

(Extended Abstract) A note on the relative importance of demographic metabolism: the case of trust

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Abstract

Since its initial formulation by Ryder, the theory of demographic metabolism has developed into a fully quantitative theory and has been applied to a variety of subjects, ranging from political attitudes to social values. There is little doubt that the replacement of cohorts is a motor of social progress, but how much does it contribute in relation to other forces of social change? I discuss some of the methodological aspects of the assessment of the relative magnitude of demographic metabolism using the trends of trust among individuals in the United States. A meta-analysis of the results of a variety of well-established models and techniques in demography and economics confirms the key importance of the process of cohort replacement on both the levels and trends of trust.

Introduction Demographic metabolism refers to the process through which a society changes its composition via the replacement of cohorts of individuals, much like an organism replaces the cells from which it is composed. The term and metaphor was originally suggested by Ryder (1965) in a seminal article that emphasized the role of cohort replacement in social transformation. According to Ryder (1965), theories of individual development imply that after an initial malleable stage of life, individuals acquire a body of traits, both medical and social, that remain relatively constant over their life time. Hence, social change is likely to occur hand-in-hand with the process of renewal of the cohorts present in a society. The quantitative implications of this theory have been explored in a number of works (Robinson and Jackson, 2001; Lutz, Kritzinger and Skirbekk, 2006; Lutz, Goujon, and Sanderson, 2007; Clark and Eisenstein, 2013). Lutz (2013) provides a formalization and summary of the quantitative side of the theory of demographic metabolism. As Lutz (2013) highlights, the hypothesis put forward by Ryder (1965) conforms a falsifiable theory that can be tested in applications.

The goal of the paper While previous work has established the significance of the cohort component in social transformation, the goal of this paper is to

assess its relative magnitude. There is no doubt that the replacement of cohorts is a motor of social progress, but how much does it contribute in relation to other forces of social change? The goal of this paper is to discuss some methodological aspects on how to assess the relative importance of demographic metabolism. I do so by examining the contribution of the cohort component on a key trait of society: trust among individuals. The choice of trust is motivated not only because of its intrinsic importance, but also because cohort replacement has been placed at the center of the debate on the causes of the decline in trust by the leading scholars in the literature (Putnam, 1995). Previous work on the topic has confirmed the significance of the differences in trust levels across cohorts in explaining the decline in trust in the United States (Robinson and Jackson, 2001; Clark and Eisenstein, 2013). Here I use existing statistical tools from the fields of demography and economics to answer two questions. The first is to the extent to which differences across cohorts have contributed to the level of trust over the last 30 years. Second, I provide estimates of the quantitative importance of cohort replacement in the downwards trend of trust among individuals in the U.S. The reason for this distinction between the contribution to levels and trends in trust is because it is possible for one component to be important for one and not the other. For example, this would be the case for a hypothetical scenario in which the age structure is a key determinant of the level of trust but has remained fairly constant over the study period.

Overview of the data The data on individual trust comes from the U.S. General Social Survey between years 1972 and 2013. The survey was conducted annually between 1972 and 1993 (with the exception of years 1979, 1981, 1992) and biannually from 1994 onwards. While there are a variety of measures of trust in the survey, this work focuses exclusively in an analysis of the following question:

- Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?

The question allows for three possible answers: (1) you can't be too careful; (2) other, depends (volunteered); (3) most people can be trusted. For tractability, ages, periods and cohorts are grouped in 6 year intervals; answers to the question on trust are divided into individuals who choose answer (3) most people can be trusted versus individuals who didn't.

Overview of the methods In order to isolate the cohort component, I estimate a variety of Age-Period-Cohort models. I use the well-established constrained generalized linear model (CGLM) (see Clayton and Schiffers, 1987) approach to solve the inherent identification problem to APC modeling. The CGLM relies on establishing the equality of at least two age, period or cohort groups, and the results are sensitive to the restrictions employed. Given that there is no conclusive formal procedure to determine an optimal restriction, I perform a meta-analysis of a variety of models. In particular, I estimate all the

possible combinations of restrictions on consecutive groups for the variables age, period and cohort. Using consecutive groups is a common strategy employed when the researcher has no informed prior on what specific groups display the most similar effects.

Levels of trust I assess the importance of the cohort component to the level of trust of the whole period via a decomposition of the r-squared of the APC model. Following Lindeman, Merenda, and Gold (1980, p. 119ff), I decompose the explained variance of the model into the contributions of each individual factor. Preliminary results indicate that the cohort component is a key contributor. Across all models cohort component is responsible for around half of the total explained variance. It is noteworthy that the importance of the cohort factor is remarkably stable across specifications.

Trends in trust Existing literature has highlighted cohort component as a significant contributor to the decline of trust levels over the past decades. I quantify this contribution decomposing the changes in the proportion of trusting individuals over time as a function of the changes in the age structure, the period and cohort composition of the society. This is a simplified case of the family of decompositions originally proposed by Oaxaca (1973) and Blinder (1973) as by construction, changes in trust stem exclusively from the variation in the distribution of the explanatory variables. The results of this exercise depend on the factor on which the restriction is placed to estimate the CGLM. For both the cases where the restriction is placed on period or age groups, the majority of models identify the cohort factor as the largest contributor to the decline in trust across period. However, there is no clear conclusion for models identified with a restriction on consecutive cohorts.

Discussion Taken together, the main results in this paper demonstrate the importance of cohort replacement in explaining the levels of trust in the U.S. as well as its steady decline in the past decades. Not only has the process of demographic metabolism contributed to the decline of trust, but its effects have been of first order in quantitative importance. This work leaves several open questions to explore. Perhaps the most important is that while APC models of the form estimated in this paper are well-suited to separate the cohort component as a general concept, they do not give an indication on why it is that these cohorts have become less trusting over time. Some work has studied the determinants of trust in cross sectional data (Alessina and La Ferrara, 2002), but to the best of the author's knowledge none has systematically explored this issue longitudinally.

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