FRANS VAN POPPEL: A SORT OF FAREWELL

LIBER AMICORUM

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Liber Amicorum

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Preface

This is a book written by scientific friends of Frans van Poppel on the occasion of his 65th birthday; an event that at present still means automatic retirement in the Netherlands. For the Netherlands Interdisciplinary Demographic Institute (NIDI) and the demographic discipline, Frans has been and still is of large stature and we have to choose one occasion to show him how big his impact is. His formal retirement is a good excuse to do that.

Indeed he has left a big mark on demographic science. For example, initially, the editors Erik Beekink and Evelien Walhout planned to add a list of his publications to this volume, but that proved to be a little out of balance, since it would have covered more than 50 pages! Nevertheless, it is not in the first place in quantity, but in the quality of his scientific work that he stands out. For NIDI he set the standard of making it the rule rather than the exception to publish in the highest ranking demographic journals. His dedication to carefully planned empirical research has been an example for younger scholars both within and outside NIDI, and he has always been more than willing to help out if a colleague asked his advice to get around a difficult research problem.

NIDI is very proud to have had such a scholar among its staff. Frans started at NIDI in 1976, a year that today is considered history for some. Retirement marks a sort of farewell, but not of the sort that Frans is going to leave the scientific stage, or NIDI. As a recognition of his contributions to both demography and to the institute, NIDI is happy to offer Frans a *honorary fellowship*, so that he remains affiliated with the institute in the future.

Without a doubt this *Liber Amicorum* is not only a fine tribute to him, but also a welcome addition to demographic libraries. The topics chosen by the contributors signify the broad area that he has covered, and the content of their contributions prove the significant scientific value he has added to the field. Taken together, they give a beautiful view of a scientific career in the heart of the demographic discipline, where a lot of work is indeed joint work, but nevertheless with a clear individual mark.

The two editors have done a very good job. Thanks to their efforts in a short time a large number of first class contributions were collected. I also express my thanks to all authors. All participants reacted enthusiastically and swiftly to the request of the editors. Each of their contributions reveals an interesting piece of Frans's career. Taken together, they form a beautiful and rich mosaic of a remarkable academic career.

Although retirement is 'a sort of farewell', I am sure his academic productivity will not show even the slightest dip around this age and he will continue to work, perhaps more leisurely than in the past, on his many demographic interests. So in a sense this collection of tributes is a snapshot in a career in full swing.

Leo van Wissen
November 2012

Introduction

On 27 December 2012 Frans van Poppel, Senior researcher at NIDI in The Hague and Professor of Kinship Demography at the Department of Sociology at Utrecht University, will retire. After more than 40 years of dedication to academic research he will become *honorary fellow* at NIDI, the research institute where he spent most of his academic career.

The editors and contributors dedicate this volume with short essays to Frans van Poppel and his influential scholarly work. The contributions in this volume *–a Liber Amicorum–* centre around issues that are of particular interest to Frans and which are central to historical demography as a whole: The history of the family, life course analysis, historical data and methodology, and historical population issues. The contributors, all national and international academic colleagues in the field of –mostly– social and economic history and historical demography reflect on the influence and impact of Frans van Poppel and his scientific work in the field of Dutch as well as international historical demography. They also reflect on their joint work, present new findings and insights, and propose new research and methodologies.

The significance of Frans van Poppel as a historical demographer has been substantial as is made clear by the various authors in their essays. In the first place, without any overstatement, the responses to the invitation to contribute to this volume were overwhelming. This tells us a lot about the personality of Frans van Poppel who is in many respects our mentor. All replies were encouraging and enthusiastic with colleagues already reflecting on his work or the work they had done together with Frans, the committees they participated in, the meetings at conferences and above all, his friendship. In the second place, the range of topics in this volume is extensive which highly reflects the academic diversity of Frans.

A first cluster of essays refers predominantly to the scope and impact of Frans in the field of family history, life course analysis and historical demography. What is the influence of Frans in historical science and demography? The essays of Dirk J. van de Kaa and Jan Kok, both presenting their ideas on the work of Frans in lectures during a seminar in honor of Frans's retirement and organized by NIDI on 11 December 2012, the personal (scientific) note of Simon Szreter and the bibliometric analysis of George Alter, should give the reader food for thought.

The variation in topics provides, in our opinion, a modest but fairly sound overview of the fields of interest of Frans. The scientific essays in this volume are distinguished according to research theme: Data and methods, fertility and nuptiality, and aging and mortality. These main fields of research are not difficult to discover in Frans's scholarly work over the past 40 years. We could range the essays of Peter Doorn, Antoinette Fauve-Chamoux, Ron Lesthaeghe and Kees Mandemakers on the side of 'methodological issues' while stressing the importance of proper techniques and good quality data. They express both implicitly and explicitly Frans's interest, his initiatives and contributions to the methodological side of historical demography. A second issue that is of special interest to Frans van Poppel is the description and explanation of differential fertility and nuptiality patterns and reproductive behavior, in particular by

social class and religious affiliation. The essays of Hans Knippenberg and Sjoerd de Vos, Jan Van Bavel and Aart Liefbroer particularly reflect on this. Frans van Poppel's dissertation on marriage in 19th and early-20th century Netherlands became a classic on nuptiality. Several contributions highlight this fact and deal with nuptiality issues: The papers of Shuang Chen, James Lee and Cameron Campbell, Hilde Jåstad and Gunnar Thorvaldsen, Pim Kooij, Ineke Maas, Marco van Leeuwen and Richard Zijdeman, Jona Schellekens and Tony Wrigley.

Regarding research on mortality –and again, it's social and economic differentials–, it may be stated that the contributions of Tommy Bengtsson, Martin Dribe, Bertie Lumey, Johan Mackenbach, Michel Oris and Mathias Lerch, Diego Ramiro-Fariñas, David Reher and Willibrord Rutten show the wide range of topics Frans van Poppel has dealt with in this type of research, for instance the effects of childbearing on health and longevity, fetal and neonatal mortality, and the impact of heat waves and seasonality on mortality in past, present and future.

The editors would like to take the opportunity to thank all contributors. It was a great honor and pleasure to work with you to make this *Liber Amicorum* possible in such a short time span. We hope that this volume which, as mentioned before, reflects in our opinion an important part of Frans van Poppel's considerable contribution to historical demography, will be read by many people with great pleasure and interest and for some researchers even might be a source of inspiration for new research.

The editors express their appreciation to Leo van Wissen and Nico van Nimwegen for encouraging and supporting this initiative from the very start. We thank Jeannette van der Aar and Jacqueline van der Helm for their technical support.

Erik Beekink and Evelien Walhout
November 2012

Part I

Scope and Impact

Frans van Poppel: A sort of farewell in 2012

Dirk J. van de Kaa

A perfect demographer

Calling Frans van Poppel a perfect demographer at his farewell party obviously is risky. People may well think that, as is not uncommon on such occasions, I'm speaking hyperbolically: That I am exagerating deliberately. But I assure you that is not the case. I have to concede, of course, that I am measuring his merits against my own standard of what a very good demographer should be. But that standard is not too subjective and will, I think, stand the test of time. Frans is so perfect because he has an insatiable interest in all issues of a demographic nature. He does not limit himself to fertility and the family but has worked on migration and mortality as well. He does not shy away from policy issues, has a sound knowledge of technical demography, while his knowledge of the literature on population questions is unsurpassed. I have never felt disappointed when I consulted him on a specific topic although I have to agree that from time to time I did feel a bit overwhelmed. Frans would normally give the necessary time depth to his work and, invariably, was in for an interdisciplinary approach and for collaborations that resulted in joint authorship with colleagues from a wide range of scholarly specializations. And, finally, I trust that his interest in population matters will not end upon formal retirement so that this occasion is not the real farewell of a much appreciated colleague!

Recruitment

After Hein Moors and Gerard Frinking, in 1976 Frans was the third member of the scientific staff who could be recruited by NIDI. I knew for some time that he would be my next choice, but effecting his recruitment was not so easy. Piet Muntendam, a very important person in the history of the institute, and himself a professor of social medicine, argued that a medical demographer should be selected to fill the new position. And, while Frans had made projections in relation to the establishment of the new medical faculty in Maastricht, he could not really count as such. Another consideration was that one of the tasks the NIDI director had was to further demographic research at the universities in the country. Luring away their most promising scholars hardly could count as such. A third obstacle was that I had been away from the Netherlands during the student revolt and sometimes was taken aback by the tremendous informalization in academic life that had followed it. When one day I was invited by a certain professor to come and get acquainted, the appointment was set for lunchtime. I told my wife not to count on me for dinner as in a faraway university town a splendid meal most likely awaited me. But when at the appointed hour I knocked on the door carrying the name plate I was looking for and I was invited in, I was offered a chair at the man's desk and was asked whether I would mind that during our conversation he would eat his sandwiches. I have never forgotten, nor forgiven, that episode. So when I first met Frans I was a little taken aback by his long flowing hair and his contemporary garb. Had he become too informal to be suitable as a researcher at an institute with a national mandate? Fortunately I didn't let it deter me and later on found him to be a very dedicated scholar while his blonde locks and height proved rather helpful when looking for him in a crowded conference room.

Publication record

Frans is a prolific author. Just over 300 publications carry his name. Of these 10 count as a book, 82 are articles published in an internationally refereed journal and the remainder have appeared in a national journal, an edited volume, or less scholarly outlet. One of the main purposes of adding Frans to NIDI's staff was for the institute to stay in touch with the many people in the country and abroad whose work had a distinct historical focus or who did not fit in mainstream demography. From examining Frans's publication record it can only be concluded that he has been extremely successful in covering these areas of interest. He has done the institute a great service by developing and maintaining an extensive network of scholarly contacts and by joining initiatives to collect data or records for special archives or databases. His willingness to work with others is quite apparent if one counts the number of people he wrote at least one publication with. Our common friend Yves de Roo let his computer make the counts for me. The result shows that during his career Frans has had no fewer than 375 co-authors with almost 150 unique names. The colleagues he published with most frequently were Peter Ekamper (18) and Aat Liefbroer (16) both of NIDI and the historian Kees Mandemakers (16) of the Academy Institute IISG. With another NIDI colleague, Hanna van Solinge, he collaborated for a publication 11 times. It would have pleased Muntendam to see that immediately following these social scientists the medial researcher, Johan Mackenbach, features in 5th place on the list with 10 joint publications. All in all Frans was single author in almost 30 per cent of the cases and first author in nearly 58 per cent. With almost 40 researchers he worked together on more than three occasions, while with the remaining hundred or so (102) he wrote a joint paper only once or twice. The list of names of co-authors is not simply long and impressively varied; it also contains internationally well respected names. For example, of Jona Schellekens, Lincoln Day, David Reher, Tapani Valkonen, George Alter and George Stolnitz. Frans would seem to have had a certain preference for surnames beginning with a B (18) or an S (17) but perhaps these people simply selected themselves.

Fields of research

It is fair to say that a person's bibliography also is bound to reflect his or her main research interests. In the case of Frans two broad areas in particular deserve attention. Marriage and fertility is the first area and the study of mortality the second. Frans's *magnum opus* is his book of 1992 on marrying in the Netherlands during the 19th and early 20th centuries. The book yielded him a doctorate from the Agricultural University of Wageningen and the distinction *cum laude*. To put the matter in perspective, it is 655 pages long and in present day terms would be worth about three Ph.D's. The book is a lasting monument and will be consulted by scholars long after Frans'active involvement in population studies has come to an end. When, the other day, I took it of it's shelf the sheets with the questions I put to Frans as a member of his promotion committee fell out. I had written them down carefully. Apparently my main concern was that while over time one may calculate demographic rates or ratios in exactly the same fashion, their meaning might have changed significantly in one and a half century: Think of extra-marital fertility! As far as I can recollect Frans agreed that the concepts of marriage and divorce also underwent changes during the 150 years or so he had looked at but not quite to the same extent. In any case, in subsequent papers he characteristically studied all sorts

of further aspects of marriage, divorce and fertility. Let me just mention the questions of the seasonality of marriage, the remarriage of widowers, the effects of changes in legislation on divorce, of the role of health selection in the marital transition, of the behaviour of widowers in a small city, of changes in the proper age of marriage, in the degree of homogamy and of the problems encountered when trying to overcome the death of one of the marrriage partners. It is a rich display of topics and interests and the collaboraters tend to change with the issue.

If one consults an international database on mortality, chances are that one finds a note that the data on the Netherlands have been supplied by Frans van Poppel. And indeed, together with several others Frans has done his utmost to try and construct cohort and period life tables from the earliest possible date. I have always found the two estimates of life expectancy at birth for the first half of the 19th century very useful in illustrating the magnitude of the changes in the last decades. For the years 1827-1828 life expectancy at birth in the Netherlands apparently only reached 36.6 years while for 1840-1851 it may even have been half a year less. Just as in the case of marriage and fertility Frans has constantly sought to broaden our horizon and to push the boundaries of our knowledge further away. One aspect concerns differental mortality: How large were the differences between rural and urban areas, between the sexes, between social classes, at different ages, and just after birth or when people had become aged? Investigating the causes of death, changes in the state of health as self-reported and the increase in the probability of death following the loss of a parent or a partner. The relation between marital status and mortality also received attention, while the survival of illegitimate children in comparison to their legitimate counterparts similarly was the subject of a study. Again, just as regarding fertility and marriage, Frans gave the role of religion his special attention. Did it result in differences in infant and childhood mortality? In all of this work, that in fact one can see grow almost organically under his hands, Frans always was on the alert for the possibility of international comparisons and when international programmes in historical demography were being launched the organizers commonly found in Frans their representative for the Netherlands.

In all of his work Frans kept an open eye for the theoretical aspects of a study and the larger framework in which the topics selected had to find their place. His extensive knowledge of population literature built up over many years of reading and acting as a sort of custodian of the NIDI library paid off handsomely on such occasions.

Epilogue

I must admit that with two exceptions, that is when both of us were on the NIDI staff and when Frans was the Rogier professor at the University of Nijmegen, I had no reason to follow Frans's career very closely. From a certain distance I was happy to see that he was doing well but we never really collaborated nor wrote a paper together. Why we never did is a moot point. Curiously enough the situation suddenly changed when Frans was coming close to retirement and I was about to become an octogenarian. A few years ago Yves de Roo and I were working on our book on the members of the Royal Academy. We then found that calculating their life expectancy was both possible and illuminating in assessing their social position. Two or three years later it ocurred to me that one could possibly collect information on the birth and death

of visual artists living during our Golden Age and in doing so shed light on their survival. The then NIDI-director, Frans Willekens, and Frans van Poppel both thought it a worthwhile project and when Jolande Siebenga quickly secured a suitable database we could start a fairly labourious task. A great problem was that just as scholars, painters and sculptors are not born famous so that in many cases approximate dates of birth and death only were known. Govert Bijwaard came up with a clever solution for this problem so that, pretty soon now, our joint paper will appear in Population Studies.

Presumably that will make me precisely the 150th person ever involved in a publication of Frans. A modest position, one might well say, but I'm pleased that at long last I have learned first hand what a remarkable and perfect demographer Frans van Poppel really is.

Ahead, not aloof. Frans van Poppel's contribution to agenda-setting in historical demography

Jan Kok

Frans van Poppel has changed the field of historical demography in two ways. First, by constituting a monumental body of knowledge, in the form of literally hundreds of articles, book chapters, monographs and edited volumes. His scientific output is, and undoubtedly will remain, an essential source for all those seeking information on family and demographic behavior in the past. Second, by inspiring others to follow his lead, to take up new topics, to explore new sources, and to experiment with new methods. In this brief essay I will focus on the latter, and I will do so by looking back as well as by looking forward. Looking at the past decades, how has Frans achieved to move the field, and in what directions? And how does his work constitute a challenge for the next generation of historical demographers?

Differential demography

Speaking for myself, but surely also for many others –both in the Netherlands and abroad-, I think that Frans van Poppel has been exemplary by his choice of topics, his typical mixture of qualitative and quantitative approaches, his quest for new data, and finally, his research collaborations. In terms of topics, Frans has early and consistently made the choice to work on *differential demography*. Until well into the 1980^{s}, historical demography in the Netherlands had been focused on mapping and contrasting locally and regionally aggregated data, in order to understand the epidemiological and fertility transitions of the 19th and 20th centuries. Frans set out to decompose these aggregates into their smallest components possible, with a clear preference for the level of the individual. Although his work frequently offers an introduction on spatial differences and trends, the apotheosis is more often than not an elaborate multivariate model showing how demographic behavior differed by social class, church denomination, and household composition. Moreover, he also integrates period effects in his models, such as food crises (e.g. the Famine of 1944/1945), GDP per capita, unemployment rates and even temperature. His work proved, among others, that religion and social class exerted autonomous influences on all aspects of behavior.

However, Frans was also quick in recognizing that the behavior of individuals had to be placed squarely in their social networks. This led him, for example, to explore genealogies to reconstruct kinship networks, and to use the witnesses on marriage certificates to study the networks of Jews and Christians in The Hague (Van Poppel and Schoonheim, 2005). In his choice of topics, Frans has managed to straddle both (social) history and demography, thus keeping open the dialogue between these disciplines and countering a trend of academic fragmentation and disassociation. On the one hand, and naming just a few examples, Frans has contributed to social history by his studies of the 'housewife ideal', the institutionalization of the elderly, social mobility, the history of leaving home (in international perspective), the study of naming practices, and the fates of reformed boys, illegitimate children, permanent celibates, and widows. On the other hand, he has taught social scientists the relevance of the

ever-changing societal and normative context of behavior and the need to adopt a long-term perspective.

Suggesting research topics is one thing, coming up with convincing results is quite another. Frans's results appeal to a wide audience (going beyond historians and demographers) because of his mixed methods approach. His hypotheses are well-grounded in the literature, including 19th century medical reports, government enquiries, ethnographic material, and egodocuments. They are tested on representative datasets, often the result of painstaking data collection, in many cases by Frans himself. Finally, the analytic handling of the data has always been –as far as I can see– of great quality. His dissertation on marriage and divorce shows his great love for history and literary sources in the detailed analysis of contemporary debates between politicians, church officials, social reformers, and eugenicists on the 'proper' age to marry. Popular attitudes to marriage are studied through regional customs, proverbs and may other sources. In the same book, however, Frans tackles the regional variation in marriage in a linear regression model, and goes on to study remarriage hazard ratios in one of the first event history analyses to be performed in Dutch historical demography (Van Poppel, 1992). Another example of his sophisticated mixed methods approach is his study with Hugo Röling on contraceptive behavior of medical doctors, in which they combined a history of debates on contraceptive techniques with family reconstitutions of a large number of medical professionals in Holland. They showed that although doctors were clearly pioneers of birth control in their private lives, concerns for the respectability of their profession prevented them from openly advocating neo-Malthusianism (Van Poppel and Röling, 2003).

The success of Frans's research stems –in part– from his fine nose for data. In his earlier work, historical census data still played a large role, but Frans soon cast his net wide to include sources as diverse as cause-of-death statistics, collections of marital records (e.g. Gouda), automatically reconstituted family trees (GenLias), archives of churchyards, interviews with priests and parishioners, and complete life course reconstructions of regional or even national samples of individuals. This could imply, as in the case of the Historical Sample of the Netherlands, a long-term involvement in organization, quality control and dissemination of the specific data infrastructure.

Agenda-setting

His success can also be attributed to his ability to collaborate across disciplines, generations and frontiers. Until recently, historians kept very much to themselves, in terms of data and methods. The 'collaborative model', as shown by Frans, expanded the scope and relevance of historical work through the fine-tuning of hypotheses and results, incorporating specialized knowledge (e.g. on statistical modeling), and allowing for large scale or comparative research. A recent example is the special issue by Frans and Tommy Bengtsson in *Explorations in Economic History* (2011) on change over time in social class differences in child and adult mortality. They refute conventional wisdom by showing that, for a long time, high income and high social status were not consistently translated into health benefits. Even more recent is his cooperation with Spanish authors (Van Poppel *et al*., 2012) who had demonstrated that child survival affected fertility decisions in pre-transition populations. By replicating their

approach on Dutch data, Frans showed on the one hand that this association appears to be universal, on the other hand that the effects differed strongly by social and religious group, reflecting strong socio-cultural differences in self-agency.

In all these aspects of historical-demographic research, Frans was ahead of the rest. Yet, he clearly never was 'aloof' – he never distanced himself from the other players in the field. As supervisor of trainees, peer reviewer, commentator at conferences, co-promotor of Ph.D. students, editor of journals, board member of organizations and in many other ways, Frans has encouraged others to take up the fascinating subject of family and population history. To summarize: Frans's track record of agenda-setting amounts to exploring promising research fields, demonstrating the added value of mixed methods, investing in data infrastructure, and setting high quality standards.

However, Frans is only human. There are still areas he has hardly touched upon. Actually, some fields may have been relatively underdeveloped by the concentration of Frans and other historical demographers on the topics mentioned above. Firstly, Frans has dedicated most of his energy to the demography of the Netherlands in the data-rich period after 1850. There are still many issues to be addressed in the earlier period. For instance, when and how did the positive association between wealth and family size disappear? Secondly, although studies on migration are not absent in Frans's publication list, he has refrained from systematically linking migration to other aspects of demography, such as fertility or mortality. Finally, Frans is not a 'system-builder'. In most of his work, he seems to studiously avoid holistic concepts such as 'demographic regime' or 'family system'. Also, he is not engaging (probably for good reasons) in debates with, for instance, those economists who seek to explain the great transformation of the nineteenth century in the form of a Unified Growth Theory that links the industrial revolution to fertility and mortality decline.

What next?

Although Frans will hopefully remain active for a very long time, the occasion for which this essay was written begs the question: What next? What are now the challenges for historians and demographers? For historians, Frans offers, firstly, a puzzling array of subtle differences in behavioral responses between occupational and religious groups and, secondly, a set of compelling questions on long-term change. Referring to the first, the next generations will have to dig deeper still. Thus, we need to find out how the assumed differences in attitudes and outlook between Catholics and (Liberal) Protestants have emerged, and how they could persist over time. What is the role of social control mechanisms in this respect? Also, the distinctions by socio-occupational group identified by Frans may hide other, possibly even more important fissures in society. How does the picture change once we compare life courses by education, income, property, or even expectations of inheritance? Referring to the second, Frans's studies suggest that change in demographic behavior is more influenced by socio-economic factors than by cultural/ideational ones, thus adding to the growing critique of diffusionist models. In a recent article (Schellekens and Van Poppel, 2010) it is argued that mortality decline coupled with the rise in real wages are the most important factors in explaining the Dutch fertility decline before 1940. However, it is still not clear how the

supposed 'quality-quantity trade-off' functioned at the level of individual couples. Moreover, Frans's analyses of nineteenth century demography need to be integrated into new narratives for non-specialist audiences. For instance, what do Frans's findings on social mobility, networks and social group differences in mortality and fertility tell us about class formation during Dutch industrialization? Can we translate Frans's remarkable findings on the life expectancy of widows and orphans to a new vision on Dutch welfare? And, finally, how do Frans's finding on strongly internalized religious norms affect our view on the meaning of Pillarization?

History matters

For demographers, Frans's legacy is clear: History matters. And it does so in at least three ways. First, Frans's recent work on family composition of adolescents in the past 150 years has shown the relevance of taking the long view. The current experience of growing up in broken families is mirrored by the many (semi-)orphans in the past (Van Gaalen and Van Poppel, 2009). Clearly, the 1950^{s} do not represent 'traditional' Dutch society. If anything, the period 1945-1965 was probably the most 'untypical' period in Dutch recent history with respect to family life. The great challenge of historical demography, as demonstrated exemplarily in Frans's work, is to show and understand precisely when demographic behavior can be understood in terms of continuity, and when it is subject to change. Secondly, the added value of the longitudinal perspective in Frans's demographic analyses is clear; people act on past experiences and we cannot understand demographic events in isolation from earlier ones. Finally, history serves as an ideal laboratory for testing socio-biological aspects of demography; e.g. determinants of starting, stopping and spacing in a non-contraceptive environment, or the intergenerational transmission of behavior (as Frans has done on the age at marriage (Van Poppel, Monden and Mandemakers, 2008)).

It is to be hoped that historical demographers will take up this challenge and pursue research along the lines suggested by Frans van Poppel. Preferably, by expanding into the more distant past as well. Above all, let's hope that future generations will be able to work in the true 'Poppelian' spirit. That is, by tackling the research questions with a balanced mixture of qualitative and quantitative content, soundly embedding them in the literature, formulating a clear body of testable hypotheses, cautiously interpreting results, and where possible, working in a truly interdisciplinary setting.

References

Bengtsson, Tommy and Frans van Poppel (2011), Socio-economic inequalities in death from past to present: An introduction. *Explorations in Economic History*, 48(3), pp. 343-356.

Gaalen, Ruben van and Frans van Poppel (2009), Long-term changes in the living arrangements of children in the Netherlands. *Journal of Family Issues*, Vol. 30(5), May, pp. 653-669.

Poppel F. van (1992), Religion and health: Catholicism and regional mortality differences in 19th century Netherlands. *Social History of Medicine*, Vol. V, nr. 2, August , pp. 229-253.

Poppel, Frans van and Hugo Röling (2003), Physicians and fertility control in the Netherlands. *Journal of Interdisciplinary History*, 34(2), Autumn, pp. 55-185

Poppel, Frans van Poppel and Marloes Schoonheim (2005), Measuring cultural differences between religions with network data. An example based on 19th century Dutch marriage certificates. *Annales de Démographie Historique,* 1, pp. 173-197.

Poppel, Frans van, Christiaan Monden and Kees Mandemakers (2008), Marriage timing over the generations. *Human Nature*, 19(1), pp. 7-22.

Poppel, Frans van, David S. Reher, Alberto Sanz-Gimeno and Maria Sanchez Dominguez (2012), Mortality decline and reproductive change during the Dutch demographic transition: Revisiting a traditional debate with new data. *Demographic Research* (in press).

The impact of a historical demographer: A bibliometric approach

George Alter

Since historical demography is a quantitative discipline, it may be interesting to examine quantitative measures of our colleague Frans van Poppel's impact on science. The development of citation indexes has resulted in the emergence of bibliometrics, a set of methods designed to analyze publication patterns in the scientific literature. This brief excursion into bibliometrics is intended to demonstrate how broad and important the contributions of our friend and colleague have been.

The most common way to measure influence in bibliometric analysis is by counting citations. The underlying assumption is that scholars are most likely to cite work that they consider original and important. A prominent example of bibliometrics is the 'Journal Impact Factor', which is published by Thomson Reuters as part of their Journal Citation Reports®. Journal Citation Reports have been published since 1975, when they were based on the Science Citation Index® and the Social Sciences Citation Index®. These indexes were created by the Institute for Scientific Information® (ISI), which was acquired by Thomson Reuters in 1994. The Science Citation Index, the Social Sciences Citation Index, and similar databases covering the arts, humanities, and biomedical research are now included in a single product known as the Thomson Reuters Web of Knowledge® (also known as ISI Web of Science®). The measures used here are derived from Web of Knowledge and two other citation databases (Scopus and Google Scholar).

These three databases index enormous numbers of publications, but that does not assure that they will produce the same results. Web of Knowledge is the oldest service, and it includes journal articles back to 1900 (Thomson Reuters Online source). However, the selection of journals in Web of Knowledge is more limited and more focused on English language journals than other products. Scopus, which is owned by publisher Elsevier, claims a larger list of journals and a wider international scope (Elsevier Online source). Both Web of Knowledge and Scopus begin with peer-reviewed journals, but they have added other publications, including books and conference proceedings. Google Scholar grows out of the Google search engine, and it indexes papers on individual websites and other web content as well as publications (Google Online source). Microsoft is developing a competitor called Academic Search, which is still in 'beta' testing.

The first problem in assembling a bibliometric analysis is assuring that we have identified the publications belonging to the person of interest. This process, known as disambiguation, involves filtering out publications that belong to other people with the same name. Fortunately, "van Poppel" is not a common academic name. A search for "vanpoppel f*" in Web of Knowledge returned 12 record sets, which could be 12 different people. Most of these records point to publications by our colleague, but it is necessary to filter out some articles, such as the 1993 article on "Scraper Systems in Pig Houses" published by a different F. van Poppel.

Both Scopus and Google Scholar had already used other information to consolidate all of the relevant records under a single identity.

As bibliographic databases become more important, there is an active movement to assign identification numbers to individual scholars. Thomson Reuters encourages authors to create a ResearcherID, which allows them to establish profiles and claim their own publications in the Web of Knowledge database. The Scopus Author ID has similar functions in that database. Both Thomson Reuters and Scopus have connected their internal author ID systems to the ORCID registry. ORCID (Open Researcher and Contributor ID) is a non-profit group founded to create a central registry of unique identifiers for individual researchers and to link individuals across existing ID schemes (ORCID Online source). In the future, ORCID or something like it will probably connect to record systems at universities and funding agencies.

Table 1 displays the results of our bibliographic searchers. Web of Knowledge, which searches the most restricted collection, identified 49 publications that were cited 523 times. Scopus found 75 publications and 725 citations. Google Scholar returned 145 publications and 1,440 citations, but this includes many duplicates. Since Google Scholar counts each version of an article separately, a single work may be counted several times (e.g. conference presentation, online working paper, journal article, et cetera). We also learn that Professor van Poppel has published with more than 80 co-authors (most often with Johan P. Mackenbach and Aart C. Liefbroer) and in at least 43 different journals (most often in *Population Studies, Annales de Démographie Historique,* and *The History of The Family*). His most cited publications are 'A longitudinal study of health selection in marital transitions' (Joung *et al*., 1998), 'Differences in self-reported morbidity by marital-status and by living arrangement' (Joung *et al*., 1994), and 'A test of Durkheim's theory of suicide – Without committing the 'ecological fallacy'' (Van Poppel and Day, 1996). According to Web of Knowledge, the authors who have cited him the most are L.H. Lumey, J.P. Mackenbach and A.C. Liefbroer, and he has been cited most in *Social Science and Medicine, History of the Family, Journal of Epidemiology* and *Community Health,* and *Demographic Research*.

Although they differ in coverage, the citation indexes provide a consistent picture of the influence of Professor van Poppel's work. All of them show an average of ten citations per publication (10.7, 9.7, 9.9). Moreover, his publications hold up over time. For example, among the 55 citations counted by Web of Knowledge in 2011, 31 refer to articles published before 2000. Others in this volume will comment on the quality of our colleague's empirical

Table 1. Results of publication and citation searches for Frans van Poppel

Source	Publications	Co-authors	Number of times cited	Citations per publication
Web of Knowledge	49		523	10.7
Scopus	75	84	725	9.7
Google Scholar	145		1,440	9.9

and theoretical contributions, but the quantitative evidence is clear. Frans van Poppel has had a major impact on the course of scholarship in historical demography, and we can expect that influence to be reflected in citations to his work for many years to come.

References

Elsevier (Online source) Scopus: http://www.info.sciverse.com/scopus (accessed October 28, 2012).

Google (Online source) Google Scholar: http://scholar.google.com/intl/en/scholar/about.html (accessed October 26, 2012).

Joung, I.M.A., H.D. van de Mheen, K. Stronks, F.W.A. van Poppel and J.P. MacKenbach (1998), A longitudinal study of health selection in marital transitions. *Social Science & Medicine,* 46, pp. 425-435.

Joung, I.M.A., H. van de Mheen, K. Stronks, F.W.A. van Poppel and J.P. Mackenbach (1994), Differences in self-reported morbidity by marital-status and by living arrangement. *International Journal of Epidemiology,* 23, pp. 91-97.

Poppel, F. van and L.H. Day (1996), A test of Durkheim's theory of suicide – without committing the Ecological Fallacy. *American Sociological Review,* 61, pp. 500-507.

ORCID (Online source) About Orcid: http://about.orcid.org/ (accessed October 28, 2012).

Thomson Reuters (Online source) Web of Knowledge: http://wokinfo.com/products_tools/multidisciplinary/webofscience/ (accessed October 28, 2012).

On the occasion of the retirement of Frans van Poppel

Simon Szreter

Frans van Poppel has had a wonderfully productive career during which he has surely become the premier historian of demography and the family in modern Dutch history.

His approach has been distinguished by his methodological diversity and preparedness to embrace the insights and knowledge that can come from all forms of evidence in addition to the quantitative information which he has analysed so resourcefully in so many distinct studies.

It was precisely this liberal-minded open-ness which I found so appealing when talking with Frans over twelve years ago about the new oral history research on contraceptive practices that I was engaged in with Kate Fisher when we encountered each other in the bar at one of the many SSHA conferences, which we have each regularly attended over the years. I remember that Frans was immediately very enthusiastic and it was he who was quick to propose that we should consider some form of collective publication along with others doing complementary quantitative and qualitative research on the contraceptive aspects of fertility declines in a number of countries. From this meeting was quickly born the idea for a session as at a subsequent SSHA meeting – in Chicago in 2001. This session was a great opportunity to bring together historians of fertility and birth control who focused on the cultural, ideological and political history of the subject in diverse countries of Europe along with others examining contemporary qualitative material collected by social-feminist activists in Scandinavia as well as interview-derived, 'new' historical evidence from Quebec and Britain. All of this was achieved in the six articles published together in the *Journal of Interdisciplinary History* as Issue Number 2 of Volume 34 in 2003. Frans was also instrumental in recruiting the great French cultural historian, Robert Nye, to our discussant and editorial team, also a person who was a great pleasure to work with.

Frans's own contribution was an excellent piece perfectly exemplifying the special issue's main methodological proposal regarding the gains to knowledge to be had from combining together both quantitative and qualitative sources of evidence. Together with Hugo Röling, Frans demonstrated how Dutch doctors maintained a careful public face of reticence on all matters to do with birth control, while nevertheless engaging very effectively in private in rigorous reduction of their own family sizes. I recall a particular glimmer of pleasure in Frans's eyes and a broad grin as he presented to us in Chicago the evidence of such systematic hypocrisy among these powerful members of a previous generation.

Frans is a very warm and generous individual who has always spontaneously emitted a great sense of fun in what he does, as on this occasion in Chicago. I hope –and am certain– that we will continue to see a lot more of this over the coming years.

Part II

Data and Methods

The census and the historical demographer

Peter Doorn

'The census tells us who we are and where we are going as a nation', the United States Census Bureau tells us, and: "A census tells us not only about our past, but it can help us prepare for our future".[1] Both statements make it clear why censuses are such an interesting source for demographic and socio-economic research. If the current census tells us where we are going, past censuses tell us where we once thought we were going. Or, as the American census puts it: "So, *how do we know* about our nation? To better understand where we came from, let's take a look back at what America was like during the first census."

Historical demographers can use such old censuses to 'predict the past'. They and socio-economic historians were the main target groups we had in mind when we started a project back in 1996 to digitize the Dutch historical censuses from the first national one in 1795 till the last traditional census held in our country in 1971. In 1981 and 1991, no census was held in the Netherlands, mainly because of a (feared) lack of cooperation by the population. And from 2001 onwards, Statistics Netherlands (Centraal Bureau voor de Statistiek, CBS) organised virtual censuses based on linked official registrations, with added information from a number of surveys.[2] Also in the early years there were gaps in the sequence of censuses. Since 1830 about every ten years a census was published; the Second World War caused a disruption and irregular census years (1947, 1956). It must be mentioned here, that the original counting forms of the Dutch censuses have regrettably not been preserved. Only for 1960 and 1971 we can avail of anonymized micro-level census information. For these years the computer files have been preserved, be it that the 1960 files are not entirely complete.[3]

The census is indeed a basic source of information about the state of the nation, and as such it seems to have great value for historical demographic research. Although it is a rich data source, it also clearly has its limitations. Over his career, it seems that Frans van Poppel has gradually moved away from using censuses as a prime source in favour of other sources for his research. Other sources that are (1) longitudinal and (2) individual, in particular supplying information on the changing position of the individual in the household, and on his or her health (and eventual death).

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1 Explanation on the website of the US Census Bureau of what a census is good for. See: http://www.census.gov/

2 Eric Schulte Nordholt, Marijke Hartgers and Rita Gircour (eds. 2004), T*he Dutch Virtual Census of 2001: Analysis and Methodology* (Statistics Netherlands, Voorburg/Heerlen), p. 276.

3 About 300,000 records are missing; for an extensive report see: Michelle van den Berk and Peter Doorn (2007), 'Een digitale detective story: de reconstructie van de Nederlandse Volkstelling van 1960', in: *Twee eeuwen Nederland geteld: onderzoek met de digitale Volks- Beroeps- en Woningtellingen 1795-2001*, ed. by O.W.A. Boonstra *et al.* (Den Haag, 2007) pp. 471-487. An English version of this paper 'Reconstruction of the digital Dutch Populations Census of 1960' is available on http://www.volkstellingen.nl/en/documentatie/1960/index.html

Early in his career, Frans was co-author of one of the eighteen monographs published on the basis of the 1971 census.[4] This monograph focused on nuptiality patterns in the Netherlands, starting with an extensive historical analysis, based on the censuses since 1889. Of course the tables were not yet available in digital form at that time, so I assume that Frans had to key in the data he needed from the published census books himself. Of the last population censuses (1960 and 1971, and also of the economic censuses since the 1930s as well), more detailed information than ever published survived, which is available in original hand-written form on transparencies in the CBS archives, of which a copy was made for use in the CBS library.[5] In the past few years, many of these fragile originals have been scanned, and part of the tables have also been transcribed as tables and are now available online.[6]

The Dutch census of 1899 was one of the most extensively published censuses, and it was the first census that became available in the form of about 10,000 pages of digital tables in 1999.[7] It was only natural to invite Frans as one of the authors of a volume of articles that was produced on the occasion.[8] In his contribution, Frans describes how the Dutch population developed from 5.1 million in 1899 to 16 million a century later. But already then it is apparent that the census was in itself not rich enough for him, and that he used a variety of other sources as well, ranging from annual reports of the Central Statistical Committee to mortality tables and genealogical data.

A few years later, in 2006, we managed to publish the tables of the remaining census years online. A symposium organised on that occasion brought together a substantial group of specialists, both from Statistics Netherlands and from the academic community of socio-economic historians and historical demographers. The ultimate aim was to produce a second book of papers on two centuries of the Netherlands in numbers. Of course, Frans was also invited. Although we tried to seduce him to collaborate in almost heart-breaking ways, he politely declined. He only could contribute if he were allowed to base himself on the population register, without using any census data at all.[9] Here the breach between the demographer and the census was complete.

4 Frinking, G.A.B. and Poppel, F.W.A. van, Een sociaal-demografische analyse van de huwelijkssluiting in Nederland 1979 VT Monografie no. 6.

5 Several years ago Frans confided me that he had a number of these originals in his office at NIDI. I can only hope that he has returned them since then, and if not, may his retirement be a good occasion for returning them to the CBS

6 The handwritten materials of the censuses of 1947, 1956 and 1960 have been scanned; the labour force census of 1947 is also available as spreadsheets. See: https://easy.dans.knaw.nl/ui/datasets/id/easy-dataset:43969 or urn:nbn:nl:ui:13-ggb-xtr

7 The original 1999 website is accessible at http://www.volkstelling1899.nl/; this was later updated as http://www.volkstellingen.nl/nl/volkstelling/jaarview/1899/index.html; the information is archived at https://easy.dans.knaw.nl/ui/datasets/id/easy-dataset:38770 or urn:nbn:nl:ui:13-988-0dq

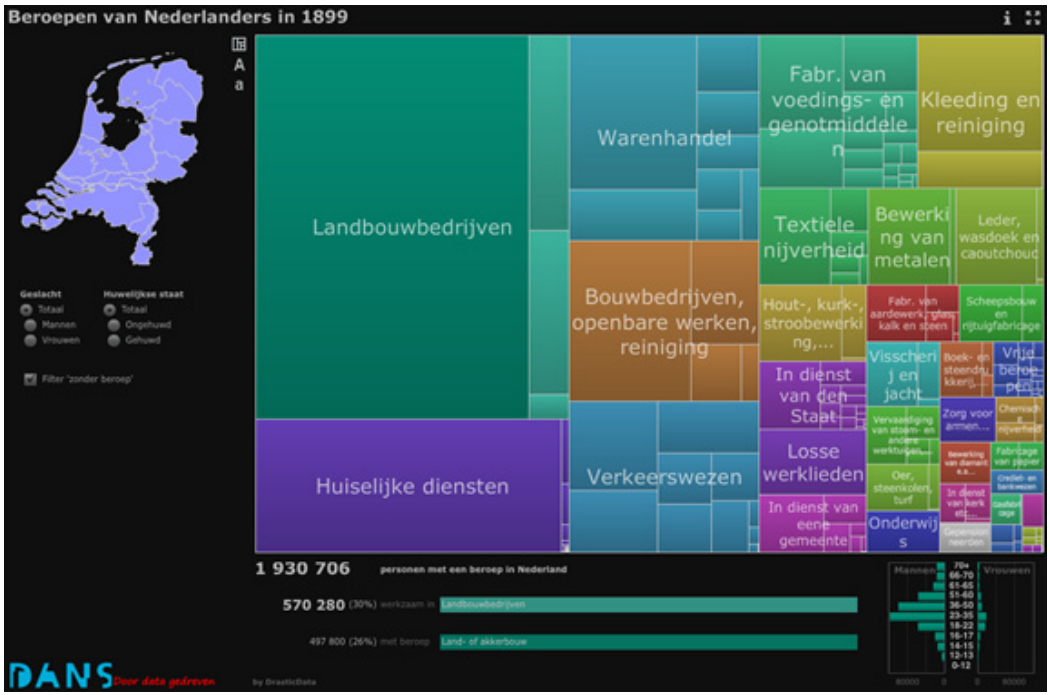
8 Frans van Poppel (2001), 'Van vijf naar 16 miljoen. De groei van de Nederlandse bevolking in de afgelopen eeuw', in: J.G.S.J. van Maarseveen en P.K. Doorn (eds.), *Nederland een eeuw geleden geteld. Een terugblik op de samenleving rond 1900* (IISG, Amsterdam), pp. 65-87.

9 E-mail correspondence between Jacques van Maarseveen, Luuk Schreven, René van Horik and Frans van Poppel, November 2006.

Is the role of censuses for historical demographers like Frans over? The census seems to have become less *en vogue* as a source of demographic research. Of course it still provides a lot of background information or reference data. Direct data from vital statistics registries that track all births and deaths, as well as certain changes in legal status such as marriage, divorce, and migration (registration of place of residence) probably offer the best sources for estimating the numbers of births and deaths and are therefore perhaps more interesting sources than censuses registry statistics. On the other hand censuses do more than just enumerate people. They typically collect information about families or households in addition to individual characteristics such as age, sex, marital status, literacy/education, employment status, and occupation, and geographical location. They may also collect data on migration (or place of birth or of previous residence), language, religion, nationality (or ethnicity or race), and citizenship.

The potential of the census for socio-economic historians and historical demographers is far from exhausted. New ways to visualize masses of data offer literally new views on hidden patterns and connections (see *figure 1*).

Figure 1. Multi-level visualisation of the Labour Census of 1899



Source: http://www.drasticdata.nl/ProjectVT/

Another new boost is coming from the linked data approach. Several present-day censuses have been published as linked open data. The CEDAR project takes Dutch historical census data as its starting point to build a semantic data-web of historical information. With such a web, it will be possible to answer questions such as:[10]

- What kind of patterns can be identified and interpreted as expressions of regional identity?
- How can patterns of changes in skills and labour be related to technological progress and patterns of geographical migration?
- How can changes of local and national policies in the structure of communities and individual lives be traced?

Census data alone are not sufficient to answer these questions. By applying a specific web-based data-model –exploiting the Resource Description Framework (RDF) technology– census data will be made inter-linkable with other hubs of historical socio-economic and demographic data (and beyond). New generations of historical demographers and socio-economic historians will without doubt find new ways to unravel hitherto hidden patterns in historical census data.

References

Berk, Michelle van den and Peter Doorn (2007), Een digitale detective story: de reconstructie van de Nederlandse Volkstelling van 1960. In *Twee eeuwen Nederland geteld: onderzoek met de digitale Volks- Beroeps- en Woningtellingen, 1795-2001*. O.W.A. Boonstra *et al*. (ed.) Den Haag, pp. 471-487.

Frinking, G.A.B. and F.W.A. Poppel van (1979), Een sociaal-demografische analyse van de huwelijkssluiting in Nederland, 1979. *VT Monografie,* no. 6.

Poppel, Frans van (2001), Van vijf naar 16 miljoen. De groei van de Nederlandse bevolking in de afgelopen eeuw. In J.G.S.J. van Maarseveen en P.K. Doorn (eds.), *Nederland een eeuw geleden geteld: een terugblik op de samenleving rond 1900*. Amsterdam: IISG, pp. 65-87.

Schulte Nordholt, Eric, Marijke Hartgers and Rita Gircour (eds.) (2004), The Dutch virtual census of 2001: Analysis and methodology. Voorburg/Heerlen: Statistics Netherlands.

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[10] See: http://cedar-project.nl/ and http://www.dans.knaw.nl/en/content/categorieen/nieuws/cedar-project-awarded

Sex ratios in global historical perspective: Female surplus versus female deficit

Antoinette Fauve-Chamoux[1]

This short paper will put in perspective some historical features of European populations, focussing on observed sex ratios and gender differences in number, according to age and various socio-economic and cultural contexts, which may help to trace differences between Europe and Indian population structures and socio-cultural behaviours in reproduction strategies, on the long run. France is taken here as a case study.

Why did Western Europe experience a frequent female surplus while the Indian continent often presented a female deficit, with suspicion of female neglect and infanticide? It is argued that the European female surplus of population may be related with female labour force participation as domestic service, late marriage, frequent celibacy and an overall larger autonomy of daughters from family control concerning schooling, leaving home, migrating, finding a job and choosing a marriage partner or staying single.

Overall sex ratios in early-modern European towns

When studying pre-industrial urban population in Europe, historians understand from the available sources that the female population outnumbered the male population, at least since the Middle Ages, as Roger Mols already noticed a long time ago (Mols, 1955, vol. 2, pp. 218-222 and Fauve-Chamoux and Sogner, 1994). In his path-breaking book, Mols emphasized the female surplus in urban societies and estimated that the phenomenon increased in Europe during the eighteenth century. There were few cities where this female-surplus model did not apply, and these were always cities with specific male communities as in Rome, Italy, with so many priests, clergymen and monks (Sonnino, 1994), or as in Oxford, England with male scholars being all clerics (clerks), as well as in some garrison towns, or towns that attracted many male migrants, be it for a specific male labour market or for the opportunity they provided for overseas ventures. This was the case in France for 'international' harbours such as Marseille, Bordeaux or Nantes. Sex ratios were usually more balanced in the French historical countryside than in towns.

Why privileging 'Female sex ratio' (FMR) versus 'Male sex ratio'?

In Europe, demographers usually agree that the sex ratio of a given population is the number of males for a hundred females (Henry, 1980, p. 11; Pressat, 1979, p. 110 and Viet, 1985, p. 122). For this paper, I proposed to call this agreed upon sex ratio a *male sex ratio*, in opposition to a *female sex ratio*, which estimates *the number of females for a hundred males or, according to the Indian way, the number of females for a thousand males* (FMR). The first advantage of the latter is that we can trace this proportion in many French historical sources, and, at the same time, we are thus able to use it for comparisons all over pre-industrial urban Europe. The second advantage is that the female sex ratio allows detailed comparisons with

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all Indian cases, since it is the way Indian scholars calculate it, and call it FMR as Agnihotri explained in his major book dedicated to *Sex ratio patterns in the Indian population:*

"Conventionally, the term sex ratio is used in India to denote female to male ratio, while internationally it is the other way around. To avoid any confusion therefore the term sex ratio will be used to mean male per 1,000 female population while FMR will mean number of females per male population" (Agnihotri, 2000, p. 27).

The focus of his remarkable study is to map the diverse and complex patterns of FMRs in India along different relevant dimensions: age groups, social groups and cultural variables, from available colonial sources and others, using traditionally the 'female sex ratio', a figure for long quite common in historical Europe.

Female surplus was a constant fact, especially when considering adult French populations. Bayeux (Normandy) was a leader for female presence (138 females for 100 males in 1774, i.e. a male *sex ratio of 72*), owing without doubt to the development of lace making during the 18th century and to the generalized practice of working at home for a protoindustrial *manufacture* (El Kordi, 1970, p. 157). Harbour cities were exceptions, although they also presented a slight female surplus, when considering the overall population. This phenomenon was clear for Marseille, and it was still traceable for Bordeaux. Bordeaux attracted most of the migrants from South-West France (Poussou, 1983), either to its male labour market or for overseas ventures, while it apparently did not keep its cohort of young native girls. Such phenomenon was true at least of the St. André parish, with its male apprentices or ship's boys aged less than 14, so that the female sex ratio there was only 87 females for 100 males. It should be noted that sex-ratio data in urban contexts vary considerably from one parish to another, depending on the parochial socio-economic structure. Attention should also be given to age structure.

The lowering proportion of children in pre-revolutionary France

Results from the survey realized for Normandy (1762) by Louis Messance, and data concerning the town of Pontoise in 1781 (Dupâquier, 1992) show a tendency toward a decline in the proportion of children to the overall population. Such a fundamental phenomenon took place in the growing large towns of these North-Western provinces of France, not far from Paris.

The steady decline of the proportion of children in the overall population during the course of the 18th century was apparently a specific French phenomenon in Europe. Two main factors accounted for it: 1) the usual practice of putting urban children out to wet nurses in the countryside caused towns to lose their children, particularly when many of them died far from home (Fauve-Chamoux, 1983; 1985); 2) urban families more and more often practiced family limitation (Fauve-Chamoux, 2004), whereas the rural population at that time (before the end of the 18th century) was not, with the exception of Normandy, where contraception

appeared early, as in some southern societies like Pyrenean societies, where a stem-family system, privileging one main heir or heiress, helped controlling reproduction.[2]

Urban children of the French kingdom accounted for less than 30 per cent of the population, whereas those in the countryside numbered about 35 per cent boys aged less than 14, and about 30 per cent girls, also below 14. Was this gender difference due to underregistration of females? The rather low proportion of girls compared to boys in the countryside was apparently a structural phenomenon, as Louis Henry showed in one of his groundbreaking methodological studies in historical demography (Henry, 1948, p. 103). The variations of sex ratios by age group, as he said, indeed should be understood as part of some natural law (Brian and Jaisson, 2007).

European 'disguised infanticide' in comparative perspective, without gender discrimination
In Europe, putting urban children out to wet nurses in the countryside affected baby boys and baby girls equally. This practice, which spread during the 17th century, has been called 'disguised infanticide' meaning a sort of delayed-action infanticide (Klapisch-Zuber, 1985). Infant mortality of nursed babies could be very high (Fauve-Chamoux, 1985; 1997). But no gender-differentiated data could ever be seriously evidenced in France about nursed babies, be they born legitimate or illegitimate (Fauve-Chamoux, 2002). C. Rollet-Eschalier (1990) also did not find any trace of female neglect in the data covering France as a whole in late 19th century. As far as one can tell, it seems that there was overall no sexual discrimination in early modern Western Europe (and, in any case, not in France) between baby boys and baby girls when nursing practices were concerned. It seems also to be the case for abandoned children, when gender data are available (Chamoux, 1973, p. 282 and Hunecke, 1991, pp. 46-47). But some exceptions were noted in late medieval Italy (Kertzer, 1993) and Gregory Hanlon has also given some interesting differentiated figures recently for early-modern Italy, but his argument will need further research (Hanlon, 2012). This absence of gender discrimination at birth in Europe in the past is probably due to the strong influence of Christianity. But a lot has been written on the creation of foundling homes in Europe and the very high mortality of unwanted children (Lynch, 2000). Infanticide was rather marginal; abortion was probably much more common, even if both actions were severely punished when identified. This European situation was very far from what was evidenced in Japan, China and India about female neglect, abandonment and female infanticide (Kurosu, 1994 and Panigrahi, 1972). Nominative studies do not show any gender differentiated behaviour towards children in historical Europe.

Indian female deficit, infanticide among elite families and caste traditions.
For India, by contrast, according to for instance Lalita Panigrahi (1972), Sunita Kishor (1993) or Rama Deb Roy (1996)[3], a number of castes and clans of North Western provinces, roughly Uttar Pradesh, Punjab Oudh and of some other Indian states of Rajasthan were known to

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[2] For references on strategies of family limitation, Malthusianism and transmission systems, see Fauve-Chamoux and Ochiai, 2009 and Duraes *et al.,* 2009.

[3] The literature on sex ratio, infanticide and abortion in India is enormous. See for example, Visaria, 1967.

practice infanticide around mid-nineteenth century.[4] An 1854 investigation by colonial authorities revealed that in the Benares Division, infanticide was clearly a common practice. The lower castes which did not own much land such as the Chamars, Kumhars, Dhobis, Telis, Lodhas and Kurmis had higher proportions of females in their population and, at the same time, they had no tradition, in their communities, of practicing female infanticide. This does not mean that they never practiced it, because they could adopt the dowry system if they improved their standard of living.

Hindu families wanted to marry their girls higher or at least equally to her own rank. This connection between female infanticide, *hypergamic* marriage and the constraints of the dowry system has been extensively discussed for Gujarat by David Pocock (1954) and commented by many authors (Goody and Goody, 1990)[5] . And in an Indian society practicing "universal marriage", a girl remaining unmarried was dishonourable for her family. In Western Europe, as John Hajnal demonstrated, the frequency of female celibacy was increasing during the eighteenth century and age at marriage was delayed (Hajnal, 1965). For a woman, staying single was a solution when no good partner was available or when her dowry was not attractive enough, or if she had none.

Nowadays, the problem of female foeticide is alarming for Indian authorities, health policy makers and directors of family planning programmes (Patel, 2007). Female infanticide is a phenomenon to be always considered in long historical perspective and, for India, in the frame of an increasing "northenisation" (Agnihotri 2000, p. 47).

If the *Hindu Succession Act* of 1956 assured equal rights to the female children of the family[6], it did not stop the decline in the *female sex ratio* (FMR), and it is still common that sons often get the best of education and inherit ancestral property. Raising a good dowry to marry a girl at a rather early age, according to traditional customs, continues to remain a problem in Hindu society, be it rural or urban (Panigrahi 1972, p. 191). The problem of fewer girls is not new in India and it requires multidisciplinary perspectives and qualitative and quantitative approaches.

Conclusion

Female surplus in urban European pre-industrial society was an important demographic phenomenon but other factors concurred to increase this female surplus in Western societies. If it was partly natural, as evidenced by the French demographer Louis Henry in 1948, the female surplus was also partly related to the labour market and to the presence in town of females born in the countryside and encouraged to migrate to cities by the development of domestic service in bourgeois homes (Fauve-Chamoux, 2005). Adolescent girls and young women were able to leave the parental home before the age at marriage, which was late, and they could earn a living independently (Fauve-Chamoux, 2003). A few studies are

4 Cf data collected by W.R.Moore, 1868

5 See Chapter 6, on marriage and the family in Gujarat, pp. 160-179, and chapter 8, on India and Sri Lanka, pp. 229-251, in Goody & Goody, 1990

6 For more, see Cave-Browne 1857; Miller 1981, 1993; Pakrasi 1970; Kishor 1993 and Caldwell 2001.

available on female labour in India for further comparative historical analysis (Moosvi, 1994), complementing the very many studies on sex ratios and historical traditions leading some well-off communities, particularly in Northern India, to female infanticide and neglect, followed, in today's India, by the largely practiced prenatal sex selection privileging sons over daughters.[7]

Fully contrasting with Indian early and universal marriage patterns, traditional female deficit, infanticide and recently, gendered abortion, the European female surplus in past urban context and the large number of unmarried immigrant working women who had left home were stressed. One of the basic characteristics of Western European pre-industrial towns was the presence of large cohorts of adult women, single or widowed, living on their own from their personal work, sometimes with legitimate or illegitimate children, but without a spouse. This feature was coupled with a strong domestic service system and a late marriage pattern (Fauve-Chamoux, 2011). Abortion was not socially accepted for religious and cultural reasons in Western culture. Infanticide was totally banned and condemned by death penalty. Being not any more regulated by mortality crises, the natural growth of the population was reduced by socio-cultural practices, as Thomas Robert Malthus had identified them (Malthus, 1798): Mercenary breastfeeding, child abandonment to charity, celibacy and late marriage, before contraceptive behaviours became fully efficient, in a secularised society (Fauve-Chamoux 2004).

References

Agnihotri, Satish Balram (2000), *Sex ratio patterns in the Indian population, a fresh exploration.* New Delhi/London: Sage.

Brian, Eric and Marie Jaisson (2007), *The descent of human sex ratio at birth: A dialogue between mathematics, biology and sociology.* Dordrecht: Springer.

Cave-browne, John (1857), *Indian infanticide: Its origins, progress and suppression.* London: W.H. Allen.

Caldwell, John C. (2001), What do we know about Asian population history? Comparisons of Asian and European research. In Ts'ui-jung Liu, James Lee, David Reher, Osamu Saito and Wang Feng (eds.), *Asian Population History.* Oxford: Oxford University Press, pp. 3-23.

Chamoux, Antoinette (1973), L'enfance abandonnée à Reims à la fin du XVIIIe siècle. *Annales de Démographie Historique, special issue "Enfant et société*". Paris: Mouton, pp. 263-285.

Das Gupta, Monica (1987), Selective discrimination against female children in rural Punjab, India. *Population and Development Review,* 13, 1 (March), pp. 77-100.

Deb Roy, Rama (1996), Female infanticide in India in a historical perspective. Paper presented at ESSHC 1996. Amsterdam: mimeo.

Dupaquier, Jacques (1992), *Pontoise et les pontoisiens en 1781.* Pontoise: Société des Amis du Vexin.

Durães, Margarida, Antoinette Fauve-Chamoux, Llorenç Ferrer and Jan Kok (eds.) (2009), *The transmission of well-being: Gendered marriage strategies and inheritance systems in Europe from the 17th to the 20th centuries.* Bern: Peter Lang.

[7] For the recent past, we recommend Patel, 2007, chapter 1, 'Introduction. Gender relations, NRTs, and female foeticide in India', pp. 26-35) (NRT: New Reproductive Technologies).

Elkordi, Mohamed (1970), *Bayeux aux XVIIe et XVIIIe siècles, Contribution à l'histoire urbaine de la France.* Paris: Mouton.

Fauve-Chamoux, Antoinette (1983), The importance of women in an urban environment: The example of the Rheims household at the beginning of the industrial revolution. In R. Wall, J. Robin and P. Laslett (eds.), *Family Forms in Historic Europe*. Cambridge: Cambridge University Press, pp. 475-492.

Fauve-Chamoux, Antoinette (1985), Innovation et comportement parental en milieu urbain (XVe-XIXe siècles). *Annales* (E.S.C.), 40, 5, pp. 1023-1039.

Fauve-Chamoux, Antoinette (2002), Changes in policy towards abandoned children and differential mortality: The case of 18th century Rheims, *Pathways of the past, essays in honour of Sølvi Sogner on her 70th anniversary*, Hilde Sandvik, Kari Telse and Gunnar Thorvaldsen (eds), Tig og Tanke. Oslo: University of Oslo, pp. 39-58.

Fauve-Chamoux, Antoinette (2003), Patterns of leaving "house" in a 19th century stem-family society. In *The road to independence. Leaving home in Western and Eastern societies, 16th-20th century*. Frans van Poppel, Michel Oris and James Lee (eds.). Bern: Peter Lang, pp. 199-220.

Fauve-Chamoux, Antoinette (2004), Fertility decline and family behaviour in 18th century Rheims. In Eugenio Sonnino (ed.), *Living in the city.* Rome: Universita La Sapienza, p. 523-546.

Fauve-Chamoux, Antoinette (ed.) (2005), *Domestic service and the formation of European identity. Understanding the globalization of domestic work 16th-21st centuries*. Bern: Peter Lang.

Fauve-Chamoux, Antoinette (2011), European illegitimacy trends in connection with domestic service and family systems (1545-2001). In Ioan Bolovan and Peter Teibenbacher (eds.), special issue Central Europe population history during the first demographic transition. *Romanian Journal of Population Studies*, Cluj-Napoca, V, 2, pp. 8-45.

Fauve-Chamoux, Antoinette and Emiko Ochiai (eds.) (2009), *The stem family in Eurasian perspective. Revisiting house societies.* Bern: Peter Lang.

Fauve-Chamoux, Antoinette and Sølvi Sogner (eds.) (1994), *Socio-economic consequences of sex-ratios in historical perspective*, 1500-1900. Milan: University Bocconi.

Goody, Esther and Jack Goody (1990), Marriage and family in Gujarat. In Jack Goody, *The Oriental, the Ancient and the Primitive; systems of marriage and the family in the pre-industrial societies of Eurasia*. Cambridge: Cambridge University Press, pp. 160-179.

Hajnal, John (1965), European marriage patterns in perspective. *Population in History*. David V. Glass and David E.C. Eversley (eds.). London: Arnold.

Hanlon, Gregory (2012), L'Infanticide «à la chinoise» en Europe moderne, *L'Histoire*, forthcoming.

Henry, Louis (1948), La masculinité par âge dans les recensements. *Population*, 3, 1, pp. 93-114.

Henry, Louis (1980), *Techniques d'analyse en démographie historique*. Paris.

Hunecke, Volker (1991), Intensita e fluttuazioni degli abbandoni dal XV al XIX seculo. In *Enfance abandonnée et société en Europe, XVe-XXe siècle, Ecole française de Rome*, pp. 27-72.

Kertzer, David I. (1993), *Sacrificed for honor, Italian infant abandonment and the politics of reproductive control.* Boston: Beacon Press.

Kishor, Sunita (1993), May God give sons to all: Gender and child mortality in India. *American Sociological Review*, 58, pp. 247-265.

Klapisch-Zuber, Christiane (1985), *Women, family, and ritual in Renaissance Italy.* Chicago: Chicago University Press.

Kurosu, Satomi (1994), Sex ratios and the years of the fire horse (hinoeuma): Cultural and regional experiences in Japan. In Antoinette Fauve-Chamoux and Sølvi Sogner (eds.), *Socio-economic consequences of sex-ratios in historical perspective*, 1500-1900. Milan: Universita Bocconi, pp. 89-102.

Lynch, Katherine A. (2000), Infant mortality, child neglect, and child abandonment in European history: A comparative analysis. In Tommy Bengtsson and Osamu Saito (eds.). *Population and Economy: from hunger to modern economic growth.* Oxford: Oxford University Press, pp. 133-164.

Malthus, Thomas Robert (1798), *An essay on the principle of population, as it affects the future improvement of society with remarks on the speculations of Mr. Godwin, M. Condorcet and other writers*. London: J. Johnson [published anonymously].

Messance, Louis (1766), *Recherches sur la population des généralités d'Auvergne, de Lyon, de Rouen, et de quelques provinces et villes du Royaume*.... Paris: Durand.

Miller, Barbara (1993), *Sex and gender hierarchies.* Cambridge: Cambridge University Press.

Mols, Roger (1954), *Introduction à la démographie historique des villes d'Europe du XIVe au XVIIIe siècle.* Louvain: Duculot, 3 vols.

Moore, W.R. (1868), *Papers on the subject of investigation and report regarding. Female infanticide in the Benares division*. Calcutta.

Moosvi, Shireen (1994), Work and gender in pre-colonial India. In Antoinette Fauve-Chamoux and Sølvi Sogner (eds.), *Socio-economic consequences of sex-ratios in historical perspective, 1500-1900.* Milan: Universita Bocconi, pp. 105-116.

Pakrasi, Kanti B. (1970), *Female infanticide in India.* Calcutta: Editions India.

Panigrahi, Lalita (1972), *British social policy and female infanticide in India.* New Delhi: Munshiram Maniharlal.

Patel, Tulsi (ed.) (2007), *Sex-selective abortion in India: Gender, society and new reproductive technologies.* London: Sage.

Pocock, David F. (1954), «The hypergamy of the Patidars». In K.M. Kapadia (ed.), *Professor Ghurye Felicitation Volume.* Bombay: Popular Book Depot.

Poussou, Jean-Pierre (1983), *Bordeaux et le Sud-ouest au XVIIIe siècle, croissance économique et attraction urbaine*. Paris: EHESS.

Pressat, Roland (1979), *Dictionnaire de démographie*. Paris: PUF.

Rollet-Eschalier, Catherine (1990), *La politique à l'égard de la petite enfance sous la IIIe république*. Paris: INED/PUF.

Sonnino, Eugenio (1994), In the male city: The status animarum of Rome in the 17th century. In Antoinette Fauve-Chamoux and Sølvi Sogner (eds.), *Socio-economic consequences of sex-ratios in historical perspective*, 1500-1900. Milan: Universita Bocconi, pp. 19-29.

Viet, Jean (1985), *Population Multilingual Thesaurus.* Paris: CICRED.

Visaria, Pravin M. (1967), The sex ratio of the population of India and Pakistan and regional variations during 1901-1961. In Ashish Base (ed.), *Patterns of population change in India, 1951-1961.* Bombay: Allied Publishers.

Erasmus' monkey. Iconoclastic reflections on two developments in technical demography

Ron Lesthaeghe

Two developments in technical demography

During the last three decades the field of technical demography has been characterized by two major developments: (i) Corrections for tempo shifts of period measures of fertility, and (ii) the shift from variants based population projections to the so-called 'probabilistic' projections. In this short piece I will argue that neither one delivered a major breakthrough.[1] Instead I think that the two developments cited above are an illustration of Erasmus' dictum: "Even if a monkey wears a golden ring, it is and will remain an ugly thing".

'Period paramount': The opposite view

First of all, it is essential to understand that important 'period effects', such as an economic crisis, a political turnaround, or a technical innovation (i.e. concerning fertility control or prolongation of life) are not synonymous with any superiority of the use of period measures of demographic events. That confusion between *period effects and period measures* seems to be ubiquitous despite the fact that they refer to totally different things. The former refers to effects of exogenous factors upon the life course, whereas the latter is a technical accounting trick. The 'period paramount' dictum fails to point out whether period effects are of paramount importance over cohort effects or whether period measures are to be preferred over cohort measures. The sooner 'period paramount' is forgotten, the better, and that in either instance. Life is just a bit too complex for such simplifications.

I take it for granted that everyone understands that, with the theoretical exception of utter historical stagnation and immobility, successive generations are socialized under different conditions, and are therefore by definition not starting from a position identical to that of their predecessors. During the 20th century, the growth of education on a global scale, for instance, already means that cohorts will be differentiated in aspirations, resources and value orientations. These features that are linked to the socialization phase of generations are the so called 'cohort effects'. That is the classic definition, and that's the one we will stick to. And for good measure: These socialization effects are *specific* for each generation. If all of a sudden there is a major expansion of the education system, the older generations will not *en masse* return to school. It is essentially only the younger generation that will reap the benefits of it.

But, of course, during their further life time, these generations will be affected by all sorts of 'period shocks' and disturbances, to which 'rational actors' are supposed to adjust. And these

[1] This short piece will be developed into a full article for peer review at a later stage. At this point it only benefitted from comments by Tomas Frejka and Tomas Sobotka.

adjustments and reactions are the so-called 'period effects'. These two effects, together with the physiological effect of aging, the social influence of family members and peers, and life cycle circumstances, largely determine the overall outcome. But the study of period *effects* does by no means imply that only period *measures* should be used. When examining cohort profiles, a given period related 'shock' of any importance will show up for all cohorts, but at *different ages*, and in the instance of cohort-period interaction, the magnitude of the effect of the 'shock' will vary according to the life cycle stage of each cohort. The breakthrough of hormonal contraception during the late 1960^{s} and 1970^{s} only affected the stopping behavior of older women, whereas it affected the entire fertile life span of the younger ones, thereby opening up the possibility for a massive postponement of first births. *In other words, period shocks are best studied by assessing their differentiated effect at the various ages and life cycle stages of each of the successive cohorts.* One does not at all need period measures of demographic events to do that finer work.

This throws us back to period measures and their use. Period measures are synthetic measures that are summations of slices of the life cycle unfolding of different cohorts. Fertility, nuptiality or mortality experiences over a short period of time are just summed up to arrive at *a final product which is not representative for any of the contributing cohorts.* These measures have no meaning in real life.[2] The only exception is of course that of perfect stationarity. In fact, to give these period measures any meaning, the stationarity condition –i.e. the hypothesis of a frozen society in which cohorts are mere copies of each other– is absolutely essential. Incidentally, this not only pertains to the Total Fertility Rate and to the Singulate Mean Age at Marriage (SMAM)[3], but also to all the indirectly standardized 'Princeton measures' (i.e. Coale's Ig, Im, Ih or If). All these are frequently used measures, because they provide summaries. *But only quick and dirty ones*. In fact, period measures are merely accountancy tricks for impatient users. Indeed, to get an idea of a final intensity[4], one has to be patient and wait till a certain age is reached by which most of the events have occurred.[5] But nothing will prevent us from measuring the events up to an earlier point (defined by either age or duration) to see where successive cohorts had arrived by that point. One way of doing this is to take a

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2 It could be argued that Kuczynski's gross and net reproduction rates (GRR and NRR) were major historical steps forward. But these period measures and especially the NRR led very illustrious demographers down the garden path and into the belief that Europe was going to die out. Despite the fact that the Lexis diagram was long known by the 1930^{s}, the impact of a tempo shift was totally ignored, together with cohort analyses.

3 The inventor of SMAM, John Hajnal, was vividly aware of this condition, much more so than many subsequent users who prefer the blurring effect of SMAM over the clean analysis of proportions married up to a given age (e.g. 20, 25 or 30) at various points in time.

4 The final intensity of mortality is of course always unity, and much of what is going to be said here pertains to other demographic events.

5 The classic objection to cohort analysis is that profiles are incomplete. Here this "impatience factor" shows up very clearly. It goes without saying that all one can do is try to complete the schedules for cohorts that are far enough, and purely speculate or write scenarios for those that are just starting with the unfolding of the life course. Just face the fact that the future is unknown for younger cohorts, but that we can monitor their progress, year after year, with a minimum of data requirements.

benchmark cohort and to study the difference function for other cohorts as measured over age or duration relative to this benchmark.[6]

The violations of the stationarity condition are the cause of all the problems with period measures. This brings us to one major violation of the stationarity hypothesis: Tempo shifts. This problem is an old one and already discussed in great detail by our older mentors like Louis Henry and Norman Ryder. But the idea of 'fixing' the problem by adjusting period measures for the speed of the delay is more novel, and was, as everyone knows, pioneered by John Bongaarts and Griffith Feeney. More specifically, these authors measured parity specific period total fertility rates, and, in the instance of postponement, they inflated these total period rates by 'backwardly projecting' them with the speed of postponement, as measured by the rate of shift in the parity specific mean ages at motherhood. One can easily extend this idea to correct the total period first marriage rate, and calculations would be simpler too, since a first marriage is a non-renewable event. The Bongaarts-Feeney trick led to several variations, but the core idea is always the same.[7] There are of course many problems with such measures.

Firstly, how do we measure the speed of the tempo shift? Over a single year (very shaky), over five years, or should we opt for a more stable average over a longer time? Furthermore, the values of the parity specific TFR^s are just period measures and therefore no more than synthetic measures that are only representative for women of a given parity, but irrespective of generation. First births occur to teenagers as well as to much older women born twenty years earlier. That problem is less acute for birth orders three and higher, but then, the contribution of such higher order births has systematically dwindled in all populations of the industrialized world.

Secondly, all tempo adjusted measures proposed so far only assume postponement, and do not offer any perspective on subsequent recuperation of fertility at later ages. The degree of recuperation is of course of paramount importance as well, and at the later stage of the so-called 'postponement transition', differential recuperation will determine the degree of definitive childlessness and the amount of increase in overall period TFR^s. A simple simulation suffices to show how the passage from postponement to recuperation, generation after generation, will determine the track of the summary period measures. In fact, Tomas Frejka has provided us with such a simple and elegant simulation of generational changes in postponement and recuperation to illustrate this point.[8] This didactical piece of his can also be taken as a blueprint to look at real cohort behavior, and to translate that back into period measures. When this is done for a set of European populations[9] one realizes furthermore that

[6] This can be done graphically or through a modeling of the difference function. For the latest on this issue see Tomas Sobotka *et al*., 2011: Postponement and recuperation in cohort fertility: New analytical and projection methods and their application. *European Demographic Research Papers*. Vienna: Vienna Institute of Demography, 2.

[7] Add to that the fact that the latest corrections are very data demanding, much more so than that required for a classic cohort analysis.

[8] Tomas Frejka, 2012: The role of contemporary childbearing postponement and recuperation in shaping fertility trends. *Comparative Population Studies – Zeitschrift für Bevölkerungswissenschaft*. Preprint release of 27 September 2012.

[9] See Tomas Sobotka *et al*, *op.cit*.

the extent of fertility recuperation is very different among these nations and cohorts, and that the rises in period TFR^s are not just the product of the end of postponement, but also and increasingly the product of differential recuperation of fertility at later ages. This then leads to the genuine social science question, i.e. why are there such major differences in the catching up phase as well? Are they related to social welfare conditions? To provisions for working mothers? To different levels of unemployment? To housing conditions? Or to ideational differences as well? I wonder whether one would have come to this 'recuperation' issue via any of the available 'tempo corrected' versions of the TFR. The bottom line is that all these finer issues are very straightforward and directly observable in the cohort perspective of fertility, whereas they are blurred and distorted in the period perspective.

And thirdly, what do we do with such 'corrected' period TFR^s? Obviously they have no predictive power whatsoever.[10] But why are the tempo adjusted measures so commonly used to warn the public that current levels are just artificially too low and will automatically rise once the postponement stops? Such pronouncements are predictions, aren't they? Reality is that not much of a rise will materialize if the end of postponement is not followed by ample recuperation, and that in such instances the tempo adjusted measures will equally fall short of giving the finer picture. Furthermore, why are most inventors and users of the tempo corrected TFR^s so typically confronting and validating their outcomes against the cohort measures of total fertility with a time lag of thirty years or so? If the benchmark of validation is cohort fertility, why then bother with all these adjustments in the first place?

To sum up, considering their massive violation of the stationarity hypothesis, period measures become clumsy affairs in periods of change. Furthermore, since demographers are mostly interested and fascinated by changes in behavior over time, they should do better than restrict their analyses to such clumsy indicators. And simple adjustments do not alter this fact. Expressed with Erasmus' metaphor, they are only the golden ring on the monkey's finger.

Probabilistic population projections: What is 'probabilistic' about them?
The classic format of population projections has been based on offering the public a set of variants, typically constructed by combining hypotheses concerning mortality, fertility and migration. These were often simplified to retain three variants only, the medium, the high and the low variant respectively. Of course, in many instances, many more fully worked out combinations were offered so that the effects of each of the hypotheses concerning the three vital events on the future course and age structure could be isolated. In combination with insights from stable and quasi-stable population theory and with those from the formal demography of migration and multi-state demography, very fine analytical work has been done. Moreover, decisions were often based, rightly or wrongly, on social science insights. But in the worst case, one could still retrospectively diagnose where premises were wrong. And finally, one has often linked these reasoned outcomes to non-demographic aspects in order to come up with highly instructive simulations of the labor force, social security costs et cetera. In such instances one not only focusses on 'variants' but on complex scenarios of what could happen in real life.

[10] John Bongaarts has repeatedly reaffirmed this in his presentations or in personal communication.

The so-called 'probabilistic' forecasts changed all that. No need for any social science insights anymore. No more construction of the edifice from its finer components such as mortality projections, cohort completion of fertility schedules, alternatives about age specific immigration and emigration probabilities. All that is needed is a collection of 'dots', i.e. numerical values of what had to be forecasted (total population size, TFR's …). These dots were typically gathered from past observations, and their distribution is then taken to project 'uncertainty' around a given trend. This gives it the name 'probabilistic'.[11] But there is nothing probabilistic about the whole affair. Instead, there are arbitrary decisions all over the place. Firstly, one has to decide about what set of dots to use. If one is to use the variance of the TFR for instance, then it is obvious that there will be vastly different outcomes depending on the inclusion or exclusion of the baby boom 'dots' of the 1960's. Secondly, how quickly will the variance manifest itself? Is there an immediate 'explosion' of uncertainty around the presumed central trend, or only a slowly widening of it? And, to add insult to injury, where does the projection of the central trend itself comes from?

All of this may be functional to show quick slides for the general public, but the professional who wants to dig much deeper is left totally uninformed about the underlying courses of the various components. In fact, more often than not the authors themselves don't know that either. For instance, what would a particular track projection of the TFR imply if one were to try to construct the underlying changes in age patterns and levels of cohort fertility? Would the outcome be feasible? Exercises of validation of this nature are very scarce or non-existent.[12]

To sum up, the term 'probabilistic' is misleading and gives the utterly false impression of being 'more objective'. Everything that matters in these projections is dependent on arbitrary choices, and, to make matters worse, such projections are purely numerical games with dots without any analytical insights on behavioral components. Indeed a 'monkey', but not even one with a golden ring this time.

A last short word…
This contribution is very thin on references since it was not at all the aim to present a bibliography here of the all too large literature on these subjects. Nor do we want to vex particular colleagues by these obviously highly critical comments. We just thought that things had to be put in perspective, and I clearly have my own vision on these matters. Many colleagues knew what I thought, but now I committed it to paper. Comments are welcome!

Finally, does all of this mean that I am utterly negative about developments in formal demography? Definitely not! For instance, one of the major breakthroughs has been multi-state demography, first pioneered by Andrei Rogers and colleagues to deal with the

[11] Forecasting attempts using judges and their insights to set the trend and boundaries rather than a collection of 'dots' are much further away from the "probabilistic" idea, and are simply close to classic forecasting based on the Delphi method. I would suggest that in these instances the correct terminology be used instead of maintaining the current label of "probabilistic".

[12] I am not even referring to probabilistic forecasts of total population sizes in which also crucial factors in the short run, such as migration, are swept under the carpet.

issue of migration between more than one population. Multi-state demography proved to be a gem in projections of individual household positions as well (e.g. the Van Imhoff-Keilman LIPRO model), and has even been an indispensable tool for well-reasoned 'speculation' about the religious or political composition of populations. In all these endeavors, one does not lose track of the composing elements and transition probabilities, and the output can be understood 'analytically' from the input. With multi-state demography we are at the opposite end of the spectrum when compared to the massive shortcut hiding under the term 'probabilistic'.

My advice for the next cohorts of demographers? Demography is at the micro level (i) the study of individual life courses as they evolve, generation after generation, over time and space, and (ii) of the impact of all factors that impact on the life course. At the macro level demography is the study of how all these individual pieces add up to a larger whole, and how the structure of this larger entity –a population– feeds back into constraints and opportunities for its constituting members. Hence, let's keep the life course unfolding among successive generations, and all its intriguing alterations over time and space, as the core, and invest in technical advances that are in line with this objective. The way forward in technical demography is therefore that of increasing analytical finesse to cope with complexity, not that of blunt shortcuts.

References

Tomas Frejka (2012), The role of contemporary childbearing postponement and recuperation in shaping fertility trends. Comparative Population Studies – *Zeitschrift für Bevölkerungswissenschaft*. Preprint release of September, 27, 2012.

Tomas Sobotka *et al*. (2011), Postponement and recuperation in cohort fertility: New analytical and projection methods and their application. *European Demographic Research Papers*. Vienna Institute of Demography, Vienna, 2.

25 Years of collaboration: The Historical Sample of the Netherlands and LINKS

Kees Mandemakers

The Historical Sample of the Netherlands (HSN) collects life course data as completely as possible for a representative portion of the 19th and 20th century Dutch population. Base of the sample are the birth certificates. Most of the data for the construction of life courses are extracted from the population registers which makes it possible to follow migrants all over the country. This feature makes the HSN database internationally unique.

The HSN started around 1987 with the formation of a work group whose members were from different social science disciplines like sociology, social-economic history, social geography, economics and demography, all sharing a relatively strong historical interest. The project started with a first meeting in an obscure restaurant near Utrecht Central Station, called the 'Pepper Box' photo 1.

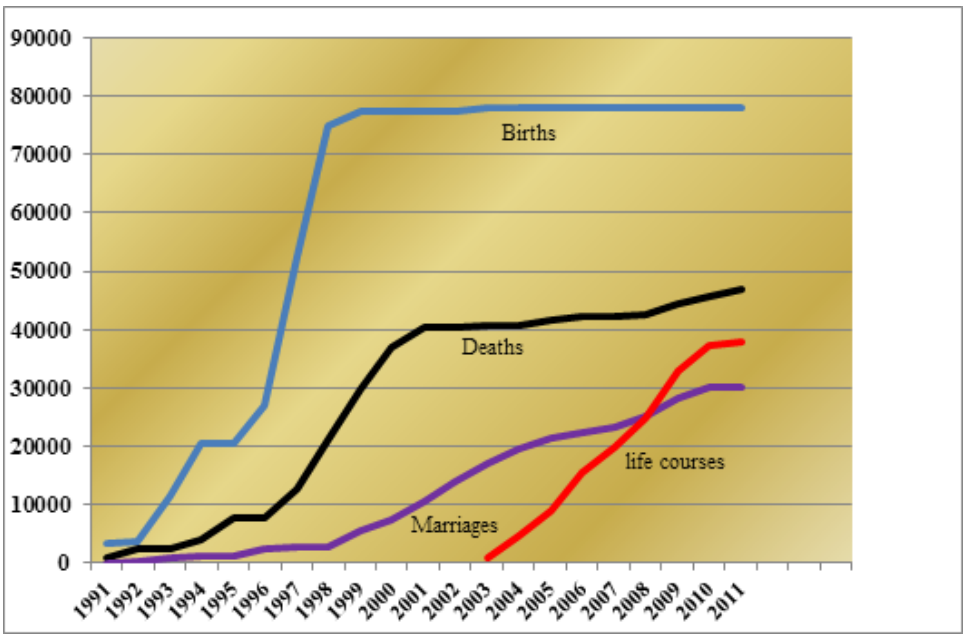
Photo 1. Bar Pepper Box in the city of Utrecht, the Netherlands

From the beginning Frans participated in the discussions how to build a representative sample for the Netherlands. These discussions resulted in the decision to sample from the birth certificates as this was the only way to achieve a really unbiased sample. Starting with infants also had the advantage that there would be immediate results in the field of infant mortality (early death certificates were relatively easy to find) which had the special interest of Frans. I won't repeat the discussions about a proper sample structure, except that we were very close to a name sample. A small majority decided in favor of the birth certificates, mainly to be sure to have an unbiased sample structure.

In 1989 the HSN was institutionalized in the form of a foundation, based at the International Institute of Social History, and Frans became member of the board. And the last two years he is the chair of the HSN. One of the main features of the HSN is the continuous struggling to get funding. In this struggle Frans played a major role; especially the acquisition of the ESM project (Early Childhood, Social Mobility and Longevity) was important. It was the first externally funded project in which the HSN received money to work on life courses of the HSN sample itself, instead of working on oversamplings of the basic sample structure. It was also the real forerunner for the enormous jump that came with the millions of the investment grant in the project *Life Courses in Context* (NWO Groot) in 2002.

Figure 1 gives an overview of the data gathered since the start of the HSN in 1991. As said, the sample was drawn from all persons born in the Netherlands between 1812 and 1922 (n=78,000).

Figure 1. Development of the HSN-database, 1991-2011



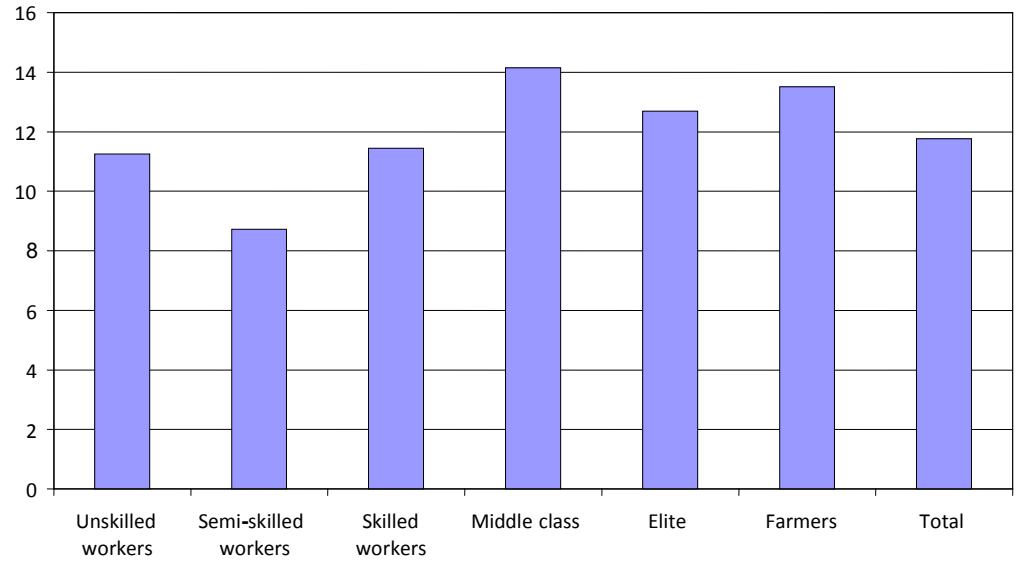
Since 1995 numerous volunteers have been working to build an index of all 19th and early 20th century civil certificates of the Netherlands, not only containing the names of all born, deceased and married persons, but also the names of their parents, places of birth, ages and partly their occupational titles. In this so-called GENLIAS dataset, especially the marriage certificates have been indexed, resulting in about 3,500,000 indexed certificates from almost all of the Netherlands for the period 1812-1932.

To use these data for scientific research the LINKS project has been initiated by the HSN. LINKS reconstructs all 19th and early 20th century families in the Netherlands. Main goals of LINKS are the construction of pedigrees (linking marriages certificates of children and parents) and families (adding births and deaths to marriage certificates). LINKS is a follow-up of earlier work with the GENLIAS dataset, especially for the provinces of Zeeland, Overijssel and Gelderland which started around 2006. Actually, in 1993, Frans and I went to Zeeland to discuss the construction of a Zeeland index of death certificates, which would have become part of the so-called AKON index (Algemene Klapper Overlijdensakten Nederland). The Zeeland index was realized but AKON was overtaken by GENLIAS which started in 1995 and developed rapidly since then.

The HSN was and is a mix of all kinds of projects directed at economic, social and demographic history based on micro data. The total output of HSN of the last twenty years amounts to 270 publications and 473 presentations. What might that have been without Frans? Perhaps nothing at all, one, given his importance for the HSN as a whole. There are 42 publications in which Frans was involved. Most of them focused on mortality with 24 publications, marriage counted 9 publications, other subjects were fertility and divorce. The number of presentations with Frans is 77 including the one in which Frans and I presented the first results of the HSN (at the Historical Demographical Conference in Montréal in 1992). We still worked with overhead sheets and I remember that Frans came to Schiphol to present me the last versions just before my departure to Montréal! The last ten years Frans is speeding up, giving presentations with HSN data at an average of ten per year. And, again, almost all of these presentations are co-productions where Frans, as always, takes a great part of the work.

The presentations of Frans are a goldmine for future work. I only have to remember the still unpublished but quite brilliant presentation about remarriages at the SHAA Chicago 2007 (*Who did and who did not? Remarriage in the Netherlands during the 19th and early 20th century*). *Figure 2* shows significant differences in the chance of remarrying between bridegrooms from different social backgrounds that are still waiting to be further analyzed, especially the question why the semi-skilled males were lagging behind in remarrying. Did they have better health prospects? Did they have smaller families? Did they have lower incomes? Were these workers not attractive partners for women looking for a partner? We found that age and marital status of the bride were very important to explain a second marriage, but why are these effects cheerfully interacting with social and provincial background? And of course the model needs to be improved as well, but that goes too far for this contribution. Anyway, with the new LINKS dataset the whole country could be covered, including effects of the first marriages as well.

Figure 2. Percentage of remarrying bridegrooms (out of total bridegrooms) differentiated on social-economic background, five regions in the Netherlands (provinces of Groningen, Overijssel, Gelderland, Zeeland and Limburg), 1812-1922 n=1,059,348)



Source: GENLIAS

Part III

Fertility and Nuptiality

Low fertility, economic change and unemployment during the interbellum period

Jan Van Bavel

In their recent paper, Schellekens and Van Poppel (2012) show that a very high proportion of the decline towards low fertility in the 1930^{s} in the Netherlands can be explained by economic change, "leaving little room for attitudinal change" (p. 965). More specifically, their results "indicate that unemployment was a major contributing factor to relatively low fertility in the 1930^{s}" (p. 983). The question remains to what extent this conclusion holds for European countries more generally, especially taking into account that the Netherlands experienced a notably late fertility transition (Van Poppel, 1983). The aim of this contribution is to shed some light on the matter with descriptive data, hoping to stimulate more sophisticated analyses in the future. Ideally, to guarantee high quality, these would be supervised by Frans van Poppel.

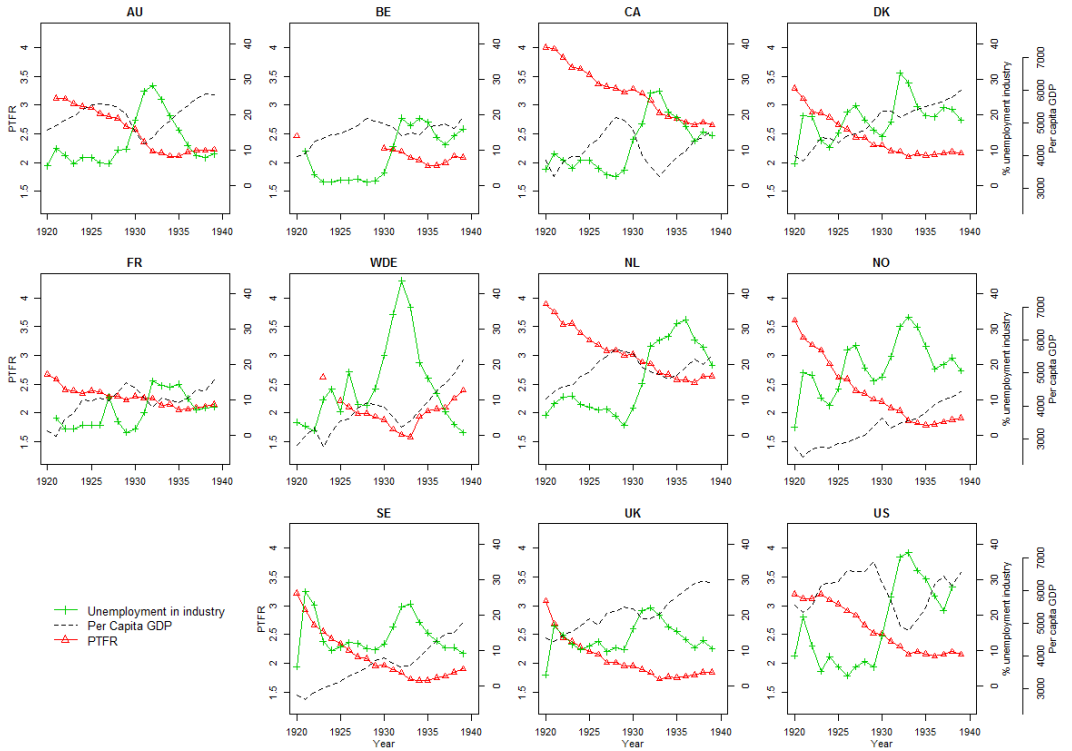
During the interwar period, demographers did not attribute low fertility to economic crisis. On the contrary, they generally linked it to continuing economic growth and increasing standards of living (Van Bavel 2010). Although unemployment soared during the Great Depression, this was not considered a major explanation for low fertility. In the judgment of Carr-Saunders (1936), "[a]s a motive for keeping the size of family small the fear of unemployment is probably far less important than the ambition of parents for their children" (p. 249).

Empirically, demographers and economists have shown that economic indicators and fertility are strongly correlated. However, the positive correlation between economic indicators and fertility only holds for the short-term ups-and-downs, not for the long term trends. "The surface waves are indeed much influenced by economic fluctuations, but the underlying tide appears to be an independent and surprisingly stable force" (Kirk, 1960, p. 254).

Figure 1 describe unemployment rates, per capita GDP and period total fertility rates (PTFR) for 11 OECD countries for the interwar years. These figures suggest that the mid-term fertility trend, in contrast to the short-term ups-and-downs, was not governed by unemployment or by the growth of the economy. For example, all countries exhibit declining fertility during the 1920^{s}, irrespective of the level of unemployment in industry and the growth of GDP per capita. And in all countries, the decline of fertility halted in the latter part of the 1930^{s}, irrespective of the severity of the economic crisis, as indicated by high unemployment and a slackening or even declining GDP.

Figure 2 plots the mid-term relations between economic indicators and fertility in a more systematic way for the same 11 countries. The two figures display the relationship between the average net reproduction rate for the years 1930-35 on the vertical axis and average economic indicators for the same years on the horizontal axes. There is no correlation whatsoever between average net reproduction and unemployment (panel A). For example, Canada and the Netherlands had about the same level of unemployment as England and Australia during these years, even though the former two countries had much higher reproduction rates. In the

Figure 1. GDP per capita, unemployment in industry, and period total fertility rates in a range of Western countries, 1920-1939 (standardized scales)

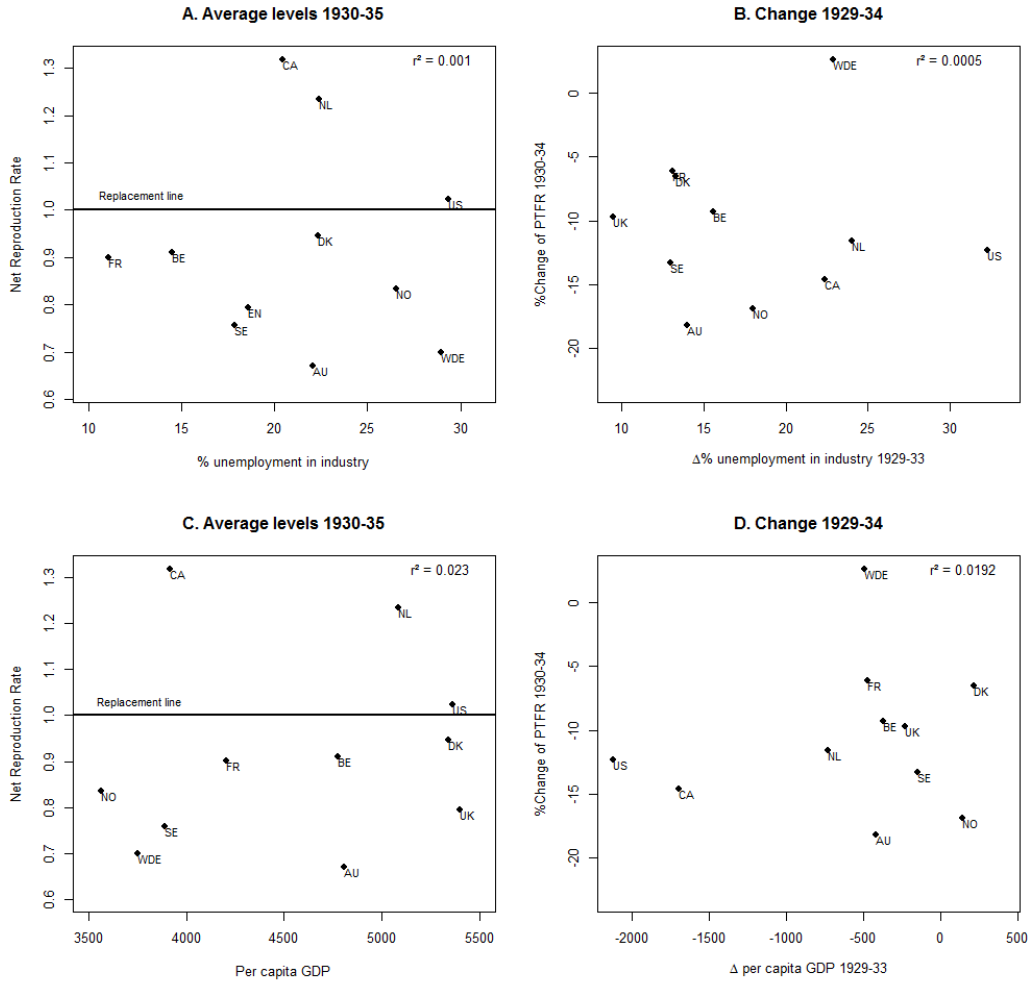


Sources:
- Unemployment in industry: Eichengreen and Hatton (1988).
- Per Capita GDP: Maddison (2003).
- PTFR: same as Figure 1 in Van Bavel (2010).

same vein, during the first half of the thirties, there was no correlation between the average net reproduction rates and the average level of GDP per capita (panel C).

Maybe the *change* rather than the level of the economic indicators mattered? Maybe people drastically restricted their fertility in response to worsening economic conditions, irrespective of the level they were used to? The scatter plots on the right hand side of figure 2 show that this explanation is deficient as well. The *drop* of total fertility during the early 1930^{s} was also not correlated with the mid-term *change* of the economic indicators during the Great Depression. For example (see panel B), unemployment rose much faster in the Netherlands, Western Germany and particularly in the United States than in Australia or Norway, even though the rate of decline of fertility was stronger in the latter two countries. Or, (see panel D) even though the GDP per capita dropped in the United States, the Netherlands, and France

Figure 2. Net reproduction rates by unemployment in industry and GDP per capita (average levels in 1930-35); change in TFR by change in unemployment and GDP per capita between 1929 and 1934[*]



[*] Change in unemployment in industry calculated as the difference between unemployment in industry in 1933 and 1929 in percentage points; the change in GDP was calculated as the difference between the figures for 1933 and 1929; the change in TFR was calculated as a relative difference: The absolute difference in TFR between 1934 and 1930 divided by the TFR for 1930.

Sources: - Unemployment in industry: Eichengreen and Hatton (1988).
- Per Capita GDP: Maddison (2003).
- PTFR: same as Figure 1 in Van Bavel (2010).

while the GDP continued to grow somewhat in Norway, fertility fell more rapidly in the latter country than in the former group of countries.

Western Germany (WDE) is an outlier due to the fact that, according to retrospective estimates based on official census data, the TFR jumped upward when the Nazis came to power. If Germany is removed from the picture, the correlation remains very low and not statistically significant.

References

Bavel, Jan Van (2010), Subreplacement fertility in the West before the baby boom: Past and current perspectives. *Population Studies* 64(1), pp. 1-18.

Carr-Saunders, Alexander M. (1936), *World population. Past growth and present trends*. Oxford: Clarendon Press.

Kirk, Dudley (1960), The influence of business cycles on marriage and birth rates, in National Bureau of Economic Research. *Demographic and Economic Change in Developed Countries*. Princeton University Press, pp. 241-257.

Poppel, Frans van (1983), *Differential fertility in the Netherlands: An overview of long-term trends with special reference to the post-world war I marriage cohorts*. Voorburg: NIDI.

Schellekens, Jona and Frans van Poppel (2012), Marital fertility decline in the Netherlands: Child mortality, real wages, and unemployment, 1860-1939. *Demography* 49(3), pp. 965-988.

Socio-economic status and marriage in Northeast China, 1749-1912

Shuang Chen, James Lee and Cameron Campbell

Marriage behaviors in historical China, as well as those in other parts of the world, are sensitive to both the underlying socio-economic institutions and the status of individual families. Past studies of marriage behaviors in historical China have identified a pattern of arranged marriage by parents and an early age at first marriage, compared to that of the populations in Western Europe (Lee and Wang, 1999 and Wolf and Huang, 1980). This phenomenon of early first marriage is mainly a function of the residential arrangement and inheritance practice in historical China. Unlike couples in Western Europe who usually established independent household upon marriage and therefore had to accumulate enough material wealth before they could marry (Hajnal, 1965 and 1982), in China couples remained in their parents' household after marriage (Lee and Campbell, 1997).

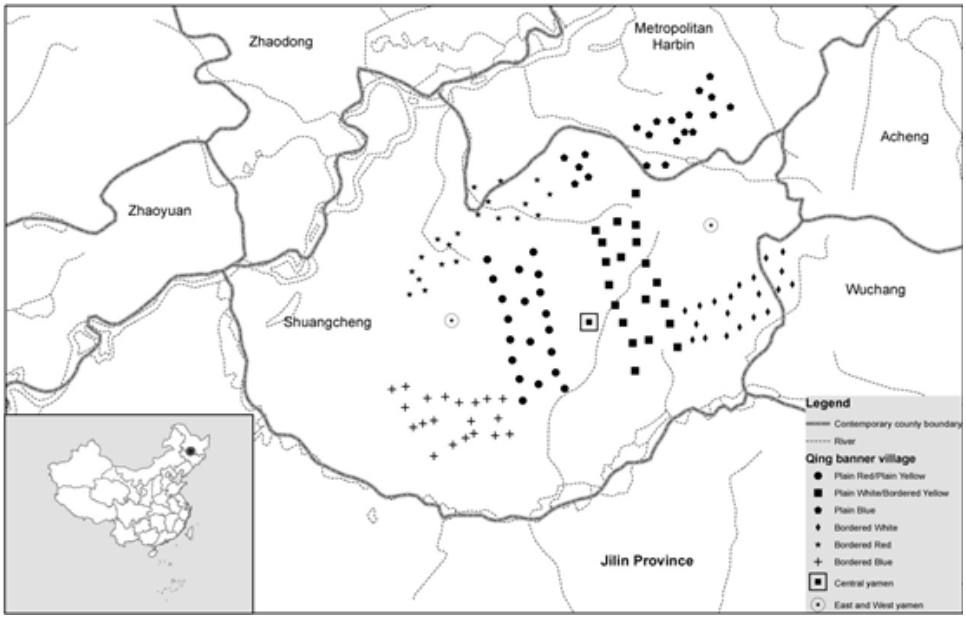
While residential arrangement and inheritance practice explained the early age at first marriage among Chinese populations, it was also true that considerable variations existed in the marriage timing. Women married early and universally while men had a relatively high rate of celibacy (Lee and Wang, 1999). Moreover, differences also existed across populations with different social status. For example, daughters of the Qing imperial lineage had a mean age of first marriage of 20.7, which is much higher than 18.3, the mean age of first marriage for daughters of banner farmers in Liaoning in Northeast China (Lee and Wang, 1999, p. 67). The mechanisms that lead to this variation still need further exploration.

In this paper, we explain how the social and political systems of historical China interplayed with individual and family characteristics to influence the chance of marrying. To do so, we summarize our findings based on recent analyses of the timing of first marriage for 0.36 million individuals, living respectively in 700 villages in Liaoning province between 1749 and 1909 (*map 1*) and 120 villages in Shuangcheng in Heilongjiang province between 1866 and 1912 (*map 2*). Both populations were institutionalized under the Qing Eight Banners system (Chen, Campbell and Lee, 2012). To record their membership to the Eight Banners, the government compiled household registers and updated them triennially or annually. Drawing from these registers, we construct two datasets, CMGPD-LN and CMGPD-SC, that consist of 2.4 million longitudinal observations for these 0.36 million individuals (Lee, Campbell and Chen, 2010 and Wang, Campbell, Chen, Dong, Noellert and Lee, 2012).

The form of major marriage and the denial of women's property rights in late imperial China determined a pattern of female hypergamy and male hypogamy in the marriage practices of this period. Despite the existence of various forms of marriage in historical China, major marriage, in which the wife moved into the husband's household to live with his parents and unmarried siblings, was the norm. Moreover, as law did not give women inheritance rights to her parents' property, it was possible that the wife entered the husband's family without any property. The unequal property rights resulted in the flow of wealth from the groom's to the bride's family. At the time of engagement, bride price was necessary to secure a marriage.

Map 1. Communities covered by the CMGPD-LN data, 1749-1909

Map 2. Communities covered by the CMGPD-SC data, 1866-1912



Therefore, the socio-economic status of the groom's family was important to win him a bride, while that of the bride's family was less important for her to be able to marry.

Consequently, a family's socio-economic status had opposite impacts on the timing of first marriage for men and women. Men with higher social economic status always married earlier, while women with higher social status tended to marry later. Results from our regression analysis reveal that the pattern of higher social economic status raising male marriage chances but lowering female marriage chances is apparent regardless of whether social and economic status is measured for father, self, or kin (Chen, Campbell and Lee, 2012). For example, father's official position, which brought a family power and wealth, raised a son's likelihood of marrying by 20.4 per cent in Liaoning and 27.3 per cent in Shuangcheng. However, the same characteristic reduced a daughter's likelihood of marrying by 25.7 per cent in Liaoning and 21 per cent in Shuangcheng. This striking difference confirmed the pattern of male hypogamy and female hypergamy on the marriage market in late imperial China; families of lower socio-economic status were more willing to trade their daughter for bride price.

Along with this line, the presence of parents in the household, which indicated a more stable family, also affected the chances of marrying for sons and daughters oppositely. Sons with both parents alive tended to marry early. A son's likelihood of marrying was reduced by 25 per cent in Liaoning and by 14.3 per cent in Shuangcheng if none of the individual's parents was alive. By contrast, the absence of both parents increased a daughter's likelihood of marrying by 39.2 per cent in Liaoning and 29.3 per cent in Shuangcheng. This is probably because, without property rights, women became more vulnerable upon parents' death, when their brothers would equally divide family property among themselves.

At the macro level, the differentiation in the timing of first marriage based on social economic status became less significant among men. However, our results still consistently show that women of lower social and political status married earlier. Here we use registration category to measure social and political status at the macro level. This is because, under the Eight Banners, registration categories defined differentiated entitlement rights to political and economic resources of the sub-populations. Within the Liaoning population, the daughter's likelihood of marrying increased by 43.8 per cent if she came from the lower status population. Similarly, in Shuangcheng, being from the lower status category increased a daughter's chance of marrying by 50.6 per cent.

Moreover, not only did gender inequality have significant impacts on marriage behaviors, but also seniority was important in determining the time of first marriage. Our results show that sibling composition and their marital status had significant impact on timing of first marriage for both men and women. Siblings appear to have married in order of seniority: having unmarried older siblings delayed the timing of first marriage of both men and women. Such effects were strongest for unmarried siblings of the same sex, suggesting that sons and daughters were in separate queues.

Above all, our empirical study demonstrates that gender is the most important structural conditions to formulate marriage behaviors. The social system featured by gender inequality and the family system that honored seniority interacted with individual and household socio-economic status to shape the marriage behaviors in Northeast China from the 18th to early 20th centuries. During this process, although some men from lower status registration category still had chances to offset their disadvantages on marriage market, women's marriage behavior were more likely to be constrained by such structural factors as registration category.

References

Chen, Shuang, Cameron Campbell and James Lee (2012), Categorical inequality and gender difference: Marriage and remarriage in Northeast China, 1749-1912. Working paper.

Hajnal, John (1965), European marriage patterns in perspective. In D.V. Glass and D.E.C. Eversley (eds.), *Population in History.* London: Edward Arnold, pp. 101-146.

Hajnal, John (1982), Two kinds of pre-industrial household formation systems. P*opulation and Development Review*. 8, pp. 449-494.

Lee, James Z. and Cameron Campbell (1997), *Fate and fortune in rural China: Social organization and population behavior in Liaoning, 1774-1873*. Cambridge: Cambridge University Press.

Lee, James Z. and Wang Feng (1999), *One quarter of humanity: Malthusian mythology and Chinese realities, 1700-2000*. Cambridge, Mass.: Harvard University Press.

Lee, James Z, Cameron Campbell and Shuang Chen (2010), *China multi-generational panel dataset, Liaoning (CMGPD-LN), 1749-1909.* User Guide. Ann Arbor, MI: Inter-university Consortium for Political and Social Research.

Wang, Hongbo, Cameron Campbell, Shuang Chen, Hao Dong, Matt Noellert and James Z. Lee (2012), *China multi-generational panel dataset, Shuangcheng (CMGPD-SC), 1749-1909.* User Guide. Ann Arbor, MI: Inter-university Consortium for Political and Social Research.

The incidence of consanguinity in Norway in the late 19th century

Hilde L. Jåstad and Gunnar Thorvaldsen

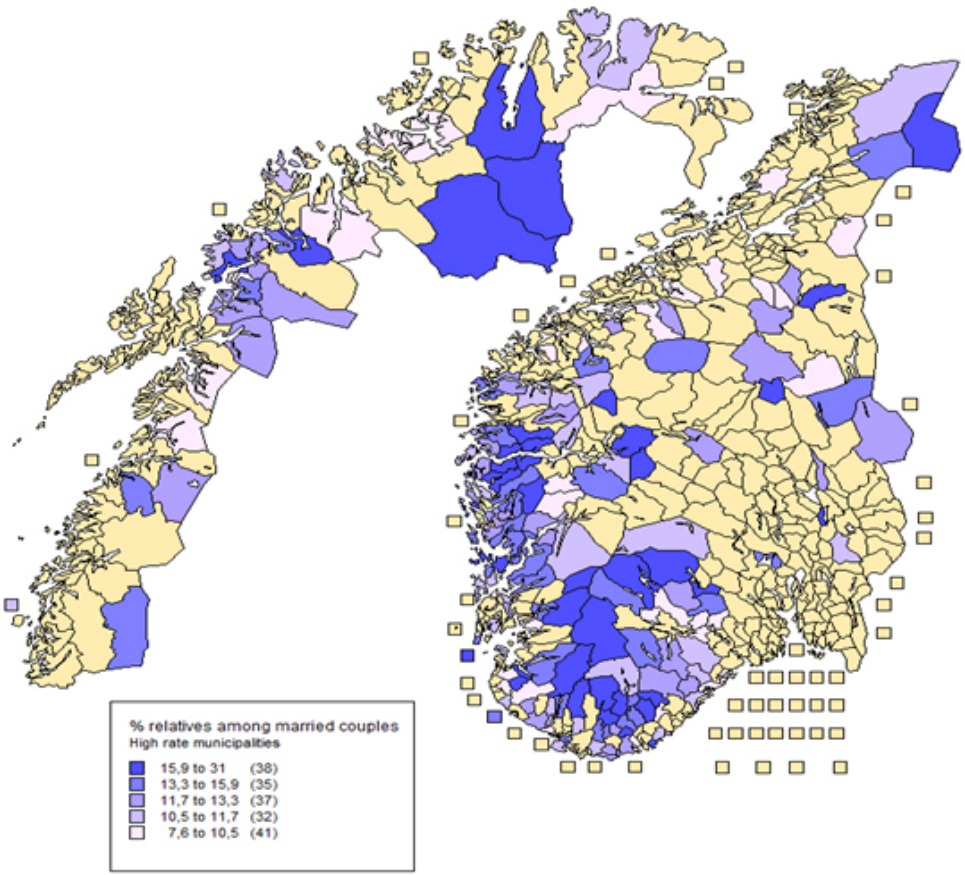
Today consanguineous marriages are defined as foreign in Norwegian culture, something done by "the others". Such marriages are more common in other countries, e.g in Pakistan whose emigrants bring along the custom to Scandinavia where they are criticized for the practice. This con-temporary context makes it topical to know how common marriages between close kin were earlier. Following the reformation, Protestants generally accepted the guidelines in *Leviticus* 18, pp. 7-18, which permitted marriage between first cousins until in 1687 Christian V's Law banned such marriage. Kin marriage was only allowed between third cousins. If closer kin married without royal license they risked losing their assets and their homes. This legislation was removed in Norway in 1800, and to the present marriage between first cousins, uncles/aunts and nieces is legal in Norway. Since parishes may function as marriage isolates and marriage patterns may be based on geographical proximity, this may result in many consanguineous relationships between spouses, which in the next round will produce similar genetic structures among descendants (Saugstad and Ødegård, 1977).

Several theories attempt to explain the prevalence of consanguinity. One focuses on pro-cesses of social class formation, where the maintenance of family wealth and land holdings was secured by marriages between close kin (Bras, Van Poppel and Mandemakers, 2009). Economic motivation has a strong explanatory power in studies of present consanguinity as well (Stoltenberg, 1997). However, on the one hand maintenance of family wealth correlates with consanguinity. On the other hand the highest levels of consanguinity are found in poor rural communities with low levels of maternal education, early age at marriage and first birth, short birth intervals, and longer reproductive spans (Bittles, 2010). The preservation of minority cultures is another theory (Ottenheimer, 1986; 1990 and 1996). A further explanation is related to the demographic transition. When more children survived into adulthood it increased the opportunities to marry a relative. When family sizes became smaller, rates of consanguineous marriages eventually diminished (Davidoff, 2006).

Kin intermarriage is usually studied in population registers, but the Norwegian 1891 census presents a shortcut since it asked about relationships between spouses who were second cousins or closer. At the time, the medical profession suspected an association between consanguineous marriages and the offspring's illnesses. In an international context, historical sources with information about consanguineous marriages in such format are rare. Charles Darwin in vain tried to lobby a question of this kind into the 1871 British census. In Norway, dr. Uchermann and other professors of medicine were interested in the causes of deafness, a variable already implemented in the censuses. The Central Bureau of Statistics reluctantly and only in 1891 agreed to implement the field: "For married women: Are you and your husband related as second cousins or closer? Yes, No." Our national analysis here is based on aggregates from official statistics (NOS 1891), complemented by a 6 per cent clustered microdata sample with circa 120,000 records – a full count of 26 municipalities.

The proportion of consanguineous marriages increased from the early 19th century peaking in the decades after 1850. This was followed by rapid decline in the 20th century, such marriages becoming almost non-existent among ethnic Norwegians. Remarkably, the growth and decline of consanguineous marriages occurred almost simultaneously in highly different localities and regions across Europe and America (Bittles and Egerbladh, 2005; Bittles and Smith, 1994; Ottenheimer, 1890; Saugstad, 1977 and Bras *et al.,* 2009). Main findings from these studies are related to geographical distribution, the relationship between consanguinity and the proportion of non-migrants (i.e. residents in municipality of birth) and population density.

Map 1. Percentage of consanguineous marriages in Norway, 1891. High rate municipalities



Map 1 shows the proportion of consanguineous marriages for municipalities that had a higher proportion of marriages between close kin than the national average –6.7 per cent (the yellow areas had a proportion lower than average). Overall, the map shows a coast-inland dichotomy with the highest proportions of consanguineous marriages in inland areas– the provinces of Telemark, East-Agder, and Hordaland stand out in the south and west with percentages of marriages between close kin 10 per cent or higher. Rates were generally low in the middle part of Norway, but the northernmost provinces, Troms and Finnmark, obtained 10.7 and 9.5 per cent respectively. Some mu-nicipalities differed substantially from the average: Valle, Sirdal, Suldal, Austevold, Jostedal, Lavik, Brekke and Kistrand had above 20 per cent. The remote and isolated Røldal parish in the west and Karasjok in the north had above 30 per cent. Another contrast is distinctly urban-rural. In the cities, the proportion of consanguineous marriages was on average 2.5 per cent.

Earlier studies have argued that high rates of consanguineous marriages correlate with sparsely populated areas where the majority of the population consists of non-migrants (Saugstad, 1977, p. 338). Saugstad further suggests that some regional variation within Norway was related to differential social structures, since the Eastern municipalities as opposed to Northern and Western Norway differ with respect to mean size of farms and proportions of cottars as opposed to landowning farmers (Saugstad and Ødegård, 1976). This is not confirmed in the map where municipalities in Eastern Norway had low rates, but is confirmed by the analysis of our microdata (Jåstad and Thorvaldsen, 2012). These show that the largest consanguineous group is found in the primary sector, and that only 17 per cent were cottars or day workers, meaning that the vast majority of consanguineous marriages were among the farmers. This analysis also shows that the probability of consanguineous marriage was significantly lower among the youngest women, proving that the incidence of consanguinity was being reduced in the late 19th century.

An interesting ethnic point is that the parts of Northern Norway which experienced the highest levels of consanguineous marriages had a majority of Sámi inhabitants, especially the typical Sámi municipalities Karasjok, Kautokeino and Kistrand. Previous studies suggested a cultural explanation, the Sámi population having a preference for first cousin marriages (Saugstad, 1977a, p. 333). High rates of consanguinity were also found in northern regions of Sweden, in areas where the majority of the population are Sámi (Alström, 1958, Fraccaro, 1958 and Böök, 1948). The high proportions of consanguineous marriages found among the Sámi raises several interesting questions that will be explored in future research. One question is related to source criticism. If kinship had different connotations among the Sámi compared to the Norwegians, this could affect both the economic activity, organization and reporting of the household's composition (Jåstad, 2011). Norwegians depicted the Sámi kinship network with expressions such as "to be 17th cousins like the Sámi", pinpointing the extended kin groups among the Sámi. An interesting question is to what extent the Sámi reported second cousin relationships when the kin relation was really more remote, thus biasing the estimates of consanguinity reported in the 1891 census. During this period the Norwegian state increased its efforts to assimilate the Sámi population, so in ethnic terms kin marriage can also be understood as a means of identity preservation.

Earlier studies have shown that parental consanguinity increases the risk of infant death (Stoltenberg, 1997 and Surén *et al.,* 2007). However, we know less about how consanguinity affected infant mortality rates in the late nineteenth century when the average infant mortality rate in Norway was around ten per cent and the causes were more complex than today. It has been suggested that biological heterogeneity or genetic variables may form part of the explanation. However, few countries have available data on consanguinity and mortality in historical populations (Guo, 1993). A map published in Thorvaldsen (2002, p. 86) shows infant mortality rates in Nor-wegian parishes for the period 1876-1880. High rates (between 180 to 224 deaths per 1.000 births) were found in the provinces Aust-Agder, Telemark and parts of Hordaland in the southern part of Norway and in Finnmark province up north. These are roughly the same as the high consanguinity areas in the map reproduced here, convincing us of the need for further studies of connections between consanguinity and infant mortality. The Historical Population Register now being built in Norway will make such studies possible with data on the individual and family levels (Thorvaldsen, 2011).

References

Bittles, A.H. and I. Egerbladh (2005), The influence of past endogamy and consanguinity on genetic disorders in northern Sweden. *Annals of Human Genetics*, 69, 5, pp. 549-558.

Bittles, A.H. (1994), The role and significance of consanguinity as a demographic variable. *Population Development Review,* 20, pp. 561-584.

Bras, H., F. van Poppel and K. Mandemakers (2009), Relatives as spouses: Preferences and opportunities for kin marriage in a western society. *American Journal of Human Biology*, 21, pp. 793-804.

Christian V's Norwegian Law, tredie bog, Cap 18, Om Egteskab.

Davidoff, L. (2006), Close marriage in the 19th and 20th century middle strata. In F. Ebtehaj, B. Lindley and M. Richards (eds.). Kinship matters. Oxford and Portland: Hart Publishing, pp. 19-46.

Guo, G. (1993), Use of sibling data to estimate family mortality effects in Guatemala, *Demography,* 30, pp. 15-33.

Jåstad, H.L. (2007), Infant mortality in ethnically mixed parishes in 19th century Northern Norway, Paper presented at the 32nd annual conference in Social Science History Association, Chicago 15-18 November.

Jåstad, H.L. (2011), *Coresidence across generations. In Northernmost Norway during the last part of the 19th century*, Ph. D, University of Tromsø.

Jåstad, H.L. and G. Thorvaldsen (2012), Consanguinity in Norway in the period 1891-1920. Consanguinity as a determinant of infant mortality? Paper presented at the European Social Science History Conference, Glasgow, 11-14 April

Ottenheimer, M. (1996), Complementarity and the structures of parallel cousin marriage, *American Anthropologist,* 88, 1986, pp. 934-939.

Ottenheimer, M. (1990), Lewis Henry Morgan and the prohibition of cousin marriage in the United States. *Journal of Family History*, 15, pp. 325-334.

Ottenheimer, M. (1996), *Forbidden relatives. The American myth of cousin marriage.* Urbana: University of Illinois Press.

Saugstad, L.F. (1977a), Inbreeding in Norway. *Annals of Human Genetic*, 40, pp. 481-491.

Saugstad, L.F. (1977b), The relationship between inbreeding, migration and population density in Norway. *Annals of Human Genetic*, 40, pp. 331-341.

Saugstad, L.F. and Ø. Ødegård (1977a), Predominance of extreme geographical proximity of the spouses of heirs to independent farms in a mountain valley in Norway between 1600 and 1850. *Annals of Human Genetic*, 40, pp. 419-430.

Stoltenberg, C. (1997), *Birth defects, stillbirth and infant death.* Dr. Degree, Oslo: Nasjonalt folkehelseinstitutt.

Surén, P., A. Grjibovski and C. Stoltenberg (2007), Inngifte i Norge. Omfang og medisinske konsekvenser, Nasjonalt folkehelseinstitutt, rapport 2.

Thorvaldsen, G. (2002), Rural infant mortality in nineteenth century Norway. *Hygiea Internationalis,* vol. 3(1), pp. 75-113. http://www.ep.liu.se/ej/hygiea/ra/013/paperc.pdf accessed 24 November.

Thorvaldsen, G. (2011), Using NAPP census data to construct the historical population register for Norway. *Historical Methods*, 44, 1.

Verzuiling ('pillarisation'), ontzuiling ('de-pillarisation') and fertility in the Netherlands (1920-1980)

Hans Knippenberg and Sjoerd de Vos

A deviant case

During a large part of the 20th century, the Netherlands have been a deviant case in the general (West-)European pattern of fertility decline. Starting in the last quarter of the 19th century, the decline of Dutch fertility slowed down from 1910/1920 onwards. In the same period, the regional differences in fertility within the Netherlands increased considerably: In 1931/1935, the southern provinces of North-Brabant and Limburg had the highest levels of marital fertility, which were 89 and 71 per cent higher than the province of North-Holland, which had the lowest level.

During the 1960s and 1970s the Netherlands lost its deviant demography as a consequence of a spectacular decline of fertility. It changed from one of the countries with the highest fertility levels into one with the lowest levels (Van de Kaa, 1987). The total fertility rate changed from 3.1 children per woman in 1960 to 1.6 in 1980. The geographical fertility pattern also showed a remarkable turn. At the end of the 1970s the province of Limburg had the lowest level and also North-Brabant now was among the provinces with the lowest fertility levels.

Explanation

It will be clear that general theories on fertility decline cannot fully explain the deviant character of the Dutch fertility decline and its changing geographical pattern. These theories focus on (mainly economic and demographic) factors, which make birth-control attractive and (cultural) factors, which make birth-control also morally and psychologically acceptable (Wilson and Lesthaeghe, 1986 and Engelen and Hillebrand, 1986).

Religion is such a factor that potentially influences the acceptation of birth-control. Van Poppel (1974) showed that from the last quarter of the nineteenth century onwards, Roman-Catholics and orthodox Calvinists *(Gereformeerden)* had a higher marital fertility than other religious denominations and secular couples. That does not explain, however, why during a large part of the 20th century, the Netherlands had a higher fertility than for instance its southern neighbour Belgium, which was almost homogeneously Catholic. Van Poppel, therefore, pointed at the specific kind of *verzuiling* ('pillarization') of Dutch society, which was relatively strong. *Verzuiling* means the segmentation in Catholic, orthodox Calvinist, Socialist and Liberal subcultures and institutional networks.

The heyday of *verzuiling* started after the 1917 Constitution paved the road for general suffrage and equal financing of public and confessional primary education (Lijphart, 1968). Roman-Catholic and (orthodox) Protestant political parties strengthened their position in Parliament and the number of Catholic and Protestant primary schools increased considerably. However, none of the confessional 'pillars' had a majority position. That minority position made them sensitive for their numerical size, not only with regard to the more liberal and socialist parts of the population, but also to each other. In the European context, the Dutch

verzuiling was unique in the sense that there was a Calvinist pillar alongside a Roman-Catholic one, which both resisted birth-control to a greater or lesser extent. The consequence was a relatively high fertility of both pillars.

Analysis
Knippenberg and De Vos (2010a and 2010b) recently analysed the municipal differences in marital fertility at three time cuts: Around 1930, 1960 and 1978. The first two moments represent more or less the beginning and the end of the *verzuiling* of Dutch society. The last moment represents the *ontzuiling* ('de-pillarisation') of society after the cultural revolution of the 1960^{s} and 1970^{s}. This paper presents the main results of their multiple regression analyses.

In **1930**, by far the main explanatory factor was the rate of Roman-Catholic *verzuiling* measured by the proportion of votes for Roman-Catholics parties at the Second Chamber elections: the higher the rate of *verzuiling*, the higher the fertility. Almost half the variance (48%) in marital fertility was explained by only this factor. Infant mortality and Protestant verzuiling also had a stimulating impact on fertility. Economic modernization and prosperity had negative regression coefficients. All significant factors together explained 65 per cent of the variance in marital fertility.

In **1960** there were again strong positive effects of Roman Catholic (% KVP) and Protestant (% ARP, CHU, SGP) *verzuiling* on fertility. Also the proportion of farmers had a positive effect, which indicates an element of the traditional agrarian pattern of family bound agrarian ways of production. The proportion of high status occupations outside the agrarian sector had a negative impact on fertility. All significant factors together explained 69 per cent of the variance in marital fertility.

In **1978**, there was a significant change in the results of the regression analysis on marital fertility. Catholic *verzuiling* was no longer the main explanatory factor, but still had a positive impact on fertility. The strongest positive effect came from the proportion of SGP voters, which is the most orthodox Calvinist party. Also the proportions of votes for the other orthodox Calvinist parties (ARP and GPV) had independent positive effects on fertility. The proportion of the less orthodox Protestant party (CHU) no longer had a significant impact on fertility. Socio-economic status has a negative impact on fertility. Together, all significant factors explained 52 per cent of the municipal variance in marital fertility.

These changes have to do with the strong *ontzuiling* ('de-pillarisation') of the Roman Catholics in this period and a mixed development as far as the Protestant 'pillar' is concerned: *ontzuiling* of the least orthodox part and a kind of *herzuiling* ('re-pillarization') of some of the most orthodox parts resulting in two very orthodox 'mini-pillars' of *bevindelijk gereformeerden* (the rank and file of the SGP) and *vrijgemaakt gereformeerden* (the rank and file of the GPV) (Janse, 1985, pp. 161-163 and Stoffels, 1995, pp. 127-152). In Parliament, the Roman Catholic party almost halved from 32 to 18 per cent, so did the Protestant CHU (from 9 to 5%), whereas the other more orthodox Protestant parties remained more or less at the same level (around 9% ARP and 2.2% SGP) or even doubled (0.8 to 1.8% GPV).

The crumbling of the Roman Catholic 'pillar' becomes the more clear when we look at the results of a regression analysis on the change in marital fertility between 1960 and 1978. In this period the marital fertility dropped considerably from 171 to 90 children per 1.000 married women until 45 year. The municipal differences can be explained for 55 per cent by only one factor: The proportion of Roman Catholics in population (1960): The higher the proportion, the larger the decline of fertility.

Conclusion

The deviant character of the Dutch fertility decline between around 1920 and 1980 and its changing geographical pattern has almost entirely to do with the specific political-religious constellation of the *verzuiling* ('pillarisation') and *ontzuiling* ('de-pillarisation') of Dutch society. The two religious pillars (Roman Catholic and orthodox Protestant) were both in a minority position and had to compete not only with the liberal and socialist segments of Dutch society, but also with each other, which resulted in a relatively high fertility until the 1960s. During the 1960s and 1970s Dutch society 'de-pillarised' as a consequence of a strong secularisation and the cultural revolution of de 1960s. Consequently, Dutch fertility declined spectacularly. Only two 'mini-pillars' of orthodox Calvinists, the rank and file of the GPV (now merged in *Christen Unie*) and the SGP resisted and showed high fertility levels until the present day.

References

Engelen, Th.L.M. and J.H.A. Hillebrand (1986), Fertility and nuptiality in the Netherlands, 1850-1960. *Population Studies*, 40(3), pp. 487-503.

Janse, C.S.L. (1985), *Bewaar het pand. De spanning tussen assimilatie en persistentie bij de emancipatie van de bevindelijk gereformeerden.* Houten: Den Hertog.

Kaa, D.J. van der (1987), Europe's second demographic transition. *Population Bulletin, 42*, pp. 1-57.

Knippenberg, H. and S. de Vos (2010a), Tussen crisis en verzuiling: regionale verschillen in vruchtbaarheid tijdens het interbellum. In J. Kok and J. Van Bavel (red.). *De levenskracht der bevolking: Sociale en demografische kwesties in de Lage Landen tijdens het interbellum* (109-140). Leuven: Universitaire Pers.

Knippenberg, H. and S. de Vos (2010b), Een opmerkelijke omslag: het veranderde geografisch patroon van de huwelijksvruchtbaarheid in Nederland tijdens de culturele revolutie van de jaren zestig en zeventig. In K. Matthijs *et al*. (red.). *Leven in de lage landen. Historisch-demografisch onderzoek in Vlaanderen en Nederland* (187-209). Leuven: Acco.

Lijphart, A. (1968), *The politics of accommodation: pluralism and democracy in the Netherlands*. Berkeley: University of California Press.

Poppel, F.W.A. van (1974), De differentiële vruchtbaarheid in Nederland in historisch perspectief: de invloed van de religie. *Bevolking en Gezin*, pp. 329-347.

Stoffels, H. (1995), *Als een briesende leeuw. Orthodox-protestanten in de slag met de tijdgeest.* Kampen: Kok.

Wilson, Ch. and R. Lesthaeghe, R. (1986), Modes of production, secularisation and the pace of the fertility decline in Western Europe, 1870-1930. In A.J. Coale and S. Cotts Watkins (eds.). *The decline of fertility in Europe* (pp. 261-293). Princeton: Princeton University Press.

Marriage and conscription in the Netherlands

Pim Kooij

In my grandfather's house there was a portrait of his grandfather, who was said to have hurriedly married in 1811 to avoid conscription for the Napoleonic expedition to Russia. Unfortunately, the story proved to be apocryphal. The man in the portrait was born in 1826. Moreover, the Dutch contingent in the Grande Armée's dramatic expedition to Russia consisted of about 15,000 professional soldiers and volunteers (Jongbloed, 1996, p. 18). Nevertheless, the story encouraged me to investigate whether there was any link between the exemption of married men from military service and an increase in the number of marriages.

Let us first see what Frans van Poppel had to say on this subject in his dissertation on marriage in the Netherlands. Van Poppel's first concern was not the number of marriages but the age of marriage and the regional and social differences regarding marriage, on which subject he draws important conclusions. However, there are some observations on the age of marriage from 1812 onwards, the first year for which a complete population registration is available (Van Poppel, 1992, p. 141), and also the year that the Napoleonic expedition to Russia took place from June to December. The data for six municipalities and four regions, which has been analysed previously, shows for the greater part a fall in the age of first marriage, especially in the towns. Perhaps hurried marriages in previous years have acted as a kind of catalyst in this urban fall of the age of first marriage, but this is speculation. We will have to take a closer look.

Conscription in the form of the forced enlistment of certain members of society had already existed for ages, but systematic conscription, affecting the entire male population, was a Napoleonic invention. It started in France in August 1793 with the *Grande levée*, and was elaborated in the Jourdan-Delbrel law of September 1798 (Woolf, 1991, pp. 157-158). Every Frenchman was now obliged to enlist for five years on reaching 20 years of age, if they were taller than 1.57 meters, not handicapped and unmarried. Marriage was indeed a means of avoiding army service; however, as the age of first marriage was rather high at that time –for men about 28 years– only a few 20 year olds would have gained exemption on this basis. Still, there were rumours of young men even marrying old women to avoid conscription (Welten, 2007, p. 338), although this would not have helped much because only men who had married before 12 January 1798, the day on which the first report on conscription by Jourdan was launched, received that privilege (Welten, 2007, p. 322).

From 1804 onwards, the possibilities for exemption for married men increased and a law of 10 September 1808 prescribed that married conscripts who had drawn a place by lot were to be placed *á la fin du depot* (Welten, 2007, p. 336). This mostly meant that married men avoided service and it was only in Napoleon's final years that the demand for soldiers became so high due to death and desertion that in some regions married men were enlisted. Moreover, there were married men who earned their living as *remplaçants* (Welten, 2007, p. 344).

The main rules governing conscription were also applied in countries occupied by Napoleon (Woolf, 1991, pp. 156-165 and Stoker, 2009). In the Netherlands, conscription came rather late, as Louis Napoleon, the King of Holland, did not like the system and prevented its introduction (his brother Joseph, King of Naples, did the same). However, after the annexation of Holland by the French Empire on 9 July 1810, conscription was introduced. In the spring of 1811, a set of municipal *Notificaties* made clear that no men of a given age could avoid military service unless they were very short, handicapped or married, and of course drew a low lot number. In the city of Groningen, for example, all the conscripts were summoned to appear at the town hall and Martini church on 9 April with good shoes and a sack, ready for departure, with the exception of married conscripts (University of Groningen Library, set of municipal notifications, PGB D 465 II).

Thus, marriage was indeed a means of avoiding active service. Did this affect the number of marriages and the age of first marriage for men? There was indeed a rise in the number of marriages. According to Hofstee, who analysed the demographic developments in the Netherlands for the first half of the nineteenth century, the number of marriages in 1810 was higher than in the previous years (Hofstee, 1978, Table 4). The number of marriages per 1,000 inhabitants in 1810 was 9.9, while in 1808 it had been 7.8 and in 1809, 8.2. This stimulus for marriage did not last long. In 1811 the number fell to 7.5 per 1,000, and in 1812 to 7.0. Then there was a rise again, to a maximum of 9.9 in 1815, a development which was of course connected with the defeats of Napoleon and the coming of peace.

It is difficult to determine whether the rise in marriages in 1810 can be ascribed to Napoleonic legislation on conscription. This requires research on a local scale focused on the age at first marriage for men, which should fall, and the gap between the age of the bride and the groom, which could increase. The difficulty is that in 1810 and part of 1811 the registration of marriages was undertaken by the churches and they did not record the ages of the couples. For this reason, most urban analyses start in 1812. There is only one local study available on this subject, the outstanding work by Joost Welten, mentioned above. He found some figures for earlier years because the municipality he studied, Weert, belonged to the Southern Netherlands at that time, which had been annexed to France in 1795 (Welten, 2007, Ch. 14).

In the years after 1810 there is no clear correlation between the regulations concerning conscription and the number of marriages. Of course, the number of marriages fell during the First World War when the army was mobilized, and also during the mobilization on the eve of the Second World War (Engelen, 2009, p. 31). These mobilizations also contributed to the character of marriages, but in a different way as, again, my family history demonstrates. During the First World War my grandfather had to leave his small home village in Gelderland and was mobilized in Dordrecht. He met his future wife there and they married after the war. The mobilization for the Second World War brought my father from Dordrecht to Roosendaal, where my mother lived. She had been born in Sauwerd in the north of the country but her father's career in the railways had brought her south. These two examples show that conscription also contributed to a greater genetic variation in marriages.

In the 1970s, exemption from service for married men was reinstated. In the previous years the drawing of lots had been abolished and married men were enlisted, receiving a special allowance. However, in 1976, Henk Vredeling, the Minister of Defence under the socialist Prime Minister, Den Uyl, realized that it was cheaper to exempt married men from service than pay these allowances. This exemption was promulgated in 1977 (*Staatsblad* 323). If you google *'Vredeling huwelijk'* ('Vredeling marriage') on the internet, there appears a number of ego-documents in which people confess they married for that reason. I also know that some of my students did so at the time. Still, this did not result in a rise in the number of marriages. In fact, the numbers kept falling, in accordance with a trend apparent since 1970, from 7.3 in 1975, to 7.0 in 1976, 6.7 in 1977 and 6.4 in 1978 (CBS, Statline).

These are a few marginal, partly individual comments on the history of marriage in the Netherlands, inspired and framed by the authority in this field, Frans van Poppel.

References

Engelen, Theo (2009), *Van 2 naar 16 miljoen mensen. Demografie van Nederland, 1800-nu*. Amsterdam: Boom.

Hofstee, E.W. (1978), *De demografische ontwikkeling van Nederland in de eerste helft van de 19e eeuw.* Den Haag: NIDI/Van Loghum Slaterus.

Jongbloed, Aad (1996), Voor koning(in) en vaderland. Dienstplicht door de jaren heen. Zutphen: Alpha.

Poppel, Frans van (1992), *Trouwen in Nederland. Een historisch-demografische studie van de 19e- en vroeg 20e eeuw.* Wageningen: A.A.G. Bijdragen 33.

Stoker, Donald, Frederick C. Schneid and Harold D. Blanton (eds.) (2009), Conscription in the Napoleonic era. A revolution in military affairs? London and New York: Routledge.

Welten, Joost (2007), *In dienst voor Napoleon's Europese droom. De verstoring van de plattelandssamenleving in Weert. Leuven*: Davidsfonds.

Woolf, Stuart (1991), *Napoleon's integration of Europe*. London and New York: Routledge.

Religious and socio-economic determinants of fertility limitation by birth spacing: Results of the Historical Sample of the Netherlands

Aart C. Liefbroer

Introduction

Frans van Poppel is a towering figure in Dutch and European historical demography. He has made major contributions to our understanding of population developments since the nineteenth century. He is one of the rare demographers that has studied all major types of demographic processes – mortality, fertility, union formation and dissolution, household composition, and migration. I am proud that I, as a fellow researcher at the Netherlands Interdisciplinary Demographic Institute, have had the privilege to collaborate with Frans on a number of articles. I have never encountered someone who had read so widely about any topic, and yet had the amazing ability to combine this vast knowledge with very meticulous quantitative –and sometimes qualitative– research.

In this short essay, I will present some new results on religious and socio-economic differentials in birth spacing among cohorts born between 1850 and 1920 in the Netherlands. I am a bit hesitant to tackle the topic, given Frans's extensive work on the issue (Schellekens and Van Poppel, 2006; Somers and Van Poppel, 2010 and Van Poppel and Roling, 2003) and the excellent study by Van Bavel and Kok (2010). Still, I have several reasons to discuss it nonetheless. First, fertility control is a topic that clearly has Frans's interest. Second, I will use data from the Historical Sample of the Netherlands (HSN). Frans has been involved in the construction and development of the HSN from its inception (and has been a Board Member of the HSN since the start) and has widely used it in his own research. A big advantage of the HSN is its large sample size, which makes it possible to test whether some of the findings from Schellekens and Van Poppel (2006) and Van Bavel and Kok (2010) also hold in a larger dataset. In addition, the data allow a first test whether social differentials in using birth spacing as a fertility limitation mechanism changed over time.

If individuals and couples wanted to limit their fertility in the Netherlands in the nineteenth century, there were basically two ways open to them. First, given the close links between sexual activity and marriage, they could postpone marriage, thus leading to a relatively late age at entry into parenthood. Second, they could try to avoid or postpone births once childbearing had started. Couples who did so, would have longer periods elapsing between subsequent births. An important question relating to the use of birth spacing as a method to limit fertility is whether the use of this method was more widespread among some social groups than among others. Earlier research (cited above) suggests that the use of this method was more widespread among liberal Protestants and Jews than among orthodox Protestants and Roman-Catholics. Results for socio-economic groups were less clear, with Schellekens and Van Poppel (2006) in The Hague finding longer birth intervals for the elite and the petty bourgeoisie than for blue collar workers, whereas Van Bavel and Kok (2010) in a study on the province of Utrecht, the village of Akersloot and the city of Amsterdam report shorter birth intervals for white collar workers than for blue collar ones.

Data

To examine this issue, I use data from the HSN (see Van Poppel et al., 2012 for information on sample selection and measurement of the variables). I have information on all live births to couples. Because of my focus on birth spacing, I only select those birth intervals that end with a live birth. In all, I have information on 23,624 closed birth intervals from 6,051 married couples. I performed a multi-level binary logistic regression analysis, comparing birth intervals of more than two years and nine months to birth intervals of two years and nine months or less. This cut-off implies that I assume that birth intervals in which it takes couples more than two years to have a conception that leads up to a new birth are indicative of conscious efforts of birth limitation. In all, 29.6 per cent of all birth intervals were longer than two years and nine months. I also experimented with other cut-offs. Overall, results were pretty similar. In all models, I controlled for wife's age at previous birth, parity, and birth cohort. In addition, I estimated an individual-level variance term, allowing for a control for unobserved heterogeneity (full results are obtainable from the author on request).

Results

In *figure 1*, I present relative odds ratios of having a birth interval of more than 2¾ year by religious denomination of the couple. Liberal Protestants are taken as the reference category with a relative odds ratio of 1. It turns out that liberal Protestant couples were most likely to postpone a next birth for so long. Catholic couples had an odds ratio to postpone for more than 2¾ year that was only one third of that of the liberal Protestants, and mixed couples and orthodox Protestants also had much lower odds ratios. The odds ratio for Jews was the only one that is not statistically significant different from that of the liberal Protestants. This suggests that birth limitation by extending birth spacing was much more common among liberal Protestant couples than among any other type (with the exception of Jewish couples). In additional analyses (results not shown), it turned out that, overall, the odds that couples had birth intervals of more than 2¾ years increased by birth cohort. However, this increase was much smaller for Catholics, orthodox Protestants and couples with an 'other' religious background, suggesting that liberal Protestants and Jews were not only already more likely to consciously space their birth midway through the 19th century, but were also much more likely to increase the use of this method during the demographic transition period under scrutiny.

In *figure 2*, I present the same type of results, but now by socio-economic class. Unskilled workers are the reference category, and have a relative odds ratio of 1. Overall, three different groups can be distinguished. The elite and the middle class (white-collar workers and petty bourgeoisie) had the highest odds ratios and were thus most likely to use birth spacing as a birth limitation strategy. All types of blue-collar workers constituted a middle group, whereas farmers were clearly least likely to have long birth intervals. All socio-economic classes, with the exception of the farmers, became increasingly likely to use birth spacing as a birth control strategy throughout the demographic transition. The farmers were the only socio-economic class that did not change its behaviour in this regard at all across birth cohorts.

Figure 1. Relative odds ratios of having a next birth more than 2¾ years after a previous one, by religious denomination

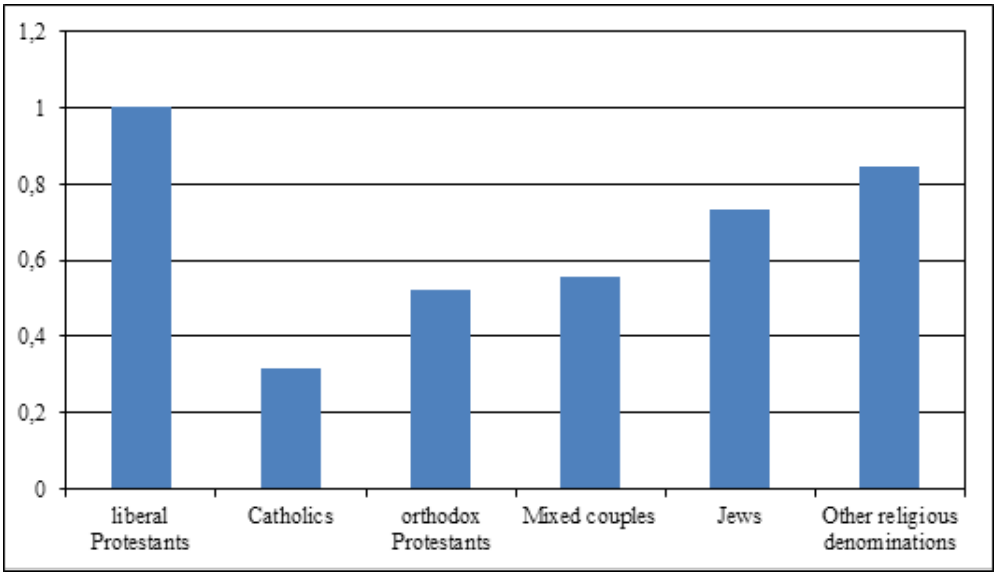
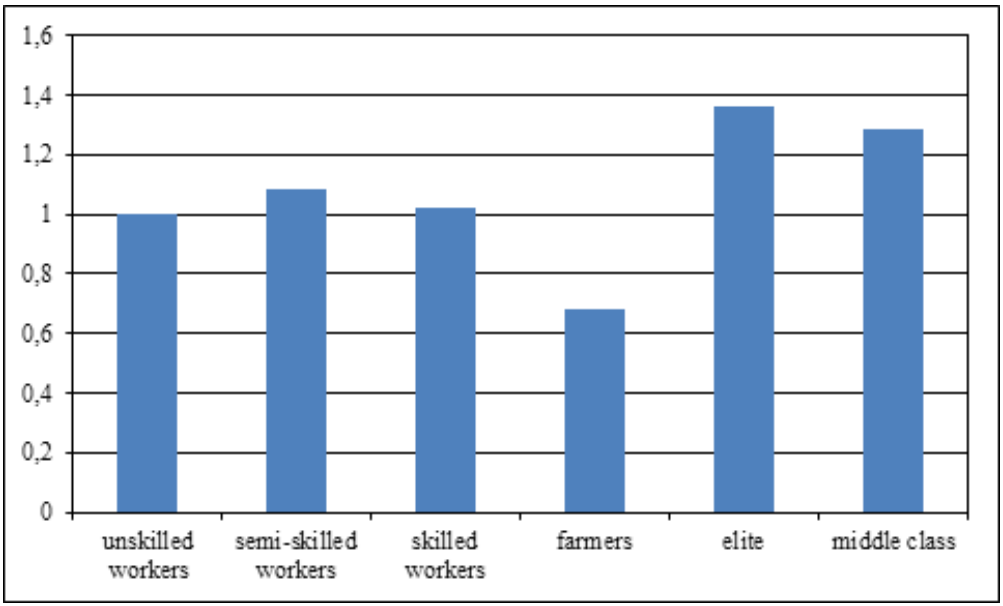


Figure 2. Relative odds ratios of having a next birth more than 2¾ years after a previous one, by socio-economic class



Conclusion

These results confirm the finding of Schellekens and Van Poppel (2006) that 19th century Catholics were less likely to use birth spacing as a fertility limitation strategy than Protestants. However, the HSN also allows to distinguish between liberal and orthodox Protestants, and thus allows me to qualify that earlier finding. Liberal Protestants differed in this respect from Catholics and orthodox Protestants behaved very much like Catholics did. These latter two groups were much more reluctant to use birth spacing as a fertility limitation mechanism in the 19th century and the most resilient to change. My results also confirm many of the findings of Van Bavel and Kok (2010), again with one important exception. The higher classes were found to be more likely to have long birth intervals, thus suggesting that using birth spacing as a fertility limitation strategy was most common among these social classes. Farmers were clearly least likely to have long birth intervals, and they also were extremely resilient to change.

References

Bavel, J. Van and J. Kok (2010), A mixed effects model of birth spacing for pre-transition populations. *The History of the Family,* 15(2), pp. 125-138.

Poppel, F. van, D. Reher, A. Sanz-Gimeno, M. Sanchez-Dominguez and E. Beekink (2012), Mortality decline and reproductive change during the Dutch demographic transition: Revisiting a traditional debate with new data. *Demographic Research*, 27, pp. 299-338.

Poppel, F. van and H. Roling (2003), Physicians and fertility control in the Netherlands. *Journal of Interdisciplinary History*, 34(2), pp. 155-185.

Schellekens, J. and F. van Poppel (2006), Religious differentials in marital fertility in The Hague (Netherlands) 1860-1909. *Population Studies,* 60(1), pp. 23-38.

Somers, A. and F. van Poppel (2010), Priest, parishioner and posterity: A Dutch urban legend or historical fact? *The History of the Family,* 15(2), pp. 174-190.

Long term trends in social and geographical homogamy: A plea for an integrated approach

Ineke Maas, Marco H.D. van Leeuwen and Richard L. Zijdeman

Long term changes and regional variations in social and geographical homogamy have received quite some attention in historical, demographic, and sociological research. Studies of geographical homogamy in the Netherlands in the 19th and 20th century show a strong tendency for people to marry someone living nearby (Ekamper, Van Poppel and Mandemakers, 2011; Maas and Zijdeman, 2010 and Van Poppel and Ekamper, 2005). Most studies show that during the 19th and 20th centuries geographical homogamy decreased, meaning that people found their partner at a larger distance (Kok and Mandemakers, 2008; Maas and Zijdeman, 2010 and Van Poppel and Ekamper, 2005).

Research on social homogamy shows that grooms who either had a high occupational status themselves or came from a high-status family married higher-status brides (Van Leeuwen and Maas, 2002; 2010). The influence of the father decreased over time (Zijdeman and Maas, 2010). Trends in social homogamy on achieved characteristics, such as own status and education, are less clear (De Graaf, Smeenk, Ultee and Timm, 2003).

Most studies on social homogamy do not consider geographical homogamy. The same is true the other way around. Here we argue in favor of an integrated study of the two types of homogamy.

Common explanations for social and geographical homogamy

Explanations of both types of homogamy are often based on the same general theory of preferences, opportunities and third parties (Kalmijn, 1998 and Van Leeuwen and Maas, 2005). Additionally, authors trying to explain decreasing geographical homogamy or decreasing homogamy of social background use similar assumptions. They refer to modernization processes, such as the development of new means of mass transport and the appearance of mass communication (Kok and Mandemakers, 2008; Van Poppel and Ekamper, 2005; Uunk, 1996 and Zijdeman and Maas, 2010). These two aspects of modernization affect homogamy through different mechanisms. Means of mass transport allow people to travel over larger distances and increase the likelihood of finding a partner outside the local region or outside the same social stratum: An opportunity based explanation. Mass communication however is thought to be instrumental in spreading information on events, technological developments, fashion, and employment beyond local regions. People from different regions and different social strata may therefore have become more alike and perceived cultural differences may have decreased. As a consequence geographical and social homogamy decreased: A preference based explanation.

If two phenomena are hypothesized to vary with the same determinants, analyzing them together has the advantage of increasing power. We can have more confidence in either a double refutation of a hypothesis or a double confirmation. If, unexpectedly, hypotheses are

confirmed for one dependent variable, but not for the other, it has become clear that the theoretical framework should at least be refined.

Regional differences in social homogamy
Some explanations of the likelihood of social homogamy predict substantial regional differences. For example according to the thesis of industrialism it became more rational for employers in industrial labor markets to select employees on the basis of achieved characteristics, such as the level of education, than on the basis of ascribed characteristics. Accordingly, in industrializing regions achieved characteristics became more important predictors of an individual's success on the labor market than ascribed characteristics (Blau and Duncan, 1967). This is assumed to have consequences for mate selection as well. One of the characteristics valued by suitors in each other is (future) economic success (Kalmijn, 1998). In industrialized societies and regions, ascribed characteristics should therefore be less important for mate selection and achieved characteristics more important, compared with preindustrial societies (Uunk, 1996). Macro-level developments such as industrialization did not occur throughout society at the same time. Some regions remained mainly agricultural long after industrialization had begun in other regions. Consequently, mate selection is expected to differ regionally (Bras and Kok, 2005 and Zijdeman and Maas, 2010).

To what extent regional differences in social homogamy exist, however, strongly depends on the extent of geographical homogamy. If a couple consists of a bride and bridegroom from two different regions, the relationship between regional characteristics and social homogamy is complicated. Most studies linking social homogamy to industrialization consider the place of marriage as the relevant region. However, according to the male breadwinner model the place of socialization of the bridegroom might be more relevant. Or, alternatively, one might argue that the place of socialization of the bride is most relevant, because she (and her family) select a spouse most able to give her an economically flourishing future. Characteristics of the place of marriage may be good predictors of the marital choices of the couple, because this might be the place where they are likely to settle after marriage (although customs sometimes require couples to marry in the place where the bride was born). Finally, geographical mobility itself –irrespective of place of origin and destination– has been shown to increase the likelihood of a socially heterogamous marriage (Pélissier, Rébaudo, Van Leeuwen and Maas, 2005).

Rival hypotheses thus exist, and at the very least, geographical homogamy should be theoretically considered when analyzing regional differences in social homogamy. Even better would be an integrated analysis, in which characteristics of places of residence before and at marriage of both bride and bridegroom can explain social homogamy.

Social differences in geographical homogamy
Earlier studies have shown that marriage partners born in different regions –who married geographically heterogamous– more often belong to higher than to lower social strata (Ekamper, Van Poppel and Mandemakers, 2011; Kok, 1998 and Van Poppel and Ekamper, 2005). There are several possible explanations for this finding. Higher status groups have

more resources that they can use to travel over large distances. They more often attended higher education, which is assumed to have taught them more universalistic values. As a consequence cultural differences between people living in different regions should matter less for them. But one can also reason differently. Higher status groups have more resources, and thus have more to loose when marrying someone from a lower group. Therefore a homogamous marriage is especially important for them. In small communities, they may not be able to find an acceptable marriage partner, forcing them to marry someone from further away.

There is some research indicating that when the size of the marriage market increased during the 20th century differences between the social strata in the likelihood of a geographically heterogamous marriage became smaller (Van Poppel and Ekamper, 2005 and Van Poppel, Ekamper and Van Solinge, 2007). In line with the previously mentioned explanations this could be the result of the spread of mass transport, enabling lower classes to travel over longer distances as well, and it could result from educational expansion and a spread of universalistic values over all classes.

When thinking about differences in geographical homogamy it is almost impossible to ignore homogamy on other dimensions. Living at a certain distance from each other is inconvenient when courting, but, unlike other characteristics, it is not enduring – after marriage the distance is often immediately minimized and thus disappears. Geographical homogamy mainly comes about as a consequence of preferences of potential spouses for homogamy on other characteristics and the varying opportunities to find such a person nearby.

Conclusion

Geographical and social mobility are intertwined to such an extent that analyzing them separately leads to incomplete and maybe even misleading conclusions. Researchers interested in geographical homogamy are well advised to consider homogamy on other dimensions as well, such as social homogamy, but also religious and age homogamy (Kalmijn, Liefbroer, Van Poppel and Van Solinge, 2006; Van Poppel, Liefbroer, Vermunt and Smeenk, 2001 and Van Poppel and Liefbroer, 2001). Those who are primarily interested in social homogamy should think about consequences of geographical mobility and homogamy, especially when they are interested in regional differences and macro-level explanations.

This book is devoted to the scholarly work of Frans van Poppel. His work is an excellent stepping stone for an integrated approach of social and geographical homogamy. He publishes on marriage in general (Van Poppel, 1992) and on social, geographical and other types of homogamy (cited above). And he plays an important role in the collection of micro-historical data, such as the Historical Sample of the Netherlands, currently as its chairperson. We personally learned a lot from him and have many reasons to be grateful. Frans: thank you!

References

Blau, Peter M. and Otis Dudley Duncan (1967), The American occupational structure. New York: John Wiley & Sons.

Bras, Hilde and Jan Kok (2005), They live in indifference together: Marriage mobility in Zeeland, the Netherlands, 1796-1922. In M.H.D. van Leeuwen, I. Maas and A. Miles (eds.). *Marriage choices and class boundaries: Social endogamy in history* (pp. 181–211). Cambridge University Press.

Ekamper, Peter, Frans van Poppel and Kees Mandemakers (2011), Widening horizons? The geography of the marriage market in 19th- and early-20th century Netherlands. In M. Gutmann, G. Deane, E. Merchant and K. Sylvester (eds.). *Navigating time and space in population studies* (pp. 115-160). International Studies in Population 9, Springer.

Graaf, Nan Dirk de, Wilma Smeenk, Wout Ultee and Andreas Timm (2003), The when and whom of first marriage in the Netherlands. In H.-P. Blossfeld and A. Timm (eds.). *Who marries whom? Educational systems as marriage markets in modern societies* (pp. 79-112). Dordrecht/Boston/London: Kluwer Academic Publishers.

Kalmijn, Matthijs (1998), Intermarriage and homogamy: causes, patterns, trends. *Annual Review of Sociology,* 24, pp. 395-421.

Kalmijn, M., A.C. Liefbroer, F. van Poppel and H. van Solinge (2006), The family factor in Jewish-Gentile intermarriage: A sibling analysis of the Netherlands. *Social Forces,* 84, pp. 1348-1358.

Kok, Jan (1998). Vrijt daar je zijt; huwelijk en partnerkeuze in Zeeland tussen 1830 en 1950. *Zeeland,* 7, pp. 131-143.

Kok, Jan and Kees Mandemakers (2008), Free choice from a limited supply. The marriage market in two Dutch provinces, 1840-1940. *Romanian Journal of Population Studies*, 2, pp. 82-104.

Leeuwen, Marco H.D. van and Ineke Maas (2002), Partner choice and homogamy in the 19th century: Was there a sexual revolution in Europe? *Journal of Social History,* 36, pp.101-123.

Leeuwen Marco H.D. van and Ineke Maas (2005), Endogamy and social class in history: An overview. *International Review of Social History,* 50, supplement on marriage choices and class boundaries: social endogamy in history, pp. 1-24.

Leeuwen Marco H.D. van and Ineke Maas (2010), Historical studies of social stratification and mobility. *Annual Review of Sociology,* 36, pp. 429-451.

Maas, Ineke and Richard Zijdeman (2010), Beyond the local marriage market. The influence of modernization on geographical heterogamy. *Demographic Research,* 23, pp. 933-962.

Pélissier, Jean-Pierre, Danièlle Rébaudo, Marco H.D. van Leeuwen and Ineke Maas (2005), Migration and endogamy according to social class: France, 1803-1986. In Marco H.D. van Leeuwen, Ineke Maas and Andrew Miles (eds.), *Marriage choices and class boundaries: Social endogamy in history* (pp. 219-246). Cambridge University Press.

Poppel, Frans van (1992), Trouwen in Nederland. Een historisch-demografische studie van de 19e en vroeg-20e eeuw. Wageningen A.A.G. Bijdragen 33.

Poppel, Frans van and Peter Ekamper (2005), De Goudse horizon verruimd. Veranderingen in de herkomst van Goudse bruiden en bruidegoms. In J. Kok and M.H.D. van Leeuwen (eds.), *Genegenheid en gelegenheid*. Twee eeuwen partnerkeuze en huwelijk (pp. 181-211). Amsterdam: Aksant.

Poppel, Frans van, P. Ekamper and H. van Solinge (2007). Farmer looking for a wife: Marital behaviour of the farming population in 19th century Netherlands. In H. Moerbeek, A. Niehof and J. van Ophem (eds.), *Changing families and their lifestyles* (pp. 51-76). Mansholt publication series, Volume 5. Wageningen: Wageningen Academic Publishers.

Poppel, Frans van and A.C. Liefbroer (2001), Leeftijdsverschillen tussen huwelijkspartners: een interpretatie van veranderingen en verschillen in de 19e en 20e eeuw. *Tijdschrift voor Sociale Geschiedenis,* 7, pp. 129-152.

Poppel, Frans van, A.C. Liefbroer, J.K. Vermunt and W. Smeenk (2001), Love, necessity and opportunity: Changing patterns of marital age homogamy in the Netherlands, 1850-1993. *Population Studies,* 55, pp. 1-14.

Uunk, Wilfred (1996), *Who marries whom? The role of social origin, education and high culture in mate selection of industrial societies during the 20th century*. Nijmegen: Thesis.

Zijdeman, Richard and Ineke Maas (2010), Changes in mate selection during industrialization: A test of modernization hypotheses in a Dutch province, 1811-1915. *Research in Social Stratification and Mobility,* 28, pp. 395-415.

Origins of the 'western European marriage pattern'

Jona Schellekens

Frans and I first met through our common interest in historical nuptiality patterns. Therefore I would like to devote this essay in his honour to reflections on the origins of the western European Marriage Pattern (EMP). As Frans would have expected me to do, I will take socio-economic stratification into account (e.g. Van Poppel and Nelissen, 1999a). This essay will focus on the lower classes.

Long before marital fertility started to decline, nuptiality was already low in northwestern Europe. John Hajnal (1965) was the first demographer to draw attention to this phenomenon. He thought an origin of the pattern of low nuptiality in the 16th century to be likely. More recent research, however, suggests that in England nuptiality was already low in the second half of the 14th century (Smith 1979, pp. 83-4 and Goldberg, 1992, pp. 203-79).

Hajnal was also the first to suggest an explanation: "The economic system influences the marriage pattern through the arrangements by which the economic basis for the support of a couple and their children is established" (1965, p. 132). Ultimately, Hajnal's explanation goes back to Malthus' model of the preventive check. Malthus' model reflects middle-class values, which he and his followers wished to impose on the lower classes (Van Poppel and Nelissen, 1999b, pp. 59-63). Whereas children of middle-class parents could often count on intergenerational transfers, children from the lower classes were much less likely to receive enough assets from their parents.

In rural areas, agricultural labourers made up the bulk of the lower class. Even though farm servants came from all layers of rural society, a disproportionate number were children of agricultural labourers (Mitterauer, 1990, p. 21). Peter Laslett (1977) called the type of servant typical of northwestern Europe 'life-cycle' servants, because service usually was a stage in the life cycle during which they were not allowed to marry. Tony Wrigley and Roger Schofield (1981) asserted that the timing of the marriage of farm servants was mostly a function of the time needed to save enough assets to set up an independent household. In their neo-Malthusian model falling real incomes raised the time needed to accumulate enough resources to set up an independent household. This neo-Malthusian model, however, raises at least two problems (for more problems see Weir, 1984 and reply by Schofield, 1985). First, Malthus proposed a different model for servants. And second, the neo-Malthusian model does not seem to fit the data.

Even if farm servants were able to save toward marriage, it does not follow from this that they would marry as soon as they had accumulated sufficient assets to set up a household. Living in farmhouses, where they were better fed and had more comforts than in a cottage, servants enjoyed a relatively high standard of living compared with what many of them could expect after marriage. Hence, servants were in no rush to get married (Schellekens, 1991 and 1997). Malthus (1826, p. 399) mentions a similar mechanism, when discussing the postponement

of marriage among domestic servants: “The servants who live in the families of the rich … possess the necessaries, and even the comforts of life, almost in as great plenty as their masters. Their work is easy and their food luxurious, compared with the work and food of the class of labourers; “ […] The greater number of them, therefore, deterred by this uninviting view of their future situation, content themselves with remaining single [...].”

In the Middle Ages the degree to which a servant could save may have been limited. Female servants often worked purely for their food, lodging, and clothes (Goldberg, 1992, pp. 185-86). Hence, Jeremy Goldberg (1992, pp. 345-56) preferred an “anti-Malthusian” model of nuptiality, in which an increase in the demand for female servants suppresses nuptiality. Thus, after the Black Death the expansion of pastoral agriculture suppressed nuptiality by raising the demand for maidservants (see also Voigtländer and Voth, 2009, pp. 251-52).

Wrigley and Schofield (1981) asserted that long-term trends in real wages explain long-term trends in English nuptiality (see also Smith 1981). Ann Kussmaul (1981, pp. 111-112), on the other hand, asserted that long-term trends in the demand for farm servants explain long-term trends in nuptiality. Her anti-Malthusian model seems to fit the data for eighteenth-century England better than the neo-Malthusian model of Wrigley and Schofield (Schellekens, 1997; 2001, pp. 5-6).

The anti-Malthusian model may explain long-term trends in nuptiality, but it does not explain the origins of the EMP. Carl Hammer (1983, p. 247) noticed that the area where the EMP is to be found in the early modern period is precisely the area of the medieval manorial system. Hence, he suggested that the origins of the EMP are to be found in restrictions imposed by manor lords on the nuptial behavior of their tenants (see also Mitterauer, 1990, pp. 27-28).

The medieval manor was an agricultural estate divided into two parts. The first was the demesne owned by the lord; the second consisted of smaller farms held on terms that required tenants to perform labour services for the lord and to make incidental payments to him in kind and cash.

To the extent that his model of worker exchange fits the ninth-century Bavarian data, Hammer (1983, pp. 245-248) appears to have uncovered the oldest evidence for life-cycle servants. They were employed on the demesne and on larger tenant farms. These servants were not the children of free tenants, however, but of serfs. If Hammer is correct, however, how do we explain the survival of an institution that had its roots in forced labour (Mitterauer, 1990, p. 28)? What made farm service so attractive that it survived the manorial system? Following Malthus (1826, p. 399), I would like to suggest that farm servants who were recruited on a free labour market, replacing the forced labour from the manor, contented themselves with remaining single, because in the farmhouse of their employer they were better fed and had more comforts than in a cottage.

References

Goldberg, P.J.P. (1992), *Women, work, and life cycle in a Medieval economy: Women in York and Yorkshire c*. 1300-1520. Oxford: Clarendon Press.

Hajnal, John (1965), European marriage patterns in perspective, pp. 101-38. In D. . Glass and D.E.C. Eversley (eds.), *Population in history: Essays in historical demography*. London: Edward Arnold.

Hammer, Carl I. (1983), Family and familia in early medieval Bavaria, pp. 217-48. In Richard Wall (ed.), *Family forms in historic Europe.* Cambridge: Cambridge University Press.

Kussmaul, Ann (1981), *Servants in husbandry in early modern England*. Cambridge: Cambridge University Press.

Laslett, Peter (1977), Characteristics of the Western family considered over time. *Journal of Family History,* 2(2), pp. 89-116.

Malthus, Thomas Robert (1826), *An essay on the principle of population*. London: John Murray.

Mitterauer, Michael (1990), Servants and youth. *Continuity and Change,* 5(1), pp. 11-38.

Poppel Frans van and Jan Nelissen (1999a), Economic opportunities and age at marriage: An analysis of 19th-century micro data for the Netherlands, pp.152-78. In Isabelle Devos and Liam Kennedy (eds.), *Marriage and rural economy: Western Europe since 1400* (Turnhout: Brepols).

Poppel, Frans van and Jan Nelissen (1999b), The proper age to marry: Social norms and behavior in 19th-century Netherlands. *History of the Family,* 4(1), pp. 51-75.

Schellekens, Jona (1991), Determinants of marriage patterns among farmers and agricultural laborers in two 18th-Century Dutch villages. *Journal of Family History,* 16, pp. 139-55.

Schellekens, Jona (1997), Nuptiality during the first industrial revolution in England: Explanations. *Journal of Disciplinary History,* 27(4), pp. 637-54.

Schellekens, Jona (2001), Economic change and infant mortality in England, 1580-1837. *Journal of Disciplinary History, 3*2(1), pp. 1-13.

Schofield, Roger (1985). English marriage patterns revisited. *Journal of Family History,* 10(1), pp. 2-20.

Smith, Richard M. (1979), Some reflections on the evidence of the origins of the 'European marriage pattern' in England, pp. 74-112. In C. Harris (ed.), *The sociology of the family* (Keele: University of Keele).

Smith, Richard M. (1981), Fertility, economy, and household formation in England over three centuries. *Population Development Review,* 7(4), pp. 595-622.

Voigtländer, Nico and Hans-Joachim Voth (2009), Malthusian dynamism and the rise of Europe: Make war, not love. *American Economic Review,* 99(2), pp. 248-54.

Weir, David R. (1984), Rather never than late: Celibacy and age at marriage in English cohort fertility. *Journal of Family History,* 9(4), pp. 340-54.

Wrigley, E.A. and R.S. Schofield (1981), *The population history of England 1541-1871: A reconstruction.* London: Edward Arnold.

The West European marriage system in early modern Europe

Tony Wrigley

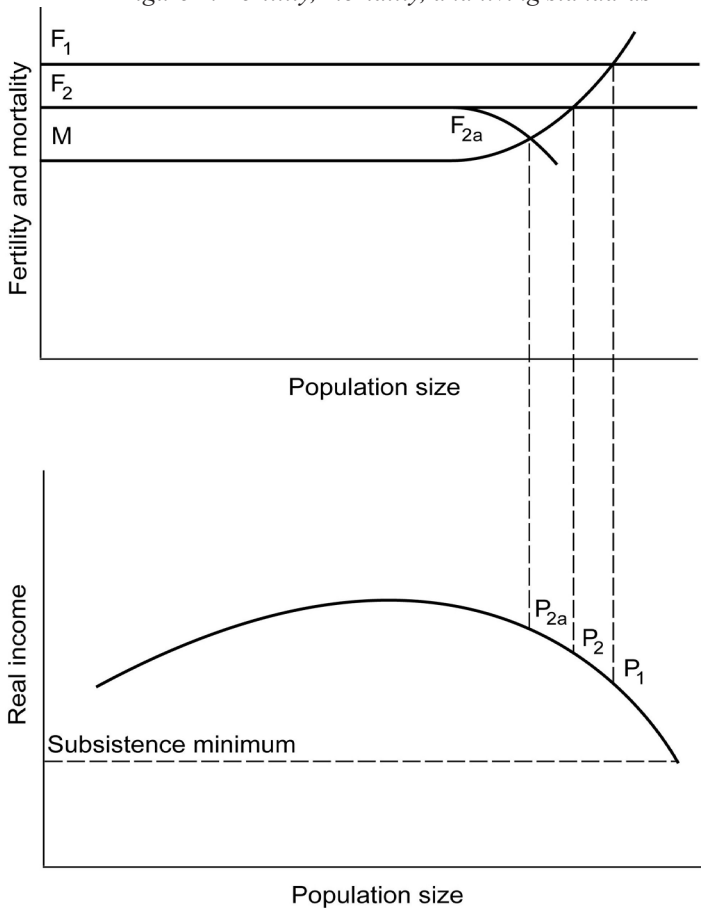
Adam Smith, Thomas Malthus and David Ricardo were unanimous and firm in insisting that while economic growth was possible it was necessarily limited. The path of growth was asymptotic; it could not become exponential. This conclusion stemmed from the fact that, while the supply of labour and of capital might be extended as required, the supply of land could not be similarly extended. Since the land supplied almost all the raw materials which entered production as well as all food supplies, economic expansion either meant taking into cultivation poorer land or using existing farmland more intensively which in turn must mean declining returns both to labour and capital. In short, the very process of growth involved changes which must at some stage bring it to a halt.

The implications of this scenario for the standard of living of the population were gloomy, especially if linked to the argument which Malthus developed about the character of the demography of the societies of his day. He suggested that at best output might grow by arithmetic progression but population would rise by geometric progression unless checked. A period of comparative prosperity would allow fertility rates to stay well clear of mortality rates and the population would increase but at some point this would cause heightened pressure on available resources, mortality would rise, and population growth would cease with the bulk of the population living close to the subsistence level. Malthus had published the first *Essay* as a young man aged 32 and subsequently modified the rigour of his initial stance considerably but it was the argument of the first *Essay* which lodged in the public mind.

The model which Malthus had sketched proved influential in many contexts. It was, for example, reading the Essay which suggested to Charles Darwin a simple and invariant mechanism to drive the process of natural selection in animal populations. In human populations, however, matters were less simple. Fertility levels were strongly affected by nuptiality and, since marriage customs differed substantially between societies, his model in its simplest form failed to do justice to a complex reality.

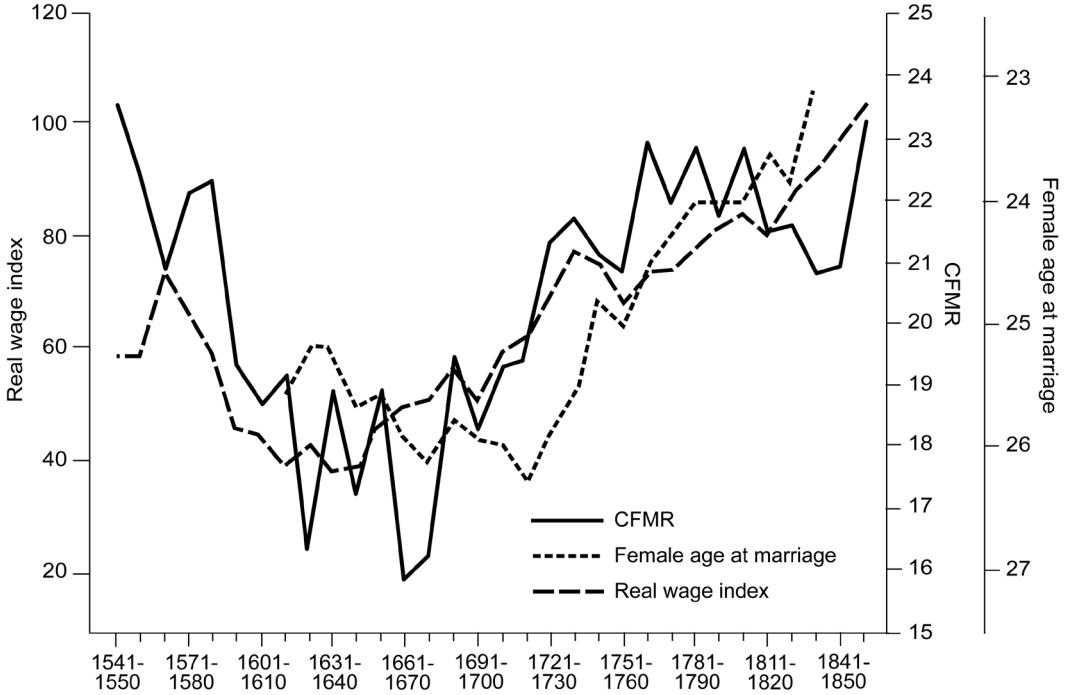
An account of the West European marriage system (WEM) in comparison with other marriage systems illustrates the limitations of a simple model in doing justice to the complexity of individual and social behaviour. Even supposing that in organic societies economic growth must cease because of the land constraint and that when this occurs population growth will also cease with fertility and mortality both at the same level, it does not follow that this implies an equal degree of misery in different populations. *Figure 1* illustrates the point. Where fertility is high invariant mortality must at some point rise to the same level placing the community in question under great stress and causing a severe decline in living standards. Fertility, however may be invariant but at a lower level. In this case also, mortality will rise to equal it, but growth will cease at a point which leaves living standards at a higher level. If fertility also is responsive to pressure and declines as living standards deteriorate a still more favourable outcome is possible. The nature of the WEM makes this relatively favourable outcome more likely.

Figure 1. Fertility, mortality, and living standards



A key feature of this system was that a newly married couple were normally expected to create a new household rather than to join an existing one. There was therefore an economic hurdle to be surmounted before a marriage could take place which would cause marriage to be delayed if economic circumstances were unfavourable. For example, *figure 2* shows that in England in the 17th and 18th centuries trends in real wages and the average age at marriage moved in parallel. When conditions were hard marriage age rose; when conditions improved marriage age declined. Moreover, whereas in most other societies marriage for women not only took place soon after attaining sexual maturity (indeed in some societies frequently before this point), it was also virtually universal. In general only women with serious physical or mental handicaps remained single. But in the WEM a significant proportion of each rising generation of women never married, and the prevalence of celibacy might also be sensitive to economic conditions. The WEM was therefore conducive to somewhat higher living standards than was common in other societies, and given the characteristic income elasticity of demand

Figure 2. Real wages, female age at marriage, and the crude first marriage rate in early modern England



for basic necessities compared to other products, the structure of aggregate consumer demand under the WEM would encourage the development of a wider range of industrial production.

A further benefit of a *low-pressure* demographic system (i.e. one in which both fertility and mortality are relatively low) stems from the fact that where fertility is comparatively low the age structure will be such that a higher proportion of the population is of working age than where fertility is higher. A lower dependency ratio implies a higher standard of living, *ceteris paribus*. Similarly, since lower mortality meant that a higher proportion of each new generation survived to working age, the proportion of the community's resources devoted to the sustenance of children who do not survive is lower in a low-pressure environment. Furthermore, since unmarried women participated more fully in production activities than married women, late marriage and relatively high celibacy levels were also attended with economic benefits.

It was not necessarily the case that in societies where marriage for women occurred early in life and few women remained unmarried fertility and mortality were higher than was normal in a West European setting. A variety of practices might result in relatively long birth intervals and a wide prevalence of infanticide might produce a similar result, as, for example, in 18th

century Nakahara.[1] Nevertheless, it is reasonable to suppose that the West European marriage system was attended by significant economic benefits when compared with the systems prevalent in much of the world before the industrial revolution.

[1] T.C. Smith, Nakahara, Family farming and population in a Japanese village, pp. 1717-1830

Part IV
Aging and Mortality

Are we getting sick of low incomes?

Tommy Bengtsson

In the last few years, increasing health differentials between social groups have received a lot of attention (Marmot, 2010). It has been argued that we become sick not only because of low income, but also because of increasing income differentials (Wilkinson, 1996; Wilkinson and Picket, 2006). Social differences in health have in recent time *diverged* not only in low-income but also in high-income countries. This is in stark contrast to the early post-war period when improvements in life expectancy in many countries made health authorities, health scientists and politicians believe that social differences in mortality had started to *converge*. The conclusion at the time was that inequality, when measured as death rates, was on steady decline, possibly even on the brink of disappearing, the reason being access to prevention and medication at low costs. Yet another view was that class differences in mortality had always existed but had stayed more or less *constant* (Cassel, 1976; Link and Phelan, 1995; 1996 and Marmot, 2004). The underlying hypothesis is that those who have greater access to economic resources will always be less afflicted, regardless of disease (Link and Phelan, 1996, p. 472).

The question is then whether health differentials have converged, diverged, or stayed more or less constant. Due to lack of coherent data covering long time periods, our knowledge has been based on highly incomplete evidence, from a variety of locations, and at various points in time. The evidence used is not only fragmentary, but furthermore only partly comparable, as different definitions of social class and mortality have been used. Link and colleagues rightly argued that "a test of the fundamental cause idea would ideally make use of a large bank of historical data about individuals and their disease experience that would also permit the identification of changes in risk factors" (Link *et al.,* 1998, p. 378). And in the past decade, historians in a variety of countries have indeed taken up anew the study of social class-mortality differences by going back to the original sources to create such banks of data. These data sets allow us to test the hypotheses put forwards by Marmot and Link and Phelan.

A recent publication summarizes the results from seven new studies of locations in Western and Southern Europe, the US and Canada, for which individual-level longitudinal data exists for long time periods (Bengtsson and Van Poppel, 2011). Most of these studies also cover large parts of the twentieth century, for which such micro data hitherto has largely been lacking. Taken together, they have a wide geographic coverage and a very long time horizon.

Geneva, with a labour force of more than 20,000 in the watch-making industry alone in 1800, saw huge but declining social differences in mortality during its 19th industrialization (Schumacher and Oris, 2010). The workers in the sawmill town of Sundsvall in northern Sweden faced higher mortality than farmers but had the same levels as the upper classes in the town itself (Edvinsson and Lindkvist, 2010). As industrialization took place in the last decades of the 19th century, no divergence in mortality took place. In Saguenay, Quebec, with a growing aluminium and pulp industry, mortality was about the same for all groups except farmers, who had significantly lower mortality up until recent time (Gagnon *et al.,*

2010). In a rural area in Scania in southern Sweden, with some emerging industry after 1860, workers and the well-off farmers suffered from the same mortality in working ages up until 1950, when they diverged (Bengtsson and Dribe, 2010). In Alghero, a port town in Sardinia, the social differences among children were substantial but did not increase as it became industrialized (Breschi *et al.,* 2010). Instead, social differences in mortality either stayed constant or declined. The situation in the Netherlands, for which data covers a large part of the country, both urban and rural, was similar. The social differences found for earlier cohorts stays the same or diminish slightly over time (Schenk and Van Poppel, 2010). While the absolute differences in infant and child mortality between social groups in the US diminish over time, the relative differences persist and possibly expand a bit (Haines, 2010).

Taken together, in no case is it possible to find evidence for worsening conditions leading to higher mortality and/or larger social differences in mortality during the industrialization phase. In one case, rural Scania, we find increasing social differences in adult mortality after 1950. We do indeed find a social gradient in mortality in urban areas, notably Geneva and Alghero, but these differences date further back in time, and in Sundsvall there were no differences at all. Instead, we discover that mortality was higher in urban than in rural areas, a common finding referred to as the urban mortality penalty. The findings that social differences in mortality were small in pre-industrial agricultural societies that are included in the studies of this special issue, except for cities, are consistent with findings for historical England both at macro level (Wrigley and Schofield, 1981; Hollingsworth, 1957 and Livi-Bacci, 1991) and at micro level (Clark, 2007).

Consequently, we find no support for the hypothesis that certain fundamental and general mechanisms always provided the well-off with longer lives and either made social differences in mortality stay *constant*, as anticipated by Link and Phelan (Link *et al.,*1998; Link and Phelan, 1995; 1996; 2002 Phelan *et al.,* 2004) or *persistent*, in the sense that well-off groups always have lower mortality than less wealthy groups, from one century to the next, as argued by Marmot (2004). Instead, we found convergence in absolute mortality differences in the United States during the 20th, for the Netherlands and for Alghero after circa 1900 and for Geneva from the 17th century onwards, and in most cases also a convergence in relative differences as well. In Sweden, both in the northern town of Sundsvall and in the rural area in southern Sweden, and also in Saguenay, Canada, we found no social differences in working age mortality during the industrialization period at all.

The reason for the lack of social differences in the past is most likely that mortality in communicable and often virulent diseases was high during this period. Almost all groups were exposed, and medical treatment was inefficient. The difference between urban and rural areas was therefore probably the result of differences in exposure, not resistance. Today, the disease pattern is entirely different, even though pandemics strike now and then. Life style factors, such as smoking, diet, and exercise, have become increasingly important. Diseases are treatable and preventions are known. Overall, a consistent causal link between socio-economic status/income and mortality is open to serious doubt.

References

Bengtsson, T. and M. Dribe (2010), The late emergence of socio-economic mortality differentials: A micro-level study of adult mortality in southern Sweden 1815-1968. *Explorations in Economic History*, 48 (3), pp. 389-400.

Breschi, M., A. Fornasin, S. Manfredini, L. Mazzoni and L. Pozzi (2010), Socio-economic conditions, health and mortality from birth to adulthood, Alghero 1866-1925. *Explorations in Economic History*, 48 (3), pp. 366-375.

Cassel, J. (1976), The contribution of the social environment to host resistance: The fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology,* 104(2), pp. 107-123.

Clark, G. (2007), *A farewell to alms: A brief economic history of the world*. Princeton: Princeton University Press.

Gagnon, A., M. Tremblay, H. Vézina and J.A. Seabrook (2010), Once were farmers: Occupation, social mobility, and mortality during industrialization in Saguenay-Lac-Saint-Jean, Quebec 1840-1971. *Explorations in Economic History*, 48 (3), pp. 429-440.

Haines, M. (2010). Inequality and infant and child mortality in the United States in the 20th century. *Explorations in Economic History*, 48 (3), pp. 418-428.

Hollingsworth, T.H. (1957), A demographic study of the British ducal families. *Population Studies,* 11, pp. 4-26.

Link, B.G., M.E. Northridge, J.C. Phelan and M.L. Ganz (1998), Social epidemiology and the fundamental cause concept: On the structuring of effective cancer screens by socio-economic status. *Milbank Quarterly* 76(3), pp. 375-402.

Link, B.G. and J.C. Phelan (1995), Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior,* 35, pp. 80-94.

Link, B.G. and J.C. Phelan (1996), Understanding sociodemographic differences in health - the role of fundamental social causes. *American Journal of Public Health,* 86(4), pp. 471-473.

Link, B.G. and J.C. Phelan (2002), McKeown and the idea that social conditions are fundamental causes of disease. *American Journal of Public Health,* 92(5), pp. 730-732.

Livi-Bacci, M. (1991), *Population and nutrition. An essay on European demographic history*. Cambridge: Cambridge University Press.

Marmot, M. (2004), *The status syndrome: how social standing affects our health and longevity*. Bloomsbury Publ., London.

Marmot, M. (2010), *Fair society, healthy lives: A strategic review of health inequalities in England post-2010*. London: UCL (The Marmot review).

Phelan, J.C., B.G. Link, A. Diez-Roux, I. Kawachi and B. Levin (2004), Fundamental causes of social inequalities in mortality: A test of the theory. *Journal of Health and Social Behavior,* 45(3), 265-285.

Schenk, N. and F. van Poppel (2010), Social class, social mobility and mortality in the Netherlands, 1850-2004. *Explorations in Economic History*, 48 (3), pp. 401-417.

Sen, A. (1998), Mortality as an indicator of economic success and failure. *The Economic Journal,* 108, pp. 1-25.

Wilkinson, R.G. (1996), *Unhealthy societies: The afflictions of inequality*. London: Routledge.

Wilkinson, R.G. and K.E. Picket (2006), Income inequality and population health: A review and explanations of the evidence. *Social Science and Medicine*, 62 (7), 1768-1784.

Wrigley, E.A. and R.S. Schofield (1981), *The population history of England*, *1541-1871. A Reconstruction. London:* Edward Arnold.

Neither alone nor neglected: The elderly in a 19th century Italian city

Renzo Derosas

In an ageing society, the conditions of the elderly present and future represent a growing concern of social scientists and policy makers. As for the elderly in the past, they are left to the hands of historians, who, for that matter, do not seem to care that much. There are obviously notable exceptions, but overall this remains a marginal field of enquiry. Regrettably so, since the elderly represent a telling vantage point from which to observe the society as a whole and its inner mechanisms.

As a member of both social groups involved here –the historians and the elderly– I would like to offer my tiny contribution, presenting the preliminary results of a study on 19th-century Venice. The questions addressed are to what extent the elderly were surrounded by kin relations –both in the household and outside– who might support them if needed, and whether such relations were effectively employed to that purpose. The first question is frequently dealt with in studies of household composition, although kin networks outside the household are often neglected. An analysis of the demographic outcomes related to the availability of kin is even less usual. Anyway, the answer is "yes" to both question: as the title goes, the Venetian elderly were neither alone nor neglected.

This study relies on a longitudinal sample of the Venetian population, drawn from the city population register and concerning the life-spells of 31,000 individuals in the period 1850 to 1869. It includes the inhabitants of four parishes: Two were extremely poor, inhabited by fishermen, boatmen, porters, and other unskilled labourers; one was made up by wage workers, employed in glass factories, at the railway station, or in the communal slaughterhouse; the fourth was in the city centre, and was inhabited by families of the middle class and by employees, artisans and shopkeepers. The dataset also includes the whole Jewish community. One third of the Venetian Jews still lived in the Ghetto, while the rest was scattered around the city. Also among the Jews all levels of socio-economic status were present. Overall, the sample represents 15 per cent of the Venetian population. It includes 6,279 persons aged 60 to 79, who constitute the object of this study.

Living arrangements (figures 1-4).
The elderly living without close kin were relatively few, around 20 per cent of the total. Most lived with their spouses (63% of males and 42% of females), sons (46 and 39% respectively), daughters (42 and 35%), brothers (6 and 4%), sisters (5 and 7%). Furthermore, 42 per cent of the males and 36 per cent of the females had close kin living in the same parish: sons (11 and 13%); daughters (13 and 15%); brothers (11 and 10%); sisters (11 and 14%). Other kin were also present: the average number present in the parish range was 5.8. Living arrangements varied with marital status, gender, and age. The patterns of cohabitation of widows and widowers were however remarkably similar: The probability of living with a son decreased with age, whereas the probability of living with a daughter increased. At 60, the percentage

Figure 1. Percentage of elderly cohabiting with kin by gender

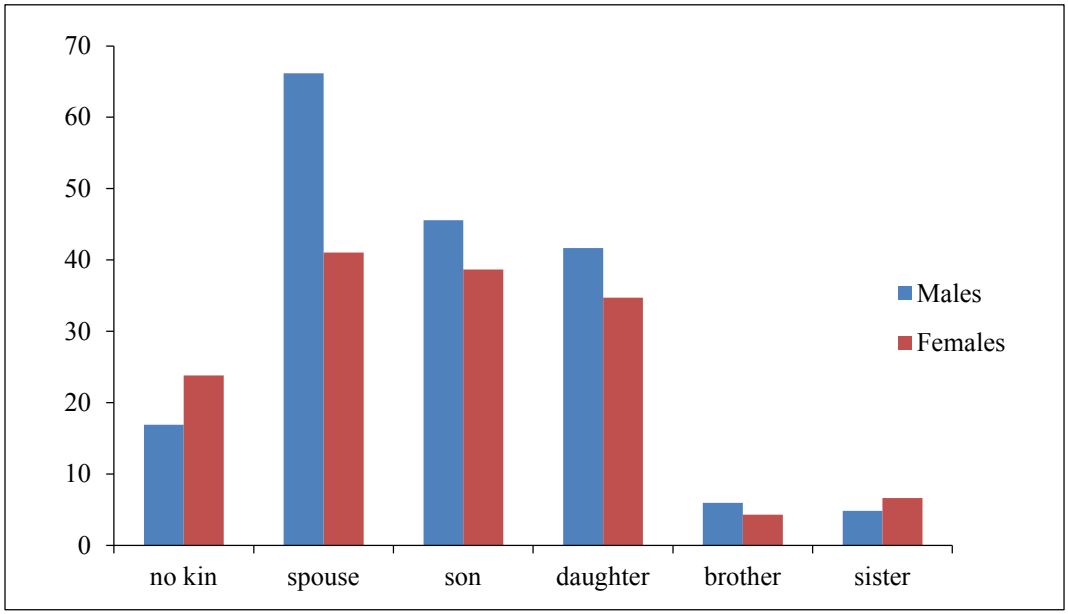


Figure 2. Percentage of elderly with neighbouring kin by gender

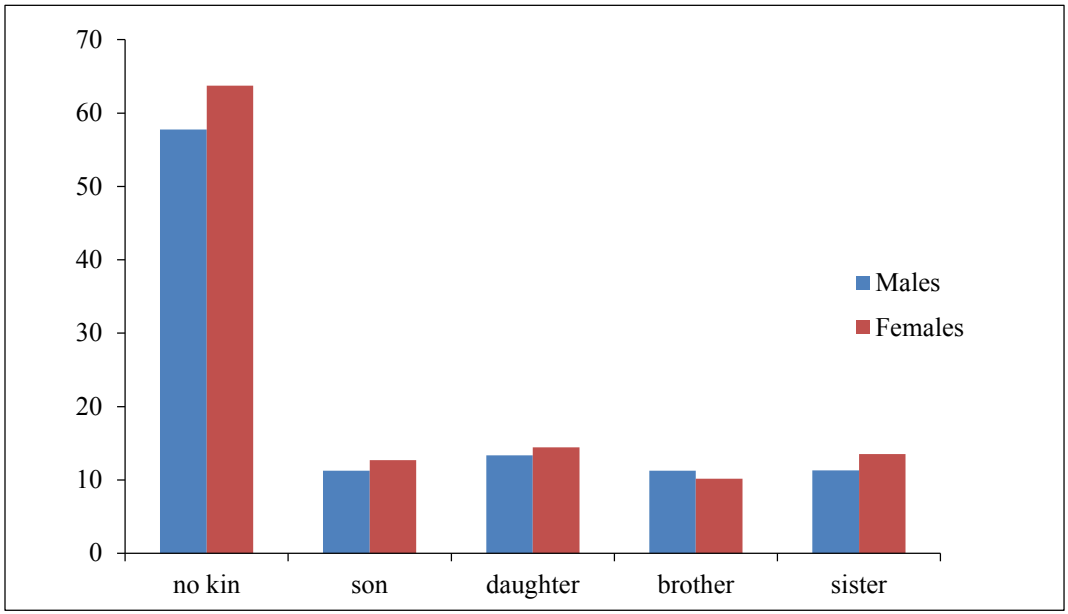


Figure 3. Percentage widowers coresiding with children by age

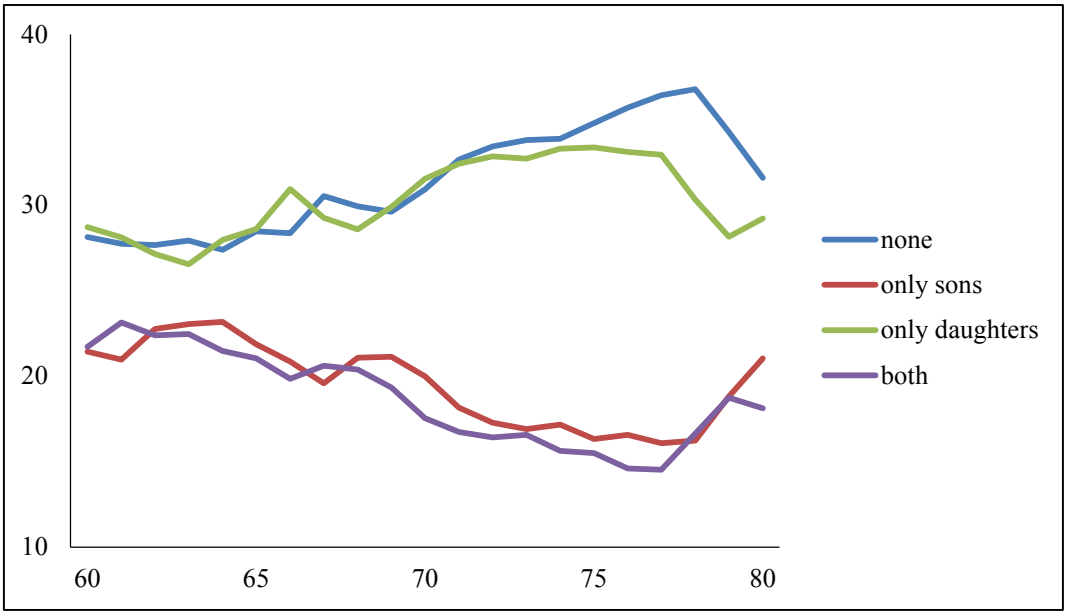


Figure 4. Percentage widows coresiding with children by age

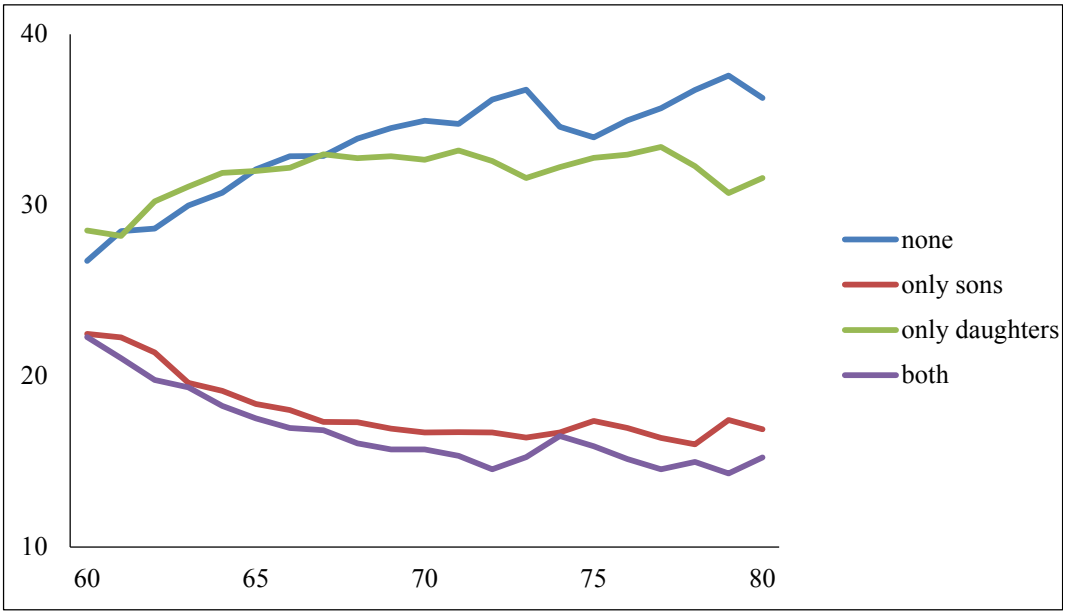


Table 1. Cox regression models of old-age mortality (60-79). Venice, 1850-1869

	Whole sample									Ever married								
	All			Males			Females			All			Males			Females		
Covariate	Prop	EXP (Coeff)	p-value	Prop	EXP (Coeff)	p-value	Prop	EXP (Coeff)	p-value	Prop	EXP (Coeff)	p-value	Prop	EXP (Coeff)	p-value	Prop	EXP (Coeff)	p-value
Gender																		
male (ref.)	0,43	1								0,44	1							
female	0,57	0,72	0,000							0,56	0,72	0,000						
Marital status										n.i.			n.i.			n.i.		
never married (ref.)	0,15	1		0,14	1		0,15	1										
married	0,43	0,91	0,321	0,60	0,97	0,803	0,30	0,84	0,192									
widowed	0,43	0,96	0,670	0,26	1,06	0,651	0,55	0,87	0,226									
Socio-economic status																		
unskilled, day laborer (ref.)	0,21	1		0,27	1		0,17	1		0,20	1		0,29	1		0,14	1	
factory worker	0,15	0,94	0,567	0,24	0,79	0,056	0,09	1,34	0,100	0,16	0,95	0,617	0,25	0,81	0,103	0,09	1,295	0,209
shopkeeper, artisan	0,16	1,04	0,659	0,32	0,93	0,535	0,04	1,48	0,106	0,16	0,98	0,867	0,32	0,90	0,401	0,04	1,186	0,548
middle class, elite	0,11	0,92	0,417	0,14	0,84	0,219	0,09	1,11	0,585	0,10	0,79	0,060	0,12	0,71	0,032	0,09	0,976	0,909
unknown	0,36	1,30	0,004	0,03	0,93	0,769	0,61	1,61	0,000	0,38	1,23	0,043	0,02	0,98	0,920	0,65	1,461	0,009
Religion																		
Catholic (ref.)	0,84	1		0,82	1		0,86	1		0,84	1		0,82	1		0,85	1	
Jewish	0,16	0,84	0,040	0,18	0,76	0,026	0,14	0,92	0,465	0,16	0,81	0,029	0,18	0,67	0,006	0,15	0,959	0,744
Current season																		
Winter (ref.)	0,26	1		0,26	1		0,25	1		0,26	1		0,26	1		0,26	1	
Spring	0,23	1,09	0,307	0,23	1,17	0,200	0,23	1,03	0,778	0,23	1,15	0,106	0,23	1,25	0,086	0,23	1,084	0,510
Summer	0,23	0,74	0,001	0,23	0,78	0,070	0,23	0,71	0,004	0,23	0,76	0,005	0,23	0,82	0,168	0,23	0,717	0,010
Fall	0,29	0,82	0,018	0,29	0,86	0,237	0,29	0,80	0,051	0,29	0,85	0,074	0,29	0,86	0,266	0,29	0,850	0,193
Food price																		
low (ref.)	0,73	1		0,74	1		0,73	1		0,73	1		0,73	1		0,73	1	
high	0,27	1,07	0,327	0,26	1,06	0,519	0,27	1,07	0,464	0,27	1,08	0,260	0,27	1,10	0,341	0,27	1,066	0,500
Ongoing cholera epidemic																		
no (ref.)	0,92	1		0,92	1		0,92	1		0,92	1		0,93	1		0,92	1	
yes	0,08	1,83	0,000	0,08	1,90	0,000	0,08	1,81	0,001	0,08	1,97	0,000	0,07	1,86	0,002	0,08	2,118	0,000

Spouse	n.i.			n.i.			n.i.											
absent										0,50	1		0,30	1		0,65	1	
present										0,50	0,96	0,532	0,70	0,94	0,528	0,35	0,962	0,695
Sons	n.i.			n.i.			n.i.											
none (ref.)										0,47	1		0,44	1		0,50	1	
coresident										0,44	0,92	0,201	0,49	0,90	0,302	0,41	0,928	0,436
non-coresident only										0,09	0,88	0,322	0,07	0,73	0,133	0,09	0,997	0,983
Daughters	n.i.			n.i.			n.i.											
none (ref.)										0,50	1		0,47	1		0,52	1	
coresident										0,40	0,90	0,159	0,43	0,84	0,102	0,37	0,953	0,629
non-coresident only										0,11	0,75	0,023	0,10	0,72	0,083	0,11	0,767	0,114
Brothers																		
none (ref.)	0,87	1		0,87	1					0,88	1		0,88	1		0,88	1	
coresident	0,03	0,60	0,017	0,04	0,61	0,067	0,88	1		0,02	0,52	0,034	0,03	0,59	0,142	0,02	0,386	0,101
non-coresident only	0,09	1,01	0,946	0,09	1,18	0,371	0,03	0,58	0,113	0,10	0,89	0,421	0,09	1,16	0,470	0,10	0,704	0,094
Sisters							0,10	0,85	0,399									
none (ref.)	0,85	1		0,86	1		0,84	1		0,86	1		0,87	1		0,84	1	
coresident	0,04	1,04	0,823	0,03	1,41	0,120	0,04	0,78	0,282	0,02	1,00	0,986	0,02	1,67	0,085	0,03	0,610	0,168
non-coresident only	0,11	0,74	0,011	0,11	0,66	0,026	0,12	0,81	0,155	0,12	0,75	0,019	0,11	0,63	0,024	0,13	0,825	0,219
No. of adult male kin	0,46	1,00	0,968	0,51	1,07	0,348	0,43	0,93	0,331	0,51	0,03	0,055	0,55	1,10	0,234	0,49	0,969	0,685
No. of adult female kin	0,46	1,01	0,848	0,51	0,93	0,381	0,42	1,08	0,289	0,51	0,00	0,056	0,56	0,94	0,441	0,48	1,061	0,439
Infants below 2																		
absent	0,81	1		0,80	1		0,81	1		0,78	1		0,78	1		0,79	1	
present	0,19	1,12	0,144	0,20	1,12	0,297	0,19	1,10	0,381	0,22	1,20	0,029	0,22	1,25	0,073	0,21	1,168	0,182
Mobility (previous year)																		
none (ref.)	0,85	1		0,85	1		0,86	1		0,85	1		0,84	1		0,85	1	
intra-parish	0,02	1,66	0,007	0,02	1,70	0,044	0,01	1,57	0,095	0,02	1,73	0,005	0,02	1,77	0,032	0,02	1,667	0,071
inter-parish	0,08	1,09	0,430	0,08	0,97	0,864	0,08	1,19	0,210	0,08	1,13	0,269	0,09	0,97	0,864	0,08	1,290	0,085
don't know	0,05	0,59	0,001	0,05	0,54	0,013	0,05	0,65	0,041	0,05	0,64	0,010	0,05	0,57	0,037	0,05	0,700	0,113
Events	1246			574			672			1055			488			567		

of those who lived with only a son was around 22, at 79 around 17; the corresponding figures for daughters where 29 and 33 respectively. Those living with both sons and daughters varied from 22 to 15 per cent. Elderly widowed without any children were at most 37 per cent of the total.

Elderly care

Care is approximated by differential survival. Cox proportional hazards models are used to test the impact on mortality of a set of confounding and exposure covariates. The confounding covariates are: Gender, marital status, socio-economic status, religion, current season, food price level, and cholera epidemic. The exposure covariates concern the presence of the spouse, sons, daughters, brothers, sisters, and of infants. For siblings and children, a distinction is made between cohabitation and proximity. The models also include the number of other male and female adult kinsfolk living in the same parish as the index person. Finally, a covariate describes whether the household to which the index person belonged had changed address in the previous year. All covariates but the last one are expected to have had a positive effect on elderly survival as sources of potential support. Elderly could also benefit indirectly from the presence of infants, enhancing their value as caregivers. A change of residence was expected to turn out detrimental, causing the disruption of one's social network.

The main results can be summarized as follows (*table 1*). As far as the confounding covariates are concerned, marital status, socio-economic status, and food price level did not significantly affect mortality. Gender, religious affiliation, cholera epidemics, and current season did. Interestingly, the risk of death of the Jews was 26 per cent less than that of the Catholics. Similarly to infants and differently from the other age groups, wintertime was quite harmful for elderly survival.

When it comes to the exposure covariates, the presence of siblings was important for the survival of the elderly, reducing significantly the risk of death. There is however an interesting difference. Brothers were helpful only when cohabiting with the index person, sisters only when neighboring. Also, siblings were more beneficial to males than to females, suggesting a gendered pattern of support. This is confirmed by the effect of children's presence: only neighboring daughters significantly reduced the risk of death of their parents, particularly of their mothers (-29%). Surprisingly enough, the spouse's presence did not affect survival.

The condition of the elderly was jeopardized by the presence of infants, which raised their risk of death by 25 per cent. Possibly, they were regarded more as competitors than as caregivers. Yet, I have shown elsewhere that grandmothers were significantly beneficial to infants' survival. Less close kinsfolk did not matter at all. On the contrary, a recent change of residence was apparently highly detrimental, raising the risk of death by 65 per cent. The increase is so huge, however, that one suspects the artefact of registration practices, whereby updates on moves were more likely to happen when an event such as a death was denounced.

Childbearing and longevity – the contribution of historical demography

Martin Dribe

In the biological and bio-demographical literature there has been a great interest in the possible long term effects of childbearing on health and mortality. A number of studies, many of them published in the best scientific journals, have argued for an evolutionary trade-off between reproduction and longevity. According to the theory of *antagonistic pleiotropy* (Williams, 1957) some genes have contradictory effects at different stages of the life course. Genes with an enhancing effect on the reproductive capacity may at the same time have detrimental effects on survival later in life (post reproduction). Natural selection tends to favor these kinds of genes because they maximize fitness, as higher mortality in the post-reproduction stage will have little impact on fitness compared to increased number of offspring. From this theory it follows that higher rates of reproduction comes at a cost of higher post-reproductive mortality and shorter life span.

As an alternative, the *disposable soma* theory (Kirkwood, 1977) argues for a metabolic trade-off between reproduction and longevity. Reproduction demands resources which could otherwise be used for physical maintenance and investments. Having more children to bear and rear (e.g. lactation) thus uses some of the resources that could have promoted a longer life, leading to the hypothesis that higher reproduction is associated with shorter life span.

These theories have provoked a large number of empirical studies on both historical and contemporary populations. Often data from historical populations have been used because of less confounding from deliberate fertility control which could affect the trade-offs studied. A number of studies finding an effect of number of children or the timing of first and last birth, have also interpreted their findings as supporting the evolutionary models. For example Westendorp and Kirkwood (1998), in a study of the English peerage spanning a period of more than 1,000 years, found that more children and lower ages at first birth were associated with shorter life span. In a careful analysis using similar data, however, Doblhammer and Oeppen (2003) only found an effect for women. Smith *et al.* (2002) found similar results for Utah, which they interpreted as consistent with the evolutionary models, and this was again repeated in a comparative analysis of historic Utah and Quebec (Gagnon *et al*., 2009).

At the same time many other studies have failed to find any consistent relationship between childbearing history and later life mortality. In an extensive review of empirical studies, Hurt *et al.* (2006) concluded that there was "no consistent pattern in the association between mortality and number of births among women who have completed their childbearing".

The interest in these issues was not that great among historical demographers to begin with. One reason for this may have been the strictly biological explanations invoked, leaving little room for individual agency or social context. We know that repeated childbearing put women under stress in the form of poor nutrition, physical and emotional stress, and greater exposure to disease, which in the long term may have detrimental effects on their health. For example,

breastfeeding affects the nutritional status of women as reflected in the quality of their teeth (see Christensen *et al.,* 1998). Therefore it seems only logical that the contribution of historical demographers to this field of research has been to bring social science back into the game. Different papers have stressed the important role played by the socio-economic context for the association between childbearing history and longevity (e.g. Beise and Voland, 2002 and Korpelainen, 2000). A study of southern Sweden in the 19th century looked at the relationship between various reproductive indicators (number of children ever born, age at first birth and age at last birth) and mortality after age 50 for men and women separately (Dribe, 2004). The effects were also analyzed separately by socio-economic status, and the results clearly showed that number of children ever born had a negative impact on longevity. Having four or five children shortened women's life span after 50 by about 3.5 years compared to women with one child or less. However, this effect could only be found among the poorest women. No effect of number of children for more well-to do women, or for men, could be found.

In a comparative analysis of three populations in Belgium, the Netherlands and Sweden in the 19th century, Alter *et al.* (2007) demonstrated the important mediating role played by widowhood. For women widowed at young ages (before 40) having more children meant significantly higher mortality after age 50, while there was no overall association between number of children and mortality. This seems to imply that it was not so much the number of children born that was important, but the circumstances under which they were raised.

In an article using data for a preindustrial Sami population in Finland, Helle *et al*. (2002) showed that number of sons, rather than the total number of children, affected women's longevity, and mainly linked it to biological mechanisms (testosterone levels related to pregnancies). Van de Putte *et al*. (2004) replicated the analysis on a 19th century Flemish village and confirmed the association between number of sons born and female age at death, but could also demonstrate that the effect was only present among working class women, and mainly for women whose sons survived to at least to age five. This led to the conclusion that resource competition, rather than pregnancy related mechanisms, was the main explanation.

As shown by these examples, the contribution by historical demography to this important research area has been significant by bringing the social and economic context into the analysis. Rather than viewing the adverse effects of childbearing on longevity as a result of evolutionary or metabolic trade-offs, the empirical evidence points strongly to the context in which women lived as the main explanation. Physical depletion following a combination of repeated pregnancies and deliveries, poor nutrition and hard physical labor had long-term adverse effects on the health and longevity of women. These negative effects were not present among the better nourished women in intact families, and their life spans also seem to have been largely unaffected by their reproductive history.

References

Alter, George, Martin Dribe and Frans van Poppel (2007), Widowhood, family size, and post-reproductive mortality: A comparative analysis of three populations in 19th century Europe. *Demography* 44(4), pp. 785-806.

Beise, Jan and Eckart Voland (2002), Effect of producing sons on maternal longevity in premodern populations. *Science,* 298(5592), pp. 317a.

Christensen, Kaare *et al.* (1998), A tooth per child? *Lancet,* 352(9123), pp. 204.

Doblhammer, Gabriele and Jim Oeppen (2003), Reproduction and longevity among the British peerage: The effect of frailty and health selection. *Proceeding of the Royal Society of London. Series B*, 270(1524), pp. 1541-1547.

Dribe, Martin (2004), Long term effects of childbearing on mortality: Evidence from pre-industrial Sweden. *Population Studies,* 58(3), pp. 297-310.

Gagnon, Alain *et al.* (2009), Is there a trade-off between fertility and longevity? A comparative study of women from three large historical databases accounting for mortality selection. *American Journal of Human Biology,* 21, pp. 533-540.

Helle, Samuli, Virpi Lummaa and Jukka Jokela (2002), Sons reduced maternal longevity in preindustrial humans. *Science,* 296(5570), pp. 1085.

Hurt, L.S., C. Ronsmans and S.L. Thomas (2006), The effect of number of births on women's mortality: Systematic review of the evidence for women who have completed their childbearing. *Population Studies,* 60(1), pp. 55-71.

Kirkwood, T.B.L (1977), Evolution of aging. *Nature,* 270(5635), pp. 301-304.

Korpelainen, Helena (2000), Fitness, reproduction and longevity among European aristocratic and rural Finnish families in the 1700s and 1800s. *Proceeding of the Royal Society of London. Series B,* 267(1454), pp. 1765-1770.

Putte, Bart van de, Koen Matthijs and Robert Vlietinck (2004), A social component in the negative effect of sons on maternal longevity in pre-industrial humans. *Journal of Biosocial Science,* 36(3), pp. 289-297.

Smith, Ken R., Geraldine P. Mineau and Lee L. Bean (2002), Fertility and post-reproductive longevity. *Biodemography and Social Biology,* 49(3-4), pp. 185-205.

Westendorp, Rudi G. and Thomas B.L. Kirkwood (1998), Human longevity at the cost of reproductive success. *Nature,* 396(6713), pp. 743-746.

Williams, G.C. (1957), Pleiotropy, natural selection and the evolution of senescence. *Evolution,* 11, pp. 298-411.

Excess mortality during the Dutch famine of 1940-45. When, where, and why? Some unresolved questions

Bertie Lumey

In a previous study of mortality during the Dutch famine, Frans van Poppel concluded that the immediate effects of the famine were so large that they affected the survival of the exposed populations (Lumey and Van Poppel, 1994).

As reviewed elsewhere, further studies at the individual level have since been carried out in the Netherlands to estimate possible long-term health effects of famine exposure in early life (Lumey *et al*., 2011). Most of these studies have looked at the relation between early life exposures during the pre-natal period and later morbidity. They have been too small to reliably evaluate changes in mortality, except for a recent study of men born during the famine (Lumey *et al*., submitted). A summary of mortality changes in relation to early life conditions after birth is also available but based on older literature (Elo and Preston, 1992).

Outside of the Netherlands, the pioneering national cohort study of the Great Finnish Famine of 1866-1868 (Kannisto *et al*., 1997) and a regional study of the Chinese Famine of 1959-1961 did not find differences in mortality or survival at older age for cohorts born during famine. Fertility or early mortality selection during the Chinese famine may have changed the characteristics of the survivors however, masking possible negative long-term effects (Song, 2009). This may also have happened in Finland, as suggested by a recent analysis using frailty models to account for unobserved cohort heterogeneity (Doblhammer *et al*., forthcoming).

Famine exposure in these studies is based on historical information regarding the timing and geographical distribution of the famine, and exposed and unexposed study subjects are defined by their date and place of birth. Sometimes, only year of birth is available for study, and accurate information on place of birth may also be missing. Timing of famine exposure in relation to critical developmental periods is sometimes feasible but the accuracy of timing will depend on available information on date of birth and the start and the end of the famine. In studies of the Dutch famine, such information has been collected and exposures have been classified according to distributed food rations in relation to stage of pregnancy (Stein *et al.,* 1975 and Lumey *et al.,* 2007). It is worth noting that birth size and body proportions vary only with exposure to famine in late pregnancy (Stein *et al.,* 2004). Birth size can therefore never be used to reliably estimate maternal nutrition in studies of birth weight and adult disease.

Famine exposure in nearly all studies is evaluated at the group level, as information on individuals is not available. In all, the exposure measures used in these studies are rather simple and given their limitations it is perhaps surprising that they have generated such useful results.

With regard to critical exposure periods, there has traditionally been a great interest in the period around the growth spurt in puberty (Tanner, 1981), but current studies tend to focus on

very early life experiences, even before birth. It is sometimes possible to contrast outcomes of the same exposure in very early pregnancy versus late in pregnancy and better understand biological pathways related to the timing of an insult (Heijmans *et al*., 2008).

Questions about long-term effects are important in view of the continuing and as yet unresolved debate on the contribution of early life factors to adult health and its policy implications (Ben-Shlomo and Kuh, 2002). Although progress is being made and more data sources are being developed (Lumey and Vaiserman, forthcoming), there are not many well designed current studies to reliably estimate long-term effects of famine on mortality and life expectancy in well-defined populations. Fortunately, this is likely to be possible however in some studies covering the WWII period from the Netherlands on which Frans is making important contributions.

Estimates from the NIOD institute in Amsterdam indicate that 250,000 Dutch men and women may have lost their lives because of WWII (NIOD, 2012). This number includes war-related casualties in the Netherlands, in the former Dutch East Indies and elsewhere. It includes the Jewish citizens who were deported and did not survive German extermination or labor camps, those who died of poor health conditions, civilian casualties of war, and deaths during the Dutch famine of 1944-1945, and civilian casualties during the liberation of the Netherlands (Klep and Schoenmaker, 1995).

With regard to the famine related deaths, the current estimates of 15,000-25,000 (De Jong, 1981; Trienekens, 1985; Klemann, 2002 and NIOD, 2012) are based on limited information. The reporting of vital statistics on births and deaths during the famine was incomplete on a national level and also in the largest affected cities in the Western Netherlands, except for Amsterdam. In addition, a systematic evaluation of the quality of available reports has never been carried out. The reporting of vital statistics was so spotty that it is worth documenting what data have actually been published for specific time periods and jurisdictions. For future reference, I have therefore summarized the available information from the Central Bureau of Statistics and from the municipalities of Amsterdam, Rotterdam, The Hague and Utrecht regarding the war period of interest (*table 1*). This information should be helpful for future studies, although the reported numbers will need careful interpretation.

Past war- or famine-related mortality estimates have been based on ad-hoc comparisons of excess deaths in exposed municipalities or regions in relation to non-famine years or non-famine regions (Dols and Van Arcken, 1946; Neurdenburg, 1947 and Burger Drummond and Sandstead, 1948). Using wider time windows, yearly time trends in mortality by gender and cause of death from national vital statistics (CBS, 1957) have also been compared, although the findings and the appropriate analysis of such data are open to discussion (Futselaar, 2008 and Lumey, 2010). A severe limitation of published national statistics is that only yearly figures at the national level are provided, ignoring that the famine was concentrated in the Western cities of the Netherlands.
With the recent availability of digitized data files from the statistical office for the Netherlands, covering overall mortality and causes of death by date of death in considerable detail, by

Table 1. Available vital statistics at the national and local level in the Netherlands covering the period of the Dutch famine of 1944-1945

Publication	Reported categories	Selected data of interest	Time period of interest covered	Reference	Comments
Maandschrift Centraal Bureau voor de Statistiek (CBS)	Huwelijken, geboorte en sterfte naar den leeftijd en naar de oorzaken van den dood, onder de werkelijke bevolking van Nederland	Levendgeboren, sterfte, en sterfte <1 jaar absoluut en per 1000/ inw.; sterfte naar leeftijd (<1 dag, 1 dag tot 1 week, 1 week tot 1 maand, <1 jaar, 1-4, 5-14, 15-19, 20-29, 30-39, 40-49, 50-59, 60-79, 80+ jaar) Naar oorzaak van de dood (23 groepen op basis van 44 doodsoorzaken) Naar gemeenten (1-45) van 25000 inwoners en meer; Naar provincien; Naar groepen van gemeenten (<5000 inw., 5-20, 20-50, 50-100, 100.000+ inw. Totaal	1943-1947, by month	Vol.38, 1943, Mar-Oct 1943 Vol.39, 1944, Nov 1943-Mar 1944 Vol.40, 1945, Apr-Jun 1944 Vol.41, 1946, Jan-Dec 1946	No data published over period Jul 1944-Dec 1945
Maandbericht van het Bureau van de Statistiek der Gemeente Amsterdam	Geboorte, sterfte naar de doodsoorzaken en de leeftijd	Geborenen m/v Leeftijd bij overlijden (<1, 1-4, 5-14, 15-19, 20-29, 30-39, 40-49, 50-59, 60-79, 80+ jaar) Overledenen m/v naar doodsoorzaak (1-44) in betreffende maand en in voorgaande maand en in dezelfde maand van het vorige jaar Totaal binnen de gemeente overleden m/v, waarvan niet behorend tot de werkelijke bevolking der gemeente, elders overledenen behorende tot de werkelijke bevolking, totaal der overledenen behorende tot de werkelijke bevoking in voorgaande maand/ zelfde maand van het vorige jaar/vorig jaar	Jan1938-Dec 1948, by month		Publication uninterrupted by war
Statistische Mededeelingen der Gemeente Rotterdam	Geboorte, sterfte, vestiging, en vertrek	Geboorte m/v, sterfte m/v, vestiging m/v en vertrek m/v, bevolking m/v op de eerste van elke maand Sterfte naar den leeftijd (<1 maand, 1 maand-1 jaar, 1-5 jaar, 5+ jaar, levenloos aangegeven)	Jan-Dec 1943 and Jan-Dec 1942, by month	1943, 1ste, 2e, 3e, en 4e kwartaal	Regular data publication interrupted over period Apr 1944-Dec 1945 Selected data over this period published in early 1946.
		Geboorte m/v, sterfte m/v, bevolking m/v op de eerste van elke maand Sterfte naar den leeftijd	Jan-Mar 1944 and Jan-Mar 1943, by month	1944, 1ste kwartaal	Birth, deaths, arrivals, and departures in city between Jan 1940-Mar 1944 by month, (Fig.)

Overzicht van de sterfte binnen de gemeente Rotterdam, m/v Overledenen binnen de gemeente in 1944 en 1945 (Fig.)	1944 and 1945, by week	1946, 1ste kwartaal met twee bijlagen	'On judging these data it should be taken into consideration, that a great number of male persons were carried off abroad; moreover numerous persons temporarily left the city in view of the food-shortage, resulting in a certain incorrectness of the observations. Would this have not been the case, the general death-rate would have been still more considerable this year and the striking difference between the number of men and women deceased still greater' (with Fig.) (Bijl. 1)
Overzicht van de geboorten binnen de gemeente Rotterdam in 1944, 1945, en een gedeelte van 1946.	Jan 1944- Jun 1946, by week		'The figures show the demographic consequences of the deportation of a great number of persons to Germany mid-November 1944, the gradual deterioration of food-conditions since September 1944, as well as the return of these men and the improved food-situation after the liberation'
Geboorten binnen de gemeente Rotterdam in 1944, 1945, en 1946	1944-1946, by week		As above (Bijl.2)
Geboorte m/v, sterfte m/v, vestiging m/v en vertrek m/v. Bevolking m/v op de eerste van elke maand, Sterfte naar den leeftijd	Jan-Dec 1946 and Jan-Dec 1945, by month	1946, 1ste, 2e, 3e en 4e kwartaal met drie bijlagen	Mid 1946 update of figures not published since mid-1944
Overzicht van de geboorten binnen de gemeente Rotterdam in 1944, 1945, 1946 en een gedeelte van 1947	Jan 1944-Jun 1947		During the last years of the enemy-occupation and the period after the liberation, birth-rates show striking fluctuations in contra-distinction to the pre-war years. At present the level which the rates have reached and still maintain, is really surprising. In order to prove this assertion as to the movement of the births in recent years, a review is given of the weekly birth-rates for the years 1944 to 1946 inclusive and part of the current year. The following factors played an important part in bringing about the important deviations. On the one side the considerable fall of births was caused by the lower frequency of marriages during the enemy-occupation and by the deportation of a great number of male persons to Germany mod-November 1944, the gradually deteriorated conditions of life especially since the autumn of 1944 (September) having also contributed to the decrease. On the other hand the rise was brought about owing to the abnormal high number of marriages contracted, the return of the deported men and the improved food supply after the liberation (May 1945). (Bijl. 2, incl. Fig.)

		Geboorten m/v, Bevolking m/v op de 1e van de maand, Sterfte naar de oorzaken van de dood (28 categorieen)	Jan-Mar 1947 and Jan-Mar 1946	1947, 1ste kwartaal met twee bijlagen	
		Sterfte naar den leeftijd			
		Geboorten m/v, sterfte m/n, Bevolking m/v op de 1e van de maand	Jan 1946 to Dec 1947,by month	1947, 1ste-4de kwartaal met twee bijlagen	
		Sterfte naar de oorzaken van de dood (28 categorieen)	1946-1947, by quarter		Yearly population, death, and birth counts (Bijl. 1)
		Overzicht van enige van de voornaamste gegevens	1938, 1946 en 1947		
		Overzicht van de geboorten binnen de gemeente Rotterdam in 1944, 1945, 1946, 1947 en een gedeelte van 1948	Jan 1944-Apr 1948, by week		See comment above on weekly births Jan 1944 -Jun 1947 (Bijl. 2)
Mededeelingen van het bureau voor statistiek en voorlichting der gemeente 's-Gravenhage	Sterfte en geboorte	Overledenen zonder oorlogsslachtoffersbinnen de gemeente	Jan-Sep 1944 and Jan-Sep 1945, by month	1946 no.1	Selected data over war period published in 1946, as a summary of some experiences of the city of the Hague under German occupation (''s-Gravenhage tijdens de Duitsche bezetting. De bevolking van 's-Gravenhage tijdens de oorlogsjaren". (pp. 5-12ff.)
		Sterfte aan ondervoeding boven de 50 jaar m/v als % total sterfte;			
		Sterfte door oorlogs-geweld per jaar (excl slachtoffers in het buitenland (w.o. de Joden het grootste aantal leveren)	Jan-Jun 1945		
		Bevolking m/v per jaar	1940-45		This summary includes sections on m/f residents in 1939-44, the deportation of the Jewish population in 1942-43; food distribution and rations, hunger edema and deaths from famine
			1939-44		
		Loop van de bevolking, totaal levend geborenen, levenloos aangegeven, en Overleden behorende tot de werkelijke bevolking	Jan 1945-April 1946, By month	1946 no.4	With descriptive summary of post-liberation conditions ('de Haagsche bevolking een jaar na de bevrijding')
		Geboortecijfers voor Den Haag, levend en levenloos geborenen,	Jan-Dec 1946	1947 no.3	With summary of 'Enige gegevens over de residentie na de bevrijding')
		Geboorte en sterfte/1000 inwoners, overledenen, w.v. jonger dan 1 jaar, (Fig.)	1936-46, by year		With continuation of the previous summary of experiences under German occupation, and births and deaths 1939-46 ('Vergelijkend jaaroverzicht over de jaren 1939 t/m 1946 (pp. 26-31)'(continuation of Summary in 1946 no.1)
		Verloop van het aantal geborenen en overledenen, huwelijken en echtscheidingen (Fig.)	1944-46, by month		

Statistische Berichten der Gemeente Utrecht; Statistische Mitteilungen der Stadt Utrecht	Sterfte en geboorte, loop van de bevolking	Levend geboren m/v, overleden m/v, vestiging, vertrek, stand der bevolking (m/v), Sterfte Sterfte naar geslacht (m/v), leeftijd (<1, 1-4, 5-14, 15-19, 20-29, 30-39, 40-49, 50-59, 60-79, 80+ jaar) en oorzaken van den dood (kleine lijst 1-44, volgens Todesursachen-verzeignis 1938	Jan-Mar 1944 and Jan-Mar 1943	28e jaargang, Jan-Mar 1944	Selected data over period April 1944 - December 1945 published in 1946
Statistische Berichten der Gemeente Utrecht; Bulletin statistique de la ville d'Utrecht		Geboorten/1.000 inw. per kwartaal (Fig.) (Tab.)	1944-46, by quarter	29e jaargang, Jan-Dec 1946	Geboorten 1937, 1940, 1944, 1946 (Fig.)
		Stand van de bevolking, loop van de bevolking, levendgeboren m/v, overleden m/v, absoluut en per 1.000 inw.	Jan-Dec 1946 and Jan-Dec 1945, by month		'Whereas the average number of births in the pre-war period was about 250 per month, with some months reaching a number of 290, the number of births exceeded 580 in May-June 1946. A decline in the number of births was seen after June 1945, reaching a low point with 171 births in November 1945. Thereafter there was a rapid increase, especially after February 1946' Deaths/1,000 pop. averaged 8.9 in 1938 and 9.0 in 1939. This number increased to 29.4/1,000 in March 1945, 22.8/1.000 in April, and 21.5 in May. A positive trend started in June with 12.6/1,000. This number continued to improve thereafter.
		Sterfte naar geslacht (m/v), leeftijd (<1 jaar, 1-4, 5-14, 15-19, 20-29, 30-39, 40-49, 50-59, 60-79, 80+ jaar) en oorzaken van den dood (kleine lijst 1-44)	1946		Deaths by sex, age, and cause of death, 1946

gender, and in selected age groups and across all municipalities, the time has finally come to address some important but unresolved questions about the Dutch famine. It will now be possible for instance to evaluate with national mortality data when the birth and death counts started to change in well-defined areas, how this relates to changes in energy and macro-nutrient availability, which effects were immediate and which were delayed, why some areas were more affected than others in spite of comparable food supplies, and if some affected cities showed greater excess mortality than others.

It will also be possible to examine differential effects of famine on specific causes of death and on the timing of these deaths. With current epidemiologic, demographic, and econometric techniques it will be possible to address these questions in a comprehensive fashion and to further quantify excess mortality in relation to the timing, location, and nature of specific insults. These analyses will not only contribute to our knowledge of the Dutch famine itself, but may also help us better identify critical exposure periods over the life course for later use in other studies in other parts of the world. Much of this work is currently being undertaken by Frans, together with his colleagues Peter Ekamper and Govert Bijwaard at NIDI and with collaborators Aryeh Stein and myself in the United States.

We should all hope that after his official retirement Frans will not abandon this work. I even hope that he will then be able to find more time to help solving some of these fundamental questions.

References

Ben-Shlomo, Y. and D. Kuh (2002), A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges and interdisciplinary perspectives. *International Journal of Epidemiology*, 31, pp. 285-93.

Burger, G.C.E., J.C. Drummond and H.R. Sandstead (1948), *Malnutrition and starvation in Western Netherlands*, *September 1944 to July 1945*. Pts 1 & 2. 's-Gravenhage: Staatsuitgeverij.

Centraal Bureau voor de Statistiek (1957), *De sterfte in Nederland naar geslacht, leeftijd en doodsoorzaken 1921-1955*. Zeist: Uitgeversmaatschappij W. de Haan.

Doblhammer, G., G.J. van den Berg and L.H. Lumey (2010), Long-term effects of famine on life expectancy. *Population Studies*: In press.

Dols, M.J.L. and D.J.A.M. van Arcken (1946), *Food supply and nutrition in the Netherlands during and immediately after World War II*. Milbank Mem Fund Quart 24, pp. 319-358.

Elo, I.T. and S.H. Preston (1992), Effects of early-life conditions on adult mortality: A review. *Population Index*, 58, pp. 186-212.

Futselaar, R. (2008), *Lard, lice, and longevity. The standard of living in occupied Denmark and the Netherlands, 1940-1945*. Amsterdam: Aksant.

Heijmans BT, Tobi EW, Stein AD, Putter H, Blauw GJ, Susser ES, Slagboom PE, Lumey LH. (2008). Persistent epigenetic differences associated with prenatal exposure to famine in humans. *Proc Natl Acad Sci U S A 105*: 17046-9.

Jong, L. de (1981), *Het Koninkrijk der Nederlanden in de Tweede Wereldoorlog, deel 10b*. Den Haag: Staatsuitgeverij.

Kannisto, V., K. Christensen and J.W. Vaupel (1997), No increased mortality in later life for cohorts born during famine. *American Journal of Epidemiology*, 145, pp. 987-994.

Klemann, H.A.M. (2002), *Nederland 1938-1948; economie en samenleving in jaren van oorlog en bezetting*. Amsterdam: Boom.

Klep, C. and B. Schoenmaker (eds.) (1995), *De bevrijding van Nederland 1944-1945; Oorlog op de flank*. Den Haag: SDU.

Lumey, L.H., F.W. van Poppel (1994), The Dutch famine of 1944-45: Mortality and morbidity in past and present generations. *Social History of Medicine*, 7, pp. 229-46.

Lumey, L.H. (2010), *Review of Ralf Futselaar. Lard, lice and longevity.* Bijdragen en Mededelingen der Geschiedenis van de Nederlanden, 125, pp. 148-50.

Lumey, L.H., A.D. Stein, H.S. Kahn, K.M. van der Pal-de Bruin, G.J. Blauw, P.A. Zybert *et al*. (2007), Cohort profile: The Dutch Hunger Winter families study. *International Journal of Epidemiology*, 36, pp.1196-204.

Lumey, L.H., A.D. Stein and E. Susser (2011), Prenatal famine and adult health. *Annual Review of Public Health,* 32, pp. 237-62.

Lumey, L.H., P. Ekamper, A.D. Stein and F. van Poppel, *Prenatal famine exposure and mortality in a national birth cohort with follow-up through age 63 years* (Submitted for publication).

Lumey, L.H. and A. Vaiserman, *Early life nutrition, adult health and development. Lessons from changing diets, famines and experimental studies*. Happauge: Nova Publishers. https://www.novapublishers.com/catalog/product_info.php?products_id=37892 (In press).

Neurdenburg, M.G. (1947), Algemene statistiek der mortaliteit en der morbiditeit. In *Medische ervaringen in Nederland tijdens de bezetting 1940-1945*, I. Boerema (ed.), pp. 321-408. Groningen: J.B.Wolters.

NIOD (2012), Cijfers Duitse bezetting. http://www.niod.knaw.nl/nl/CijfermateriaalDuitsebezetting.htm. (Access date November 3, 2012).

Song, S. (2009), Does famine have a long-term effect on cohort mortality? Evidence from the 1959-1961 great leap forward famine in China. *Journal of Biosocial Science*, 41, pp. 469-491.

Stein, Z., M. Susser, G. Sanger and F. Marolla (1975), *Famine and human development. The Dutch Hunger Winter of 1944-1945*. New York: Oxford Univ Press.

Stein, A.D., P.A. Zybert, M. van de Bor and L.H. Lumey (2004), Intrauterine famine exposure and body proportions at birth: The Dutch Hunger Winter. *International Journal of Epidemiology*, 33, pp. 831-6.

Tanner, J.M. (1981), *A history of the study of human growth*. Cambridge: Cambridge University Press.

Trienekens, G.M.T. (1985), *Tussen ons volk en de honger; de voedselvoorziening, 1940-1945*. Utrecht: Matrijs.

Divergence of life expectancy and the epidemiological transition theory

Johan P. Mackenbach

Introduction

During the 20th century, life expectancy in Europe has risen strongly, but with important variations in both time and space, as shown in *figure 1*. Apart from a steady rise and some major interruptions we see an increasing dispersion in recent decades. This recent divergence is mainly due to stagnation and sometimes decline of life expectancy in Central and Eastern Europe (McMichael *et al*., 2004; Leon, 2011; Moser *et al*., 2005; Zatonski, 2008 and Robine *et al*., 1995). Studies have shown that recent unfavorable mortality trends in Central and Eastern Europe are largely due to unfavorable trends in mortality from cardiovascular diseases, caused by various circumstances linked to the political and economic situation in the communist and post-communist era (Rechel *et al*., 2009; Leon *et al*., 2009; McKee *et al*., 2009; Pomerleau *et al*., 2006 and Stuckler *et al*., 2009).

It is unknown, however, how these recent trends compare to longer term developments in life expectancy. As figure 1 suggests, this is not the first episode of widening of the life expectancy gap in Europe. An earlier episode occurred during the 1920s and 1930s. Is the current widening more or less severe than the earlier one? Is there a general explanation that can account for both episodes of widening?

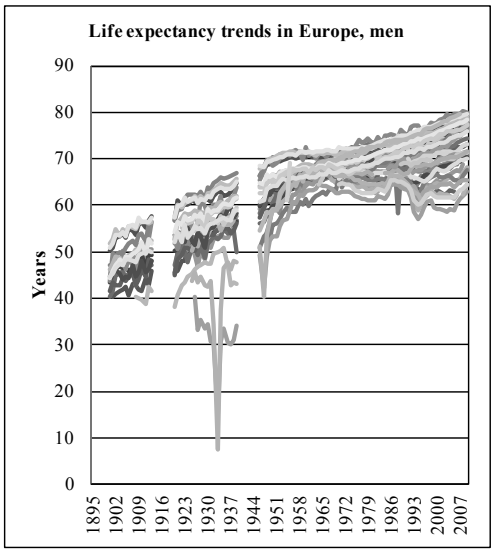
The epidemiological transition theory

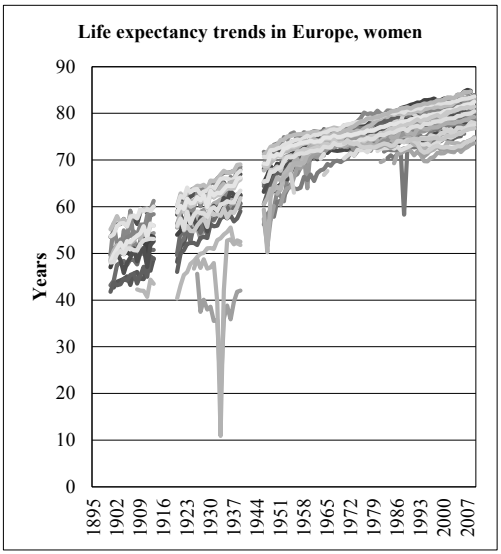
The theory that is most often used to explain long-term trends in mortality is that of the 'epidemiological transition'. During the epidemiological transition, which in different parts of Europe began between 1850 and 1920 (Riley, 2001), mortality declined precipitously and life expectancy rose in a spectacular manner, often in parallel with economic growth. What we generally see is rapid growth of life expectancy until about 1950-1970, followed by a few decades of stagnation, and then renewed growth of life expectancy starting in the period 1970-1990 (*figure 1*).

It has been argued that rapid declines in mortality are often accompanied by growing disparities, e.g. between countries, regions within the same country, or socio-economic groups, and that the recent divergence of mortality and life expectancy trends in Europe is simply to be expected as a corollary of the latest stage in the epidemiologic transition (Vallin *et al*., 2004 and Meslé *et al*., 2006). The main reason is that innovations which reduce mortality are first implemented in some countries and then slowly diffuse to others (Rogers, 1962). This is an appealing notion, but it carries the risk that diverging life expectancy is seen as a 'normal' phenomenon that will inevitably disappear when a natural process of diffusion is allowed to continue.

In order to assess the validity of this idea it is necessary to more systematically quantify variation in life expectancy in Europe over the whole period 1900-2008, and to assess whether the two episodes of divergence in life expectancy coincided with rapid but differential declines of mortality from infectious diseases and cardiovascular diseases, respectively.

Figure 1. Life expectancy trends in Europe, 1900-2008, by gender





Convergence and divergence of life expectancy and cause-specific mortality

Table 1 shows that during the twentieth century, the inter-quartile range of life expectancy in Europe rose substantially between 1900 and 1920 (women) and 1930 (men), and then declined to reach its lowest values in 1960. After 1960, however, it started to increase again, to reach values in 2008 that were similar to those seen before World War II. The first episode of widening occurred both in Western- and in Central- and Eastern Europe, but the most recent episode of widening is almost entirely due to developments in Central- and Eastern Europe.

Figure 2 shows trends in age-standardized mortality from all causes during the same time-period. The three trend-lines represent the life expectancy values corresponding to the first, second and third quartiles, respectively. In the first sub-period, all three trend lines declined spectacularly, both among men and among women, but at first this decline was more rapid in some countries than in others, causing divergence between the trend lines. This divergence occurred both in Europe as a whole and in Western Europe only. In the second sub-period we see the trend lines starting to decline *and* diverge again, but in this case a more detailed analysis shows that the divergence is due to developments in Central- and Eastern Europe.

Whether we should regard the current divergence as equally severe as the one occurring during the first decades of the 20th century depends strongly on the measure used. In absolute terms, current disparities in life expectancy are almost as large as those observed in 1920 and 1930, at least among men, but in relative terms (as a fraction of median life expectancy in Europe) the dispersion is much less. With regard to the age-standardized mortality rates, in

Table 1. Variation in life expectancy in Europe, 1900-2008, by gender

a. Men

Variability in LE

Men	ca. 1900	ca. 1910	ca. 1920	ca. 1930	ca. 1939	ca. 1950	ca. 1960	ca. 1970	ca. 1980	ca. 1990	ca. 2000	ca. 2008
# Countries	22	20	22	29	28	42	41	40	44	44	44	42
Average	43,54	48,89	49,49	52,62	56,47	61,45	66,47	67,35	68,39	70,17	71,70	73,77
Minimum	29,49	38,77	38,14	34,37	34,25	52,60	59,00	60,03	60,97	63,47	59,15	61,91
Q1	40,22	45,60	45,33	48,73	54,88	58,96	65,40	66,18	66,10	66,61	68,72	70,10
Q2	44,04	49,71	50,96	53,77	56,67	61,93	66,69	66,91	68,48	70,82	73,21	75,97
Q3	47,01	53,71	53,82	57,83	60,04	64,41	67,92	68.97	70,86	73,42	75,59	77,90
Maximum	51,77	56,44	57,52	63,96	66,93	70,32	72,45	72,36	73,59	75,62	77,92	80,14
IQR (Q3-Q1)	6,79	8,11	8,49	9,10	5,17	5,46	2,52	2,78	4,77	6,82	6,86	7,79

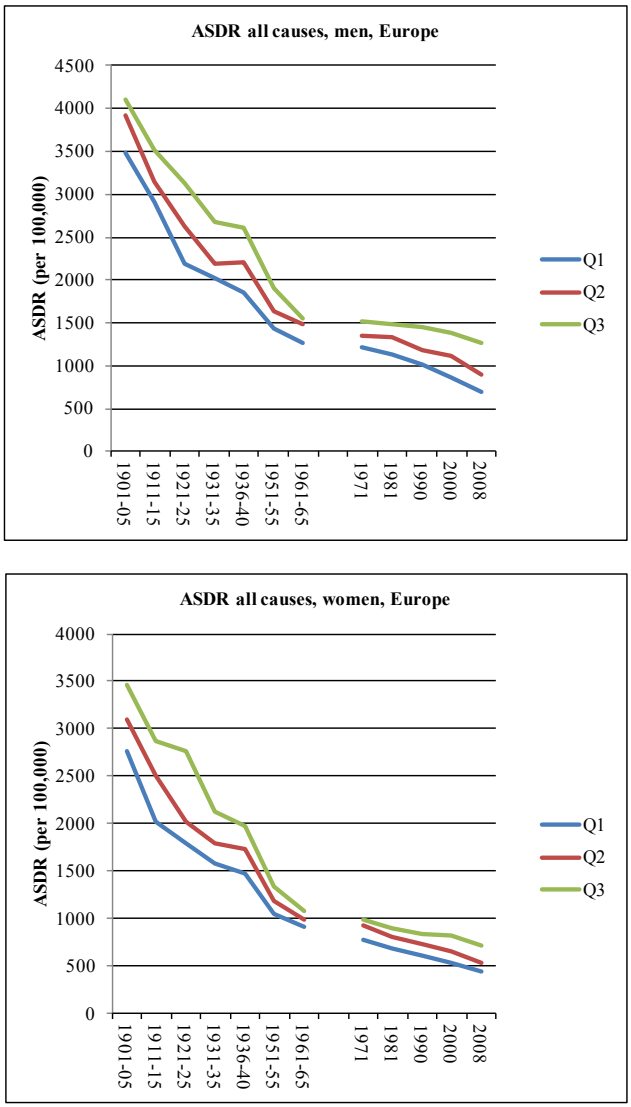
b. Women

Variability in LE

Women	ca. 1900	ca. 1910	ca. 1920	ca. 1930	ca. 1939	ca. 1950	ca. 1960	ca. 1970	ca. 1980	ca. 1990	ca. 2000	ca. 2008
# Countries	22	20	22	29	28	42	41	40	43	44	44	42
Average	45,76	51,14	51,94	56,14	60,90	65,92	71,50	73,54	75,09	77,23	78,58	80,41
Minimum	31,73	39,16	40,35	38,60	42,02	54,37	62,80	62,80	67,70	72,02	71,45	73,31
Q1	42,02	46,53	46,58	51,40	58,83	63,05	70,64	72,99	73,26	75,39	76,21	77,87
Q2	47,53	52,89	54,46	58,04	61,89	67,37	71,99	73,50	75,20	77,66	79,40	80,97
Q3	49,45	54,94	56,23	59,47	64,10	69,00	73,32	75,29	77,07	79,25	81,08	83,13
Maximum	55,15	59,63	60,17	65,60	69,04	73,53	75,86	77,46	80,55	81,83	83,15	84,84
IQR(Q3-Q1)	7,43	8,41	9,65	8,07	5,27	5,95	2,68	2,30	3,80	3,86	4,86	5,26

Notes: Q1 = life expectancy at first quartile. Q2 = life expectancy at second quartile or median. Q3 = life expectancy at third quartile. IQR = Inter-quartile range or Q3-Q1.

Figure 2. Variation in age-standardized death rates in Europe, 1901-2008, by all causus, by gender



Notes: ASDR = Age-standardized death rate; Q1 = age-standardized death rate at first quartile; Q2 = age-standardized death rate at second quartile or median; Q3 = age-standardized death rate at third quartile; IQR = Inter-quartile range or Q3-Q1.

absolute terms current disparities are still well below those observed in the 1920s. In relative terms (as a fraction of the median), the variation in 2008 is larger than in the 1920s for men, and of similar magnitude for women.

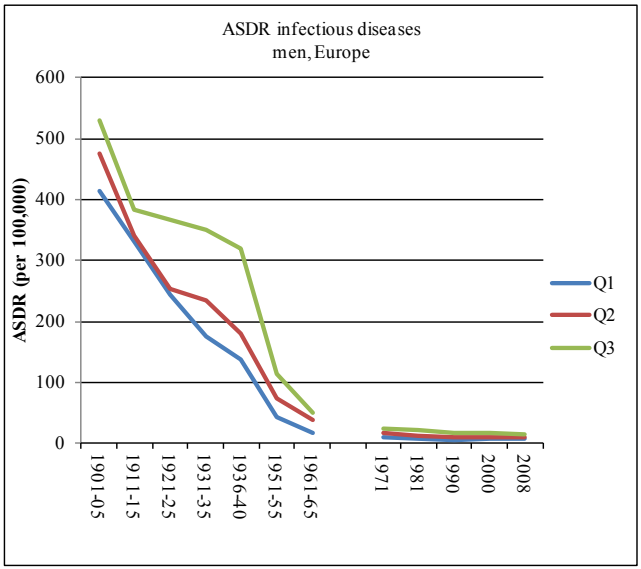
The first episode of widening occurred in a period of rapid mortality decline, mainly because of declining mortality from infectious diseases. *Figure 3* shows that some countries lagged behind in their decline of mortality from infectious diseases, which led to a substantial gap in mortality from these causes. The second episode of widening occurred in a period of beginning mortality decline, driven by declining mortality from cardiovascular disease. Figure 3 shows that there were substantial differences between countries in the starting year of mortality decline for cardiovascular diseases, and that mortality still went up in some countries while it already declined in some others, particularly among men. The countries lagging behind were all in Central- and Eastern Europe. This led to a large gap in mortality from these causes.

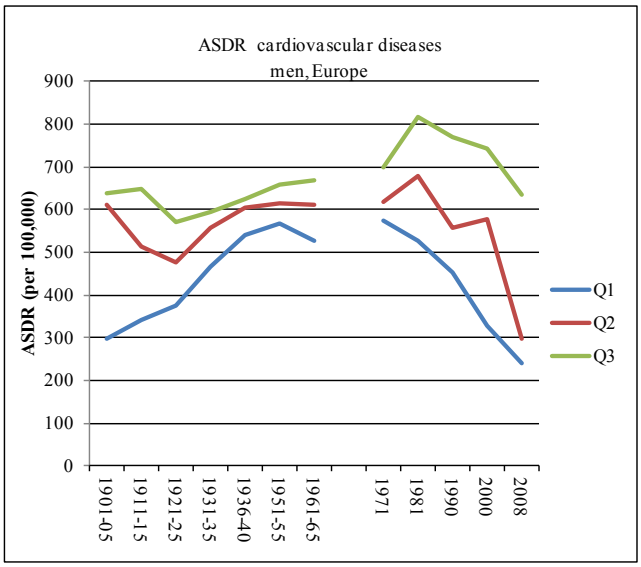
Conclusions

Our results suggest that both episodes of widening differences in life expectancy can plausibly be seen as resulting from differences between countries in timing of epidemiologic transitions. Although this suggests a common explanation of both episodes, at least at a very general level, we also found an important difference between the two episodes which casts doubt on a common explanation: the second episode is partly due to rising mortality in some countries, which we did not observe in the first episode. This second episode of widening disparities in life expectancy also coincided with a rising gap in national income between countries which was caused by the impoverishment of a part of Europe following the collapse of the Soviet Union (Stuckler *et al*., 2009 and Maddisson, 2003). This did not simply cause a delay in epidemiological transition but appears to have led to an actual setback.

Therefore, interpreting the recent widening in terms of a 'normal' delay of epidemiological transitions related to the necessary diffusion of innovations across the European subcontinent, may well be a romantic illusion. The current episode of widening differences in life expectancy is an alarming phenomenon that should be a main focus of European policy making.

Figure 3. Variation in age-standardized death rates in Europe, 1901-2008, infectious and cardiovascular diseases, men





Notes: ASDR = Age-standardized death rate; Q1 = age-standardized death rate at first quartile; Q2 = age-standardized death rate at second quartile or median; Q3 = age-standardized death rate at third quartile.

References

Leon, D.A., V.M. Shkolnikov and M. McKee (2009), Alcohol and Russian mortality: A continuing crisis. Addiction (Abingdon, England). 104(10), pp. 1630-6. Epub 18 August 2009.

Leon, D.A. (2011), Trends in European life expectancy: A salutary view. *International Journal of Epidemiology,* 40(2), pp. 271-7. Epub 19 March 2011.

Maddison, A. (2003), The world economy: Historical statistics. Paris: Organisation of Economic Cooperation and Development.

McMichael, A.J., M. McKee, V. Shkolnikov and T. Valkonen (2004), Mortality trends and setbacks: Global convergence or divergence? Lancet, 363 (9415), pp. 1155-9. Epub 6 April 2004.

McKee, M. (2009), Public health in Central- and Eastern Europe and the former Soviet Union. In R. Beaglehole and R. Bonita (eds.). Global public health: A new era. Oxford etc.: Oxford University Press; p. 101-21.

Meslé, F. and J. Vallin (2006), Diverging trends in female old-age mortality: The United States and the Netherlands versus France and Japan. *Population Development Review*, 32(1), pp. 123-45.

Moser, K., V. Shkolnikov and D.A. Leon (2005), World mortality, 1950-2000: Divergence replaces convergence from the late 1980ˢ. Bulletin of the World Health Organization, 83(3), pp. 202-9. Epub 31 March 2005.

Pomerleau, J., K. Lock and M. McKee (2006), The burden of cardiovascular disease and cancer attributable to low fruit and vegetable intake in the European Union: Differences between old and new member states. *Public Health Nutrition,* 9(5), pp. 575-83. Epub 23 August 2006.

Rechel, B. and M. McKee (2009), Health reform in central- and eastern Europe and the former Soviet Union. *Lancet*, 374(9696), pp. 1186-95. Epub 6 October.

Riley, J.C. (2001), Rising life expectancy. A global history. Cambridge: Cambridge University Press, 243 p.

Robine, J.M., S. Le Roy and C. Jagger (1995), Changes in life expectancy in the European Union since 1995: Similarities and differences between the 25 EU countries. n.p.: European Health Expectancy Monitoring Unit (EHEMU); n.d.

Rogers, E.M. (1962), Diffusion of innovations. Glencoe: Free Press.

Stuckler, D., L. King and M. McKee (2009), Mass privatisation and the post-communist mortality crisis: A cross-national analysis. *Lancet*, 373(9661), pp. 399-407. Epub 20 January 2009.

Vallin, J. and F. Mesle (2004), Convergences and divergences in mortality. A new approach to health transition. *Demographic Research*; SPECIAL COLLECTION 2, ARTICLE 2, pp. 11-44.

Zatonski, W. (2008), Closing the health gap in the European Union. Warsaw: Maria Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, 227 p.

Heat waves and elderly mortality responses: What about social differential vulnerability?

Michel Oris and Mathias Lerch[1]

In his long and so successful journey across demography and population history, Frans van Poppel explored many topics, always bringing original and important contributions. It was also the case when he addressed the relations between temperature fluctuations and the modernization of human behaviours, this later being apparent in the reduction of mortality responses. We can wonder if this long historical trend is not reaching its end and if human populations are not becoming again vulnerable to climatic variations. Although heat waves have a long history, it was in 1995 that temperature peaks emerged as 'new social risks' on the political agenda. Indeed, in July of that year approximately 750 heat-related deaths occurred in Chicago over a period of just five days. Eric Klinenberg's 2002 book *Heat wave: A social autopsy of disaster in Chicago* became a bestseller since in 2003 Europe was also hit by a similarly brutal episode. A so-called *Omega block* had led to a stagnation of the weather pattern, creating a high-pressure ridge that lasted for several days, mainly in France, Italy and Switzerland. The resulting record temperatures caused an excess of deaths that is estimated to range from 35,000 to 55,000.[2] The large majority of the victims were elderly living in urban agglomerations (Sardon, 2006, p. 292 and Kovatz and Jendritzky, 2006).

Those experiences have been traumatic from both a psychosocial and a political point of view, and heat wave has since become an issue of general concern about the future of our societies. The challenges for human health are particularly intensified by the changing pattern of global warming, which is increasingly driven by an increase in maximum rather than minimum temperature and therefore mainly concerns summer rather than winter periods when compared to the past (Rebetez *et al.,* 2008). Human populations are therefore increasingly exposed to extreme heat events and are expected to be so in the future. Indeed, despite the ongoing debate around climate change, predictions of an intensification of heat wave episodes (in frequency, intensity and duration) appear to be robust (Beniston, 2004). Furthermore, all demographic scenarios consistently predict a massive increase of the share of elderly people, thus the expectation of a growing number of frail people who can be considered vulnerable to the effects of climate change.

In this context, many teams are elaborating projections combining demographic perspectives and climate change models. For example, Peng *et al.* (2011) estimate the yearly excess of deaths for the city of Chicago for 2081-2100 in seven global climate models. Ouranos (http://ww.www.ouranos.ca/) does the same for Canada. The counter-view of these catastrophic scenarios for our future is firstly, that humanity will progressively learn how to cope with

[1] This paper is a contribution of the research group 13 to the NCCR LIVES. The NCCRs are a tool of the Swiss National Science Foundation and we are grateful for this support.

[2] In a 2008 published article, Jean-Marie Robine and his colleagues even estimated that 'Death toll exceeded 70,000 in Europe during the summer of 2003'.

climate change and secondly, that the decrease of winter deaths will compensate the rise of summer mortality. The European project Climate Trap, supported by of COST Action 730 since 2005, has the ambitions to construct a Universal Thermal Climate Index including the human capacities for anticipation and acclimatization.

Those studies and the debate about our uncertain future provide a typical illustration of the 'risk society' that Ulrich Beck defined as "a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself" (1992, p. 21). We consider however that the attempts to predict what will happen in the next decades are premature, and that we still need to go back to the basis. Indeed, many crucial knots in the causal chain remain unclear. In this short contribution, we consider only the social dimensions of vulnerability when elderly are at risk of death during heat waves.

Till now few studies were able to control socio-economic factors at the individual level or, if they did so, only for a small sample of population or deaths. Due to constraints of the data, socio-economic characteristics of the whole population living in a specific place are often used as a proxy for status of all the inhabitants. Since this approach reduces the concept of contextual effects to the aggregation of individual effects, it implies an ecological bias. This may be one reason for the heterogeneity in conclusions of studies that investigated the effect of socio-economic status at the aggregate level using local percentages of unemployed or lowly skilled population, median incomes or other composite indexes. No effect on heat-related mortality was observed in Rome (Schifano *et al*., 2009), Brisbane (Yu *et al*., 2010), Budapest and London (Ishigami *et al.,* 2008). However, poorer neighbourhoods had a higher excess mortality relative to affluent ones during heat-waves in St. Louis (Smoyer, 1998) and median neighbourhood income was associated to higher heat-related mortality among the non-elderly in Milano (Ishigami *et al.,* 2008). Excess mortality was also higher in deprived areas of the city of Paris and its strongly urbanised suburbs (Rey *et al.,* 2009). Comparing 11 US cities, Curriero (2002) also found a stronger mortality response to heat where the level of schooling was lower and poverty more prevalent.

Canoui-Poitrine *et al.* (2006) observed a change in both the geographical and the socio-economic composition of the deaths during the heat wave in Paris when compared to reference years. They therefore concluded that contextual and individual factors both matter for heat-related mortality. But in Sao Paulo, regional levels of unemployment had no significant impact (Gouveia *et al*., 2003), whereas the lower-skilled population indeed had a higher excess mortality. This contrasted with the findings in Mexico and Chile, where individual educational attainment did not have an effect (Bell *et al.,* 2008). However, manual workers in France had a higher mortality than managers at older ages during heat waves (Vandentorren *et al.,* 2006).

Even when the effect of socio-economic status is estimated simultaneously at the individual and contextual level, results diverged. Unemployment levels did not affect heat-related mortality in Barcelona, but the lowest skilled elderly women were characterized by the highest excess mortality (Borell *et al.,* 2006 and Browning *et al.* 2006). By contrast the authors showed that

individual socio-economic characteristics had the same effect on mortality during the 1995 heat wave in Chicago when compared to previous summers. But neighbourhood affluence and commercial vitality protected individuals only during the heat wave. A more dynamic social ecology, it was argued, is protective against heat-related mortality since it maintains healthier social institutions and limits the decay of infrastructure in neighbourhoods.

Conclusions regarding social risk factors are heterogeneous as well. Social isolation at the individual level is often implied from marital status, assuming the single, divorced and widowed to be more at risk of isolation. Unmarried elderly had indeed a higher mortality in Rome (Schifano *et al.,* 2009) and in Paris (Canoui-Poitrine *et al.,* 2006). In the latter however, this may have resulted from a mortality selection effect, as marital status did not play a role when controlling for several individual and household-level variables indicating social status (Vandentorren *et al.,* 2006). Rather than marital status, living arrangement may specifically matter. In Modena, unmarried women did not have a higher mortality when controlling for negative effects associated to living in either a single-person household or a care institution (where people are probably frailer and accumulate co-morbidities). At the local level, a denser social interaction is usually expected to increase assistance to those people most sensible to heat. Assuming the demographically more stable neighbourhoods to be characterized by a higher degree of social interaction, Smoyer (1998) and Uejio *et al.* (2011) indeed observed a negative relationship with heat-related mortality in St. Louis and in Philadelphia. The empirical sociological investigation of Klinenberg (2002) on the 1995 episode in Chicago showed higher vulnerability among African-Americans compared to Hispanics. The author attributed this difference to the fact that many African-Americans lived in areas of sub-standard housing and less cohesive neighbourhoods while Hispanics lived in areas of higher density but with more social cohesion. However, Browning *et al.* (2006) did not find an effect of the neighbourhood's demographic stability.

This review of a rich literature that includes many excellent studies demonstrates the interest of the scientific community for heat episodes related mortality. However, we remain with a challenging puzzle of contradictory conclusions. New research designs need to be built, with a multilevel approach.

References

Beck, Ulrich (1992), *Risk society: Towards a new modernity.* New Delhi: Sage.

Bell, Michelle L., Marie S. O'Neill, Nalini Ranjit, Victor H. Borja-Aburto, Luis A. Cifuentes and Nelson C. Gouveia (2008), Vunerability to heat-related mortality in Latin America: A case-crossover study in Sao Paulo, Brazil, Santiago, Chile and Mexico City, Mexico. *International Journal of Epidemiology,* 37, pp. 796-804.

Beniston, Martin (2004), The 2003 heat wave in Europe: A shape of things to come? An analysis based on Swiss climatological data and model simulations. *Geophysical Research Letters, 31*, L02202, pp. 1-4.

Borell, Carme, Marc Mari-Dell'Olmo, Maica Rodriguez-Sanz, Patricia Garcia-Olalla, Joan Al. Cayla, Joan Benach and Carles Muntaner (2006), Socio-economic position and excess mortality during the heat wave of 2003 in Barcelona. *European Journal of Epidemiology,* 21, pp. 633-640.

Browning, Christopher R., Danielle Wallace, Seth L. Feinberg and Kathleen A. Cagney (2006), Neighborhood social processes, physical conditions, and disaster-related mortality: The case of the 1995 Chicago heat wave. *American Sociological Review,* 71 (August), pp. 661-678.

Canoui-Poitrine, F., E. Cadot, A. Spira and Groupe Régional Canicule (2006), Excess deaths during the August 2003 heat wave in Paris, France. *Revue d'Epidemilogie et Santé Publique,* 54, pp. 127-135.

Curriero, Frank C., Karylin S. Heiner and Jonathan M. Samet (2002), Temperature and mortality in 11 cities of the Eastern United States. *American Journal of Epidemiology*, 155(1), pp. 80-87.

Gouveia, Nelson, Shakoor Hajat and Ben Armstrong (2003), Socio-economic differetials in the temperature-mortality relationship in Sao Paulo, Brazil. *International Journal of Epidemiology,* 32, pp. 390-397.

Ishigami, Ai, Shakoor Hajat, R. Sari Kovats, Luigi Bisanti, Magda Rognoni, Antonia Russo and Anna Paldy (2008), An ecological time-series study of heat-related mortality in three European cities. *Environmental Health,* 7(5).

Klinenberg, Eric (2002), *Heat wave: A social autopsy of disaster in Chicago*. Chicago, IL: Chicago University Press.

Kovats, S. and G. Jendritzky (2006), Heat waves and human health. In B. Menne and K.L. Ebi (eds.), *Climate change and adaptation strategies for human health.* Darmstadt, pp. 63-97.

Peng, R.D., J.F. Bobb, C. Tebaldi, L. McDaniel, M.L. Bell and F. Dominici (2011), Towards a quantitative estimate of future heat wave mortality under global, climate change. *Environmental Health Perspectives,* 119(5), pp. 701-706.

Rebetez, M., O. Dupont and M. Giroud (2008), An analysis of the July 2006 heatwave extent in Europe compared to the record year of 2003. *Theoretical and Applied Climatology*.

Rey, Grégoire, Anne Fouillet, Pierre Bessemoulin, Philippe Frayssinet, Anne Dufour, Eric Jougla and Denis Hémon (2009), Heat exposure and socio-economic vulnerability as synergistic factors in heat-wave-related mortality. *European Journal of Epidemiology,* 24, pp. 495-502.

Robine, J.M., S.L. Cheung, S. Le Roy, H. Van Oyen, C. Griffiths, J.P. Michel and Fr. Herrmann (2008), Death toll exceeded 70,000 in Europe during the summer of 2003. *C R Biol,* 331(2), pp. 171-178.

Sardon, J.P. (2006), Evolutions démographiques récentes des pays développés. *Population, 61*(3), pp. 227-300.

Schifano, Patrizia, Giovanna Cappai, Manuela De Sario, Paola Michelozzi, Claudia Marino, Anna Maria Bargagli and Carlo A. Perucci (2009), Susceptibility to heat wave-related mortality: A follow-up study of a cohort of elderly in Rome. *Environmental Research,* 8(50), pp. 1-14.

Smoyer, Karen E. (1998), Putting risk in its place: Methodological considerations for investigating extreme event health risk. *Social Science and Medicine,* 47(11), pp. 1809-1824.

Uejio, Christopher K., Olga V. Wilhelmi, Jay S. Golden, David M. Mills, Sam P. Gulino and Jason P. Samenow (2011), Intra-urban societal vulnerability to extreme heat: The role of heat exposure and the built environment, socio-economics, and neigborhoods stability. *Health & Place,* 17, pp. 498-507.

Vandentorren, S., P. Bretin, A. Zeghnoun, L. Mandereau-Bruno, A. Croisier, C. Cochet, J. Ribéron, I. Siberan, B. Declercq and M. Ledrans (2006), August 2003. Heat wave in France: Risk factors for death of elderly people living at home. *European Journal of Public Health,* 16(5), pp. 583-591.

Yu, Weiwei, Pavla Vaneckova, Kerrie Mengersen, Xiaochuan Pan and Shilu Tong (2010), Is the association between temperature and mortality modified by age, gender and socio-economic status? S*cience of the Total Environment,* 408, pp. 3513-3518.

Frans van Poppel and the study of perinatal and childhood mortality

Diego Ramiro-Fariñas

One of the many areas in which Frans van Poppel has been involved during his fruitful career is the study of mortality and more specifically the study of perinatal health and childhood mortality. His work focused on different aspects of this topic: Practices and care of delivery, via doctors or midwives, health of the mothers or infant and child mortality, among others. One of the areas, fetal mortality, attracted his attention during the last years via his collaboration with Robert Woods. International collaboration is indeed one of the gifts that Frans gives to the rest of the international academic community, and this area is one of many in which he has shown it.

In 'Two hundred years of evidence-based perinatal care: Late fetal mortality in the past', Robert Woods, Anne Lokke and Frans van Poppel showed the longest possible time series of fetal mortality in several countries in Europe and pinpointed the role of the improvements in the quality of obstetric care and the registration of fetal deaths during that period of time. Despite the complications of estimating such series, as they mentioned in the paper, this simple comparison of the long-run time series offers some unexpected clues, such as the hill-shaped trend in the middle of the 19th century which also appeared in other early-childhood mortality estimates and for several countries in Europe. This hill shape pattern from the 1820s to the 1850s was tentatively explained in different ways: To a certain degree it was associated with improvements in the quality of stillbirth registration. Iit was connected to socio-economic factors which were of particular importance, such as maternal nutrition, labor force participation and reproductive history, which has long been known to influence fetal growth. The possibility of premature birth or the hill shape can also be connected to the rising percentage of poor laborers in the populations, to the famine following the potato blight of the 1840s, to changes in the disease environment in which the mother lived or to something else. In his work, Frans used the data on Zeeland, to show that it had an extraordinary high percentage of stillbirths compared with the rest of the Netherlands. Zeeland had a late-fetal mortality rate (stillbirth rate) peaking at just over 60 per 1,000 total births in the 1860s. This called the attention of Dutch authorities and therefore several special committees were set up to investigate the causes. These committees pointed to the absence of trained midwives and doctors in the province as the reasons for such high levels, and this situation did not change until measures to improve birth assistance in these areas were taken from the late 19th century onwards. In later works Frans considered the formal and likely causes of the Zeeland trend, the quality of stillbirth registration, and focused in particular on the clustering of fetal deaths in families and social groups, making use of a highly detailed database where he explores both the correlates and the possible implications for such clustering.

In both cases, Frans van Poppel and Robert Woods tried to answer some of the key questions for research on historical fetal and neonatal mortality patterns, such as to gather direct evidence for the level of late-fetal mortality in the past, using data from more statiscally advanced societies. To estimate the age pattern of fetal and infant mortality in high-mortality

populations where life expectancy at birth was less than 40 years. Or to estimate the stillbirth rate from 'knowledge' of other mortality rates and to try to understand what form of predictive association exists between them, and trying to overcome the problems related with language and definition conventions, blurred age categories, registration practices, the organization of the statistical system, the estimation and the proximate causes of death and the background causes.

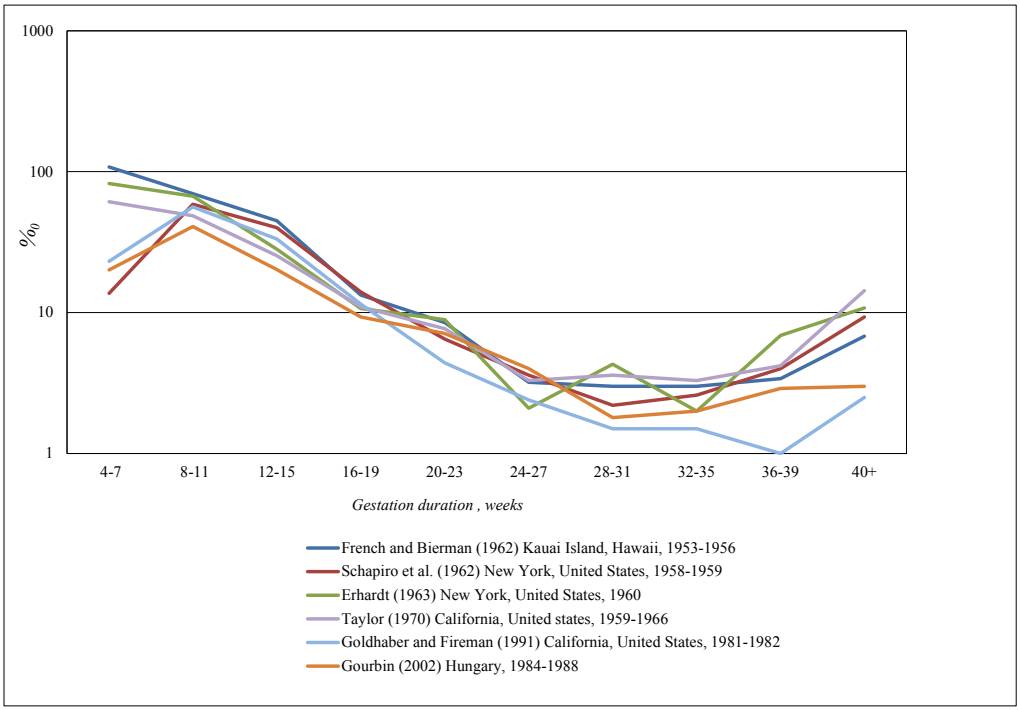
Although in the past there have been studies dealing with differential stillbirth mortality in urban and rural areas or by legitimacy and some examples of those studies are given in the table below, there is still a lack of understanding of the levels of mortality between conception untill birth. How these levels were fluctuating in the past, what was the role of natural or intentional abortion through time and what would be the best proxi to estimate such mortality considering that it will be almost impossible to gather complete and detailed information on pregnancy loss for historical times? The attempts carried out to estimate the risk of fetal death by gestation duration in different studies, in follow up studies of recognized pregnancies, has showed very different results, especially during the first 12 weeks of gestation (see *figure 1*). On the other hand, the attempts to estimate stillbirth mortality from other infant mortality measures, such as neonatal mortality or first week mortality have been unsuccessful. Considering the relevance of the influence of fetal mortality over birth outcomes and the size of each cohort, it is crucial to find ways in which we can disentangle this conundrum, and I am sure Frans will carry on doing it in the future.

Table 1. Comparative SBR for the 1860s, 80s and 1920s

	Norway	Denmark	Sweden	France	Belgium	Finland (1881-85)	Spain (1922-31)	Japan (1922-31)
Total births	36,7	38,9	32,7	34,4	35,9		30,0	54,1
Capital	56,5	42,9		(69,6)				
Towns	42,5	32,2	40,7	41,5	41,7		57,8	62,4
Rural areas	34,7	39,6	31,6	29,8	33,7		23,8	53,0
Urban/Rural	*1,2*	*0,8*	*1,3*	*1,4*	*1,2*		*2,4*	*1,2*
Legitimate births total	34,5	37,9	31,3	32,2	34,7		28,3	
Capital	45,2	37,0		(63,8)				
Towns	38,0	30,5	35,4	38,2	39,3	28,3	54,4	
Rural areas	33,6	39,3	30,8	28,4	33,1	26,2	22,8	
Urban/Rural	*1,1*	*0,8*	*1,1*	*1,3*	*1,2*	*1,1*	*2,4*	
Illegitimate births total	54,7	47,8	46,0	62,0	51,0		56,3	
Capital	112,6	64,3		(85,6)				
Towns	85,6	45,9	56,2	67,5	59,4	61,1	79,1	
Rural areas	49,0	43,3	41,3	53,1	44,1	44,5	44,9	
Urban/Rural	*1,7*	*1,1*	*1,4*	*1,3*	*1,3*	*1,4*	*1,8*	

Source: Woods, 2007, Pitkänen, 1983 and Ramiro and Murakoshi, 2004.

Figure 1. Risk of fetal death by gestation duration in different studies. (for 1,000 recognized pregnancies) per thousand



Source: Constructed from Gourbin, 2006.

Demographic systems and population change: Restoring mortality its rightful place

David Reher

Demographic commonsense suggests that mortality should be a cornerstone –perhaps THE cornerstone- for all demographic systems both past and present. This should be the case with high mortality societies but also in societies characterized by moderate or even relatively low levels of mortality. The internal logic underlying demographic systems as defined by Malthus is based on the interplay between the carrying capacity of any given society and the way it interacts with population size and growth. Excess growth leads to falling living standards and eventually to demographic adjustment by means of what he termed preventive and positive checks. With the exception of exogenous mortality shocks –epidemics–, within these systems mortality is determined basically by prevailing living standards and its key role is how it affects growth rates. Researchers have been hard put to find a more relevant role for mortality in pre-industrial societies or even, for that fact, to establish clearly its sensitivity to economic change. Faced with the non-responsiveness of mortality to basic swings in real wages in England and Wales, for example, Wrigley and Schofield (1981) ended up attributing to fertility, and especially to nuptiality, the key to the existing demographic system, especially insofar as how they affected population growth rates. Researchers making use of distributed lag models have only found weak links between economic fluctuations and mortality in low-mortality countries like England. Only in higher mortality societies does the situation appear to be different, at least in part (Lee, 1981; Galloway, 1988 and Reher and Ortega, 2000).

The relative neglect of the role of mortality has carried over into research on the demographic transition. Contrary to the initial intuitions of Notestein, one of the most salient results of the European Fertility Project was that mortality and mortality change appear to have played little or no role in stimulating fertility change. It is not our purpose here to examine why they reached such an apparently counter-intuitive conclusion, but rather to show that once again mortality was relegated to a secondary role when explaining major demographic change, an orphan so to speak at the banquet of demographic enquiry on a grand scale.

Mortality is of course central to determining population growth rates and therefore key to the viability and resiliency of any demographic system. The way this plays out, however, is not how Malthus envisioned with prevailing mortality levels oscillating more or less in accord with short and medium-term economic swings. The key role of mortality is not so much in how it shapes population growth directly but how it influences fertility. There are very direct causal links going from mortality to both fertility and nuptiality. In the past, societies with high mortality were invariably ones with high fertility. Women tended to marry early when inheritance came early and also where there was a social awareness that they needed to have many childbirths if just a few were to survive. A woman who lost a child tended to have another one soon afterward both because she wanted another child and also because losing a child cut breastfeeding short and initiated a rapid return to fecundability (Reher, 1999).

Prevailing mortality levels provide the ultimate explanation of why there are high and low-pressure demographic systems in different parts of the pre-industrial world and why these appear to be so stable over time. It also provides the ultimate explanation of why fertility declined during the demographic transition, especially during its initial stages. As childhood mortality declined, fertility declined as well, often quite independent of whether or not women wanted smaller families. This has been shown forcefully in two recent publications, one of which I was fortunate enough to coauthor with my much-admired friend and colleague Frans van Poppel (Reher and Sanz, 2007 and Van Poppel *et al.,* 2012). From a historical standpoint, demographic systems may be much more about mortality and mortality change than they are about nuptiality, fertility, family formation patterns or economic change.

This being the case, a key issue requiring the attention of demographers and historical demographers alike is why mortality tended to be so persistently different in different areas at any given moment in the past and why and how it changed. Here the answers are multiple, intriguing but often incomplete. Living standards are important of course, but so are climate, resource availability and life styles, as well as the incidence of epidemics and infectious disease. It is also a matter of maternal education, especially during the demographic transition. In many ways, childhood mortality is a product of parental expectations regarding child survival and in societies where this was low, parents tended to 'expect' their children to die and thus paid less attention to their health early in life. This last aspect is also a matter of culture, as the enormous differences in mortality for different religious groups and social classes in Europe has so forcefully shown. Analysis of these patterns of behavior has been a prominent part of much of Frans van Poppel's most incisive work over the years (Van Poppel *et al.,* 2012; 2005; 2012; Van Poppel and Nelissen, 1999 and Van Poppel, 1985). All of these factors come into play when explaining mortality and mortality change in the past and they also contribute to our understanding of demographic systems and demographic change.

Eventually the ascendancy of mortality came to an end, though not before well into the 20th century. The appearance of reproductive strategies based on small completed family size is the beginning of the end of this hegemony in the developed world though it is instructive to recall that this type of change could never have happened before child survival had improved to a point where it was no longer relevant for reproductive decisions. This also happened in the developing world, though in the opposite direction, when mortality declined dramatically during the central decades of the twentieth century and fertility no longer responded in kind. There too the link between them had been severed, thus marking the end of the reign of mortality as the key determinant of demographic systems and demographic change.

References

Galloway, P. (1988), Basic patterns of annual variations in fertility, nuptiality, mortality and prices in pre-industrial Europe. *Population Studies,* 42/2, pp. 275-303.

Lee, R.D. (1981), Short-term variation: Vital rates, prices and weather. In E.A. Wrigley and R.S. Schofield, *The Population History of England, 1541-1871; A Reconstruction.* Cambridge Mass.: Harvard University Press, pp. 356-401.

Poppel, F. van (1985), Late fertility decline in the Netherlands: The influence of religious denomination, socio-economic group and region. *European Journal of Population,* 1(4), pp. 347-373.

Poppel, F. van and J. Nelissen (1999).,The proper age to marry: Social norms and behaviour in 19th century Netherlands. *The History of the Family*. An international quarterly, 4(1), pp. 51-76.

Poppel, F., van, M. Jonker and K. Mandemakers (2005), Differential infant and child mortality in three Dutch regions, 1812-1909. *Economic History Review,* 58(2), pp. 272-309.

Poppel, F. van, D.S. Reher, A. Sanz-Gimeno, M. Sanchez-Dominguez and E. Beekink (2012), Mortality decline and reproductive change during the Dutch demographic transition: Revisiting a traditional debate with new data. *Demographic Research, 37*, article 11, pp. 299-338.

Poppel, F. van, J. Schellekens and A.C. Liefbroer (2002), Religious differentials in infant and child mortality in Holland, 1855-1912. *Population Studies,* 56(3), pp. 277- 289.

Reher, David S. (1999), Back to the basics: Mortality and fertility interactions during the demographic transition. *Continuity and Change,* 14, 1, pp. 9-31.

Reher, D.S. and J.A. Ortega Osona (2000), Malthus revisited: Exploring medium-range interactions between economic and demographic forces in historic Europe. In T. Bengtsson and O. Saito (eds.). *Population and economy. From hunger to modern economic growth.* Oxford: Oxford University Press, pp. 183-212.

Reher, D.S. and A. Sanz-Gimeno (2007), Rethinking historical reproductive change: Longitudinal data for a Spanish town. *Population and Development Review,* 33(4), pp. 703-728.

Wrigley, E.A. and R.S. Schofield (1981), *The Population History of England*, 1541-1871; A reconstruction, Cambridge Mass.: Harvard University Press.

The impact of the 1911 heat wave on mortality in the Dutch province of Limburg

Willibrord Rutten

The start of rapid mortality decline in the Netherlands was determined around 1880.[1] However, in the southern parts of the country, in particular the provinces of Noord-Brabant and Limburg, the onset of the 'new mortality regime' came much later. Early childhood mortality declined less rapidly in these areas. Infant mortality rates did not show any substantial improvement and even increased in the province of Limburg until the early 20th century (*figure 1*). Cultural factors played a relatively important role in regional variations in mortality decline. The high percentage of Roman Catholics living in these areas was determined as a major factor contributing to the higher mortality in the South.[2] In those days Catholics gave less emphasis to respect for life and avoidance of health hazards. For example, during the 19th century vaccination campaign against smallpox it turned out that Roman Catholics were less in favor of active prevention than mainstream Protestants.[3] Hygienic awareness was low. It was particular the Catholic mothers who did not breast-feed their babies at all or just for a shorter period. It is presumed that the low incidence of breast-feeding was part of an ideological system, constructed by the regional clergy and the regional Catholic elite.[4] This Catholic ideological system was characterized by extreme prudishness. Misplaced shame of the female body is said to have incited women to replace breast-feeding by bottle-feeding and weaning of children at an early age.[5] However, it is problematic to blame Catholic doctrine for this. The neglect of breast-feeding was contrary to the principles of pastoral medicine and pastoral health care. As it was stated in Carl Capellmann's *Medicina pastoralis*, an authoritative textbook for the Catholic clergy and seminary students: "Unde patet, certum esse officium matris, non fraudare infantem cibo a Deo ipso ad hoc sibi dato, sed suo ipsius lacte nutrire".[6] In translation: Clearly, breast-feeding is a maternal duty. It is an error to deprive the baby from the mother's milk, being a nourishment created by the good Lord himself to feed the infants. Exceptionally, in clearly specified circumstances, Catholic doctrine allowed breast-feeding to be replaced by bottle-feeding, in particular during illness and in case of loss of earnings, which applies to young working mothers employed outside their homes.[7] Other

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1 Theo Engelen, *Van 2 naar 16 miljoen mensen. Demografie van Nederland, 1800-nu* (Amsterdam 2009) pp. 98-99.

2 Judith Wolleswinkel-van den Bosch, *The epidemiological transition in the Netherlands* (Rotterdam 1998) p. 170.

3 Willibrord Rutten, *'De vreselijkste aller harpijen'. Pokkenepidemieën en pokkenbestrijding in Nederland in de 18e en 19e eeuw: een sociaal-historische en historisch-demografische studie*. AAG-Bijdragen 36 (Wageningen, 1997) p. 342 (graph 10.14) and p. 421.

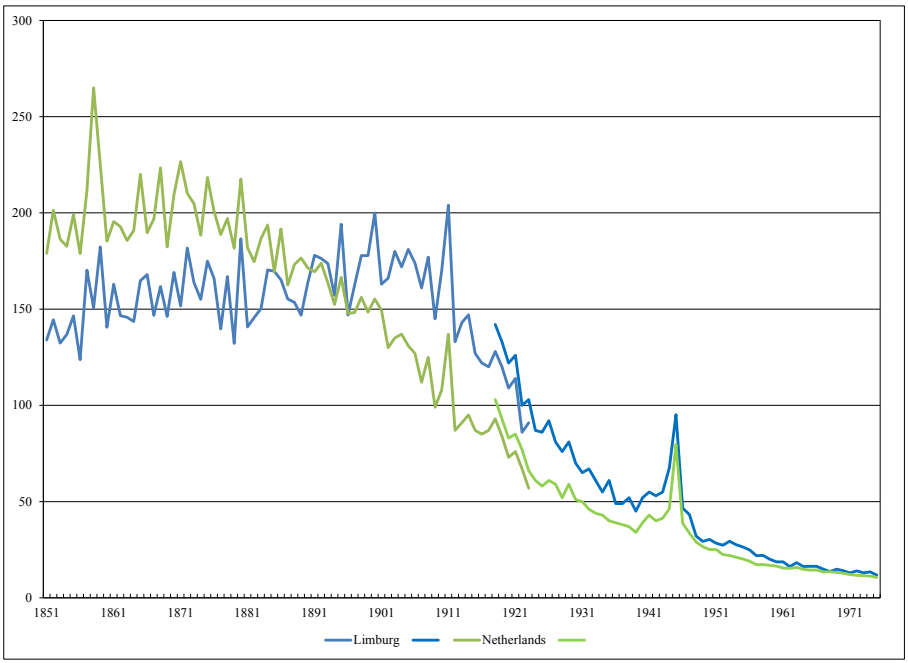
4 F. van Poppel, 'Religion and health: Catholicism and regional mortality differences in 19th-century Netherlandse', *Social History of Medicine,* 5:(2) (1992) pp. 229-253.

5 P. Meurkens, *Sociale verandering in het Oude Kempenland; demografie, economie en cultuur van een pre-industriële samenleving* (Nijmegen, 1984).

6 Carl Capellmann, Medicina pastoralis (Aquisgrani 1877, 3rd edition 1893) p. 47. *The Medicina pastoralis* was translated into English, French, German, Spanish and had many editions from 1877 until at least 1926.

7 Idem, pp. 48-49.

Figure 1. Infant deaths per 1.000 live births in Limburg and the Netherlands. Annual figures, 1851-1975 (deceased before registration included from 1918)



Source: Verslag van den toestand van het hertogdom Limburg (1851-); Statistisch Jaarboek voor het Koninkrijk der Nederlanden (1857-); Jaarcijfers voor het Koninkrijk der Nederlanden (1892-); Statistiek van den loop der bevolking in Nederland (1900-); Statistical Yearbook (1970-).

factors frustrating the practice of breast-feeding must be accounted for. In rural societies like Limburg the nursery of babies was commonly left to older sisters, aunts, grandmothers, allowing the mothers to resume their work on the family farm within a couple of weeks after delivery.

Anyhow, the diminished frequency and duration of breast-feeding resulted in a rise in infant mortality in the province of Limburg. During hot weather artificial feeding of children became even more difficult than it already was under normal circumstances. The relationship between temperature and mortality in the Netherlands was tested for a long historical period by Frans van Poppel *cum suis* in an unique empirical study.[8] They found out that children were by far the most vulnerable group when temperature peaked. Effects of heat on mortality were observed within one or two days and the impact was strongest for infants below age one. Delayed effects of extremely high temperatures were found among the youngest age groups too, until four weeks after a heat wave. They also observed strong regional differences

[8] Peter Ekamper, Frans van Poppel, Coen van Duin and Kees Mandemakers, 'Heat waves and cold spells and their effect on mortality: An analysis of micro-data for the Netherlands in the 19th and 20th centuries', *Annales de Démographie Historique* (2010) pp. 55-104.

in the effect of heat on mortality. However the southern province of Limburg, by neglect of breast-feeding highly vulnerable for periods of heat and drought, was not included in the dataset. In the summer of 1911 the people of Limburg had to cope with 22 tropical days (≥30°C).[9] What was the impact of the 1911 heat wave on Limburg mortality?

Mortality data were retrieved from the GENLIAS-database.[10] I used meteorological data from the Maastricht weather station.[11] The distance between the weather station and the area for which the weather measurements were considered indicative was acceptable. The distance between the weather station and any of the province's municipalities for which we had mortality data was about 111 kilometers in straight line.

Applying the definition[12] of the Netherlands Royal Meteorological Institute to the weather station in Maastricht the south of the country witnessed in 1911 a prolonged heat wave that lasted from 20 July to 14 August, including 11 summer days and 15 tropical days. Highest maximum temperatures were measured on 23 July (36,2°C) and 28 July (36,3°C). The heat wave was followed by a second episode of warm weather lasting from 18 August to 13 September. The period from 1 September to 13 September almost generated a second heat wave, including 6 summer days and 5 tropical days, but cannot be qualified as such because this episode of extremely high temperatures was interrupted twice by a one day cooling down (maximum temperature 23,7 and 22,0°C).

The impact of extreme temperatures on death rates is presented in *figure 2*, showing the daily mortality ratio (the observed number of deaths in a day divided by the average number of deaths per day in that year) and the average 24-hour temperature from May to October 1911. The daily mortality ratio was calculated both for all ages and ages below 2. The summer of 1911 had devastating effects, with mortality ratios for all ages incidentally exceeding values around two (a doubling of the expected number of deaths). The effects of extreme heat consisted of a more or less instantaneous effect and a more delayed effect, in particular on early childhood mortality. Temperature peaked for the first time around 7 July which was followed by a peak around 13 July in the number of deaths of children up to two years. For the next few days mortality receded. After the heat wave beginning around 20 July mortality started to increase again, but did not return again on its pre-peak level though temperature declined for a few days. Each new peak in temperature generated a surplus mortality that was added to the up-trending mortality level generated by the delayed effects of earlier peaks in temperature. A time lag of about four weeks is observed between highest temperatures and highest mortality.

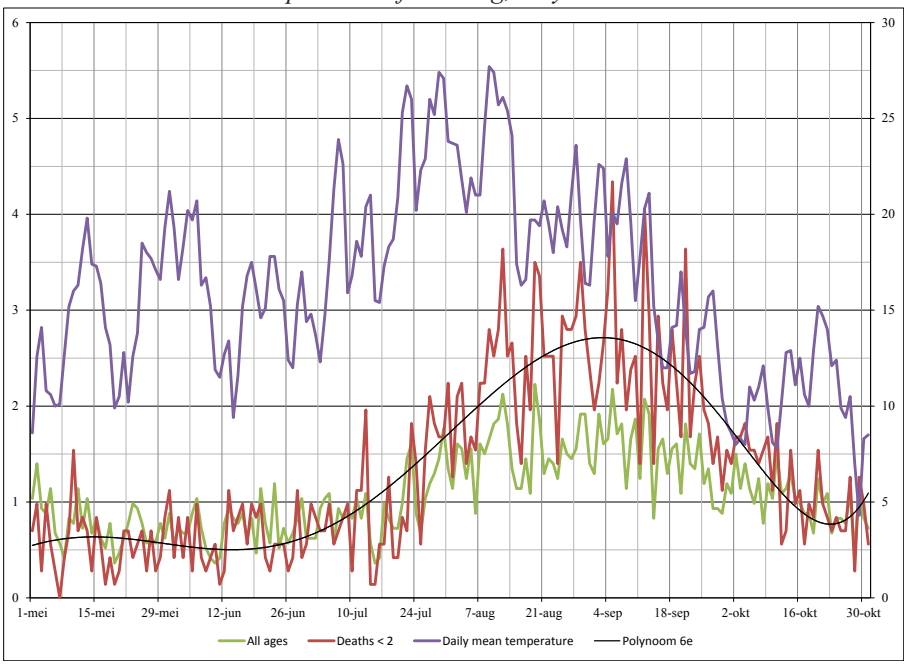
9 As compared to 12 in the north and the center of the Netherlands.

10 By courtesy of Regionaal Historisch Centrum Limburg (Ria Cruts).

11 KNMI, *Daggevens van het weer in Nederland*. Electronic source retrieved (2012) from http://www.knmi.nl/klimatologie/daggegevens/download.html

12 According to the official definition by the Netherlands Royal Meteorological Institute a heat wave is defined as a period of at least five days, each with a maximum temperature of at least 25°C (called summer days), including at least three days with a maximum of temperature of at least 30°C (called tropical days) measured at the De Bilt station located in the centre of the Netherlands during a period of at least five days.

Figure 2. Daily mortality ratio (scales left) and average 24-hour-temperature (°C) (scales right) in the Dutch province of Limburg, May to October 1911



Source: KNMI and RHCL, Genlias database.

The strong effects of heat that were observed among infants and young children were caused mainly by high rates of gastrointestinal diseases.[13] This was first of all a consequence of high proportions of artificially fed children. The quality of foods such as milk and bread porridge deteriorated at high temperatures; the quality of water, used to dilute milk or prepare other foods, was extremely bad as well during periods of heat and drought; and purity of feeding bottles and teats could not be guaranteed. These factors played a role in the excessive vulnerability of infants in Limburg. These findings largely corroborate the conclusions of Van Poppel *cum suis* in relation to the impact of 1911 heat wave on mortality in the province of Zeeland.[14]

The heat wave of 1911 marked the last episode of extreme infant mortality in Limburg. From now on (1912) infant mortality dropped in an unprecedented way (figure 1). The devastating 1911 heat wave alarmed political and health care authorities in the province to intervene by a major campaign to eliminate bottle feeding and other bad nursery practices.[15]

[13] Jaarverslag van de Gezondheidscommissie ingesteld voor de Gemeenten Baexem, Beegden, Grathem (1911) p. 15. Verslag van de bevindingen en handelingen der Gezondheidsscommissie gezeteld te Gulpen, ingesteld voor de vereeniging van gemeenten, omvattend Bocholtz, St. Geertruid, Gulpen (1911) p. 10.

[14] Ekamper *et al*., 'Heat waves and cold spells', p. 73.

[15] J.F.R. Philips, Gezondheidszorg in Limburg. Groei en acceptatie van de gezondheidsvoorzieningen 1850-1940 (Assen 1980).

References

Capellmann, Carl (1877), Medicina pastoralis (Aquisgrani, 1877, 3rd edition, 1893) 47. The Medicina pastoralis was translated into English, French, German, Spanish and had many editions from 1877 until at least 1926.

Ekamper, Peter, Frans van Poppel, Coen van Duin and Kees Mandemakers (2010), Heat waves and cold spells and their effect on mortality: An analysis of micro-data for the Netherlands in the 19th and 20th centuries. *Annales de Démographie Historique*, pp. 55-104.

Engelen, Theo (2009), *Van 2 naar 16 miljoen mensen. Demografie van Nederland, 1800-nu*, Amsterdam.

Meurkens, P. (1984), *Sociale verandering in het Oude Kempenland; demografie, economie en cultuur van een pre-industriële samenleving*, Nijmegen.

Philips, J.F.R. (1980), *Gezondheidszorg in Limburg. Groei en acceptatie van de gezondheidsvoorzieningen 1850-1940*.

Poppel, F. van (1992), Religion and health: Catholicism and regional mortality differences in 19th century Netherlands. *Social History of Medicine*, 5(2) pp. 229-253.

Rutten, Willibrord (1997), De vreselijkste aller harpijen. Pokkenepidemieën en pokkenbestrijding in Nederland in de 18e en 19e eeuw: een sociaal-historische en historisch-demografische studie. AAG-Bijdragen 36, Wageningen.

Wolleswinkel-van den Bosch, Judith (1998), *The epidemiological transition in the Netherlands*. Rotterdam.

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Forty years of groundbreaking research in historical demography did not go unnoticed. At the occasion of his formal retirement as Senior Researcher at the Netherlands Interdisciplinary Demographic Institute (NIDI), in December 2012, this volume of short essays –a *Liber Amicorum*– is dedicated to Frans van Poppel and his scholarly work.

From the 1970^{s} onwards, Frans van Poppel has been one of the leading academic figures in the field of historical population studies, both at the national and international levels. He produced an abundance of influential publications in leading scholarly journals and a number of volumes dealing with central issues in historical demography. His 1992 doctoral dissertation *Trouwen in Nederland. Een historisch-demografische analyse van de 19^{e} en vroeg-20^{e} eeuw* has been a classic on nuptiality ever since. Throughout his career, which includes a L.G. Rogier Chair at the History Faculty of Radboud University Nijmegen (1998-2001) and the Kinship Demography Chair at the Department of Sociology at Utrecht University in 2012, Frans van Poppel applied and developed a strong interdisciplinary approach combining elements from demography, sociology, epidemiology, geography, and history.

The significance of Frans van Poppel as a leading historical demographer is made clear in the various contributions to this publication which focus on issues that are central to historical demography as a whole and Frans van Poppel's work in particular: Data and methods, fertility and nuptiality, and aging and mortality. The authors, all national and international academic colleagues in the field of social and economic history and historical demography –directly and indirectly– reflect on the influence of Frans van Poppel and his scientific work. They also reflect on their joint work, present new findings and insights, and propose new research and methodologies.

As stated by the director of NIDI, Leo van Wissen, in his preface: "Without a doubt this *Liber Amicorum* is not only a fine tribute to him, but also a welcome addition to demographic libraries."