

Postmaterialism as a Lifetime Learning Process

A Longitudinal Analysis of Intra-cohort Value Change in Western Europe*

Raul Tormos

Universitat Autònoma de Barcelona (UAB)

raul.tormos@uab.es

Research on value change and stability tends to underline the importance of generational factors. One good example is the theory of postmaterialism developed by Ronald Inglehart. Although Inglehart admits the presence of period shocks as a short-term force, he basically points to the relevance of generational effects. Formative experiences shape different age cohorts through their lifetime, and the values of society shift progressively due to the force of generational replacement. In his many publications he shows empirical evidence of wide and constant generational differences. However if we analyze contemporary time series which cover a wider period (Eurobarometer), we also find relevant changes inside each generation over time. Then it is possible to talk about an adult learning process in the field of postmaterialism. It is not just a matter of minor short-term period influences affecting the “normal” change due to generational replacement, but a systematic intra-cohort trend linked to the European economic prosperity of the last decades. Once we compare the contribution of generational replacement to the overall change in postmaterialism with the one of the period, we may find out that the latter could be even bigger than the former. The fact of postmaterialism showing less intra-cohort stability than it should according to Inglehart’s theory, can question the “socialization hypothesis” based on the formative experiences idea. The concept of generation itself could be adjusted to reflect the lifetime learning processes. I perform a longitudinal analysis of the Eurobarometer data, adding different economic system-level information from OECD.

Key words: Values, postmaterialism, age-period-cohort effects, lifetime learning.

* Paper to be presented at the *European Survey Research Association, Warsaw Conference 2009*. First draft. Please do not quote without author’s permission.

“The political values of West European publics are changing and generational replacement plays a major role contributing to this change.”

Paul Abramson and Ronald Inglehart (1992: 183)

Introduction

The study of values has placed a considerable amount of confidence in the impressionable years model of political learning. This model predicts fluctuations in political orientations during adolescent and young adult years, followed by a period of modest to strong crystallization, and then by a relative stability from thereon (Jennings, 2007). The main implications of this model are stability in political orientations and the emergence of generations and generation units. However, in the real world there is not only stability but also value change. Important researchers in the field of values such as Ronald Inglehart explain the change in values basically as a consequence of generational replacement. This means applying again the impressionable years framework of analysis. Change is caused mainly by the death of old generations carrying old values that are substituted progressively by young ones with new orientations. Is there any room in this scheme for individual value change over the life cycle? Are adults able to learn new values and attitudes to adapt to new contexts? Recent evidences point to the capacity to learn and change during the whole life period (Mishler and Rose 2007). Even people completely socialized under authoritarian regimes are able to change and adapt their views to the new democratic context.

The purpose of this paper is to test people’s capacity to learn and change their values over the lifetime. The field of values, in comparison with attitudes or opinions, has been traditionally one in which the hegemony of the impressionable years model has remained relatively unquestioned. As sociopsychological objects, attitudes and opinions are thought to be more on the surface and become more easily influenced by the context. On the contrary, values are considered to be deeply rooted in individual’s mind. But even values can change over time. I choose Inglehart’s theory of postmaterialism to study the amount of intra-cohort change in values, because it is a theory which gives a crucial role to generation effects. I confront two perspectives of analysis, the cultural theory based on the impressionable years model and the institutionalist theory that emphasizes adult learning. I finally assume a third point of view: the lifetime learning model. Generation effects are crucial, but people learn and change all over the life cycle, though probably following a declining function. In younger years there is more room for change than later on, but the capacity for change does not disappear.

Abramson and Inglehart (1986, 1987 and 1992) developed a method to test the amount of value change caused by generational replacement. In this paper I follow their method and use the same data expanding the period of observations. Nowadays it is possible to analyse a wider time series of the cross-section data Inglehart and his colleagues used. I assume that the best way to test intra-cohort stability of values is using panel data. However, the difficulty to find data of that sort, the availability of cross-section surveys,

and the possibility to replicate Inglehart and colleagues' work, led my final choice. Across many West European countries there has been a considerable amount of change in materialist/postmaterialist values in the period between 1970 and 1999. In general terms, the level of postmaterialism has clearly increased. The question is whether this change is attributable almost entirely to generational replacement, or if the increasing economic security experienced by all cohorts over this period has something to do with it. In other words, which is the contribution of intra-cohort value change to the increase in the level of postmaterialism compared to the effect of generational replacement?

In this paper I first define the theoretical framework of analysis which helps me build my hypotheses. Then I explain which data and methodology I use. I replicate Abramson and Inglehart studies (1986, 1987 and 1992) to prove with new data the effect of generational replacement on postmaterialist value change in comparison to intra-cohort change. I verify whether the series of postmaterialism with generational replacement and the counterfactuals without generational replacement are stationary or do follow some kind of trend. I study both series to find models that best fit them. Both series seemed to be influenced by exogenous variables: inflation rates and other economic and social factors. I define regression models with lagged dependent variables to try to explain the dynamics of postmaterialism with and without cohort replacement. The implications of the results lead me to give support to the lifetime learning model.

Models of political learning

The study of transitions to democracy and their consequences on attitudes has reopened a debate about the capacity of adult learning or relearning in political science. The discussion goes round the strength and durability of generational effects in political socialization, the adaptability of adults to political change, and the time needed for a relevant change to happen (Mishler and Rose 2007). This debate confronts two perspectives. On one side, the cultural theory basically follows the impressionable years model of political learning. It emphasizes the strength of socialization at an early age. Basic political attitudes are supposed to be deeply crystallized and change only slowly over wide periods of time. Generational differences are considered to be of crucial importance because each cohort is socialized under different social and economic conditions and comes to age at diverse historical epochs. The other side in confrontation is the institutional theory. This perspective emphasizes adult political experiences and adult "relearning" as a consequence of the current evaluation of the context. Although they do not deny the importance of early socialization, institutional theories consider that attitudes and behaviours are to a great extent adaptable. From this point of view adult life experiences play a larger role in adult opinion-formation. They predict generational differences to diminish with time, overwhelmed by contemporary shared experiences (Mishler and Rose 2007).

Cultural and institutional theories are not necessarily opposed, but they can be considered different components of a lifetime learning model. According to Mishler and Rose (2007), political lessons of childhood are reinforced, revised and replaced over time by later life experiences. I use this approach as a framework to analyse a particular case in this paper. From a lifetime learning perspective, the debate between cultural and institutional explanations finally reduces to the empirical question regarding the relative importance of early life socialization in comparison to later life experiences on political

attitudes and behaviours. In the case of the collapse of the Soviet Union, Mishler and Rose (2007) found that lifetime learning offers the most complete explanation and predicted a fast adaptation of Russian attitudes and behaviours to the new democratic reality.

Central to cultural theories of political learning is the concept of generation as the basic unit of socialization. Cohort effects can have the form of discrete historical differences or monotonic macrosocial transformations. In the first case, all generations in society may be socialized broadly into a common political culture, but particular historical episodes such as war or economic depression, separate idiosyncratically the cohort with this formative experience from the rest. The second type of generational differences are linked to broad social processes of progressive change such as modernization. Every new generation lives in a slightly different world as a consequence of this ongoing macrosocial transformation. The effects of these processes tend to be unidirectional. Progress may take place quicker or slower, but the direction of change is supposed to be the same. Generational differences resulting from these processes are continuous and monotonic, one good example of them being Inglehart's postmaterialism. On the contrary, cohort differences caused by a unique historical period tend to be discrete and unconnected.

Cultural theories forecast that initial differences between cohorts will remain unchanged as generations grow older. Early life socialization is considered to be more important than later life experiences in the formation adult attitudes and behaviour, following the idea of the "primacy principle" developed of by Searing, Wright and Rabinowitz (1976). In the same vein, the "structuring principle" (Searing, Schwartz and Lind 1973) postulates that attitudes learned early in life interpret and shape later life learning in a path-dependent process that reinforces early life socialization.

Institutional theories do not give a crucial role to the impressionable years and cohort effects. They consider that major institutional changes and events have similar contemporaneous effects on different generations (Mishler and Rose 2007). Therefore, should there be some sort of initial generational differences, they would tend to disappear as a consequence of the homogenising effect of the contemporaneous experiences. Institutional theories underline the effect of the current historical period and life-cycle experiences. Individual characteristics, especially economic interests, are more likely than generational membership to condition individual responses to contemporary experiences. As economic and social circumstances change in a predictable way as people age, and so do individual interests, these theories forecast that learning through experience would vary as well in a predictable way along the life cycle.

Lifetime learning models admit the importance of generation effects, but also recognize the possibility of intra-cohort change. Each generation remains influenced by what they live under their impressionable years, but adult socialization linked to life cycle processes or time-related change exert a substantial impact on current political orientations. Adults are exposed to different unanticipated political and economic experiences during their life. Some of these experiences require an equilibrium between values learnt in the past, and others demand the adoption and acceptance of new ones (Siegel 1989). Moreover, adults have to confront a number of roles which are different to those from their youth, and these new roles can lead to different directions. Early life

socialization may have not provided an adequate preparation to anticipate new situations without an additional learning (Siegel 1989). From a lifetime learning perspective, we could observe constant generational differences in attitudes as well as intra-cohort change due to period or age effects.

The propensity for individual change can vary depending on the nature of the variable to be explained. It should make a difference if our dependent variable is a value, an attitude or an opinion. Although sometimes these terms are used synonymously and there is not a unanimous consensus about their differences (Oskamp and Schultz 2005, Van Deth 1995), some important distinctions between them should be taken into account. Values, in comparison to attitudes and opinions, are less linked to concrete situations or objects, and refer to broader abstract concepts instead (Schwartz 2001). Following Oskamp and Schultz (2005), a value could be defined as an important life-goal or societal condition desired by a person and defined in abstract terms. And values, as sociopsychological phenomena, should be more stable than attitudes and opinions, because abstract goals tend to change less than specific situations, objects or actions. In addition, in the causal chain that leads to behaviour, values are supposed to be earlier than attitudes (Oskamp and Schultz 2005, Van Deth 1995). According to Rokeach (1979), values are central in a person's whole system of attitudes and opinions, that is they are resistant to change, and they influence many other opinions and attitudes. All these reasons could explain why the cultural point of view has prevailed in the study of values. Values are thought to be linked to early socialization, the impressionable years learning model and generation effects. Value theories like Inglehart's postmaterialism illustrate clearly that case.

Inglehart's theory of postmaterialism

The theory of materialist/postmaterialist value change developed by Ronald Inglehart (1971, 1977, 1990 and 1997) could be used to test some assumptions of the cultural, the institutional and the lifetime learning models. The two pillars of Inglehart's theory are the scarcity hypothesis, and the socialization hypothesis. Following the first one, people's priorities are thought to reflect their economic environment. Individuals attribute more value to things that are relatively scarce. This concept of scarcity is based on Maslow's hierarchy of needs. Human beings first attend the needs which are most urgent, and only when they are fulfilled, they care for others. Fundamental needs are physiologic, as well as linked to physical and economic security. Once these needs are satisfied, people try to attend other necessities which are less materialistic and more symbolic or expressive, such as social relations, quality of life or self-fulfilment. However, according to Inglehart, the values of people do not directly reflect their actual material security but their subjective perception of it. This perception is supposed to be strongly conditioned by pre-adult socialization, following the impressionable years' model of political learning. The socialization hypothesis establishes that people who experienced material deprivation and economic insecurity when they were young remain conditioned by those experiences through their life cycle. Even though their living conditions improve thereafter, they will continue to praise those material aspects which were scarce during their youth. In a similar way, people who experience material well-being during their impressionable years, do not focus only on attaining material needs because they take them for granted. Following the socialization hypothesis, Inglehart sustains that the diffusion of postmaterialist values does not take place

automatically. It happens in a gradual way, basically as a consequence of generational replacement. Old cohorts carrying predominantly materialist values are substituted by new and much more postmaterialist generations. As Inglehart states (1990), after a period of a drastic increase in economic and physical security, we would expect age group differences to continue, because they have lived different formative experiences. There would be a time lag between changes in economic environment and its political consequences, following the logic of cohort replacement. Therefore, it is cohort effects what really matters –through generational replacement, and not period effects.

The assumptions of this theory fit clearly the cultural model of learning. It represents a particular type of cultural socialization in which progressive change takes places as a consequence of a broad social process, namely modernization. Every new cohort experiences a slightly different context as a consequence of this ongoing macrosocial transformation. In this scheme, the final source of change in values is supposed to be economic development or material welfare of individuals and nations. Theory predicts that countries experiencing a long enough period of economic prosperity should increase their levels of postmaterialist values at the rhythm established by generational replacement. In these nations, which fit the profile of many EU countries, stable and monotonic generational differences in values may appear in response to the slightly different context each cohort has experienced in its formative years.

In their many empirical analysis, Inglehart and colleagues identified clear differences in the levels of postmaterialism between age groups in a series of cross-sections surveys. The younger the group the more postmaterialist values it had. An academic debate originated about if those differences were due to generation, life cycle or period effects. Most of the energies of Inglehart and his team focused on discarding life cycle effects, and they seemed to succeed. If age differences in materialist/postmaterialist values were caused by life cycle effects, the consequences for macrosocial change would have been negligible. In a situation of demographic stability, a perfect life cycle effect would have had a zero-sum impact in the overall level of postmaterialism. A value transformation with deep long-lasting effects on society should come from a progressive and sustained generational change. A potential life-cycle effect would have been the main enemy of postmaterialist theory, as it would have questioned its long-lasting effects in society. Inglehart (1990) provided evidences that showed no signs of an increase in materialist values when cohorts age –though he did not use the most suitable methodology to rule out the APC conundrum.

When it comes to the discussion about period effects the situation appears a bit blurry. In some occasions it seems that Inglehart considers period to have no impact in comparison to generation effects and cohort replacement. In other cases, he maintains that period effects are already included in his theory through the scarcity hypothesis. Although he finally admits the possibility of both generation and period effects operating together in materialist/postmaterialist values, he considers the latter to be of a second order. Period effects are thought to respond to short-term fluctuations in the economic environment. This point of view is probably the consequence of the period of observations he was studying at the beginning (1970-1984). When during a period of time the exogenous causal factor of materialist/postmaterialist values, namely economic environment, does not follow any particular trend (nor deterministic neither stochastic) but apparently random oscillations, aggregate change in postmaterialism would come almost entirely from generational replacement. Yet, what if the economic environment

is not experiencing fluctuations, but a consistent upward trend? If we are admitting both generation and period effects to happen, we would expect a change in values parallel to that economic trend, operated both by generational and period factors. However, Inglehart and colleagues seemed to focus only on generation effects and cohort replacement. Following this interest, they developed and applied a method to test the amount of value change caused by generational replacement. In this paper I reproduce their method with the same data, but expanding the period of observations. Repeating Abramson and Inglehart's studies (1986, 1987 and 1992) with new data will help me to test the effect of generational replacement on postmaterialist value change compared to intra-cohort change.

Data and methodology

The data source I use is the Eurobarometer Surveys (specifically the microdata from the Eurobarometer Trend File), a series of national surveys sponsored by the European Union (formerly European Community) which covers the period between 1970 and 1999. I address my attention to the same countries that Abramson and Inglehart analysed (1986, 1987 and 1992): Germany, Great Britain, the Netherlands, France, Belgium and Italy. For some years there is more than one survey per country. However I treat the data on a yearly basis combining the subsamples, both to reproduce Abramson-Inglehart's analyses and as a way to reduce sampling error.

The items used to measure value priorities are also those employed by Inglehart and his team. It is the short four-item version of the materialism/postmaterialism scale. There have been discussions about the convenience of this measure, and the superiority of the larger battery of indicators (Inglehart 1977). Unfortunately, the 12-items battery is only available in a few time points of the series, and its use would make it not comparable to Abramson-Inglehart analysis. In the four item scale respondents are asked to select what they believe their country's two top goals should be among the following four choices:

1. maintaining order in the nation;
2. giving the people more to say in important government decisions;
3. fighting rising prices;
4. protecting freedom of speech.

Respondents who select "maintaining order" and "fighting prices" are classified as materialists, and those who choose "giving people more say" and "freedom of speech" are classified as postmaterialists. The rest of combinations (one materialist and one postmaterialist response) are considered to be "mixed". For the aggregate data analysis of nations, years and cohorts, I also use the percentage difference index computed by subtracting the percentage of materialists from the percentage of postmaterialists. This measure is equivalent to a mean score and ranges from -100 (completely materialist) to 100 (fully postmaterialist).

Table 1 presents the distributions of value types together with the percentage difference index (PDI) for each of the six countries. In France, the Netherlands, Germany and Britain the percentage of materialists has clearly dropped at the same time that postmaterialists have risen. If we pay attention to the PDI—a quicker way to grasp

Table 1. Distribution of Materialist/Postmaterialist Values in Six West European Societies, 1970-1999

	Year of Survey																							
	1970	1971	1973	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1997	1999
France																								
Materialist	38,3	42,9	36,8	41,9	39,9	31,9	37,3	43,0	43,9	38,3	36,9	37,3	34,2	35,0	30,5	27,9	24,6	26,8	26,8	28,3	28,7	25,4	24,9	25,8
Mixed	50,6	46,4	52,7	45,9	49,0	52,1	48,2	45,5	47,2	49,4	50,8	51,7	53,3	52,4	53,6	53,8	53,6	55,2	54,0	52,9	52,8	55,6	52,7	52,9
Postmaterialist	11,1	10,7	10,5	12,2	11,1	16,0	14,5	11,5	8,9	12,3	12,3	11,0	12,6	12,6	15,9	18,3	21,8	17,9	19,2	18,8	18,5	19,0	22,4	21,3
Total percent	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
(Number)	1966	2013	2144	1302	2173	2057	937	1878	1909	1872	1943	1932	1956	1919	1889	1931	3892	2911	2938	2886	2952	956	954	968
Score on index	-27,3	-32,2	-26,3	-29,7	-28,7	-15,9	-22,9	-31,6	-34,9	-26,0	-24,6	-26,3	-21,6	-22,3	-14,5	-9,7	-2,8	-8,9	-7,6	-9,5	-10,2	-6,4	-2,5	-4,5
Belgium																								
Materialist	32,6	30,2	25,9	30,6	32,7	30,5	33,0	37,6	36,6	41,1	45,3	36,9	46,1	41,6	36,3	32,9	27,4	29,1	28,9	31,7	32,4	35,1	30,0	33,1
Mixed	53,2	54,8	60,8	56,3	56,7	56,9	52,1	52,3	53,7	49,2	46,2	53,8	45,8	45,4	50,3	52,7	55,3	54,3	53,4	53,9	55,1	52,5	58,6	54,7
Postmaterialist	14,2	15,0	13,3	13,1	10,6	12,6	14,9	10,0	9,7	9,7	8,4	9,3	8,1	13,0	13,4	14,4	17,2	16,6	17,7	14,4	12,5	12,4	11,4	12,3
Total percent	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
(Number)	1239	1353	1245	1012	1783	1835	869	1791	1708	1854	1923	1952	1914	1883	1850	1866	3696	2793	2850	2857	2831	958	933	956
Score on index	-18,4	-15,3	-12,6	-17,5	-22,1	-17,9	-18,1	-27,6	-26,9	-31,4	-36,9	-27,6	-38,0	-28,6	-22,8	-18,5	-10,2	-12,5	-11,2	-17,3	-19,9	-22,7	-18,6	-20,8
Netherlands																								
Materialist	29,3	35,8	30,4	31,4	32,5	26,5	29,1	36,4	33,3	29,8	23,7	25,8	18,4	17,5	18,6	16,0	13,9	15,8	15,4	15,4	18,9	16,6	11,9	14,2
Mixed	52,5	55,1	57,8	54,2	50,6	49,9	52,2	49,8	52,3	53,4	56,6	55,9	56,9	59,9	57,4	58,5	57,9	59,0	57,4	58,7	59,5	63,1	62,5	64,0
Postmaterialist	18,2	9,1	11,8	14,4	16,9	23,6	18,7	13,8	14,5	16,8	19,8	18,3	24,7	22,5	23,9	25,5	28,2	25,2	27,3	25,8	21,5	20,2	25,6	21,8
Total percent	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
(Number)	1388	1607	1406	1058	1891	1997	1047	2019	1914	1979	1990	1961	1975	1950	1883	1882	3881	3047	2941	2918	2919	1020	1008	982
Score on index	-11,1	-26,7	-18,7	-16,9	-15,6	-2,9	-10,4	-22,6	-18,8	-13,0	-3,9	-7,5	6,3	5,0	5,3	9,5	14,3	9,3	11,9	10,4	2,6	3,6	13,8	7,6
Germany																								
Materialist	46,2	44,6	44,8	40,7	42,0	38,0	36,2	41,9	44,0	35,1	27,1	23,5	24,5	17,8	18,0	19,0	18,9	20,8	23,9	29,9	29,8	30,6	23,9	25,3
Mixed	43,3	45,8	47,3	47,8	49,5	51,1	52,0	47,8	48,6	51,1	54,8	57,3	56,5	64,9	59,7	57,7	61,0	60,1	58,5	56,7	58,5	53,8	62,8	59,6
Postmaterialist	10,5	9,7	7,9	11,5	8,5	10,9	11,8	10,3	7,4	13,8	18,1	19,2	19,0	17,2	22,3	23,3	20,0	19,2	17,6	13,4	11,7	15,6	13,3	15,0
Total percent	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
(Number)	1865	1923	1953	891	1783	1841	948	1868	1739	1948	1875	1792	1852	1906	1807	1924	4276	2988	3030	2992	3046	991	980	992
Score on index	-35,7	-34,9	-36,9	-29,2	-33,5	-27,1	-24,4	-31,5	-36,5	-21,3	-9,0	-4,3	-5,5	-0,6	4,3	4,3	1,1	-1,6	-6,3	-16,4	-18,1	-15,0	-10,7	-10,3
Italy																								
Materialist	36,5	47,1	42,0	40,1	47,3	44,7	47,0	55,7	54,8	46,0	51,4	43,0	44,1	39,1	34,4	29,8	29,4	27,6	28,7	27,9	25,5	23,3	29,2	37,5
Mixed	50,7	45,1	49,7	48,3	43,7	45,9	43,3	39,6	39,9	46,5	43,5	48,5	47,6	51,5	53,8	57,9	57,9	60,3	59,4	61,5	63,1	59,1	61,0	54,7
Postmaterialist	12,8	7,8	8,3	11,7	9,1	9,4	9,6	4,7	5,3	7,5	5,2	8,5	8,3	9,5	11,8	12,3	12,7	12,2	11,9	10,6	11,4	17,6	9,8	7,9
Total percent	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
(Number)	1693	1917	1899	1024	2101	2123	1130	2157	2193	2031	2013	2098	2102	2133	1982	2024	3976	3052	3042	3032	2964	1025	963	957
Score on index	-23,6	-39,2	-33,7	-28,4	-38,2	-35,3	-37,4	-51,0	-49,4	-38,5	-46,2	-34,5	-35,7	-29,6	-22,6	-17,6	-16,7	-15,4	-16,8	-17,3	-14,2	-5,7	-19,4	-29,6
Britain																								
Materialist			30,8	36,3	43,5	32,7	24,5	36,1	31,7	23,2	25,6	25,8	26,2	23,0	20,0	21,1	18,4	23,2	22,5	23,1	24,7	19,5	21,9	23,2
Mixed			61,4	56,0	52,1	59,3	63,3	54,6	60,1	63,0	61,9	57,7	59,3	63,5	64,2	59,3	62,5	59,1	60,1	60,0	61,1	64,8	62,3	62,5
Postmaterialist			7,8	7,7	4,4	7,9	12,2	9,3	8,1	13,8	12,5	16,6	14,5	13,5	15,8	19,6	19,1	17,7	17,4	16,9	14,2	15,7	15,8	14,3
Total percent			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
(Number)			1916	1272	2610	2620	1338	2735	2602	2441	2464	2578	2632	2540	2452	2501	4840	3475	3724	3712	3728	1254	1242	1220
Score on index			-23,0	-28,6	-39,2	-24,8	-12,3	-26,8	-23,6	-9,4	-13,1	-9,2	-11,7	-9,5	-4,2	-1,5	0,7	-5,4	-5,2	-6,3	-10,6	-3,8	-6,1	-8,9

Source: Eurobarometer trend file.

* It has been applied the "wnation" weighting factor to the "nation2" variable. However, the number of cases is the actual number of respondents who received a score on the value index.

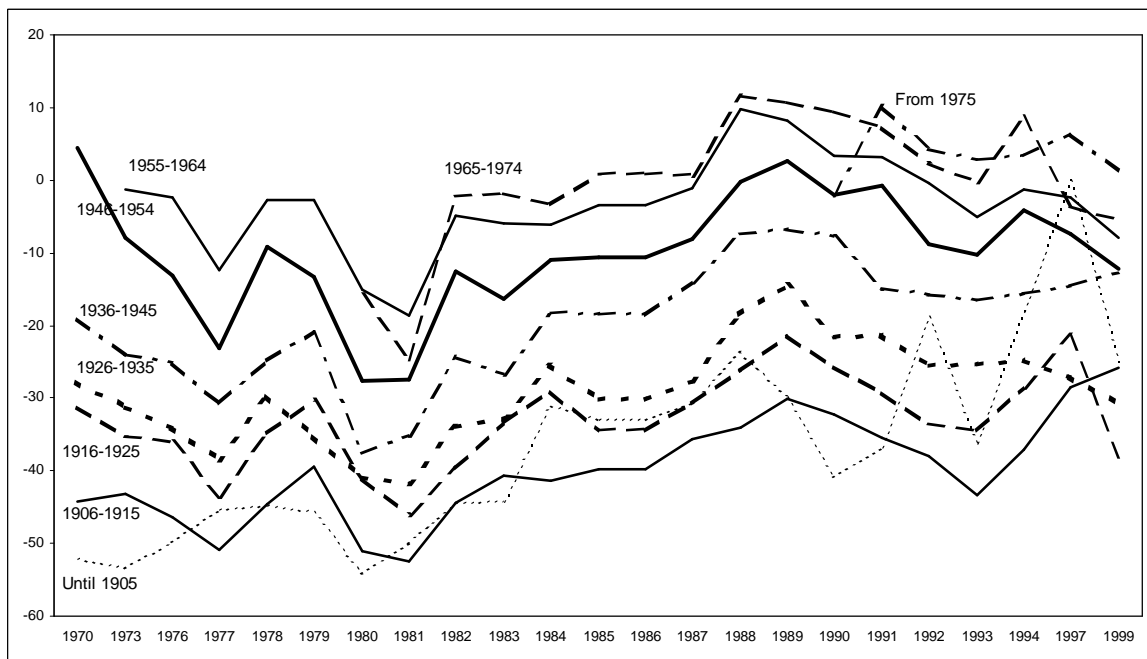
** Percentage of postmaterialist minus percentage of materialists.

the net effect of changes in value types, in Italy there has been an increase since the beginning of the eighties, although at the end of the series it has suffered a sharp decline. Belgium is a case with no clear trend in materialist/postmaterialist values.

A crucial part of Inglehart's analysis is defining generational groups to explore their differences in values over time. I establish nine cohorts following his classification, with only a slight variation¹. Moreover, Inglehart combines the samples of the six countries to increase the number of cases per cohort and year. He argues that doing so the reliability of the analysis is improved. I follow his procedure applying the European weighting factor when the six national samples are taken together, to adjust the country samples to the real proportions of the population. Table 2 shows the PDI score of each cohort over the period between 1970 and 1999. Table 3 indicates the percentage of people in each cohort with respect to the total year sample. It can be seen how older generations decrease in number as time passes.

Figure 1 represents graphically the evolution of each generation's PDI score over the thirty year period that goes from 1970 to 1999. We can observe clear and monotonic generational differences confirming the cohort effects predicted by the theory: the younger the generation the higher the level of postmaterialism. And these cohort differences remain quite constant over time. The figure also indicates a certain trend by which each cohort shows increasing levels of postmaterialist values with time, after the traumatic period of economic crisis of the seventies and the beginning of the eighties. Therefore, the final picture seems one in which there are constant generational differences coexisting with intra-cohort change.

Figure 1. *Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries across Generations, 1970-1999.*



Source: Eurobarometer surveys.

¹ In the Eurobarometer Trend File the variable age in years is not included in the first surveys of the period. There is only age groups to match Inglehart's generations. That is the reason why there is a slight one-year mismatch between Inglehart's cohorts and mines.

Table 2. Percentage of Postmaterialists minus Percentage of Materialists in Each Cohort in a Combined sample of Six European Countries, 1970-1999.

	1970	1973	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1997	1999
Until 1905	-52	-53	-50	-45	-45	-46	-54	-50	-44	-44	-31	-33	-33	-31	-24	-30	-41	-37	-19	-36	-18	0	-25
1906-1915	-44	-43	-46	-51	-45	-39	-51	-53	-44	-41	-41	-40	-40	-36	-34	-30	-32	-36	-38	-43	-37	-28	-26
1916-1925	-31	-35	-36	-44	-35	-30	-41	-46	-40	-33	-29	-34	-34	-31	-26	-21	-26	-29	-34	-34	-29	-21	-38
1926-1935	-28	-31	-34	-38	-30	-35	-41	-42	-34	-33	-25	-30	-30	-28	-19	-14	-22	-21	-26	-25	-25	-27	-31
1936-1945	-19	-24	-25	-31	-25	-21	-38	-35	-24	-27	-18	-18	-18	-14	-7	-7	-8	-15	-16	-17	-16	-15	-13
1946-1954	4	-8	-13	-23	-9	-13	-28	-27	-13	-16	-11	-11	-11	-8	0	3	-2	-1	-9	-10	-4	-7	-12
1955-1964		-1	-2	-12	-3	-3	-15	-19	-5	-6	-6	-3	-3	-1	10	8	3	3	0	-5	-1	-2	-8
1965-1974							-16	-25	-2	-2	-3	1	1	1	12	11	9	7	2	0	9	-4	-5
From 1975																	-2	10	4	3	3	6	1

Source: Eurobarometer Trend File.

Table 3. Percentage of Population in Each Cohort in a Combined Sample of Six European Countries, 1970-1999.

	1970	1973	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1997	1999
Until 1905	17	10	8	7	6	5	5	4	3	3	2	2	2	1	1	1	1	0	0	0	0	0	0
1906-1915	15	18	14	15	14	14	14	13	12	11	11	9	8	7	6	5	5	4	3	3	3	1	1
1916-1925	14	13	13	13	13	13	12	13	13	13	12	14	13	13	13	13	11	11	10	10	9	6	6
1926-1935	18	16	16	16	16	16	15	14	14	14	13	14	13	14	14	14	15	14	14	14	13	13	13
1936-1945	18	18	17	18	17	17	16	16	16	16	16	14	15	15	15	15	15	15	15	15	14	16	14
1946-1954	18	17	17	17	17	16	17	17	17	17	17	16	16	16	15	15	15	15	14	15	15	14	14
1955-1964		7	13	15	17	19	20	20	19	19	18	20	19	19	18	18	18	17	18	17	17	19	17
1965-1974							1	3	6	8	11	12	14	16	18	20	20	20	20	20	19	20	20
From 1975																	1	3	5	7	9	12	15

Source: Eurobarometer Trend File.

From a simple visual observation of Figure 1 it would be plausible to discard the stricter version of the institutional model of learning applied to materialist/posmaterialist values. Generational differences do not disappear as a result of the homogenising effect of the period. And a similar conclusion would be appropriate to the purest version of the cultural model of learning: it is quite likely that the observed intra-cohort change would not be attributable only to sampling error. Therefore, the lifetime learning model begins to win support. Cohort effects seem to define the starting point of each generation and create a constant gap between those generations along the period. However, generations are not immune to the changing context. They experience transformations to adapt themselves to the historical period.

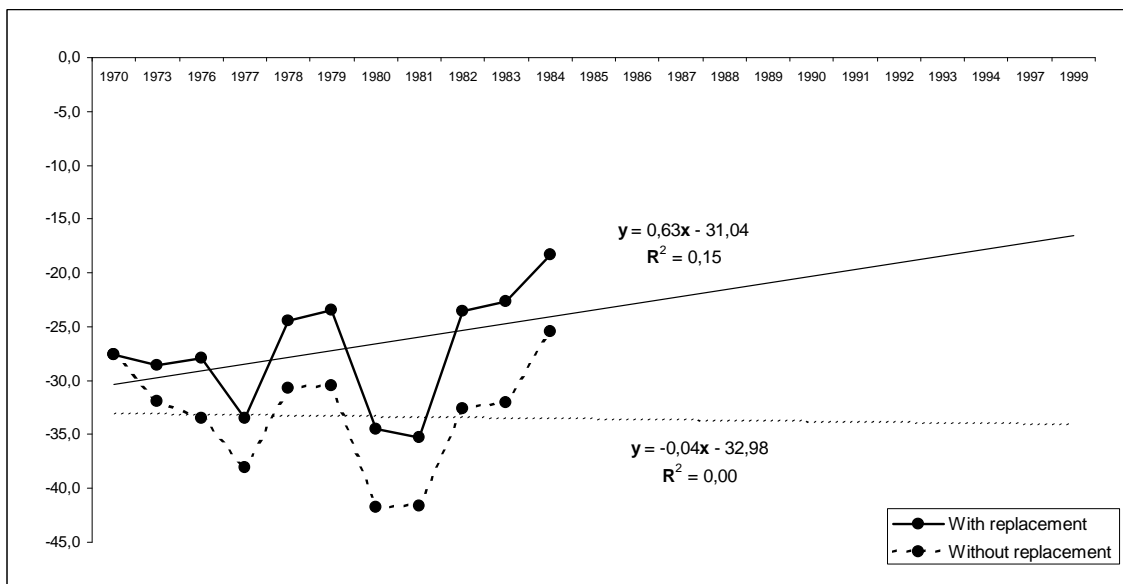
After this preliminary analysis, I want to define more precisely the contribution of cohort effects by means of generational replacement to the overall change in values in comparison to intra-cohort value change. To do so, I follow Abramson-Inglehart's procedure that can be accounted in a series of articles (1986, 1987 and 1992). The method they applied to determine the effect of generational replacement on materialist/postmaterialist values consists in the creation of a counterfactual. They algebraically generate a series of postmaterialism of a hypothetical population in which no generational replacement takes place. This series is used as a baseline for comparison with the actual population which follows the normal demographic replacement rules. The procedure used to create this simulated society without cohort replacement is to remove new generations from the calculation. Then, the cohorts in the first observation of the period (1970) are considered to be immortals, and their members remain constant all over the period (1970-1999). In the following surveys, the postmaterialism index in each cohort is then multiplied by the number of surveyed people that originally constituted that cohort in 1970. We sum up these products and divide them by the total number of cases. Following this procedure it is possible to obtain a population in which the effect of generational replacement has been removed. This counterfactual can then be compared with the actual values of the population. The difference between the results of the actual series of the postmaterialism index and the simulated ones shows the effect of generational replacement. According to Abramson and Inglehart (1986), this is an important task, since replacement is a major force promoting value change.

I introduce some adjustments into the original procedure, as I am analysing a wider time series. Older cohort groups are affected by mortality during the period of observations (see Table 3) and this can alter the aggregate results of the series without generational replacement in two directions. Sampling error will be higher in these groups because they will decrease in number, and differential mortality rates will overrepresent postmaterialist individuals (as they have higher social status and usually live longer). Therefore, I define four different versions of postmaterialism without cohort replacement, removing generations from the calculation when they represent less than a certain percentage among the overall population. Then I verify whether the series of postmaterialism with generational replacement and its counterfactuals are stationary or do follow some kind of trend. I try to adjust models that fit those series. I analyze one exogenous variables which is thought to influence postmaterialist values. And finally I define a set of regression models with lagged dependent variables to explain the evolution of postmaterialist values with and without cohort replacement.

Results

Figure 2 presents the first time series that Abramson and Inglehart (1986) analysed using their counterfactual procedure. The period of observations ranges from 1970 to 1984. The solid line indicates the series with generational replacement, and the dotted line the series without replacement. The two lines start from the same point in 1970, but they separate from each other when new cohorts enter the series with replacement pushing it upwards. Both lines seemed to suffer in a similar way the ups and downs created by the troublesome economic situation and high inflation rates of that epoch. However at the end of the period, we can appreciate an overall increase in the level of postmaterialism in the series with cohort replacement. This is particularly relevant if we compare it to its counterfactual without generational replacement that presents no improvement in its aggregate level.

Figure 2. *Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1984.*

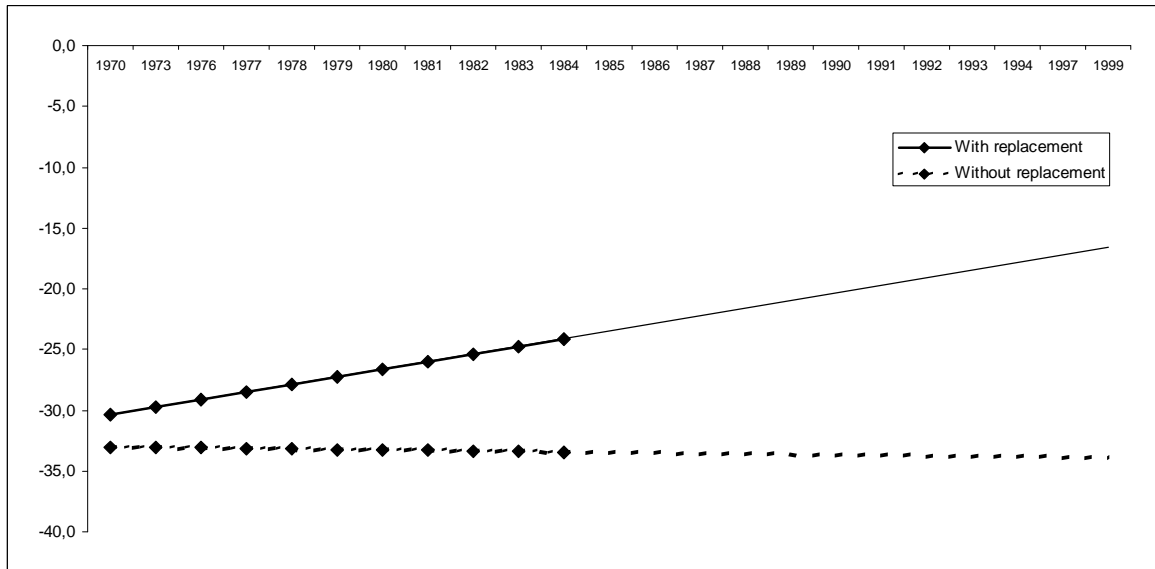


Source: Eurobarometer surveys.

If we apply a simple OLS regression model with a deterministic trend to both series in order to explore their potential increase with time, we can confirm the differences commented earlier. The passage of time explains 15% of the variance in the series with replacement, and the level of postmaterialists increases by 0.63 every year. In contrast, no signs of trend appear in the series without replacement, but local level oscillations. Figure 3 shows a graphic representation of the those regression models.

According to these data, Abramson and Inglehart concluded that generational replacement played a major role in the final growth of postmaterialist values during this period. They argued that even in a period of economic crisis generational replacement would push upwards postmaterialist values, as it represents the major force of value change. However, this period of observations, precisely because of its exceptionality, would not be the best one to test generational replacement against period effects.

Figure 3. *Percentage of Postmaterialists minus Percentage of Materialists Predicted by the Model with Replacement and the Model without Replacement, 1970-1984.*



Source: Eurobarometer surveys.

If we expand the observations to cover the period between 1970 and 1999 we find a much more different picture. Across these six West European countries there has been a considerable amount of change in materialist/postmaterialist values over the period. In 1970 the PDI score was -27.6 points, a situation in which materialist individuals clearly outnumbered postmaterialist ones. Thirty years later, the index reached the value of -12.3, indicating a reduction in the number of materialists and the growth of postmaterialists. In general terms, the level of postmaterialism clearly increased. The question is whether this change is attributable almost entirely to generational replacement, or if the increasing economic security experienced by all cohorts over this period has something to do. In other words, which is the contribution of intra-cohort value change to the increase in the level of postmaterialism compared to the effect of generational replacement?

As said earlier, I do not reproduce exactly Abramson-Inglehart's procedure as I am taking into account a longer period of observations and this will have consequences in older cohorts. These generations would have diminished in number and their scores in the value scale would be affected. It is documented (1987) that differential death rates can lead to problems in tracking cohorts when they reach old age since postmaterialists (who have higher levels of education and income) tend to live longer than materialists. As their social composition changes, older cohorts can become more postmaterialist. There are also problems regarding sampling error if subsamples are too small. To correct for these factors I introduce some adjustments into the original procedure. I establish four different versions of postmaterialism without cohort replacement, removing generations from the calculation when they reach less than a certain percentage among the total population. The first series without replacement 'type a' or 'PDI_a', is the most implausible of all. It treats all generations as if they were immortals no matter how scarce they are. This clearly overstates older and less representative cohorts. The following versions of postmaterialism without replacement try to correct by the real weight of generation groups when they reach lower quantities. Postmaterialism without replacement 'type b' remove cohorts which represent less than 2% in the overall sample of that year. Being that a generous criterion, series without

replacement ‘type c’ drops generations under 5%, and series without replacement ‘type d’ under 10%.

First of all, I want to test whether any of the series is stationary, especially the counterfactuals without generational replacement. If that was the case, the capacity of adult learning in the field of values would be in question. Table 4 provides the results of the Augmented Dickey-Fuller test. The null hypothesis is that the series have a unit root and are stationary in levels. None of them appear to be stationary, not even the most illusory one –without generational replacement ‘type a’. How can we describe then the evolution of those series over the period of observations? Figures 4 to 7 represent graphically the series of postmaterialist values with generational replacement (the solid line) and the several versions of postmaterialism without replacement (the dotted lines). It seems quite clear that the original series Abramson and Inglehart (1986) studied were anomalous with respect to the rest of period. From a visual observation of the data, it looks like after 1981 there is a trend in all series towards increasing levels of postmaterialist values. Moreover, all series without generational replacement progress quite similarly to the real series with replacement. This means that once we discount the undoubted effect of generational replacement, postmaterialist values continue to grow. There seems to be a significant amount of change due to intra-cohort adaptation to the context. If the exogenous variables defining this context are following a trend, so does postmaterialism. And even the less realistic counterfactual (without replacement ‘type a’) seems to progress in parallel to the actual series.

Table 4. Results of the augmented Dickey-Fuller test statistic of the PDI series, 1970-1999.

	t	Prob.*
with replacement	-1.252176	0.6376
without replacement (a)	-1.573679	0.4829
without replacement (b)	-1.437416	0.5502
without replacement (c)	-1.371625	0.5821
without replacement (d)	-1.369563	0.5831

Null Hypothesis: the variable has a unit root

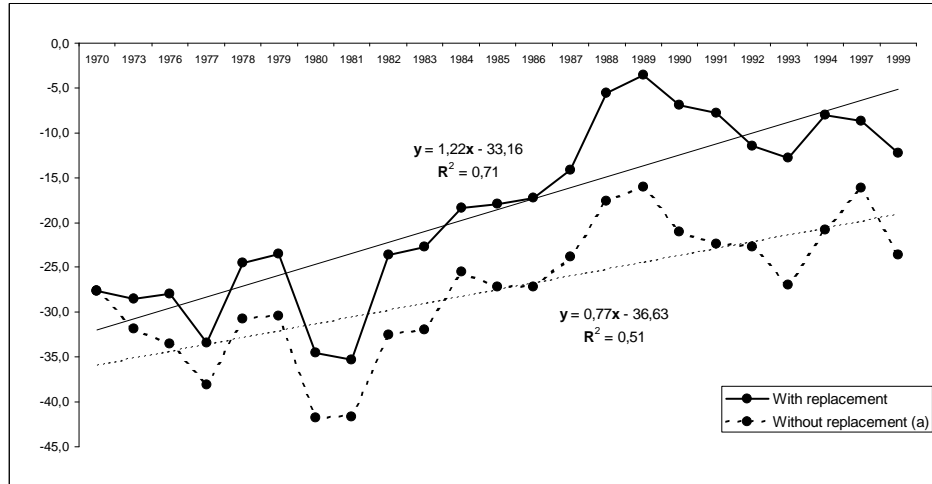
Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=8)

*MacKinnon (1996) one-sided p-values.

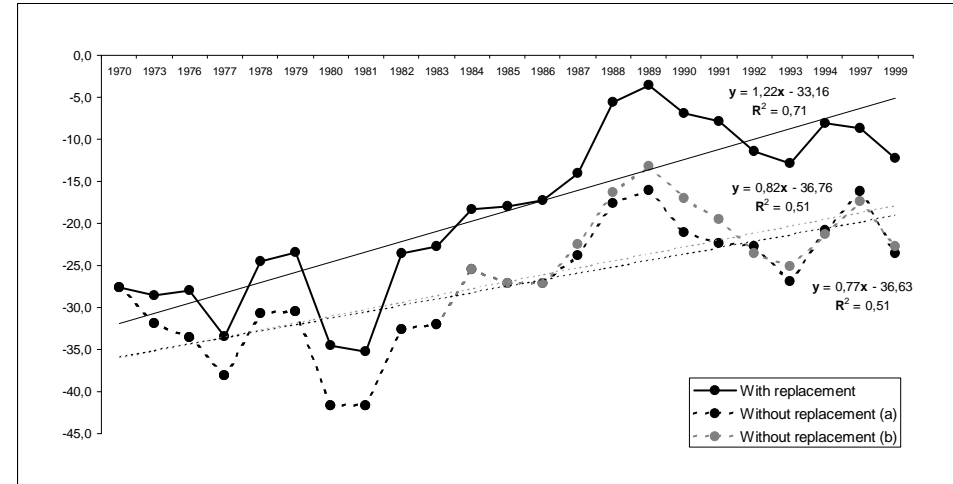
My second purpose is to define OLS regression models that best describe the series of postmaterialism, and therefore I perform a set of trials. The first of these trials considers all of the series to be predicted just by a deterministic trend (and an intercept). Although these are imperfect models as the residuals appear to be autocorrelated and Durbin-Watson statistics indicates serial correlation, they are quite helpful as a first approach. Figures 4 to 7 include the equations of these models. In all cases the trend has as strong and relevant impact. However the slope of the models without generational replacement is less steep than that of the series with replacement. This means that the gap between the two will increase with time. Postmaterialism with generational replacement grows at a speed of 1.22 points per year, while counterfactual ‘type a’ does

Figure 4. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



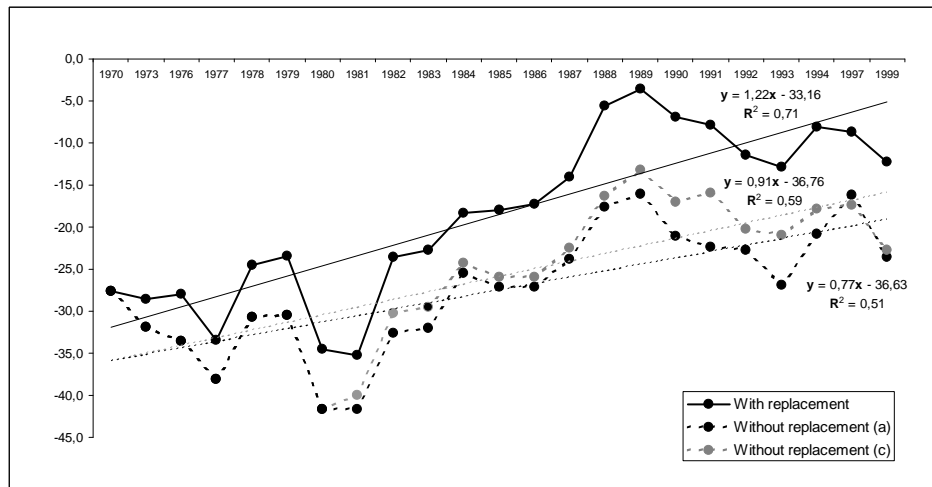
Source: Eurobarometer surveys.

Figure 5. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



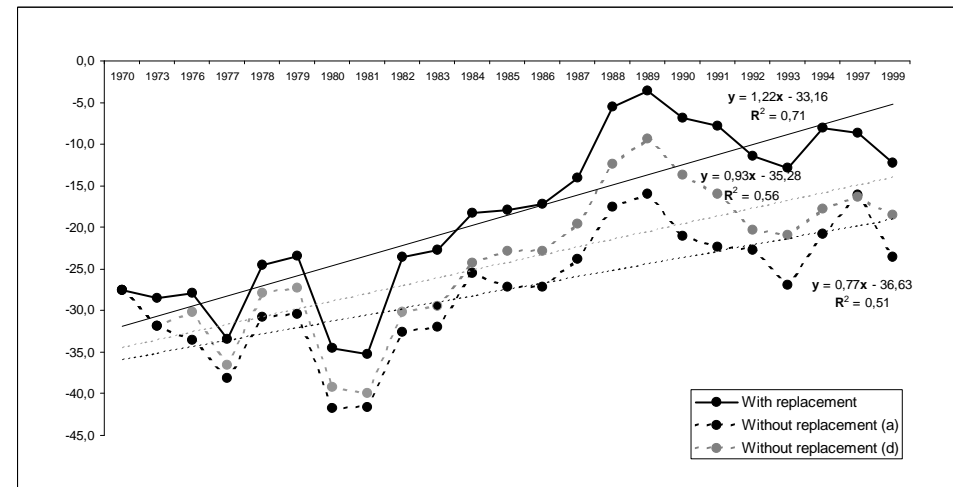
Source: Eurobarometer surveys.

Figure 6. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



Source: Eurobarometer surveys.

Figure 7. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



Source: Eurobarometer surveys.

it at 0.77, 'type b' at 0.82, 'type c' at 0.91, and 'type d' at 0.93. The series without cohort replacement that have removed older generations resemble much more to the actual series with replacement. This fact can also be asserted by looking at the R-squared values. All that can not erode the fact that both postmaterialism with replacement and all its counterfactuals evolve quite similarly, as if they were cointegrated and having a common exogenous factor.

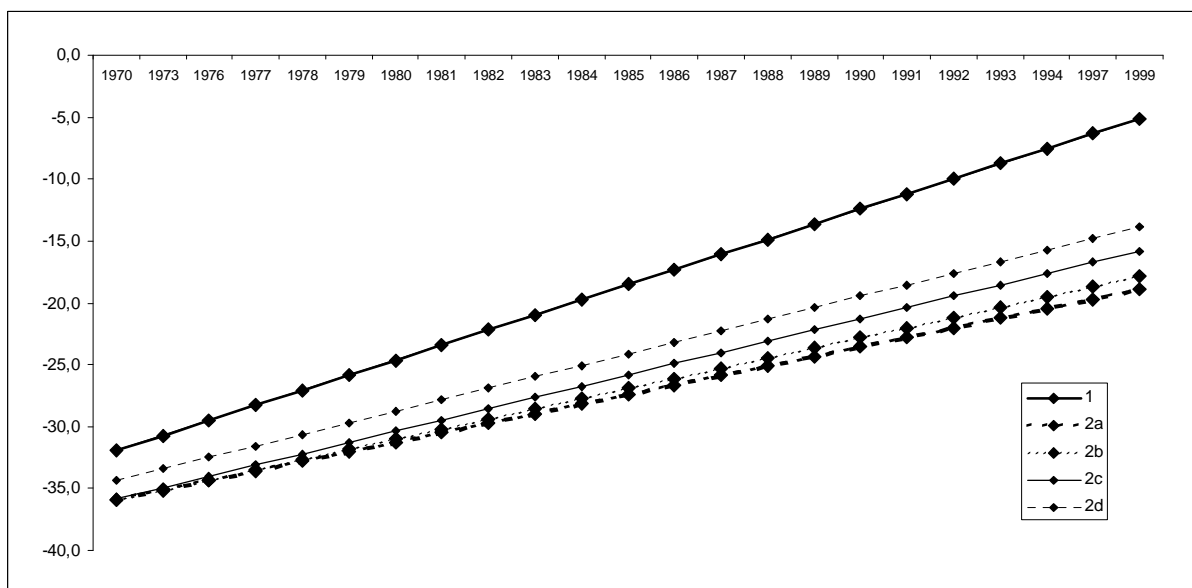
I use these OLS regression models to estimate the effect of the period against that of cohort replacement. I set the expected values of the counterfactual models without generational replacement (models 2a, 2b, 2c and 2d) as a baseline for comparison against the model with generational replacement (model 1) to see how they differ. Table 5 presents those expected values and Figure 8 shows its visual representation.

Table 5. PDI Scores Predicted by the Models with and without Replacement, 1970-1999

	Model 1 with repl.	Model 2a without repl.	Model 2b without repl.	Model 2c without repl.	Model 2d without repl.
1970	-31.9	-35.9	-35.9	-35.9	-34.4
1973	-30.7	-35.1	-35.1	-34.9	-33.4
1976	-29.5	-34.3	-34.3	-34.0	-32.5
1977	-28.3	-33.6	-33.5	-33.1	-31.6
1978	-27.1	-32.8	-32.7	-32.2	-30.6
1979	-25.8	-32.0	-31.8	-31.3	-29.7
1980	-24.6	-31.2	-31.0	-30.4	-28.8
1981	-23.4	-30.5	-30.2	-29.5	-27.8
1982	-22.2	-29.7	-29.4	-28.6	-26.9
1983	-21.0	-28.9	-28.6	-27.7	-26.0
1984	-19.7	-28.2	-27.7	-26.8	-25.1
1985	-18.5	-27.4	-26.9	-25.8	-24.1
1986	-17.3	-26.6	-26.1	-24.9	-23.2
1987	-16.1	-25.9	-25.3	-24.0	-22.3
1988	-14.9	-25.1	-24.5	-23.1	-21.3
1989	-13.6	-24.3	-23.6	-22.2	-20.4
1990	-12.4	-23.5	-22.8	-21.3	-19.5
1991	-11.2	-22.8	-22.0	-20.4	-18.5
1992	-10.0	-22.0	-21.2	-19.5	-17.6
1993	-8.8	-21.2	-20.4	-18.6	-16.7
1994	-7.5	-20.5	-19.5	-17.7	-15.8
1997	-6.3	-19.7	-18.7	-16.7	-14.8
1999	-5.1	-18.9	-17.9	-15.8	-13.9
Dif. (1999-70)	26.8	16.9	18.0	20.0	20.5
Intra-cohort change		63.1%	67.2%	74.6%	76.2%

To see how each series changes over the period of observations, we can subtract the predicted value at the end of the series from that at the beginning. In the model with generational replacement we can observe an increase in the level of postmaterialism of 26.8 points. The growth in the levels of the counterfactual series is not as intense as in the actual one, but is remarkable anyway. It is almost 17 points increase in counterfactual 'type a', 18 in 'type b', 20 in 'type c' and 20.5 in 'type d'. We can consider the increase in the series with replacement as being the total possible increase in postmaterialism, including both the effect of generational replacement and the change due to period effects (intra-cohort learning). Every counterfactual's growth over the period of observations should be a pure consequence of intra-cohort learning, as no new and more postmaterialist generations are included in the calculation. Then, the ratio between the growth of the counterfactual and that of the actual series could be considered the net effect of intra-cohort change with respect to the total change produced during the period of observations. If we make the calculation, we can tell that between 1970 and 1999 the growth in postmaterialist levels caused by intra-cohort change is higher than that due to generational replacement. We can estimate intra-cohort change as ranging between 63.1% in counterfactual 'type a' and 76.2% in 'type d'. The effect of generational replacement is the difference with respect to 100.

Figure 8. *Percentage of Postmaterialists minus Percentage of Materialists Predicted by the Model with Replacement (1) and the Models without Replacement (2a, 2b, 2c, 2d), 1970-1999.*



Source: Eurobarometer surveys.

I do not want to say that generational replacement is less important than intra-cohort change. These evidences just imply that during this period of observations the growth due to intra-cohort change was higher than that caused by generational replacement. Cohort replacement has a slower effect, but anyway constant and deep. Earlier we have seen clear and wide generational differences in the levels of postmaterialism (Figure 1). This means that cohort replacement will continue to play its role in the future, gradually pushing upwards the levels of postmaterialism. As generational differences do not disappear but remain constant, in the long run cohort replacement would continue to be a stable source of value change. However, the large increase in postmaterialist values experienced across these six European countries between 1970 and 1999 is mainly attributable to intra-cohort change.

Next, I continue to make trials to find a better model to describe the series of postmaterialism. Then I introduce the trend as a third degree polynomial to better capture the pattern of the series. This trial can be seen in Figures 9 to 12. It improves considerably the fitness and the residual autocorrelation, but serial correlation only disappears clearly in the case of postmaterialism without replacement 'type c'. However the series are also affected by abrupt changes in levels. Therefore I introduced these changes in levels as time-related dummy variables together with the trend. This improves considerably the previous models and achieves residual stationarity as measured by ADF tests. The OLS models are defined in the following way:

The first model 1 (postmaterialism with generational replacement) can be established as follows:

$$postmat = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + \delta_5 D5 + u_t$$

where α is the constant term, β is the regression coefficient of T which is the time trend, and δ_n are the different coefficients of each dummy time related variables ($D1$, $D2$, $D4$ and $D5$) and u_t is the error term.

Equivalent models are defined for the counterfactuals without generational (model 2a, 2b, 2c, 2d):

$$postmat_a = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

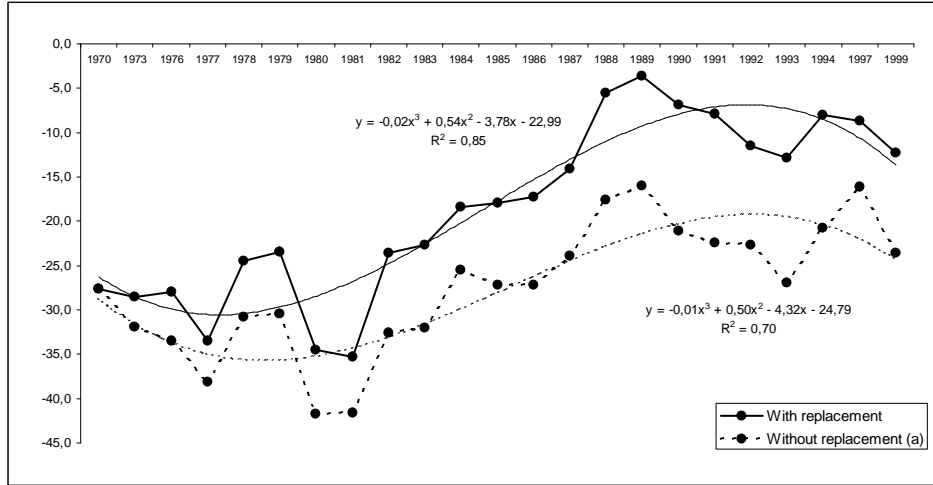
$$postmat_b = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

$$postmat_c = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + \delta_5 D5 + u_t$$

$$postmat_d = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

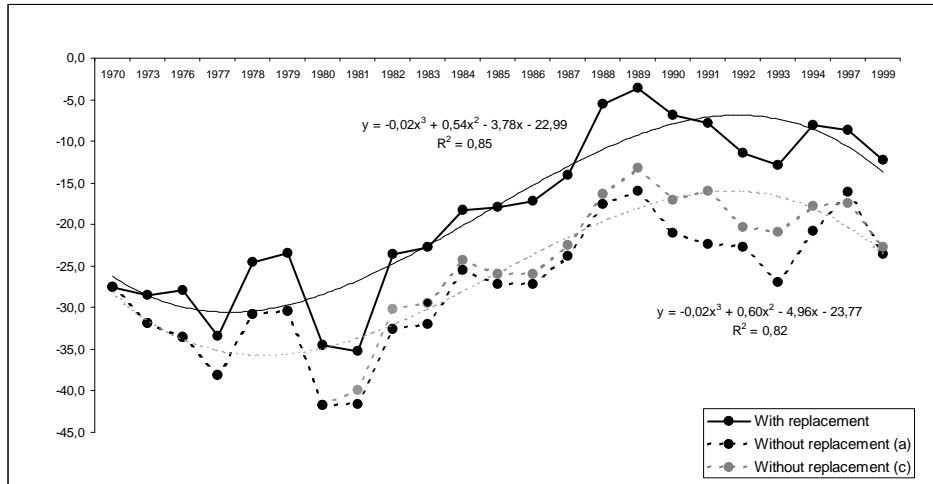
Table 6 presents the estimation outputs of these models. As can be seen in all the series the R-squared is higher than all previous models. A graphical representation of these models is presented in Figures 13 to 17. At the bottom of those figures a plot of the residuals is included in which is possible to appreciate their stationarity. The results of the ADF tests showing residual stationarity are presented in Table 7.

Figure 9. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



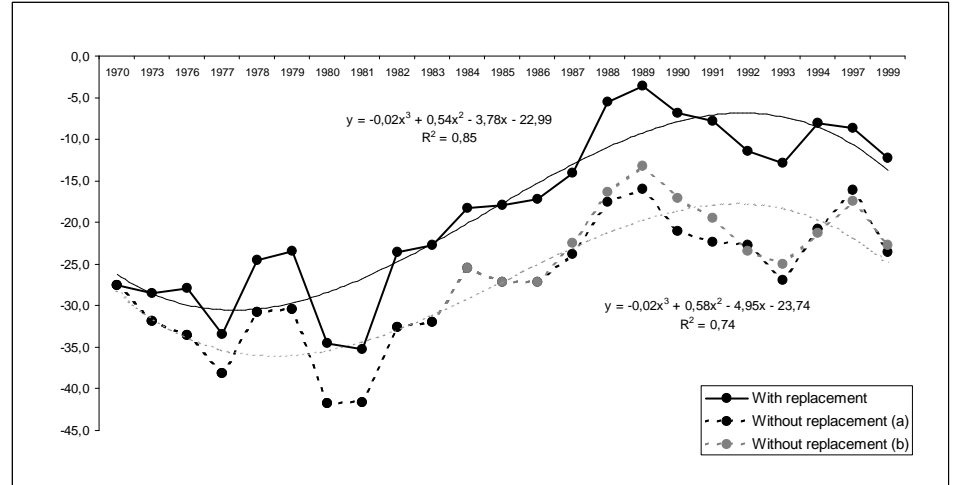
Source: Eurobarometer surveys.

Figure 11. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



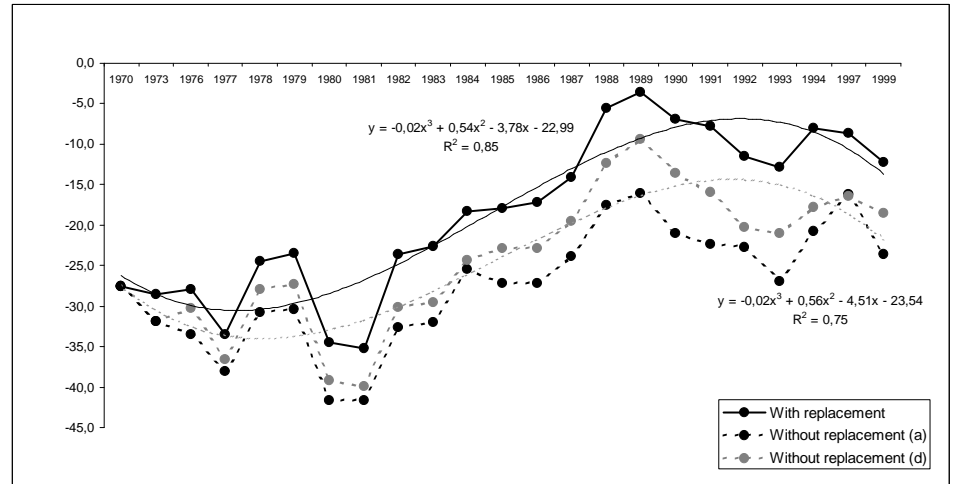
Source: Eurobarometer surveys.

Figure 10. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



Source: Eurobarometer surveys.

Figure 12. Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries, 1970-1999.



Source: Eurobarometer surveys.

Table 6. Descriptive OLS Regression Models to Explain the Evolution of Postmaterialism With and Without replacement, 1970-1999

	Model 1	Model 2a	Model 2b	Model 2c	Model 2d
	B	B	B	B	B
C	-31.38 ** (0.785)	-33.63 ** (1.204)	-33.54 ** (1.089)	-33.88 ** (0.963)	-32.49 ** (0.915)
T	0.818 ** (0.046)	0.452 ** (0.066)	0.444 ** (0.061)	0.546 ** (0.056)	0.527 ** (0.051)
D1	-8.626 ** (2.015)	-8.069 * (3.139)	-8.100 ** (2.839)	-8.570 ** (2.473)	-8.364 ** (2.385)
D2	-12.93 ** (1.446)	-13.26 ** (2.253)	-13.27 ** (2.037)	-13.25 ** (1.774)	-13.18 ** (1.711)
D4	8.642 ** (1.092)	5.097 ** (1.681)	7.885 ** (1.520)	7.030 ** (1.340)	8.818 ** (1.277)
D5	-5.447 * (2.111)			-5.246 (2.591)	
R-squared	0.967	0.841	0.881	0.920	0.928
Adjusted R-squared	0.960	0.815	0.862	0.903	0.916
S.E. of regression	1.948	3.036	2.746	2.391	2.307
Sum squared resid	91.09	230.5	188.5	137.2	133.0
Log likelihood	-59.23	-73.15	-70.13	-65.37	-64.91
Durbin-Watson stat	1.261	1.059	1.037	1.034	0.998
Mean dependent var	-18.87	-27.10	-26.75	-25.82	-24.31
S.D. dependent var	9.761	7.060	7.397	7.678	7.985
Akaike info criterion	4.349	5.210	5.009	4.758	4.660
Schwarz criterion	4.629	5.444	5.243	5.038	4.894
F-statistic	140.8	32.95	46.37	55.02	80.56
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000

Note: Standard errors in parenthesis.

** p>0,01

* p>0,05

Table 7. Results of the augmented Dickey-Fuller test statistic to the residuals of models 1, 2a, 2b, 2c and 2d, 1970-1999.

	t	Prob.*
Model 1	-3.951747	0.0052
Model 2a	-3.593955	0.0123
Model 2b	-3.708720	0.0093
Model 2c	-4.204301	0.0027
Model 2d	-3.560808	0.0133

Null Hypothesis: the variable has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=8)

*MacKinnon (1996) one-sided p-values.

Figure 13. *Observed and Predicted Values of Model 1, and Plot of the Model Residuals.*

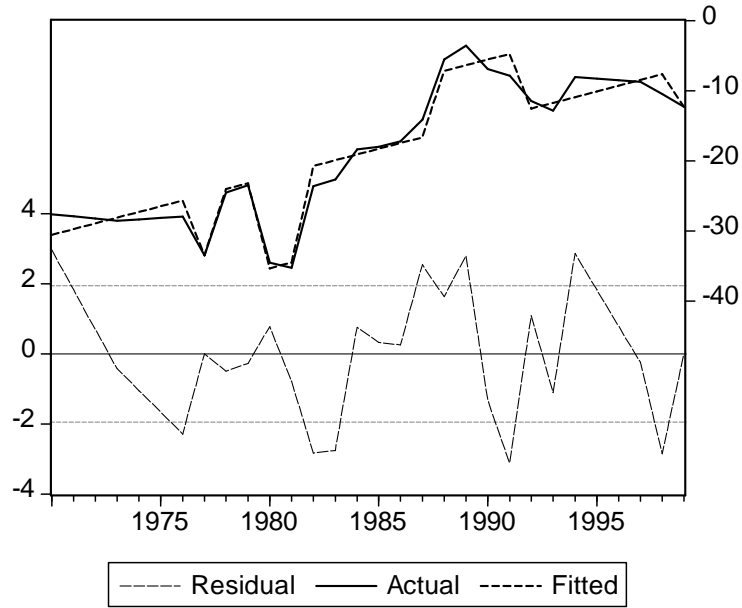


Figure 14. *Observed and Predicted Values of Model 2a, and Plot of the Model Residuals.*

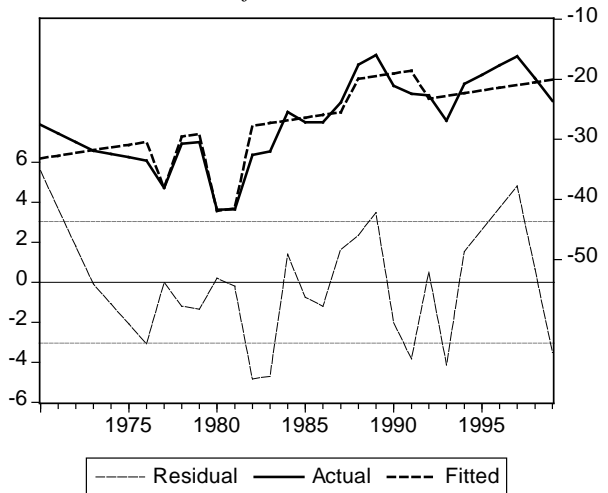


Figure 15. *Observed and Predicted Values of Model 2b, and Plot of the Model Residuals.*

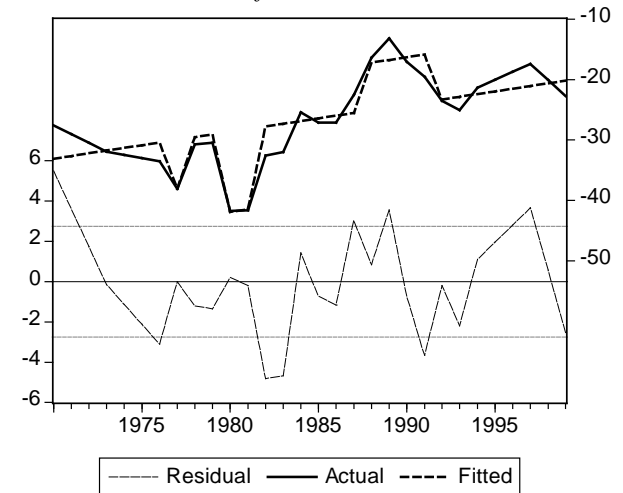


Figure 16. *Observed and Predicted Values of Model 2c, and Plot of the Model Residuals.*

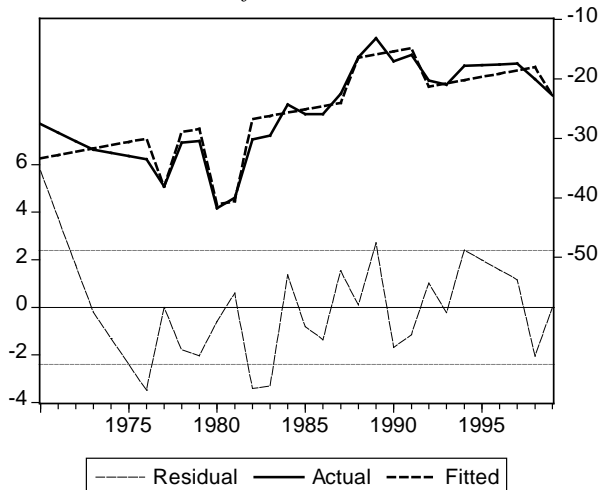
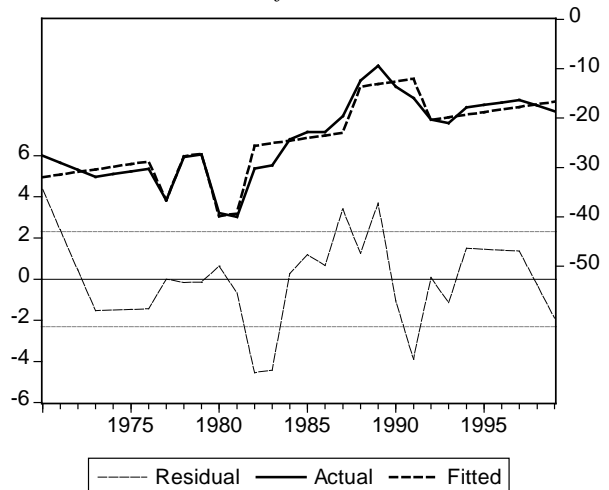
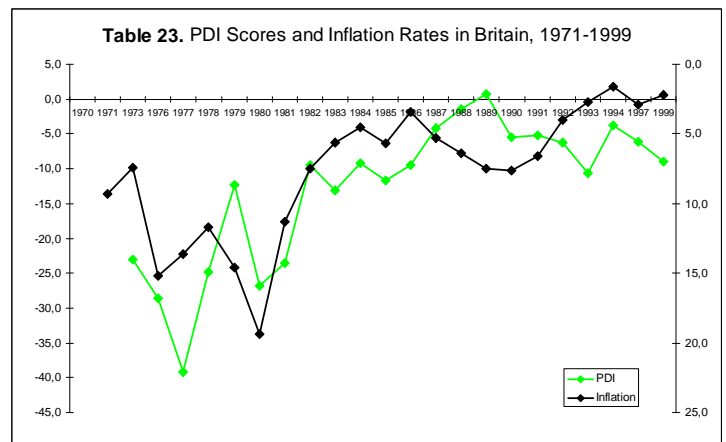
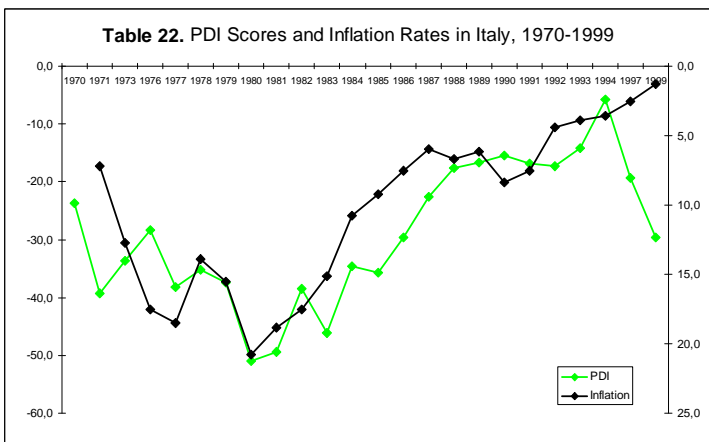
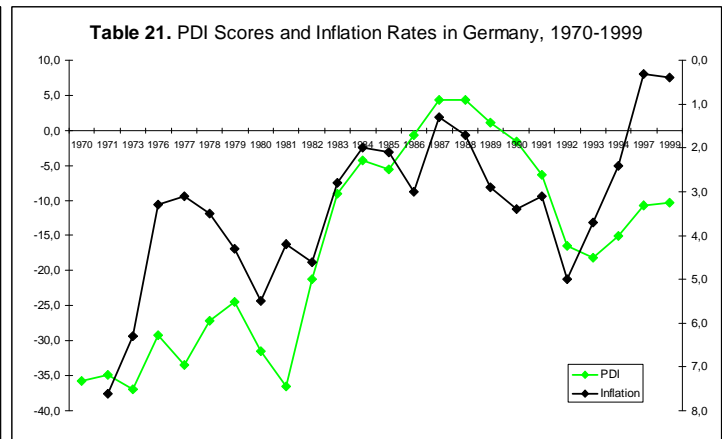
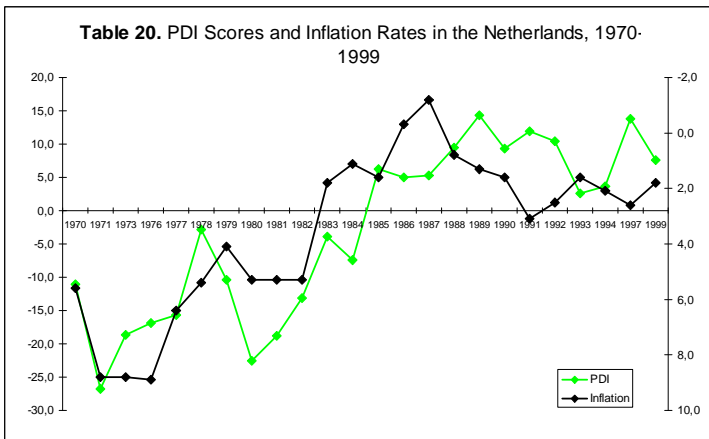
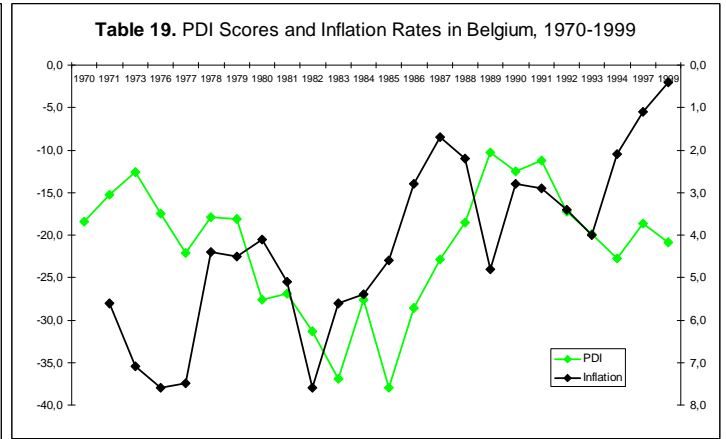
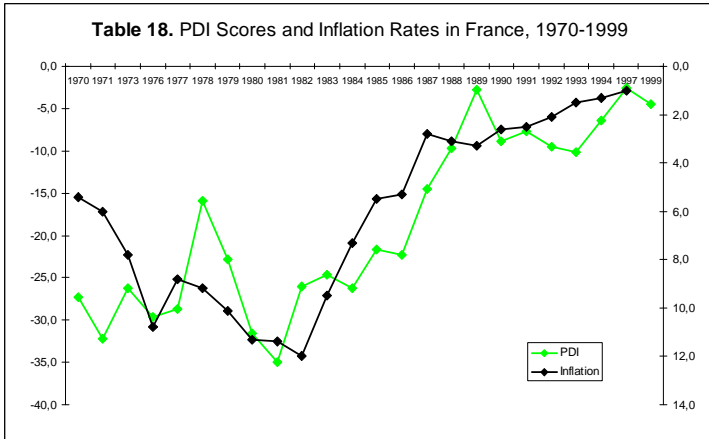


Figure 17. *Observed and Predicted Values of Model 2d, and Plot of the Model Residuals.*



After all this process, I finally describe the evolution of postmaterialism with and without generational replacement as a function of a trend and sudden changes in levels. The next step is to analyse the exogenous factors which are affecting the dynamics of actual postmaterialism and its counterfactuals. In the literature, it is possible to distinguish two kinds of references about those external influences. First, postmaterialism is treated as a function of economic security or material wellbeing of nations and individuals as a general concept. This is considered to be a long-term influence linked to the modernization process and generational replacement. The second is the idea of period effects as short-term influences on materialist/postmaterist values operationalized with indicators such as inflation or unemployment (Inglehart and Abramson 1994). The weakness of these conceptualizations, from my point of view, is the fact that they appear seemingly unconnected. On one side we have various levels of economic prosperity creating differences between generations by means of the impressionable years model of learning, and then on the other side there are short-term period effects affecting all cohorts along their lifetime. But what if both types of influences are basically the same but happening at different moments of an individual's life cycle? This broad concept of economic security could include at the same time long and short-term components. And the difference between generation and period effects can blur if we think of economic security as influencing people's values with different intensity depending on their age. Following Bartels (2001), period and generation effects can be conceptualized as basically the same thing happening at different moments of people's lifetime. The younger the person, the higher the impact of the context. However people always receive and process influences from the context. The task of testing these points is far too ambitious for this paper. But the part I can test is what happens when one of those exogenous variables considered a short term period effect does have a trend and not just local level oscillations.

I will focus on analysing the effects of inflation on postmaterialist values with replacement and its counterfactuals without replacement. The opinion is quite unanimous about the clear impact that inflation rates have on postmaterialism. Quoting Abramson and Inglehart (1992): "[...] aggregate-level changes in responses to these items [the four items value scales] are strongly related to changes in the consumer price index. Though respondents are asked to choose long-term goals, they are more likely to select 'fighting rising prices' when inflation rates are rising. As has been shown in many publications [...], in all six countries there is a substantial correlation between annual changes in the consumer price index and changing scores in the value index". Figures from 18 to 23 illustrate this covariation for the countries included in my analysis. Abramson and Inglehart continue to say: "Indeed, even though there are year-to-year fluctuations, the overall distribution of values is continuously affected by generational replacement, and our goal in this article is to estimate that impact." But economic environment does not only provide short term fluctuations in the form of local level oscillations, it can also bring a trend apart from that coming from generational replacement.

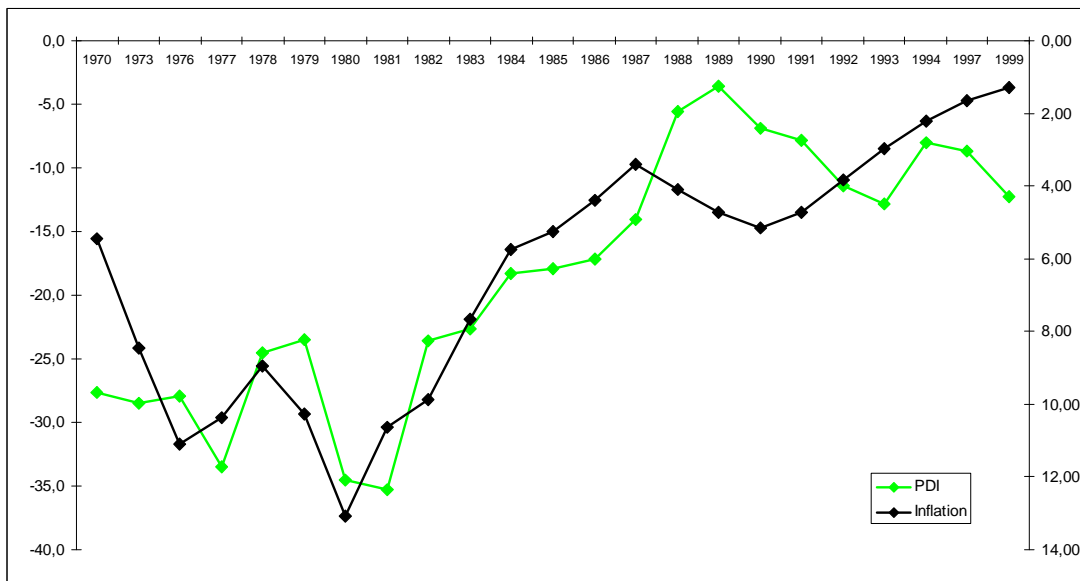


Source: Eurobarometer surveys and OECD statistics.

We have already seen that the counterfactuals without cohort replacement can be described introducing a time-deterministic trend together with changes in levels in a similar way as the series with replacement. Now I want to explain this dynamic by means of an exogenous factor, namely inflation rates. I am quite conscious that the real causes of the intra-cohort increase in the levels of postmaterialism across Western Europe should be seek in the overall economic welfare experienced over a large part of the thirty year period, and not just in the reduction of inflation rates alone. That welfare has been interrupted in some moments, however the trend has been one of an upward nature. Reduction of inflation rates is just part of the process, along with stable economic growth, increasing GDP per capita, and low unemployment rates, that created

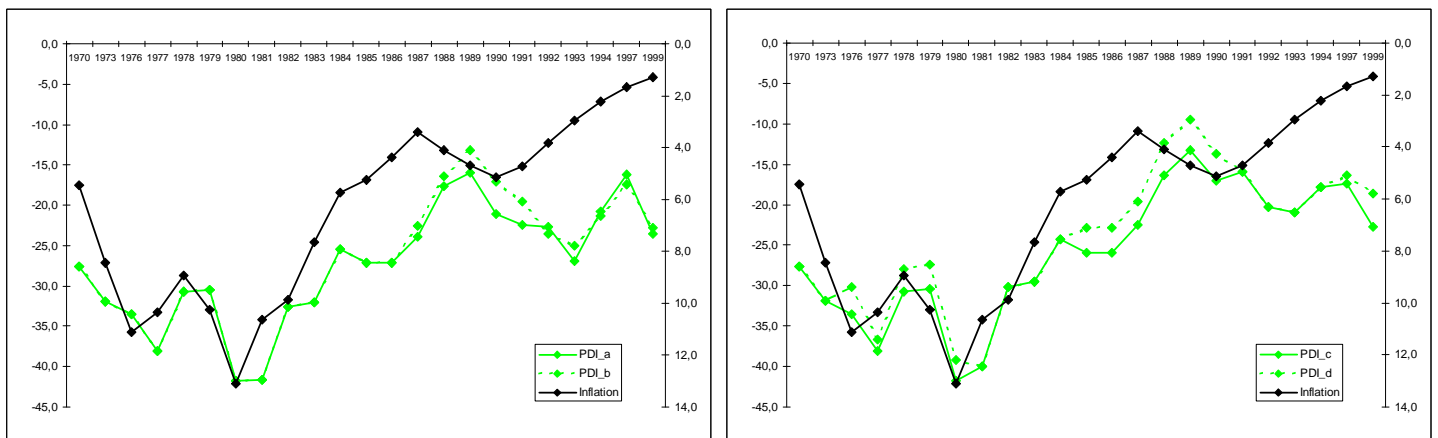
a more secure and prosperous environment in which postmaterialism not only grew as a consequence of generational replacement, but as a product of intra-cohort current context actualisation. Nevertheless, if we focus our attention on inflation rates provided by the OECD (and weighted by countries to match our combined sample), we can see that it covariates with postmaterialist values over the period. Figure 24 shows the series of postmaterialism with replacement together with inflation rates. In Figure 25 we can observe that a certain covariation with the counterfactuals series, though not as strong as in the actual time series. Moreover, it also seems that the counterfactuals series carrying less old generations are more affected by inflation rates.

Figure 24. *The Dynamics of PDI Scores with Replacement and Inflation Rates, 1970-1999.*



Source: Eurobarometer surveys and OECD statistics.

Figure 25. *The Dynamics of PDI Scores without Replacement (a, b, c and d) and Inflation Rates, 1970-1999.*



Source: Eurobarometer surveys and OECD statistics.

From a visual analysis of the previous figures it is possible to assert a certain degree of covariance between postmaterialist values and inflation. Furthermore theory tells us that this does not happen only by chance, there is a substantive relationship between the two variables. However correlation does not prove causality. To study causality it is necessary to establish statistical controls. This is because a third variable could be biasing the relation between our dependent and independent variables. According to Hadenius and Teorell (2005), even in well-specified models there are other potential sources of bias, such as endogeneity and the presence of a causal lag. When working with longitudinal cross-section data instead of panel data, as it is the case, there are some limitations. However, the problem with endogeneity could be solved with a good theory about the studied phenomena. In our case, it is quite obvious that the causal link goes from inflation to postmaterialism and not the other way around. The causal lag refers to the time it takes the independent variable to affect the dependent variable. This can be controlled by lagging the independent variable. It is also possible to lag the dependent variable and include it as an independent variable. This will ensure that the effects of X on Y previous to the lag are controlled (Hadenius and Teorell 2005).

I want to know if inflation has a relevant statistical impact on the series of postmaterialism with generational replacement as well as in those without replacement. To test it statistically I define a set of OLS regression models (see Table 8), one with the series of postmaterialism with generational replacement as a dependent variable and the others with the different versions of the counterfactuals. Because of its nature, it is quite likely that inflation, a short-term factor, will have a higher contemporary effect on postmaterialism rather than a lagged one. I test this assumption with different versions of inflation with and without time lags, and prove it to be correct. Therefore, in the final models, I include as independent variables both inflation at present time (with no time lag), and the lagged dependent variable (with one time lag, $t-1$). Lagged dependent variables are often utilized as a means of capturing the dynamics of political attitudes (Keele and Kelly 2006). In these models, I made the level of postmaterialism at time t to be a function of postmaterialism at $t-1$ as modified by new information about the inflation rate. The lagged dependent variable coefficient has a dynamic interpretation as it indicates the timing of the effect of inflation on postmaterialism. I previously realized that inflation has lagged effects on postmaterialism, so including the lagged dependent variable is a way to rule out these effects. I exclude the intercept after as it does not have statistical significance. The lagged dependent variable procedure is also a manner to capture potentially relevant exogenous factors excluded from the model (Keele and Kelly 2006). This may also be the case, as I do not include enough indicators to reflect the general level of economic security (such as GDP per capita, human development index, etc.). The OLS estimator produces biased but consistent estimates when used with a lagged dependent variable if there is no residual autocorrelation in the data-generating process.

Table 8. OLS Regression Models to Explain the Evolution of Postmaterialism with Replacement (Model 1) and without Replacement (Model 2a, 2b, 2c and 2d), 1970-1999

	Model 1		Model 2a		Model 2b		Model 2c		Model 2d	
	B	Beta	B	Beta	B	Beta	B	Beta	B	Beta
LDV (-1 lag)	0.664 **	0.679	0.837 **	0.840	0.835 **	0.840	0.834 **	0.839	0.795 **	0.803
	(0.106)		(0.071)		(0.069)		(0.076)		(0.081)	
Inflation	-0.876 **	-0.316	-0.595 *	-0.160	-0.591 *	-0.161	-0.571 *	-0.160	-0.661 *	-0.196
	(0.302)		(0.264)		(0.255)		(0.271)		(0.275)	
R-squared	0.855		0.708		0.752		0.773		0.772	
Adjusted R-squared	0.850		0.697		0.742		0.765		0.764	
S.E. of regression	3.797		3.952		3.820		3.789		3.934	
Sum squared resid	389.3		421.8		394.1		387.5		417.9	
Log likelihood	-78.81		-79.97		-78.98		-78.74		-79.83	
Mean dependent var	-18.57		-27.08		-26.72		-25.76		-24.19	
S.D. dependent var	9.791		7.184		7.526		7.807		8.098	
Akaike info criterion	5.573		5.653		5.585		5.568		5.644	
Schwarz criterion	5.667		5.747		5.679		5.663		5.738	
Durbin-Watson stat	1.762		1.840		1.693		1.805		1.784	

Note: Standard errors in parenthesis.

** p>0,01

* p>0,05

From the results presented in Table 8, it seems that the inclusion of a lagged dependent variable in the models does not erode the effect of inflation. In all cases, contemporary inflation rates remain as a relevant predictor of contemporary postmaterialism. The results have another substantive interpretation: inflation has a stronger impact on postmaterialism with replacement than on the series without replacement. In other words, the effect of including young cohorts and removing older ones in the series increases the sensitivity to contextual effects. The different versions of postmaterialism without generational replacement are much more dependent upon its own past, which means they have more inertia. The closer to one the LDV coefficient, the higher the inertia. However, in these series the level of postmaterialism continues to be affected by current inflation rates. Therefore, there is room for learning in the different moments of the life cycle, though the propensity probably decays with age. That can be seen by comparing the relative effects of the LDV and inflation among the four counterfactuals. The series without replacement containing higher amounts of old cohorts are more affected by inertia and less by inflation. Figure 26 show the condition of stationarity in the residuals of these models.

Figure 26. Correlograms of the Residuals from Models 1, 2a, 2b, 2c and 2d, 1970-1999.

Model 1

Sample: 1971 1999
Included observations: 29

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.086	0.086	0.2348	0.628
		2 -0.362	-0.372	4.5892	0.101
		3 0.019	0.108	4.6012	0.203
		4 0.092	-0.070	4.9054	0.297
		5 -0.135	-0.111	5.5921	0.348
		6 0.221	0.323	7.5044	0.277
		7 0.067	-0.162	7.6853	0.361
		8 -0.103	0.162	8.1439	0.420
		9 -0.029	-0.078	8.1813	0.516
		10 -0.102	-0.224	8.6742	0.563
		11 -0.268	-0.153	12.251	0.345
		12 0.074	-0.080	12.543	0.403

Model 2a

Sample: 1971 1999
Included observations: 29

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.026	0.026	0.0215	0.883
		2 -0.306	-0.306	3.1295	0.209
		3 0.046	0.071	3.2028	0.361
		4 -0.016	-0.127	3.2117	0.523
		5 -0.022	0.026	3.2291	0.665
		6 0.236	0.212	5.4038	0.493
		7 0.049	0.034	5.5016	0.599
		8 -0.008	0.152	5.5042	0.703
		9 -0.028	-0.043	5.5407	0.785
		10 0.054	0.137	5.6793	0.841
		11 -0.259	-0.363	9.0397	0.618
		12 0.004	0.083	9.0404	0.699

Model 2b

Sample: 1971 1999
Included observations: 29

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.111	0.111	0.3980	0.528
		2 -0.296	-0.312	3.3131	0.191
		3 -0.010	0.076	3.3166	0.345
		4 -0.022	-0.140	3.3337	0.504
		5 0.026	0.083	3.3598	0.645
		6 0.246	0.208	5.7314	0.454
		7 0.095	0.062	6.0967	0.529
		8 -0.056	0.075	6.2308	0.621
		9 -0.063	-0.041	6.4108	0.698
		10 -0.084	-0.066	6.7457	0.749
		11 -0.173	-0.234	8.2489	0.691
		12 0.029	-0.029	8.2929	0.762

Model 2c

Sample: 1971 1999
Included observations: 29

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.052	0.052	0.0870	0.768
		2 -0.304	-0.307	3.1542	0.207
		3 0.090	0.140	3.4345	0.329
		4 0.020	-0.106	3.4482	0.486
		5 -0.002	0.090	3.4482	0.631
		6 0.231	0.209	5.5279	0.478
		7 0.144	0.151	6.3783	0.496
		8 -0.119	-0.011	6.9604	0.539
		9 -0.032	0.026	7.0257	0.634
		10 -0.098	-0.205	7.4828	0.679
		11 -0.239	-0.282	10.327	0.501
		12 0.038	-0.124	10.403	0.581

Model 2d

Sample: 1971 1999
Included observations: 29

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.079	0.079	0.2006	0.654
		2 -0.345	-0.353	4.1577	0.125
		3 0.095	0.183	4.4670	0.215
		4 0.087	-0.086	4.7400	0.315
		5 -0.131	-0.041	5.3851	0.371
		6 0.199	0.261	6.9367	0.327
		7 0.091	-0.081	7.2737	0.401
		8 -0.127	0.075	7.9589	0.437
		9 -0.037	-0.070	8.0199	0.532
		10 -0.028	-0.114	8.0560	0.623
		11 -0.145	-0.094	9.1049	0.612
		12 0.017	-0.050	9.1201	0.693

Conclusion

In this paper I presented some evidences indicating that materialist/postmaterialist values follow the lifetime model of learning, instead of the pure cultural or institutional models. The impressionable years thesis that guides the cultural approach is not questioned, as its validity is contrasted with wide evidences of generational differences. However that is not the only source of value change, and depending on the characteristics of the context it can even be of a second order. It is true that generational differences in values remained constant over the period, but there is also a great deal of intra-cohort change. It is possible to discard the strict institutional model that predicts generational differences to disappear as a consequence of the homogenising effect of the period. Though materialist/postmaterialist values seem a clear case of lifetime learning. Formative experiences (as generation effects) establish the starting point for each cohort, and distinguish each generation from the rest over time. However existing cohorts are not immune to the changing characteristics of the context. They experience transformations to adjust themselves to changing contextual conditions. If external conditions are following a particular trend, the value associated would reflect it in a contemporaneous way and not just by means of generational replacement. The fact of a value such as postmaterialism presenting less intra-cohort stability than expected, could also drive to rethink the idea of generation. Leaving this for future research, the concept of generation itself could be adjusted to reflect the lifetime learning processes. Following Bartels (2001), the generational cliché could be de-composed in period shocks with varying effects depending on age, as a proxy of information accumulation.

References

- Abramson, Paul R. and Ronald Inglehart (1986): "Generational Replacement and Value Change in Six West European Societies", *American Journal of Political Science* 30 (1): 1-25.
- Abramson, Paul R. and Ronald Inglehart (1987): "Generational Replacement and the Future of Post-Materialist Values", *The Journal of Politics* 49 (1): 231-241.
- Abramson, Paul R. and Ronald Inglehart (1992): "Generational Replacement and Value Change in Eight West European Societies", *British Journal of Political Science* 22 (2): 183-228.
- Abramson, Paul R. and Ronald Inglehart (1994): "Education, Security, and Postmaterialism: A Comment on Duch and Taylor's 'Postmaterialism and the Economic Condition'", *American Journal of Political Science* 38 (3): 797-814.
- Abramson, Paul R., Susan Ellis and Ronald Inglehart (1997): "Research in Context: Measuring Value Change", *Political Behavior* 19 (1): 41-59.
- Achen, Christopher H. (2000): "Why Lagged Dependent Variables Can Suppress the Explanatory Power of Other Independent Variables", paper prepared for the Annual Meeting of the *Political Methodology Section of the American Political Science Association*, Los Angeles.
- Baker, Regina M. (2007): "Lagged Dependent Variables and Reality: Did you specify that autocorrelation *à priori*?", paper prepared for the Annual Meeting of the *American Political Science Association*, Chicago.
- Bartels, Larry M. (2001): "A generational model of political learning", paper prepared for the annual meeting of the *American Political Science Association*, San Francisco.
- De Graaf, Nan Dirk, Jacques Hageaars and Ruud Luijkx (1989): "Intragenerational Stability of Postmaterialism in Germany, the Netherlands and the United States", *European Sociological Review* 5 (2): 183-201.
- Duch, Raymond M. and Michael A. Taylor (1994): "A Reply to Abramson and Inglehart's 'Education, Security, and Postmaterialism'", *American Journal of Political Science* 38 (3): 815-824.
- Ester, Peter, Michael Braun and Peter Mohler eds. (2006): *Globalization, Value Change and Generations. A Cross-National and Intergenerational Perspective*, Leiden, Brill.
- Hadenius, Axel and Jan Teorell (2005): "Cultural and Economic Prerequisites of Democracy: Reassessing Recent Evidence", *Studies in Comparative International Development* 39 (4): 87-106.
- Inglehart, Ronald (1971): "The Silent Revolution in Europe: Intergenerational Change in Post-Industrial Societies", *American Political Science Review* 65: 991-1017.
- Inglehart, Ronald (1977): *The Silent Revolution: Changing Values and Political Styles Among Western Publics*. Princeton: Princeton University Press.
- Inglehart, Ronald (1981): "Post-Materialism in an Environment of Insecurity", *The American Political Science Review* 75 (4): 880-900.

- Inglehart, Ronald (1990): *Culture Shift. In Advanced Industrial Society*, Princeton: Princeton University Press.
- Inglehart, Ronald and Paul R. Abramson (1994): “Economic Security and Value Change”, *The American Political Science Review* 88 (2): 336-354.
- Inglehart, Ronald (1997): *Modernization and Postmodernization. Cultural, Economic, and Political Change in 43 Societies*. Princeton: Princeton University Press.
- Inglehart, Ronald and Paul R. Abramson (1999): “Measuring Postmaterialism”, *The American Political Science Review* 93 (3): 665-677.
- Inglehart, Ronald (2008): “Changing Values among Western Publics from 1970 to 2006”, *West European Politics* 31 (1-2): 130-146.
- Jennings, M. Kent (2007): “Political Socialization”, en Russell J. Dalton y Hans-Dieter Klingemann eds. *The Oxford Handbook of Political Behavior*. Oxford, Oxford University Press.
- Keele, Luke and Nathan J. Kelly (2006): “Dynamic Models for Dynamic Theories: The Ins and Outs of Lagged Dependent Variables”, *Political Analysis* 14: 186-205.
- Mishler, William and Richard Rose (2001): “What are the origins of political trust? Testing institutional and cultural theories in Post-communist societies”, *Comparative Political Studies* 34: 30-62.
- Mishler, William and Richard Rose (2007): “Generation, Age, and Time: The Dynamics of Political Learning during Russia’s Transformation”, *American Journal of Political Science* 51 (4): 822-834.
- Oskamp, Stuart and P. Wesley Schultz (2005): *Attitudes and opinions*. Mahwah (New Jersey): Lawrence Erlbaum Associates Inc.
- Schwartz, Shalom H. (2001): “¿Existen aspectos universales en la estructura y el contenido de los valores humanos?” in Maria Ros and Valdiney V. Gouveia eds., *Psicología social de los valores humanos. Desarrollos teóricos, metodológicos y aplicados*. Madrid: Biblioteca Nueva.
- Searing, Donald D., Joel J. Schwartz, and Alden E. Lind (1973): “The Structuring Principle: Political Socialization and Belief Systems”, *American Political Science Review* 67 (2): 415-432.
- Searing, Donald D., Gerald Wright, and George Rabinowitz (1976): “The Primacy Principle: Attitude Change and Political Socialization”, *British Journal of Political Science* 6 (1): 83-113.
- Siegel, Roberta S. ed. (1989): *Political Learning in Adulthood. A Sourcebook of Theory and Research*. Chicago and London: The University of Chicago Press.
- Van Deth, Jan W. and Elinor Scarbrough eds. (1995): *The impact of values*. Oxford: Oxford University Press.