0503192    -2.31   0.021    -.2150583   -.0178106
 cohort_1980 |  -.1083233   .0677891    -1.60   0.110    -.2411875    .0245409
 cohort_1985 |  -.3362995   .1353965    -2.48   0.013    -.6016719   -.0709272
       _cons |    1.32358   .0157086    84.26   0.000     1.292792    1.354369
------------------------------------------------------------------------------
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ie

Intrinsic estimator of APC effects                  No. of obs      =     56368
Optimization     : ML                               Residual df     =     56338
                                                    Scale parameter =         1
Deviance         =  73476.77903                     (1/df) Deviance =  1.304213
Pearson          =  56371.98762                     (1/df) Pearson  =  1.000603

Variance function: V(u) = u*(1-u/1)                 [Binomial]
```

```
Link function    : g(u) = ln(u/(1-u))             [Logit]

                                                  AIC             =  1.304584
Log likelihood   = -36738.38952                   BIC             = -542841.6
```

poldisc	Coef.	OIM Std. Err.	z	P>|z|	[95% Conf.	Interval]
age_20	-.172517	.0250815	-6.88	0.000	-.2216759	-.1233581
age_25	-.1532519	.0255727	-5.99	0.000	-.2033734	-.1031304
age_30	-.0010789	.0246556	-0.04	0.965	-.0494029	.0472451
age_35	-.0329901	.0262696	-1.26	0.209	-.0844775	.0184974
age_40	.1281739	.0287695	4.46	0.000	.0717866	.1845611
age_45	.1027357	.0284056	3.62	0.000	.0470618	.1584096
age_50	.0554154	.0299208	1.85	0.064	-.0032283	.1140591
age_55	.020388	.0299568	0.68	0.496	-.0383262	.0791022
age_60	.0366712	.0308171	1.19	0.234	-.0237293	.0970716
age_65	.0164536	.0311456	0.53	0.597	-.0445906	.0774978
period_1975	-.1101067	.0235908	-4.67	0.000	-.1563438	-.0638695
period_1980	.0583339	.0227277	2.57	0.010	.0137884	.1028793
period_1985	-.0117262	.0212633	-0.55	0.581	-.0534016	.0299491
period_1990	.0094429	.0203819	0.46	0.643	-.0305049	.0493908
period_1995	-.0886616	.0212679	-4.17	0.000	-.1303459	-.0469773
period_2000	.0649007	.0221888	2.92	0.003	.0214115	.1083899
period_2005	.0778169	.0269334	2.89	0.004	.0250285	.1306054
cohort_1910	-.2295234	.0808286	-2.84	0.005	-.3879445	-.0711024
cohort_1915	-.0755461	.0592748	-1.27	0.202	-.1917225	.0406303
cohort_1920	-.1292059	.0453202	-2.85	0.004	-.2180319	-.04038
cohort_1925	.0157687	.0395588	0.40	0.690	-.0617652	.0933025
cohort_1930	.1471496	.0373911	3.94	0.000	.0738643	.2204349
cohort_1935	.1663019	.0358552	4.64	0.000	.0960269	.2365768
cohort_1940	.2476279	.0349917	7.08	0.000	.1790454	.3162104
cohort_1945	.2978885	.0325514	9.15	0.000	.234089	.361688
cohort_1950	.2371181	.0306435	7.74	0.000	.1770579	.2971783
cohort_1955	.2280525	.0279268	8.17	0.000	.1733171	.282788
cohort_1960	.1475508	.0281285	5.25	0.000	.09242	.2026817
cohort_1965	.0422052	.0292742	1.44	0.149	-.0151712	.0995817
cohort_1970	-.0572063	.0314154	-1.82	0.069	-.1187793	.0043667
cohort_1975	-.1604655	.0369594	-4.34	0.000	-.2329046	-.0880263
cohort_1980	-.3978962	.0446434	-8.91	0.000	-.4853957	-.3103966
cohort_1985	-.4798199	.0901184	-5.32	0.000	-.6564486	-.3031911
_cons	.4488647	.0126473	35.49	0.000	.4240764	.473653

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uk

Intrinsic estimator of APC effects                No. of obs      =     58514
Optimization     : ML                             Residual df     =     58484
                                                  Scale parameter =         1
Deviance         =  72382.78864                   (1/df) Deviance =  1.237651
Pearson          =  58515.52589                   (1/df) Pearson  =  1.000539

Variance function: V(u) = u*(1-u/1)               [Binomial]
Link function    : g(u) = ln(u/(1-u))             [Logit]

                                                  AIC             =  1.238042
Log likelihood   = -36191.39432                   BIC             = -569597.3
```

poldisc	Coef.	OIM Std. Err.	z	P>|z|	[95% Conf.	Interval]
age_20	-.1935516	.0260555	-7.43	0.000	-.2446194	-.1424838
age_25	-.0579975	.0261108	-2.22	0.026	-.1091737	-.0068212
age_30	.0321542	.0252508	1.27	0.203	-.0173365	.0816448
age_35	-.0183448	.0260974	-0.70	0.482	-.0694948	.0328052
age_40	.0376631	.0283835	1.33	0.185	-.0179676	.0932938
age_45	.0259213	.0293677	0.88	0.377	-.0316383	.0834809
age_50	.0025123	.0305088	0.08	0.934	-.0572839	.0623084
age_55	.1077777	.030906	3.49	0.000	.047203	.1683524
age_60	.052809	.0300444	1.76	0.079	-.0060769	.1116949
age_65	.0110563	.0303558	0.36	0.716	-.0484399	.0705525
period_1975	.0134943	.023763	0.57	0.570	-.0330803	.060069
period_1980	-.0002677	.0225805	-0.01	0.991	-.0445246	.0439893
period_1985	.0701091	.0218553	3.21	0.001	.0272735	.1129448
period_1990	.2352022	.0212458	11.07	0.000	.1935613	.2768432
period_1995	-.1614721	.0209775	-7.70	0.000	-.2025871	-.120357
period_2000	-.2037608	.0218494	-9.33	0.000	-.2465848	-.1609369
period_2005	.0466949	.0289946	1.61	0.107	-.0101336	.1035233

cohort_1910	-.1403988	.0791642	-1.77	0.076	-.2955578	.0147601
cohort_1915	-.1237357	.0557169	-2.22	0.026	-.2329388	-.0145325
cohort_1920	-.017111	.0456422	-0.37	0.708	-.1065681	.072346
cohort_1925	.0081396	.0405145	0.20	0.841	-.0712673	.0875465
cohort_1930	.1297797	.0378833	3.43	0.001	.0555298	.2040297
cohort_1935	.1135257	.0356538	3.18	0.001	.0436455	.1834058
cohort_1940	.2107867	.03335	6.32	0.000	.145422	.2761515
cohort_1945	.3088266	.0324866	9.51	0.000	.245154	.3724992
cohort_1950	.258257	.0313905	8.23	0.000	.1967327	.3197812
cohort_1955	.1231923	.0291711	4.22	0.000	.066018	.1803665
cohort_1960	.0449667	.0291712	1.54	0.123	-.0122077	.1021411
cohort_1965	-.0965005	.0298261	-3.24	0.001	-.1549586	-.0380424
cohort_1970	-.1715852	.0322076	-5.33	0.000	-.234711	-.1084595
cohort_1975	-.1984526	.0401643	-4.94	0.000	-.2771732	-.1197319
cohort_1980	-.1666781	.0499267	-3.34	0.001	-.2645326	-.0688235
cohort_1985	-.2830124	.1010498	-2.80	0.005	-.4810663	-.0849585
_cons	.6944288	.0131172	52.94	0.000	.6687196	.7201381

A3-b Synthetic results provided by APC-IE

	(1) poldisc	(2) poldisc	(3) poldisc	(4) poldisc	(5) poldisc	(6) poldisc	(7) poldisc	(8) poldisc	(9) poldisc
age_20	0.0837	0.0420	-0.0261	0.0298	0.0649	-0.0806	0.0986	-0.173	-0.194
age_25	0.0608	0.0581	0.0603	0.120	0.144	0.0136	0.121	-0.153	-0.0580
age_30	0.00133	0.0361	0.0576	0.0120	0.0416	-0.0751	0.0863	-0.00108	0.0322
age_35	0.0646	0.00628	0.124	0.0353	0.0788	-0.00348	0.0424	-0.0330	-0.0183
age_40	0.00357	0.0149	-0.00990	0.0242	-0.00373	-0.0281	0.127	0.128	0.0377
age_45	-0.0103	0.0774	-0.0101	0.0714	0.0424	0.0372	0.0377	0.103	0.0259
age_50	-0.0231	0.0456	-0.0124	0.0242	0.0356	0.0664	-0.0475	0.0554	0.00251
age_55	-0.0558	-0.0622	-0.0747	-0.0360	0.0110	0.0264	-0.147	0.0204	0.108
age_60	-0.0236	-0.0929	-0.0383	-0.0522	-0.142	-0.0295	-0.117	0.0367	0.0528
age_65	-0.101	-0.125	-0.0704	-0.228	-0.272	0.0730	-0.201	0.0165	0.0111
period_1975	0.0215	-0.457	-0.263	-0.374	-0.225	0.0530	-0.362	-0.110	0.0135
period_1980	-0.217	-0.326	-0.0914	-0.0832	-0.434	0.00963	-0.377	0.0583	-0.000268
period_1985	-0.168	-0.122	-0.0901	0.00324	-0.486	-0.165	-0.127	-0.0117	0.0701
period_1990	-0.119	0.104	-0.0908	0.186	0.0776	0.116	0.186	0.00944	0.235
period_1995	0.168	0.285	-0.169	-0.0942	0.556	-0.100	0.131	-0.0887	-0.161
period_2000	-0.00704	0.104	-0.0197	0.0632	0.417	0.00537	0.233	0.0649	-0.204
period_2005	0.321	0.411	0.724	0.299	0.0950	0.0816	0.315	0.0778	0.0467
cohort_1910	-0.307	-0.324	-0.182	-0.244	-0.239	0.182	-0.432	-0.230	-0.140
cohort_1915	-0.257	-0.351	-0.131	-0.204	-0.130	-0.427	-0.187	-0.0755	-0.124
cohort_1920	-0.0473	-0.0600	-0.0336	0.0350	-0.0258	-0.200	-0.0876	-0.129	-0.0171
cohort_1925	0.0207	-0.0467	-0.0746	-0.160	-0.0627	-0.0894	-0.0374	0.0158	0.00814
cohort_1930	-0.0700	-0.0213	0.0378	-0.0434	-0.203	-0.138	0.0216	0.147	0.130
cohort_1935	0.0791	0.0769	0.110	0.165	-0.112	0.181	0.000844	0.166	0.114
cohort_1940	0.218	0.225	0.244	0.194	-0.00657	0.190	0.186	0.248	0.211
cohort_1945	0.320	0.283	0.328	0.250	0.175	0.363	0.317	0.298	0.309
cohort_1950	0.301	0.283	0.310	0.275	0.331	0.342	0.250	0.237	0.258
cohort_1955	0.232	0.232	0.303	0.219	0.334	0.353	0.265	0.228	0.123
cohort_1960	0.141	0.136	0.0881	0.230	0.196	0.264	0.150	0.148	0.0450
cohort_1965	-0.0326	0.0750	-0.00443	0.0851	0.0776	0.00401	0.0555	0.0422	-0.0965
cohort_1970	-0.0757	-0.0931	-0.0338	-0.0213	0.0683	-0.143	0.0587	-0.0572	-0.172
cohort_1975	-0.127	-0.0987	-0.00760	-0.201	-0.0241	-0.247	-0.116	-0.160	-0.198
cohort_1980	-0.270	-0.196	-0.124	-0.151	-0.115	-0.393	-0.108	-0.398	-0.167
cohort_1985	-0.124	-0.119	-0.829	-0.427	-0.264	-0.243	-0.336	-0.480	-0.283
_cons	0.719	0.340	1.306	1.571	0.773	0.991	1.324	0.449	0.694

A3-c Detailed results provided by HAPC

We thank Fred Pampel for the STATA syntax developed in his paper (Pampel and Hunter 2012) that we could adapt our case

```
fr
Mixed-effects logistic regression               Number of obs      =     58907
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     58907
                                                               avg =   58907.0
                                                               max =     58907
Integration points =   1                        Wald chi2(2)       =      8.11
Log likelihood = -36187.508                     Prob > chi2        =    0.0174
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .1020267   .0480574     2.12   0.034     .0078359    .1962175
        zag2 |  -.0187121   .0108907    -1.72   0.086    -.0400574    .0026332
       _cons |   .7548571   .0844765     8.94   0.000     .5892862     .920428
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .1322385   .0379975      .0752963    .2322429
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .2507522   .0725175      .1422582    .4419897
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   384.39   Prob > chi2 = 0.0000

*********************************************
be
Mixed-effects logistic regression               Number of obs      =     57004
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     57004
                                                               avg =   57004.0
                                                               max =     57004
Integration points =   1                        Wald chi2(2)       =     12.84
Log likelihood = -37487.341                     Prob > chi2        =    0.0016
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .0652236   .0530665     1.23   0.219    -.0387848    .1692321
        zag2 |  -.0338069   .0104224    -3.24   0.001    -.0542344   -.0133795
       _cons |   .3748489   .1087506     3.45   0.001     .1617015    .5879962
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .2299908   .0703341      .1262997    .4188115
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .2400692   .0715703      .1338361    .4306255
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =  1051.31   Prob > chi2 = 0.0000

*********************************************
nl
Mixed-effects logistic regression               Number of obs      =     59568
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     59568
                                                               avg =   59568.0
                                                               max =     59568
Integration points =   1                        Wald chi2(2)       =     13.60
Log likelihood = -29258.435                     Prob > chi2        =    0.0011
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .0680897   .0551567     1.23   0.217    -.0400155    .1761948
        zag2 |  -.0428469   .0132178    -3.24   0.001    -.0687533   -.0169405
       _cons |   1.377948   .1115518    12.35   0.000     1.159311    1.596586
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
```

```
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |    .255744   .0732369      .1458977    .4482934
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .2000396   .0683504      .1023938    .3908033
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   505.95   Prob > chi2 = 0.0000

*********************************************
de
Mixed-effects logistic regression               Number of obs      =     57639
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     57639
                                                               avg =   57639.0
                                                               max =     57639
Integration points =   1                        Wald chi2(2)       =     21.32
Log likelihood =  -24746.02                     Prob > chi2        =    0.0000
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |  -.0268978   .0315518    -0.85   0.394    -.0887381    .0349425
        zag2 |  -.0626181   .0139607    -4.49   0.000    -.0899805   -.0352557
       _cons |   1.637388   .0854762    19.16   0.000     1.469857    1.804918
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .1924117   .0553456       .109494    .3381213
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .1590284   .0364438      .1014867    .2491958
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   325.22   Prob > chi2 = 0.0000

*********************************************
it
Mixed-effects logistic regression               Number of obs      =     59797
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     59797
                                                               avg =   59797.0
                                                               max =     59797
Integration points =   1                        Wald chi2(2)       =     36.60
Log likelihood = -35622.133                     Prob > chi2        =    0.0000
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |  -.0576191   .0354764    -1.62   0.104    -.1271515    .0119134
        zag2 |  -.0631865   .0108143    -5.84   0.000    -.0843822   -.0419908
       _cons |   .8264229   .1453749     5.68   0.000     .5414935    1.111352
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .3640971   .0991105      .2135563    .6207574
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .1700707   .0426863      .1039884    .2781468
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =  2004.30   Prob > chi2 = 0.0000

*********************************************
lu
Mixed-effects logistic regression               Number of obs      =     25085
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     25085
                                                               avg =   25085.0
                                                               max =     25085
Integration points =   1                        Wald chi2(2)       =      4.29
Log likelihood = -14065.493                     Prob > chi2        =    0.1173
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .0446098   .0353273     1.26   0.207    -.0246304      .11385
        zag2 |  -.0317011   .0181769    -1.74   0.081    -.0673271    .0039249
       _cons |   1.006747    .072617    13.86   0.000     .8644204    1.149074
------------------------------------------------------------------------------
------------------------------------------------------------------------------
```

```
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .0859752   .0289708      .0444168    .1664177
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .2331601   .0493516      .1539875    .3530392
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   149.53   Prob > chi2 = 0.0000

*********************************************
dk
Mixed-effects logistic regression               Number of obs      =     57222
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     57222
                                                               avg =   57222.0
                                                               max =     57222
Integration points =   1                        Wald chi2(2)       =     12.55
Log likelihood = -27503.131                     Prob > chi2        =    0.0019
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |  -.0523745    .036253    -1.44   0.149    -.1234291      .01868
        zag2 |  -.0434017   .0130723    -3.32   0.001     -.069023   -.0177805
       _cons |   1.398368   .1027811    13.61   0.000     1.196921    1.599815
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .2449452   .0700763      .1398135    .4291299
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |    .158604   .0421268      .0942381    .2669329
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   644.76   Prob > chi2 = 0.0000

*********************************************
ie
Mixed-effects logistic regression               Number of obs      =     55371
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     55371
                                                               avg =   55371.0
                                                               max =     55371
Integration points =   1                        Wald chi2(2)       =     90.01
Log likelihood = -36090.663                     Prob > chi2        =    0.0000
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .1464881   .0246458     5.94   0.000     .0981833     .194793
        zag2 |  -.0792726   .0106489    -7.44   0.000     -.100144   -.0584012
       _cons |   .4880586   .0534476     9.13   0.000     .3833032    .5928141
------------------------------------------------------------------------------
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5) |   .0604507   .0200286      .0315777    .1157237
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5) |   .1764053   .0367619      .1172536    .2653978
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   199.45   Prob > chi2 = 0.0000

*********************************************
uk
Mixed-effects logistic regression               Number of obs      =     57498
Group variable: _all                            Number of groups   =         1
                                                Obs per group: min =     57498
                                                               avg =   57498.0
                                                               max =     57498
Integration points =   1                        Wald chi2(2)       =     42.36
Log likelihood = -35569.607                     Prob > chi2        =    0.0000
------------------------------------------------------------------------------
     poldisc |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         zag |   .1100132   .0246818     4.46   0.000     .0616378    .1583886
        zag2 |  -.0550215   .0107524    -5.12   0.000    -.0760958   -.0339472
       _cons |   .7222993   .0687724    10.50   0.000      .587508    .8570907
------------------------------------------------------------------------------
```

```
------------------------------------------------------------------------------
  Random-effects Parameters  |   Estimate   Std. Err.     [95% Conf. Interval]
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.ye5)  |   .1505477   .0420612      .0870681    .2603091
-----------------------------+------------------------------------------------
_all: Identity               |
                  sd(R.co5)  |   .1386182   .0293161      .0915802    .2098163
------------------------------------------------------------------------------
LR test vs. logistic regression:     chi2(2) =   465.45   Prob > chi2 = 0.0000

*********************************************
```

A3-c Synthetic results provided by HAPC

co5	cohbefr	cohbebe	cohbenl	cohbede	cohbeit	cohbelu	cohbedk	cohbeie	cohbeuk
1916	-.5437314	-.5561736	-.3542354	-.2473655	-.1927351	-.3492748	-.2969463	-.2856742	-.2146513
1921	-.3335615	-.3457143	-.2856336	-.0925064	-.0735711	-.1466027	-.1679851	-.259824	-.083012
1926	-.2342802	-.1996919	-.2562954	-.2096421	-.1571657	-.1488625	-.1385737	-.1161091	-.0714455
1931	-.2905835	-.1822897	-.1654716	-.0524953	-.2392847	-.1304453	-.0724729	.0095889	.0266801
1936	-.0766184	-.019916	-.0336737	.0689194	-.1324391	.1564955	-.0798193	.0391426	.0606641
1941	.1110336	.1462609	.0870777	.1268795	-.0472685	.1827483	.1249022	.1785045	.1365631
1946	.2094941	.2412185	.2334116	.1496783	.1285602	.2882922	.2190644	.2288069	.2431339
1951	.279948	.2276129	.2584307	.2323294	.2858087	.3196986	.2071811	.1793634	.2053553
1956	.2474161	.2485648	.2223348	.1396665	.2853175	.3040007	.1696344	.2049869	.1005695
1961	.2055959	.1496314	.1101792	.1867206	.1245687	.1987061	.1048791	.1241749	.0121101
1966	.0932328	.1580256	.0226924	.0274616	.0413082	-.0765561	.0559671	.0508352	-.1059229
1971	.1145528	.0470242	.0797156	-.1000102	.1014801	-.1285644	.0077885	-.0250697	-.1194688
1976	.0796793	.0601424	.0559735	-.1083068	-.0619947	-.2710211	-.0671089	-.0786897	-.1153156
1981	.1349462	.024673	.0229843	-.1246336	-.0630583	-.209196	-.0682859	-.2519874	-.0764353

	cohbsefr	cohbsebe	cohbsenl	cohbsede	cohbseit	cohbselu	cohbsedk	cohbseie	cohbseuk
stderr	.04752	.0573279	.0552483	.0502657	.051267	.0517762	.0496685	.032534	.0404745

Appendix 4 – Results of the OLS regression of the detrended cohort coefficients of political participation (poldidce) on the country-specific detrended size of birth cohorts (demodce) and the country-specific detrended real economic growth, in log-gdp (lgdpdce)

A first correlation matrix shows that no variable is cohort-trended, and correlations are relatively strong (but not too strongly see below)

```
. pwcorr poldidce  demodce lgdpdce c , star(.05)

             | poldidce  demodce  lgdpdce      coh
-------------+------------------------------------
    poldidce |   1.0000 
     demodce |   0.4763*  1.0000 
     lgdpdce |   0.4206*  0.4014*  1.0000 
         coh |  -0.0000   0.0000  -0.0000   1.0000 
```

The OLS regression shows the role of both cohort size and economic growth in cohort bumps

```
. reg poldidce demodce lgdpdce, robust

Linear regression                                      Number of obs =     108
                                                       F(  2,   105) =   44.79
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2896
                                                       Root MSE      =  .14101

------------------------------------------------------------------------------
             |               Robust
    poldidce |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     demodce |   .5807928   .1273595     4.56   0.000     .3282626    .8333231
     lgdpdce |   .5047088     .18752     2.69   0.008     .1328913    .8765263
       _cons |  -5.79e-11   .0135691    -0.00   1.000    -.0269051    .0269051
------------------------------------------------------------------------------
```

The variance inflation factor shows that, even if the explanatory variables are correlated, we have no problem of excessive collinearity

```
. vif

    Variable |       VIF       1/VIF  
-------------+----------------------
     demodce |      1.19    0.838884
     lgdpdce |      1.19    0.838884
-------------+----------------------
    Mean VIF |      1.19
```