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Postmaterialist Values and Adult Political Learning. Intracohort Value Change in Western Europe

Valores postmaterialistas y aprendizaje político adulto. El cambio de valores intracohorte en Europa occidental

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Key words

Social Values
• Post-materialism
• Age Groups
• Adult Socialization
• Generational Differences • Cohort Analysis
• Longitudinal Studies
• Period Effects

Abstract

Research on value change and stability tends to underline the importance of generational effects, Inglehart's theory of post-materialism being an example of this. According to his theory, formative experiences shape the values of each age-cohort, and social change takes place progressively due to the force of generational replacement. This article analyzes survey data covering a wider period of observations than the one Inglehart used to draw his conclusions. By applying time series techniques, I find significant changes within each generation over time. I show how an important adult learning process in the field of post-materialist values has taken place, which has been neglected by the empirical literature. Contrary to Inglehart's point of view, I conclude that period effects are not just minor short-term influences affecting the «normal» change due to generational replacement, but a systematic intracohort trend linked to the European economic prosperity of recent decades.

Palabras clave

Valores sociales
• Postmaterialismo
• Grupos de edad
• Socialización adulta
• Diferencias generacionales • Análisis de cohortes • Análisis de series temporales
• Efecto período

Resumen

La investigación sobre estabilidad y cambio de valores tiende a subrayar la importancia de los efectos generacionales, siendo la teoría del postmaterialismo de Inglehart un ejemplo de ello. En su teoría, las experiencias formativas configuran los valores de cada cohorte de edad, y el cambio social tiene lugar de forma gradual mediante el reemplazo generacional. En este artículo se analizan datos de encuestas que abarcan un período de tiempo más amplio que el que utilizó Inglehart para sacar sus conclusiones. Aplicando técnicas de series temporales se identifican cambios relevantes en cada generación a lo largo del tiempo. Se demuestra que ha tenido lugar un importante proceso de aprendizaje adulto en el ámbito de los valores postmaterialistas, obviado en la literatura empírica. Contradiciendo a Inglehart, se concluye que los efectos del período no son sólo de carácter menor y cortoplacista, sino que toman la forma de una tendencia sistemática de tipo intracohorte. Esta tendencia se vincula a la creciente prosperidad económica europea de las últimas décadas.

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 crystallization, and then by a relative stability from thereon (Jennings 2007). The main im-

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plications of this model are stability in political orientations and the emergence of generations. 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. Following the "impressionable years" model, change is supposed to be 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? Different evidences point to the capacity to learn and change during the whole life period (Sigel 1989). Even people completely socialized under authoritarian regimes are able to change and adapt their views to a new democratic context (Mishler and Rose 2007).

The purpose of this research is to test people's capacity to 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 (Rokeach 1979, Glenn 1980). But even values can change over time. I use Inglehart's theory of postmaterialism to study the amount of intracohort change in values, because it gives a crucial role to generation effects. I confront two perspectives of analysis, the cultural theory based on the "impressionable years" model and the institutional theory that emphasizes adult learning. In this article, I assume a third point of view: the lifetime learning model. Generation effects are crucial, but people learn and change all over their life cycle, though probably following a declining path. 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 research 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 colleagues used. Across many Western European countries there has been a considerable amount of change in postmaterialist values 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 those years has had something to do with it. I test the contribution of intracohort value change to the increase in the level of postmaterialism compared to the effect of generational replacement.

First I define the theoretical framework of analysis that guides 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 intracohort change. I verify whether the series of postmaterialism with generational replacement and the counterfactuals without 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 the inflation rate together with the lagged dependent variable to explain the dynamics of postmaterialism with and without cohort replacement. The implications

of the results lead me to support 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 transformations, and the time needed for a relevant change to happen (Mishler and Rose 2007). This debate confronts two perspectives: one coming from the political culture tradition, the cultural theory; and the other from the rational choice school, the institutional theory. The discussion can be traced back many decades, and it is central to contemporary political science (see Eckstein 1988, Whitefield and Evans 1999, Mishler and Rose 2001, 2002 y 2007 for a review). The followers of the political culture approach favoured the "impressionable years" model of learning. They underlined the relative stability of national cultures and the idea of change produced mainly by cohort replacement. Conversely, the rational choice supporters relied on the capacity of individuals to evaluate the ongoing institutional performance relatively free from the bias of past experiences, and therefore they emphasized people's capacity for change.

The emergence of the political culture approach in the field of political science dates back to 1960 (see Eckstein 1988), with the seminal works of Almond and Coleman (1960), and Almond and Verba (1963 and 1979) followed by a plethora of studies. Following Whitefield and Evans (1999), the basic idea beneath the subjective political culture approach – its hegemonic branch – is that people's preferences, values and beliefs derive from normative orientations learned early in life, which are stable over time. Differences between nations with respect to values and attitudes are then explained in terms of long-standing societal norms transmitted through socialization, especially during individual's formative years (Whitefield and Evans 1999). In this vein, the cultural theory of learning, which derives from this political culture tradition, basically follows the "impressionable years" model. As Mishler and Rose indicate (2007), this approach emphasizes the strength of socialization at an early age. Fundamental 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, inspired by the rational choice school. In this theory, situational characteristics are supposed to be the factors that shape individual attitudes and behaviour (Whitefield and Evans 1999). These situational elements are social dispositions of the agent, political opportunities and recent experiences. In Whitefield and Evans' words: "individuals construct and reconstruct their political responses and behaviour on the basis of the combination of available information, resources and constraints". To this approach, the source of differences among nations is to be found in their diverse contemporary state context, individual endowments and opportunities for political voice. It does not expect them to be created by long-standing cultural dissimilarities, understood as shared political values crystallized through early life socialization. This is because individuals are thought to react to the intermediate context and the recent political, economic and social experiences. Quoting Whitefield and Evans (1999): "by comparison with the political culture approach, the rational choice explanation is rather direct and immediate in terms of the causal chain of processes required to produce a given attitudinal response;

individuals assess a given political issue in terms of their recent experience and calculated future opportunities". This perspective is supposed to emphasize adult political experiences and adult "relearning" as a consequence of the current evaluation of the context (Mishler and Rose 2007). In this vein, institutional theories consider that attitudes and behaviours are to a great extent adaptable. Adult life experiences play then a larger role in adult opinion-formation. Generational differences, if they should exist, would diminish with the passage of time, overwhelmed by the bulk of contemporary shared experiences.

In fact, cultural and institutional theories could also be seen as complementary; two compatible components of a same lifetime learning model. More recently, even Almond himself argued against the conflict between the two theories (1993). When confronted to many evidences pointing to the adaptability of cultures, he finally claimed for an approach to political culture able to take into account institutional factors and recent experiences (Whitefield and Evans 1999). He admitted that adult experience with governmental, social and economic performance should be included in the definition of political culture. From a more general point of view, Delli Carpini (1989) also claims that there is no theoretical reason to assume that one ever stops the iterative process of learning and reevaluating. "Once the rapid psychological, moral, cognitive, and educational developments associated with childhood and adolescence have occurred, there are no solid biological or experiential arguments to suggest that there is less change and development in one's forties, than in one's thirties, or in one sixties than in one's fifties" (apart from the physical and mental decay of old age) (Delli Carpini 1989). According to Mishler and Rose (2007), in a lifetime learning model, political lessons of childhood are reinforced, revised and replaced over time by later life experiences. I use the lifetime learning approach as a framework to analyse a particular case in this research: the evolution of materialist/postmaterialist values.

How do cultural, institutional and lifetime learning theories envision change in values and attitudes? The usual way of understanding change from a culturalist approach is as a slow and progressive process. 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. This second type of generational differences is 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. Generational differences are continuous and monotonic; one good example of them is Inglehart's postmaterialism. 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 understand change in values and attitudes much more as a "real-time" process, as they do not give such 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 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. There should be a quick individual reaction in response to external conditions.

Lifetime learning models admit the importance of generation effects, but also recognize the possibility of intracohort change. Each generation remains influenced by the experiences of the "impressionable years", but adult socialization linked to life cycle processes or time-related change exerts 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 (Sigel 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 (Sigel 1989). From a lifetime learning perspective, we could observe constant generational differences in attitudes as well as intracohort change due to period or age effects.

The propensity for individual change can vary depending on the nature of the characteristic to be explained. It should make a difference if the 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.

There is much discussion about the idea of values beneath Inglehart's theory. Still unrefuted work suggests that postmaterialism can not be qualified as a fundamental value (see Clarke and Dutt 1991, and Jackman and Miller 2005 among others). The first problem comes when trying to find a widely accepted definition of values. Being aware of the different conceptual and measurement flaws of the theory, I use Inglehart's approach because my objective is to study a particular aspect of it: the socialization hypothesis. It emphasizes the strength of socialization at an early age. Values and attitudes attached to modernization are supposed to be deeply crystallized and change only slowly over wide periods of time.

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 fulfilled, they care for other ones. 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 in pre-adult years 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 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, as these groups 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, to him 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.

Inglehart identified clear differences in the levels of postmaterialism between age groups in a series of cross-sections surveys (1977). The younger the age-group the more postmaterialist it was. A debate emerged about whether those differences were due to generation, life-cycle or period effects. Most of the energies were spent on discarding life-cycle effects. If age differences in mate-

rialist/postmaterialist values were caused by age 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 avoiding the use of proper methodology to rule out the APC conundrum.

When it comes to the discussion about period effects the situation appears less clear. Inglehart maintains that period effects are already included in his theory through the scarcity hypothesis (Inglehart 1990; Abramson and Inglehart 1992). Although he 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 (Inglehart 1990). Period effects are thought to respond to short-term fluctuations in the economic environment, especially inflation, and to have no lasting impact in the long-run (Abramson and Inglehart 1986; Inglehart 2008; Inglehart and Welzel 2005). Therefore, Inglehart equates period effects to short-term random fluctuations (2008).

When during a period of time the exogenous causal factor of materialist/postmaterialist values, namely economic environment, does not follow any particular tendency (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 generation and period factors. However, Inglehart seemed to focus only on generation effects and cohort replacement. In fact, Abramson and Inglehart (1986, 1987 and 1992) developed a method to test the amount of value change caused by generational replacement. I reproduce their method but expanding the period of observations to test the effect of generational replacement against that of intracohort change.

Data and methodology

The data source I use is the Eurobarometer Surveys more specifically, the microdata from the Eurobarometer Trend File, a series of national surveys sponsored by the European Union 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 colleague. It is the short four-item version of the materialism/postmaterialism scale[1]. In the four items scale respondents are asked to select what they believe their country's two top goals should be among the following four choices:

[1] 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.

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 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 variation[2]. Moreover, Inglehart combines the samples of the six countries to increase the number of cases per cohort and year. He argues that by 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 graphically represents 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 over 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 intracohort change.

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 postmaterialist 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 intracohort 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 over the period of observations. However, generations are not immune to

[2] In the Eurobarometer Trend File the variable age in years is not included in the first surveys of the period. There are 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 1. *Percentual Distribution of Materialist/Postmaterialist Values in Six West European Societies. 1970-1999**

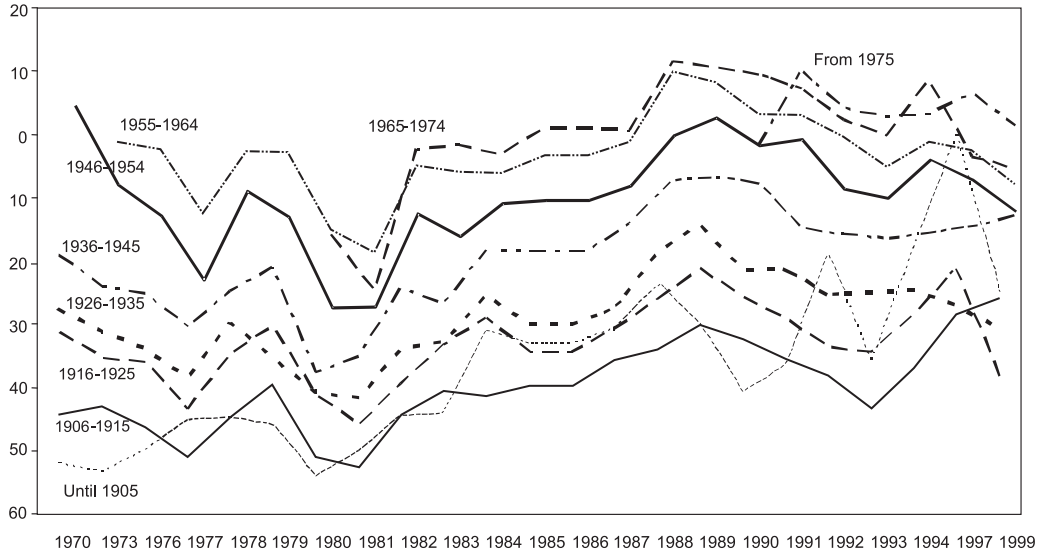
	Year of Survey																							
	1970	1971	1973	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1997	1999
France																								
Materialists	38.3	42.9	36.8	41.9	39.9	31.9	37.3	43.0	43.9	38.3	36.9	37.3	34.2	35.0	30.5	27.9	24.6	26.8	26.8	28.3	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
N	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																								
Materialists	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
N	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																								
Materialists	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
N	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																								
Materialists	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
N	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																								
Materialists	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
N	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																								
Materialists			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
N			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

* 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.

Source: Eurobarometer Trend File.

FIGURE 1. *Percentage of Postmaterialists minus Percentage of Materialists in a Combined Sample of Six West European Countries across Generations, 1970-99.*



Source: Eurobarometer surveys.

the changing context. They experience transformations to adapt to the new circumstances.

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 intracohort 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 consists in the creation of a counterfactual society. They algebraically generate a series of postmaterialist values 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 set of observations (1970) are considered to be immortals, and their members remain constant over the whole time-period (1970-1999). In the following surveys, the postmaterialist 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 an artificial population in which the effect of generational replacement has been removed. This counterfactual case can then be compared with the actual values of the population. The difference between the results of the actual series and the simulated ones accounts for 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.

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.

TTABLE 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.

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 constitute 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 variable 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.

The counterfactual procedure

Figure 2 presents the first time series that Abramson and Inglehart (1986) analysed using their counterfactual procedure[3]. 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.

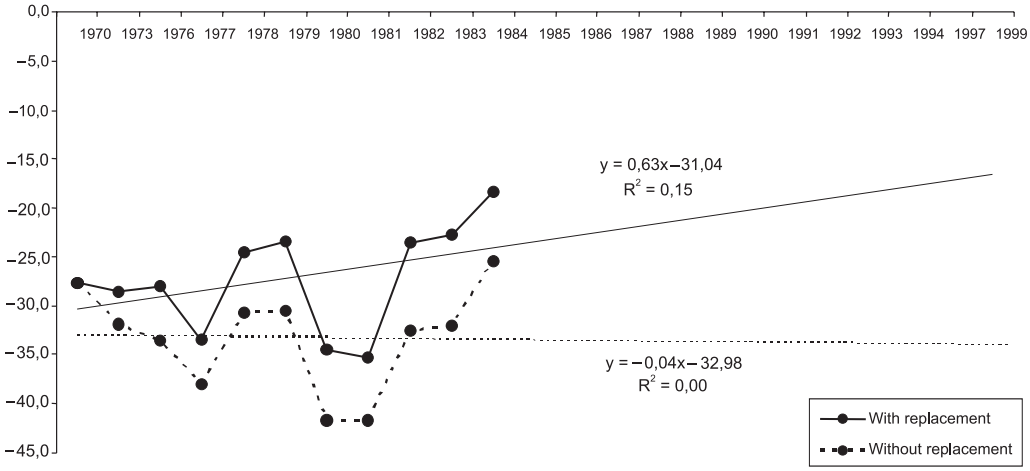
If we apply a simple OLS regression model with a deterministic trend to both series in order to explore their potential increase over time, we can confirm the differences commented earlier. The passage of time explains 15% of the variance in the series with replacement, and the percentage of postmaterialists 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 graphical representation of 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 postmaterialist values upwards, 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.

If we expand the observations to cover the period between 1970 and 1999 we find a much more different picture. Across these six Western European countries there has been a considerable amount of change in materialist/postmaterialist values. 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 materialist individuals and a growth of postmaterialists. In

[5] The PDI scores presented in most of the figures show negative numbers (PDI ranges from -100 to 100). This is why the values of the index appear under the horizontal axis from now on.

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



Source: Eurobarometer surveys.

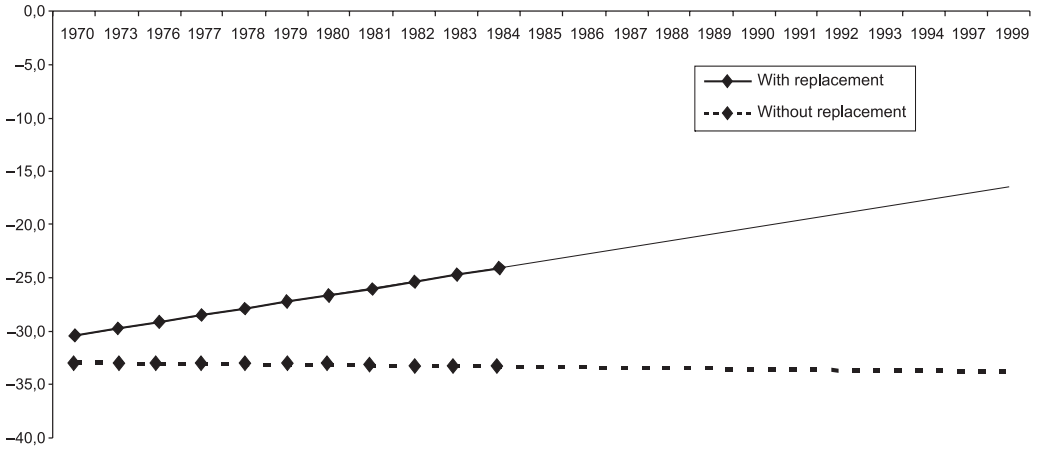
general terms, the level of postmaterialism has clearly increased. The question is whether this change is attributable almost entirely to generational replacement, or if the increasing economic security experienced by all cohorts over this period of time has something to do.

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' removes 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%.

A DESCRIPTIVE TIME SERIES ANALYSIS

First of all, I want to test whether any of the series is stationary, especially the counterfac-

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.

tuals 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? Figure 4 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 the period. 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 intracohort 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 evolve in parallel to the actual series.

TABLE 4. *Results of the Augmented Dickey-Fuller test statistic of the PDI series, 1970-84.*

	t	Prob.*
with replacement	–1.252	0.638
without replacement (a)	–1.574	0.483
without replacement (b)	–1.437	0.550
without replacement (c)	–1.372	0.582
without replacement (d)	–1.370	0.583

Null Hypothesis: the variable has a unit root.

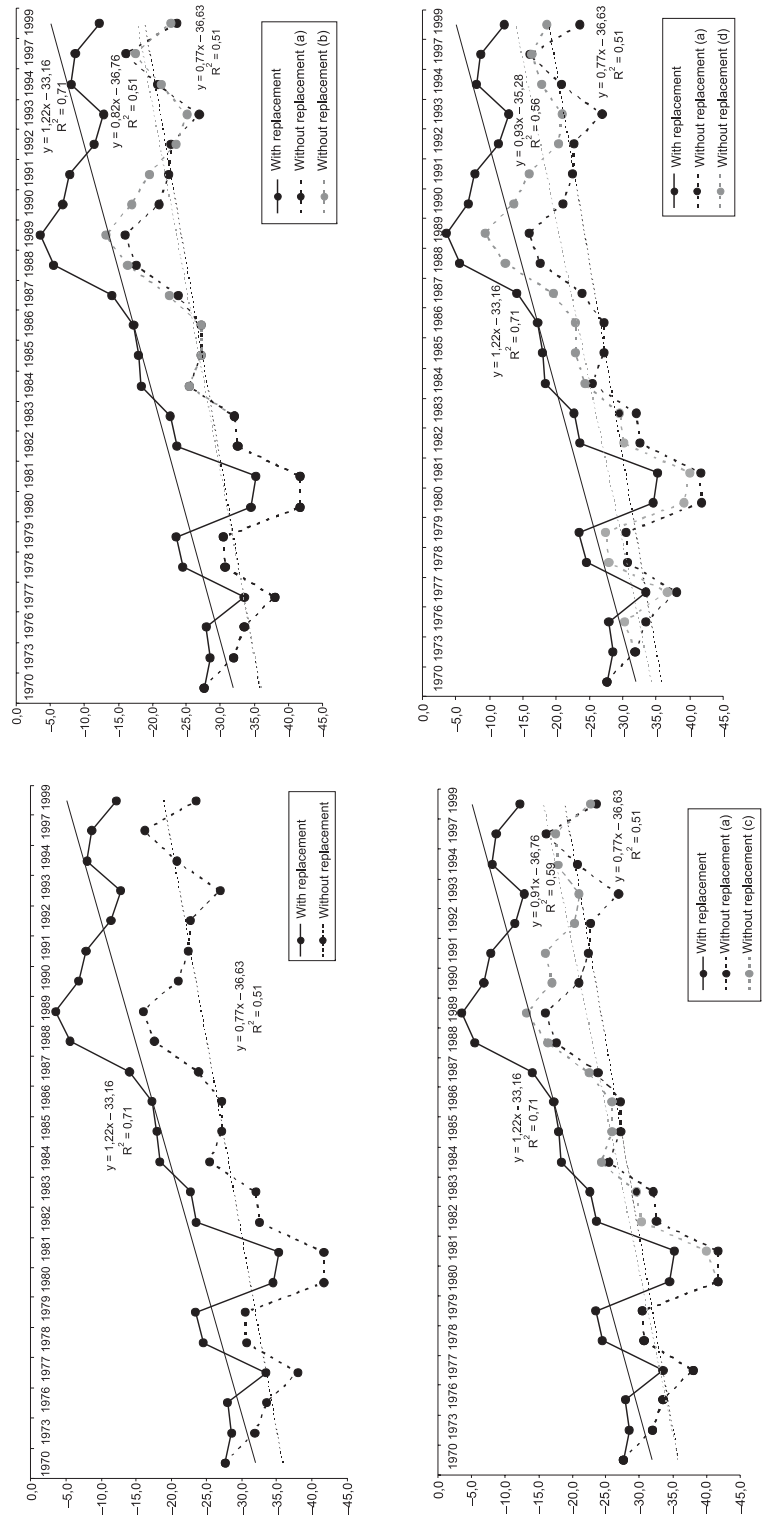
Exogenous: Constant.

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

FIGURE 4. *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.

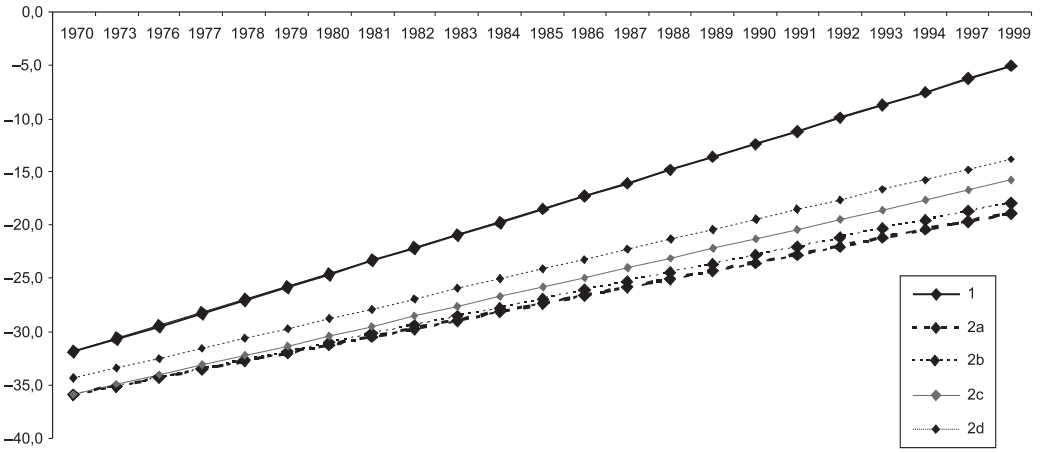
Table 5. *PDI Scores Predicted by the Models with and without Replacement. 1970-1999*

	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
Diff. (1999-70)	26.8	16.9	18.0	20.0	20.5
intracohort change	63.1%	67.2%	74.6%	76.2%	

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. Figure 4 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 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 cointegers and had 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 to see how they differ. Table 5 presents those expected values and Figure 5 shows its visual representation.

FIGURE 5. *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*

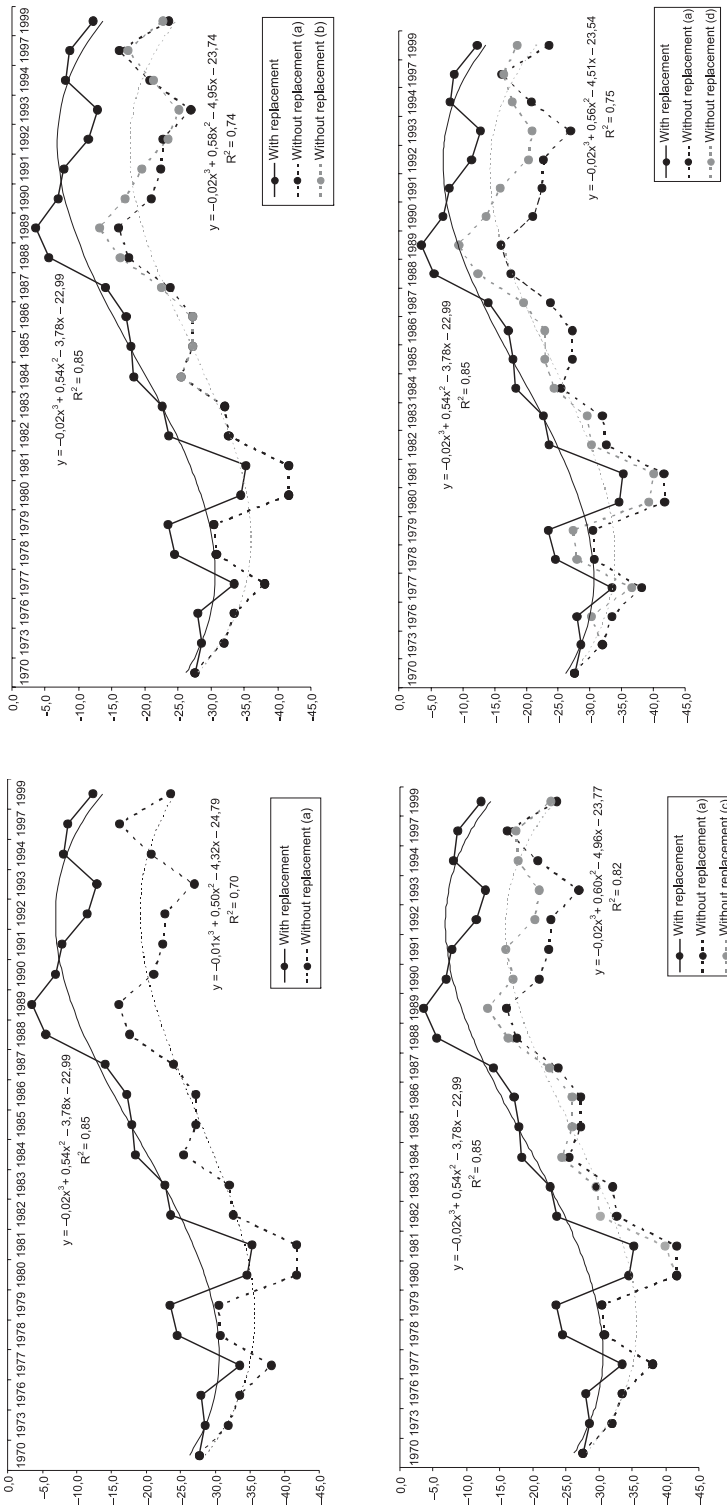


Source: Eurobarometer surveys.

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 (model 1) 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 a 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 (intracohort learning). Every counterfactual's growth over the period of observations should be a pure consequence of intracohort 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 intracohort 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 intracohort change is higher than that due to generational replacement. We can estimate intracohort 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.

I do not want to say that generational replacement is less important than intracohort change. These evidences just imply that during this period of observations the growth due to intracohort change was higher than that caused by generational replacement. Cohort replacement has a slower effect, but anyway steady and deep. 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 intracohort change.

FIGURE 6. *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.

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 Figure 6. 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 achieving 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:

$$(1)\ posmat\_a = \\ = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + \delta_5 D5 + u_t$$

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 wi-

TABLE 6. *Descriptive OLS Regression Models to Explain the Evolution of Postmaterialism with and without Replacement, 1970-1999*

	Modelo 1	Modelo 2a	Modelo 2b	Modelo 2c	Modelo 2d
	B	B	B	B	B
C	**–31,38****	**–33,63****	**–33,54****	**–33,88****	**–32,49****
	(0,785)	(1,204)	(1,089)	(0,963)	(0,915)
T	**0,818****	**0,452****	**0,444****	**0,546****	**0,527****
	(0,046)	(0,066)	(0,061)	(0,056)	(0,051)
D1	**–8,626****	**–8,069***	**–8,100****	**–8,570****	**–8,364****
	(2,015)	(3,139)	(2,839)	(2,473)	(2,385)
D2	**–12,93****	**–13,26****	**–13,27****	**–13,25****	**–13,18****
	(1,446)	(2,253)	(2,037)	(1,774)	(1,711)
D4	**8,642****	**5,097****	**7,885****	**7,030****	**8,818****
	(1,092)	(1,681)	(1,520)	(1,340)	(1,277)
D5	**–5,447***			–5,246	
	(2,111)			(2,591)	
R-squared	0,967	0,841	0,881	0,920	0,928
Ajusted 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

thout generational replacement (model 2a, 2b, 2c, 2d):

$$(2)\ posmat\_a = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

$$(3)\ posmat\_b = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

$$(4)\ posmat\_c = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + \delta_5 D5 + u_t$$

$$(5)\ posmat\_d = \alpha + \beta \cdot T + \delta_1 D1 + \delta_2 D2 + \delta_4 D4 + u_t$$

Table 6 presents the estimation outputs of these models. R-squares are higher than in all previous models. A graphical representation of these models is presented in Figures 7 and 8. At the bottom of those figures a plot of the residuals is included in which it is possible to appreciate their stationarity. The results of the ADF tests showing residual stationarity are presented in Table 7.

Finally, I conclude that the evolution of postmaterialism with and without generational replacement can be defined 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. It is possible to distinguish two kinds of references about those external influences in the literature. First, postmaterialism is treated as a function of economic security or material wellbeing of nations and individuals as a broad concept (Inglehart 1990, 1997). This is considered to be a long-term influence linked to

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	–3.951	0.005
Model 2a	–3.594	0.012
Model 2b	–3.709	0.009
Model 2c	–4.204	0.003
Model 2d	–3.561	0.013

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

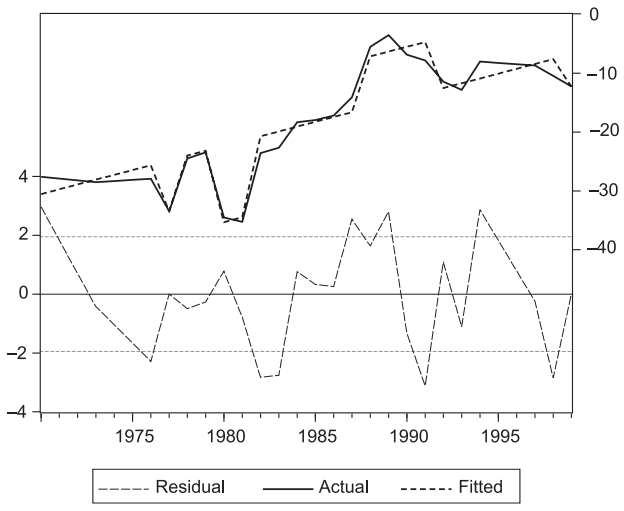
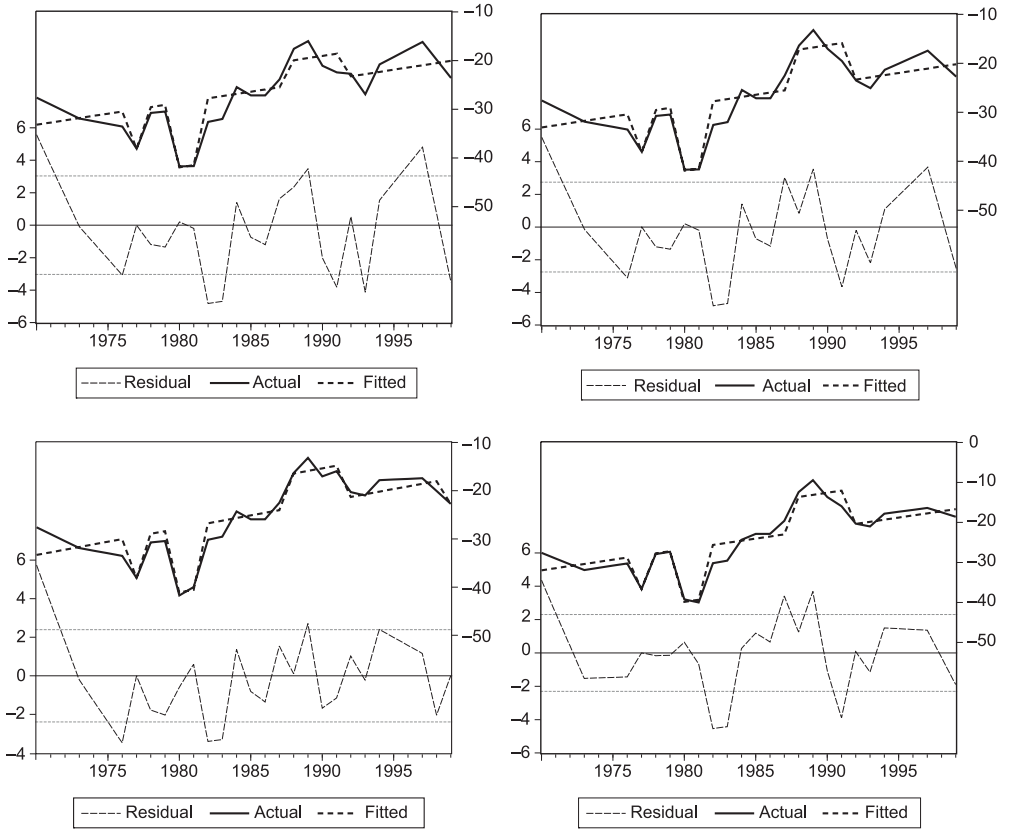


FIGURE 8. *Observed and Predicted Values of Model 1, and Plot of the Residuals (2a, 2b, 2c y 2d)*



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 (Abramson and Inglehart 1986, 1994). The weakness of these last conceptualizations is 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 on the other side short-term period effects influencing all cohorts over 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. 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 is, 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 article. But the part I can test is what ha-

ppens 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 scale] 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". 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 tendency apart from that coming from generational replacement.

A MULTIVARIATE DYNAMIC MODEL

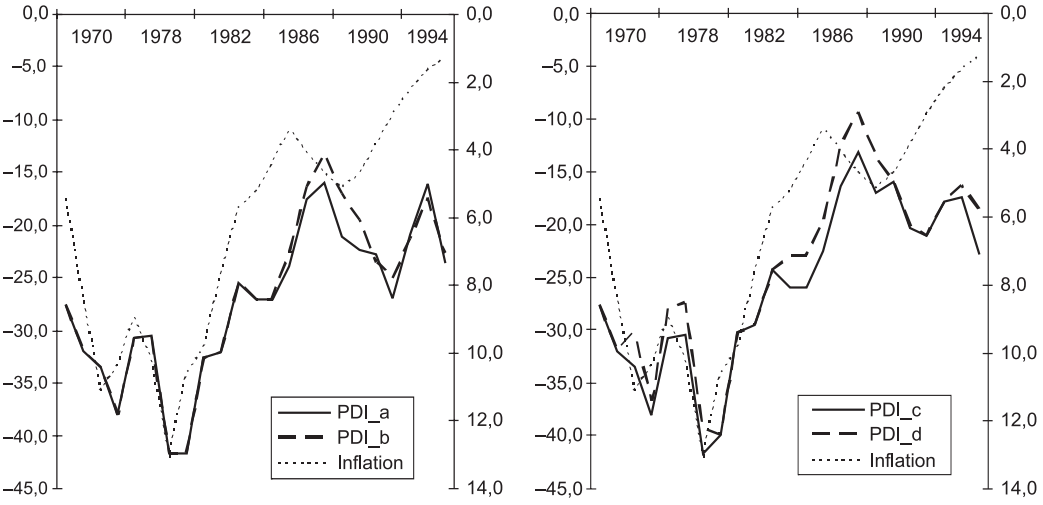
Now I want to explain the dynamic of postmaterialist values with and without cohort replacement by means of an exogenous factor, namely inflation rates. I am quite conscious that the real causes of the intracohort increase in the levels of postmaterialism across Western Europe should be seek in the overall economic welfare experienced over a large part of the thirty year period of time, 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 intracohort 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 covaries with postmaterialist values. Figure 9 shows the series of postmaterialism with replacement together with inflation rates. In Figure 10 we can observe a certain covariation with the counterfactuals series, though not as strong as in the actual time series. Moreover, it also seems that the counterfactual series carrying less old generations are more affected by inflation rates.

From a visual analysis it is possible to assert a certain degree of covariance between postmaterialist values and inflation. Furthermore, theory tells that there is a substantive relationship between these 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 relationship 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 repeated cross-section data instead of panel data, as it is the case, there are some limitations. 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

FIGURE 9. *The Dynamics of PDI Scores with Replacement and Inflation Rates, 1970-1999*

Source: Eurobarometer surveys and OECD statistics.

FIGURE 10. *The Dynamics of PDI Scores without Replacement (a, b, c and d) and Inflation Rates, 1970-1999*



Source: Eurobarometer surveys and OECD statistics.

TABLE 8. *OLS Regression Models to Explain the Evolution of Postmaterialism with Replacement (Model 1) and without Replacement (Models 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	
Ajusted 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 parentheses.

** p > 0,01.

* p > 0,05.

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 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, the human development index, or the unemployment rate).

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 period effects. The different versions of postmaterialism without generational replacement are much more dependent upon their own past, which means they have more inertia. The closer to one the LDV coefficient is, 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. Autocorrelation tests not shown prove the condition of stationarity in the residuals of these models[4].

Concluding remarks

In this research I presented clear evidence indicating that materialist/postmaterialist values follow a lifetime model of learning, instead of a pure cultural or institutional one. These evidences have direct consequences on Inglehart's theory of change. He fully relies on the assumptions of the culturalist approach and the "impressionable years" model, which states that changes do not take place quickly but progressively through cohort replacement. In the analysis presented here, this paradigm has been proved to be insufficient to explain the evolution of postmaterialist values. It is true that intergenerational differences in values remained constant over the period of observations, but there is also a great deal of within-cohort change that has been neglected or misunderstood in the empirical literature. 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 to the 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 type of analysis that has been performed here accounts for this dynamic view of value and attitude change. It implies an improvement with respect to the one originally proposed by Abramson and Inglehart, which is unable to explain current developments in postmaterialist values. Their counterfactual procedure to study value change was based on the natural replacement of cohorts in society. The underlying assumption was that postmaterialist values were age-stable. I have reproduced their method considering a wider time period of observations and prove their assumptions to be wrong. I use their method as a benchmark to test the amount of change that has not been produced by cohort replacement. Replacement happens to account only for a fraction of the huge overall change in the levels of postmaterialism over time. The biggest share comes from within-cohort adjustments: generations changing their values to adapt to contempo-

[4] 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 (Keele and Kelly 2006).

rary political and economic experiences. This is corroborated by descriptively exploring the evolution of the series with and without cohort replacement. Both can be modeled the same way, meaning that they evolve similarly: with a time trend and sudden changes in levels coming from period shocks. In fact, period effects can have the shape of sudden shocks but also of consistent trends. Furthermore, I have demonstrated that the series with and without cohort replacement can be predicted by the same exogenous factors. To do so, I built a parsimonious dynamic model with just a lagged dependent variable and current inflation rates as regressors.

As the dynamic model has shown, even in the case of a value like postmaterialism, there is still room for change and adjustment after the period of adolescence and youth. This is a major implication of this research, given the fact that the "impressionable years" model is usually taken for granted, especially in the field of political culture studies. The results of this research are useful to warn about the perils of an acritical acceptance of the cultural model. Values are supposed to be amongst the most age-stable sociopsychological features and deeply rooted in individual's mind. But even values can change within a person's lifetime. People do not lose their capacity to change after the formative years, still in the realm of values[5]. And this means good news in many respects. When new socio-political situations emerge, like transitions to democracy, it is quite likely that the time needed for the population to adapt could be shorter than predicted by the traditional culturalist approach, as values and attitudes would be more malleable than expected. This argument has also a side effect: if bad new conditions should come out, the line of progress could be reversed faster.

Another consideration derived from this research is related to the very nature of period effects. Inglehart's understanding of them coincides with a very common point of view in the political culture literature, which is biased in favor of generation effects. Period and generation are seen as substantially different concepts. Period effects are conceived as random shocks: sudden changes in levels without any particular trend. They are not supposed to affect the dynamics of cohort replacement and generational differences in the long run. However, as I have argued here, period effects can have both the shape of random shocks and consistent trends. However, this is not the only relevant matter: period effects are basically the same as cohort effects, but happening at different stages of the life cycle. Experiences of adolescence and early adulthood leave a lasting imprint in peoples mind, but individuals continue to receive impacts from the context during the rest of their lifetime. Period effects during the formative years are called generation effects, and for the rest of the life cycle they are named period effects. However, generation and period effects are basically the same in essence. When we observe intergen-

[5] This research has used a particular indicator to measure postmaterialist values. As signaled by Clarke and Dutt (1991), indicators of postmaterialism could be affected by measurement problems of validity and reliability. To avoid criticisms regarding the indicator used to test my hypotheses and to expand the external validity of my findings, I have performed additional analyses (Tormos 2010). An alternative way to test the applicability of the lifetime learning model to values related with the modernization process could be studying different indicators of that process. Inglehart considers change in attitudes to homosexuality and the decline in religious values and practices as some of them (1990, 1999, 2005). By studying their dynamics, I could prove that other attitudes and values linked to the modernization process are as well experiencing the same "real-time" transformation as postmaterialism does, contradicting most of the literature about the subject. I have already performed analyses with these two alternative indicators (attitudes towards homosexuality and religious practices and values) for a large group of countries (OECD countries) over a period of time of more than 30 years, reaching the same conclusions as in the case of postmaterialist values. The amount of intracohort learning is not only clearly larger than that produced by cohort replacement, but also bigger than generation effects themselves.

erational differences in a particular value or attitude, we are in fact observing the consequences of past period effects. If these intergenerational differences are monotonic, it would mean that past period effects had a trend, which could or could not have persisted until the present time. This idea of period and generation effects coincides with Bartels approach to the subject (2001). According to him, the generational cliché could be decomposed in period shocks with varying effects depending on age, as a proxy of information accumulation. In this way, the concept of generation could be adjusted to reflect the lifetime learning processes.

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