

# Inequality by Demographic Factors

## Findings from Individual-Level Cantonal Tax Data

Rudolf Farys  
University of Bern  
[rudolf.farys@soz.unibe.ch](mailto:rudolf.farys@soz.unibe.ch)

Oliver Hümbelin  
Bern University of Applied Sciences  
[oliver.huembelin@bfh.ch](mailto:oliver.huembelin@bfh.ch)

Extended Abstract prepared for the International Conference,  
The Evolution of Economic and Social Inequalities in Switzerland (and Beyond):  
Exactly How and Why Inequality has Changed and with what Impacts  
University of Neuchatel, Switzerland  
23-25 October 2014

## 1 Introduction

This paper examines how income inequality is affected by demographic factors and demographic change. A lot of inequality-research is done on processes affecting unequal wages (economic factors) and redistribution (institutional factors), but there is little work on the effect of demographic change on income distribution, although this field is increasingly gaining attention.

Indeed the population of Europe is in change. The demography report 2010 published by EUROSTAT (2011) notes that Europe is becoming older, more numerous and more diverse. In Switzerland the picture is similar. Over the last 30 years population grew by 1.8 Million (STATPOP)<sup>1</sup> and a central part of growth is due to migration. On average the annual net migration since 1980 was ~28'000 (PETRA/STATPOP).<sup>2</sup> At the same time there is a trend of people to live alone. The share of people living in one-person households tripled from 1980 (12%) to 2012: (36% (VZ)).<sup>3</sup> Furthermore like many western societies Swiss population is ageing. Indeed the share of people over 65 rose from 14% (1980) only to 17% (2012) (ESPOP/STATPOP) but estimations predict this share to be 24% in 2030 (SCENARIO).<sup>4</sup> All these developments can be theoretically related to income inequality.

<sup>1</sup> <http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/07/blank/data/01.html>

<sup>2</sup> <http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/07/blank/data/01.html>

<sup>3</sup> <http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/04/blank/01/02/01.html>

<sup>4</sup> <http://www.bfs.admin.ch/bfs/portal/de/index/themen/01/02/blank/key/alter/gesamt.html>

## 2 Theory

In particular the increase of one-person households seems to increase inequality (Daly and Valleta 2006, Peichl et al. 2011, Grabka and Kuhn 2012). Because people marry later/less and divorce more often people have to rely on their own earnings and don't profit from within household redistribution. Moreover, Fritschi and Bannwart (2013) show that differences between households with and without children are rising, which might be a sign of new poverty risks. Their analyses highlight the importance of subgroup inequality analyses.

Furthermore, the ageing of society is expected to lead to greater inequality. Already Mincer (1958) linked age to wages by showing, that the quality of performance on the job (and hence wages) is a function of formal training and experience (which is naturally proxied by age). Schellenbaur (2013) therefore argues that in a (hypothetic) world where wages depend only on age and are otherwise completely equal within an age-group, annual cross-section results lead to substantial inequality due to age differences within society. Von Weizsäcker (1996) goes a step further and argues that the ageing of a population might be associated with increasing inequality by many potential channels. Kaufmann (2005), in turn, warns of rising differences between age-groups. Ageing of the population might lead to a conflict between generations when financial feasibility of social security is being tested.

Also migration can affect the distribution of income while no general mechanisms are identified (Morris and Western 1999). We assume that it matters especially which segments and qualification levels of domestic economy is target of migration. Immigration in low wage sectors can put additional pressure on low wages and therefore increase inequality. Also immigration of top earners can lead to more inequality. How immigration of general working population affects inequality is not easy to say.

When linking demography to inequality two inequality-relevant processes must be separated. (1) Demographic change can affect the overall income distribution. (2) Demographic change can lead to segregation and problematic between group differences within a society (without necessarily affecting overall income inequality).

While we think that all three areas (age structure, household, migration) are worth of more investigations, we focus in this paper on the change of age and household structure. Our central research questions are: Is overall inequality affected by demographic change? Do between group differences change over time, when looking at age groups and household types.

## 3 Data and Method

We perform a statistical "case Study" by using cantonal tax data from Basel-City. For this canton we have information out of tax dossiers reaching relatively far back in time. Hence we can compare the situation back in 1991 with 2011 allowing us to investigate the role of demographic change. A main advantage of tax data is data coverage (no sample bias). The data used for the following analysis include all residents of Basel-City of age 18 and older. To assess inequality we look at the net income (Reineinkommen) which equals the total income after non-social deductions. The same data provides information on household-structure and age making it possible to identify demographic subpopulations.

We decompose overall inequality into within and between group components by using the Theil-Index, which is additively decomposable (Hao & Naiman 2010):

$$\begin{aligned}
 \blacktriangleright \quad I(y; \theta) &= \underbrace{\sum_{l=1}^L \phi^l \left( \frac{\mu^l}{\mu} \right)^\theta I(y^l; \theta)}_{\text{Within components}} + \underbrace{I(\mu^1, \dots, \mu^L; \theta)}_{\text{Between component}}
 \end{aligned}$$

By looking at inequality (Theil Index) within and between subpopulations for two different years (1991 and 2011) we highlight and evaluate the different mechanisms how these demographic changes can affect inequality. In a last step we estimate a counterfactual distribution using inverse probability weighting to quantify how much of the inequality rise can be explained by ageing and changes in household composition.

## 4 Results

Inequality in Basel-City rose from 1991 (Gini: 0.43, Theil: 0.41) to 2011 (Gini: 0.49, Theil: 0.56). 19% of this increase can be explained by ageing and changes in household composition. The mechanisms however vary. Ageing contributes to inequality due to rising incomes of retired people and lower incomes of young adults. But the main drivers of inequality are diverging incomes within the workforce. Household structure contributes due to an increased between group inequality as (1) incomes for married households grew faster than for single households (2) the share of single households grew from about 56% to about 65%. One interesting fact worth to mention is that a further increase of single households will cause the between group inequality component to shrink as the Theil Index - for two homogeneous subpopulations - reaches a maximum for a 63% share of the poorer group.

In further analysis it needs to be clarified whether the „single“ tax units are actually single households. Two „poor singles“ might go without a marriage but live together. In future analyses with tax data from Bern we will investigate this issue by utilizing household-IDs constructed out of housing registers.

## 5 Literature

- Daly, M. C., & Valletta, R. G. (2006). Inequality and poverty in United States: the effects of rising dispersion of men's earnings and changing family behaviour. *Economica*, 73(289), 75–98.
- Fritschi, T., & Bannwart, L. (2013). *Einfluss familienpolitischer Ausgleichsinstrumente auf die Ungleichheit von Einkommen in der Schweiz*. Bern: Berner Fachhochschule.
- Grabka, M., & Kuhn, U. (2012). Entwicklung der Einkommensungleichheit in Deutschland und in der Schweiz seit der Jahrtausendwende. *Schweizerische Zeitschrift Für Soziologie*, 83(2), 311–334.
- Hao, L., & Naiman, D. Q. (2010). *Assessing Inequality*. California, New Delhi, London, Singapore: SAGE.
- Kaufmann, F.-X. (2009). Gibt es einen Generationenvertrag? In *Sozialpolitik und Sozialstaat: Soziologische Analysen* (pp. 165 –182). Springer-Verlag.
- Mincer, J. (1958). Investment in human capital and personal income distribution. *The Journal of Political Economy*, 66(4), 281–302.
- Morris, M., & Western, B. (1999). Inequality in Earnings at the Close of the Twentieth Century. *Annual Review of Sociology*, 623–657.
- Peichl, A., Pestel, N., & Schneider, H. (2012). *Does Size Matter? The Impact of Changes in Household Structure on Income Distribution in Germany* (SSRN Scholarly Paper No. ID 1998548). Rochester, NY: Social Science Research Network. Retrieved from <http://papers.ssrn.com/abstract=1998548>
- Schellenbauer, P. (2013, Oktober). Wer hat, dem wird nicht immer gegeben. Retrieved from <http://www.avenir-suisse.ch/31570/einkommen-wer-hat-dem-wird-nicht-immer-gegeben/>
- Von Weizsäcker, R. K. (1996). *Does an Aging Population Increase Inequality?* (CEPR Discussion Paper No. 1322). C.E.P.R. Discussion Papers. Retrieved from <https://ideas.repec.org/p/cpr/ceprdp/1322.html>