

# ***AGING AND TRANSPORT-RELATED ENERGY USE: DO GENERATIONS MATTER?***

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## **Overview**

Europe is experiencing a fast demographic shift, whose consequences for energy consumption and environment have been studied but generally undervalued by policy makers. The share of elderly people in the total population will significantly increase in the near future as the post-war baby-boom generation reaches retirement. Elderly people, however, are not only a growing proportion of the population but an increasing percentage of “active” householders. Indeed, the economics literature almost universally predicts that an aging population will increase residential energy demand and reduce transport-related energy use: older households spend more on heating and less in transportation, because their members stay at home for a larger proportion of the day. However, this causal link is more complex than expected because of the different pressures exerted by human and non-human factors, as socio-demographic transformations (longer life expectancy and smaller family size), economic transformations (income distribution by age and by income category), changes in lifestyle and environmental attitudes, among which global warming concern. In our view, the latter components can be well represented by the concept of energy culture. According to Stephenson et al. (2015), different social norms, including individual expectations and aspirations, interplay with material culture and energy practices in shaping individual behaviour, subject to the external influences that form the context where energy cultures develop. This is particularly important in the case of transport, where the energy culture of high income countries is indissolubly linked to a preference for car: cars are generally perceived as the means of travel giving status, sense of comfort, control and freedom (Steg, 2003). Additional impacts may come from consumer preference shift (Torgler et al., 2008), different attitude towards environment preservation among generations and from differentiated habits and preferences of the growing immigrant share of the population. In this paper, we pursue this line of research by exploring household heterogeneity in terms of age and generation in Italy. We think that the Italian case is particularly interesting because of at least three concurring factors: an almost complete energy dependency, a very high car and motorcycle ownership rate and a very fast aging transformation, due also to a steady increase in life expectancy.

## **Methods**

We assess the role of sociodemographic factors in the Italian context of private transport by looking at pooled cross sections on annual Household Budget Survey (IHBS) published by the Italian Statistical Office (ISTAT) for the period 1997-2013. Then, we build a pseudo panel dataset (Deaton, 1985) by which cohorts of households are followed from one survey to another to investigate the role of the changing generation preferences by distinguishing between a pure age effect and a cohort effect on transport-related energy demand. We apply a decomposition of age, cohort and period effects (Deaton and Paxson, 1994), to disentangle the generational from the life-cycle components in the general transport demand trend.

## **Results**

The pooled regression analysis confirms the key role of the socio-demographic drivers in transport-related choices for Italian households as found by Eakins (2013) for the Irish case. For vehicle possession, a positive link between income, wealth and the number of vehicle is confirmed, as is the fact that women householders are associated with lower number of vehicle in the household. The effect of the different age classes is negative for the younger and older householders, thus confirming the findings of a life-cycle pattern in vehicle possession. In the case of equivalent fuel expenditure, the role of age classes appears constantly increasing with age. A negative link between education level and equivalent fuel consumption seems to confirm that higher education levels are associated to a higher propensity toward an energy-saving behaviour, as widely confirmed by the literature.

The empirical analysis performed on repeated cross-sections allows to investigate whether “transport culture” changes over time and to estimate age, period and cohort (APC) effects. Results show that the age effects present a life-cycle pattern, increasing between ages 25 and 33 and then decreasing up to the age of 80. The cohort effects are of smaller magnitude but they are nonlinear. Indeed, transport fuel expenditure increases with a peak for the cohort born in 1940 (householders aged 57 in 1997) then the cohort effect decreases for older generations (with a trough for those born in 1925 (aged 72 in 1997)). Cohort and age effects for total household energy expenditure – the sum of residential and transport related energy demand - reveal a different pattern (Bardazzi and Paziienza, 2017). Equivalent energy expenditure shows a steadily increasing age effect while cohort effects show that younger generations clearly have increased total energy expenditure and this is particularly true for the cohort of those born in the 1970s. This overall effect is due to the predominance of cohort and age effects related to electricity and heating fuels: the younger generations – born between 1947 and 1988 – that grew up in the post-war period show a preference for more heating comfort and leisure compared to the older generations (born before 1947) who spend less for energy as most of these cohorts lived through the war and their spending attitudes were influenced by the experience.

## Conclusions

In this paper, we have found evidence of a life-cycle pattern in vehicle possession and fuel expenditure, beside confirming the importance of other socio-demographic determinants on household transport-related energy use. This pattern is consistent also with the estimated age effects on the pseudo panel with a decreasing equivalent transport fuel expenditure after the age of 55. Age has the opposite effect on household total energy expenditure as older householders steadily increase their demand. However, by building cohort data for Italian households, we have decomposed and estimated also significant nonlinear cohort effects on transport fuel expenditure which interplay with the age effects to decrease transport fuel consumption in newer generations. According to our estimates, baby boomers and older generations have a positive cohort effect, so that their transport fuel expenditure is significantly higher compared with the younger generations. This evidence supports the argument of Stephenson et al. (2015) that different social norms, including individual expectations and aspirations, interplay with material culture and energy practices in shaping individual behaviour, subject to the external influences, which form the context where energy cultures develop. The changing age structure of population is interplaying with differentiate transport cultures: for baby boomers cars still give status and individuals of this generation drive more and more. On the other hand, Millennials show a higher environmental attitude and use new technologies to share and mix transport means. This transport transition can be appreciated by looking at age and cohort effects in Italy. Fuel consumption steadily declines with age, whereas cohorts born after the War (between 1949 and 1959) exhibit the highest fuel consumption intensity. In other words, beyond population aging, new generations may contribute to a reduction of transport fuel use and GHG emissions.

## References

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