Dipartimento di Statistica
"Giuseppe Parenti"

Methods for "Reconciling" Micro and Macro in Family Demography Research: A Systematisation

Anna Matysiak, Daniele Vignoli

Università degli Studi
di Firenze

Methods for "Reconciling" Micro and Macro in Family Demography Research: A Systematisation[1]

Anna Matysiak[*] – Daniele Vignoli[**]

[*] Institute of Statistics and Demography, Warsaw School of Economics, Al. Niepodległości 164, 02-554 Warsaw, Poland – email: amatys@sgh.waw.pl

[**] Department of Statistics "G. Parenti", University of Florence, Viale Morgagni 59, 50134, Italia – email: vignoli@ds.unifi.it

Abstract: After mid-20th century the scientific study of population changed its paradigm from macro to micro so that the main focus of attention has been devoted to individuals as the agents of demographic action. However, to handle all the complexities of human behaviours, the interactions between individuals and the context they belong to cannot be ignored. Therefore, in order to explain (or, at least, understand) contemporary fertility and family dynamics the gap between micro and macro should be bridged. In this contribution we highlight two possible directions for bridging the gap: (1) integrating life-course analyses with contextual characteristics, thanks to the emergence of theory and tools of multi-level modelling and (2) bringing the findings at the micro-level back to macro-outcomes via meta-analytic techniques and agent-based computational models.

Keywords: family demography, methodological individualism, multi-level event-history models, agent-based computational models, meta-analyses.

---

[1] We prepared a short version of this work as an invited paper (Vignoli & Matysiak 2009) at the scientific meeting of the Italian Statistical Society, 23-25 September, Pescara (Italy), for the session organized by Letizia Mencarini ("*Methodological developments and data availability for integration of micro/macro and social network dimensions of socio-demographic behaviour*"). The Italian Statistical Society has already devoted two appointments to this debated issue during its scientific meetings, the first organized by Antonella Pinnelli in 1995 ("*Micro and macro dimensions of demographic behaviours: theoretical frameworks and models*") and the second by Antonio Santini in 2000 ("*Micro and macro analyses in demographic studies*").

The need to bridge the gap between micro and macro in family demography research

After mid-20th century the scientific study of population changed its paradigm from macro to micro so that the main focus of attention has been devoted to individuals as the agents of demographic action. Event-history analysis was born from the need to develop a comprehensive theoretical framework for studying events that occur within the life-course (Courgeau and Lelièvre 1997). This new approach led to a much wider set of research into human behaviours than classical macro-demographic analysis and allowed to shift the research from the mere description of phenomena to its interpretation (Salvini and Santini 1999).

The strong shift from macro to micro created a series of disadvantages, however. First, for many years the importance of the social and economic context in which individuals live was disregarded and its potential effect on fertility and family behaviours was ignored. Second, the improvement in the access to the individual-level data and development of the techniques of event-history analysis led to an explosion in the number of micro-level studies. This micro-level evidence is generally fragmented and often provides contradictory results. The reason is that the micro-level studies focus on a specific situation, constituting only a piece in the overall puzzle of understanding contemporary fertility and family dynamics. Third, not much effort was made to draw conclusions from the micro-level studies to explain the macro-level outcomes, which is in fact not easy due to micro-level interactions of the processes.

Recently, a renewed interest in linking the macro- and micro-level research has been recorded in many disciplines of social science (e.g., Voss 2008). Scientists are now emphasizing the need to bridge the gap between micro- and macro-approaches in family demography research as a prerequisite for a deeper understanding of contemporary fertility and family dynamics. This new trend is reflected in two international demographic research projects conducted within the EU Framework Programmes: Mic-Mac (Willekens et al. 2005) and Repro (Philipov et al. 2009).

Sharing this view, in this contribution we outline the directions and analytical methods for a successful "reconciliation" between micro and macro in family demography research. In what follows we propose: (1) to bridge the macro-to-micro gap by integrating life-course analyses with contextual characteristics thanks to the

emergence of theory and tools of multi-level modelling and (2) to bridge the micro-to-macro gap bringing the findings at the micro-level back to macro-outcomes via meta-analytic techniques and agent-based computational models. Before we proceed with our analytical suggestions we briefly present the concept of methodological individualism that drove the shift from the macro- to the micro-level in family demography research.

Methodological individualism

The major inference of *methodological individualism* is that understanding of individual behaviour is crucial for explaining the social phenomena observed at the macro-level. Various versions of this doctrine have developed across disciplines. They range from more extreme ones, suggesting that social outcomes are exclusively created by individual behaviours, to less extreme versions that additionally assign important role to social institutions and social structure (Udehn 2002). Such a less extreme version of methodological individualism was proposed by Coleman (1990) and it was adopted in demography (de Bruijn 1999: 19-22).

According to Coleman, the relation between an individual and the society runs from the macro- to the micro-level and from the micro- to the macro-level. Figure 1 represents the three mechanisms corresponding to this process: (1) *situational mechanism* in which the context influences individual background; (2) *action formation mechanism* within which individual background affects individual behaviour; and (3) *transformational mechanism* that transforms individual actions into a social outcome (see also Hedström and Swedberg 1999, Billari 2006)

Individual life choices are at the centre of this theoretical model. Individuals do not live in a vacuum, however, but they are embedded in a social environment, a macro-context. The context is a multi-level and multidimensional "*structure of institutions that embody information about opportunities and restrictions, consequences and expectations, rights and duties, incentives and sanctions, models, guidelines, and definitions of the world*" (de Bruijn 1999: 21). This information is continuously transmitted to individuals who acquire, process, interpret, and evaluate it. In this way, the context influences people's life choices, which are subsequently transformed into a social outcome observed at the macro-level.

Figure 1 – General theoretical model for the explanation of social outcomes.
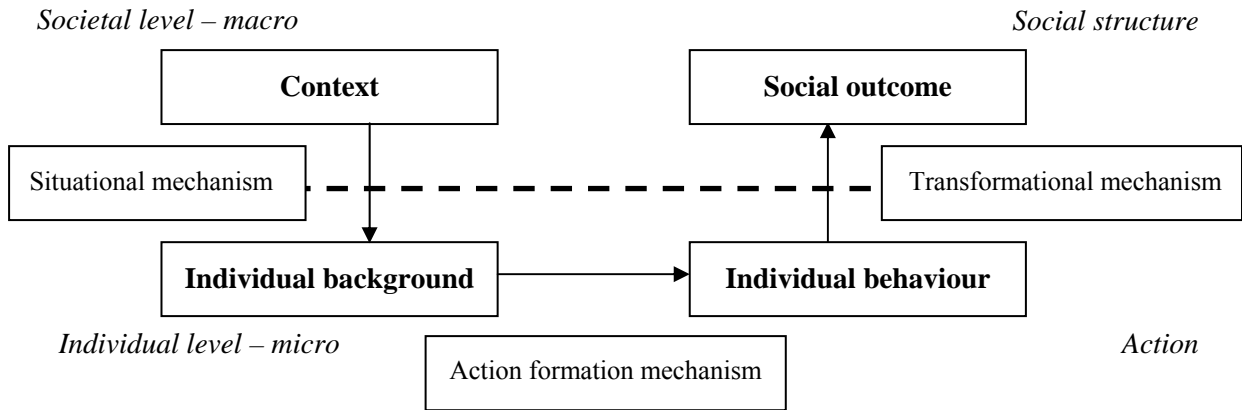
Source: Coleman (1990) adapted by Hedström and Swedberg (1999).

An improvement in the availability of longitudinal data as well as the development of the tools of event-history analysis allowed social researchers to take a deeper insight into the action formation mechanism or at least into how the individual background influences people's behaviours. Much less attention has been so far paid to exploring the situational and transformational mechanisms. Below we elaborate on how these macro-to-micro and micro-to-macro gaps can be closed in empirical research by referring to the most suitable analytical methods available. Alongside the presentation of the methods we document a series of examples from the literature. For consistency in the general reasoning of this paper, all illustrations refer to the field of family demography.

Bridging the macro-to-micro gap: multi-level event-history analyses

With the aim to explore people's life choices life-course theory and event-history techniques have become standard practice in family and fertility research. These approaches ignore the fact, however, that individuals are by definition nested in households, census tracts, regions, countries, etc and that these situational contexts affect people's decisions. In the light of the conceptual framework proposed by Coleman (1990) this significantly limits our possibilities to understand human behaviours (De Rose 1995, Blossfeld 1996, Rosina and Zaccarin 2000).

Furthermore, such approach leads also to technical problems for applying single-level models to hierarchically structured data leads to a bias to the model estimates. The reason is that single-level models assume independence among the observations that are in fact dependent because they are nested within the same unit. For instance, households residing within the some neighbourhood are likely to have similar characteristics.

The most influential approach that has been born to account for hierarchical structure of the data is multi-level modelling. Multi-level models see individuals, as behavioural agents, embedded in social units (tracts, regions, country, etc.). They allow the analyst to detect the effect of the context on individual behaviour as well as to identify macro-characteristics which are mainly responsible for the contextual effect (Borra and Racioppi 1995, Micheli and Rivellini 2000, Zaccarin and Rivellini 2002). The natural implication of these methods is that they blur the artificial boundaries between micro and macro analyses (Voss 2008). Multi-level event-history analysis, in particular, represents a challenged and so far not much explored room to bridge the gap between analysis of events unfolding over the life-course (micro) and contextual (macro) approaches in family demography research. However, if the methods (and corresponding software packages) are relatively well-established, data availability is a critical point.

In order to conduct a multi-level event-history analysis longitudinal individual data should be linked with the time-series of contextual indicators. This requires data on migration histories of the individuals, together with all other life-history careers, as well as time-series data on contextual indicators. Therefore, so far, this method has been mainly employed on cross-sectional data. For instance, Testa and Grilli (2006) studied the influence of regional contexts on ideal family size, using cross-sectional data from the 2001 Eurobarometer. They showed that family size ideals are lower among those cohorts of young women who reside in regions where fertility of older cohorts was lower as well. The authors explain this finding by an intergenerational transmission of fertility ideals across cohorts.

Only recently have some researchers started to investigate the influence of macro-level factors on family-related behaviours from longitudinal perspective. Among them even a more limited number allowed for a hierarchical structure by accounting for the unobserved community-level factors or even introducing into the model some

contextual indicators in order to explicitly study their impact on family-related behaviours. Here, we give an example of two studies leading to contrasting influence of macro-level factors on individual fertility timing. The first is the study by Schmitt (2008) who introduced contextual indicators at the individual-level, thereby estimating a single-level hazard model. The other is the study by Adsera (2005) who applied a multi-level event-history model.

Both of these studies explored the impact of regional unemployment on childbearing, using the European Community Household Panel (ECHP 1994-2001). The former referred to four European countries (Germany, France, the United Kingdom, and Finland). In the study, information on the regional unemployment rate was considered in the model specification at the individual-level, alongside other characteristics of a woman. The empirical findings demonstrated that regional unemployment rate did not affect fertility in Finland, Germany, and the United Kingdom, but was positively related to the propensity to have the first child in France. Introducing regional information at the individual level does not allow to properly account for the role of the context, however. This limit was overcome by the multi-level study by Adsera (2005) that yielded contrasting findings. It was conducted on a pooled dataset for thirteen European countries and it included information on the country-level gender unemployment gap and long term-unemployment rate that were introduced into the model on higher level than the individual one. Her results clearly illustrate that a higher gender gap in unemployment as well as higher long-term unemployment rate slow down the transition to motherhood and higher order births.

To summarise, the existing macro-to-micro studies generally make use of the data either at national, regional, or, even, municipal level. Some authors argued that the regional (or municipal) context appears to be a sort of ''meso-level'', between macro social structures and micro-demographic characteristics (e.g., Testa and Grilli 2006). The available literature does not only point out differences between countries or regions in the timing of fertility or in fertility intentions, but also demonstrates that accounting for the context may change the influence of the individual-level factors (Philipov et al. 2009). Therefore, future research should give a better recognition to multilevel-event-history approaches.

Bridging the micro-to-macro gap: meta-analyses and agent-based computational models

Despite the problems with data availability the contextual influence on action formation is quite well understood already. By contrast, the transformational mechanism from the micro- to the macro-level is largely unexplored. At the same time the rapid development of micro-level studies increases the need to summarize the existing individual-level empirical evidence in order to explain the macro-level phenomena. In this paper we elaborate on two possible ways of bridging the micro-macro gap from the bottom up. These are meta-analysis and agent-based computational models.

Meta-analytic techniques

Meta-analysis, or in other words a quantitative literature review, can facilitate drawing general conclusions from micro-level findings. This methodology, relatively new in the social sciences, has been developed in order to synthesise, combine and interpret the abundance of empirical evidence on a certain topic. It offers a clear and systematic way to compare results of different studies standardised for the country analysed, the method applied, the control variables employed, the sample selected, etc.

In order to conduct a meta-analysis, papers researching a topic of interest are collected in a systematic manner. Estimated coefficients are selected across studies and recalculated in a standardised way into comparable indicators (i.e. effect sizes). The effect sizes constitute units of statistical analysis and can be combined into single summary indicators or analysed with the use of regression techniques. The quintessence of this approach is to quantify the effect of interest on the basis of the available micro-level empirical studies.

Meta-analysis has been only recently adopted in family demography research. The very few meta-studies include the meta-analysis of the aggregate relationship between population's age structure and fertility as hypothesised by Easterlin (Waldorf and Byun 2005), the impact of modernisation and the strength of the marriage norms on divorce risks in Europe (Wagner and Weiss 2006), and the micro-level relationship between fertility and women's work in industrialised economies (Matysiak and Vignoli 2008). In order to give a better insight into the method of meta-analysis we elaborate shortly on two of these meta-studies. The meta-analysis of divorce risks was conducted

on 120 individual-level studies (Wagner and Weiss 2006). The authors found a great heterogeneity of divorce risks within as well as between countries and explained it with a cross-country variation in marriage norms and barriers to divorce. They found that cohabitation has a stronger effect on marital stability in countries with rigid marriage norms. Furthermore, countries with lower barriers to divorce are characterized by a weaker association between the parental divorce and the divorce risk of the offspring. In another meta-study Matysiak and Vignoli (2008) aimed at synthesising the research on the micro-level relationship between fertility and women's work in industrialised economies. Two effects were analysed: the effect of women's work on fertility (90 studies) and the effect of young children on women's employment entry (55 studies). The authors found that the micro-level relationship between the two variables is still negative, but its magnitude varies across countries, differing in the welfare policies, labour market structures and social acceptance of women's work. This variation in the magnitude of the micro-level relationship explains the existence of the positive cross-country correlation between fertility and women's labour supply observed in OECD countries since the mid-1980s (Rindfuss et al. 2003, Kögel 2004, Engelhardt et al. 2004).

Meta-analysis is certainly a useful tool for summarising and synthesising the abundant micro-level research. Its unquestionable strength is that the effect estimates produced within this framework have higher external validity than those obtained in individual studies due to the generality of results across various research works (Shadish et al. 2002). Nevertheless, a weakness of this method lies in the assumption that the micro-to-macro transformation can be achieved by a simple summation of individual-level actions into a macro-level outcome. According to Coleman (1990), the complex interaction between and within social groups as well as the heterogeneity of individuals preclude a simple aggregation of individual actions into a macro-level outcome. Since demographic choices are also made by interacting and heterogeneous individuals the assumption implicit to the meta-analysis may not be valid.

Agent-based computational models
The agent-based computational models come as a solution to this problem. They seem to us to be the most powerful tool for transforming the micro to the macro that allow to

account for the heterogeneity among the individuals and the complexity of individual-level interactions (Billari and Ongaro 2000, Billari 2006). The agent-based computational model is a toolkit that derives macro-level outcomes from micro-level findings without imposing restrictions on the homogeneity and lack of interactions. It includes micro-simulation, that models the macro processes based on the empirical models (i.e. event-history models, or, even, multilevel event-history models) as well as formal models of demographic behaviours that operationalise the decision-making processes at micro-level and simulate their outcomes into macro-level indicators. The additional advantage of the agent-based computational models is that they allow to study the impact of policy interventions on demographic behaviours, taking into account policy side effects as well as policy interactions with other elements of the social system (Van Imhoff and Post 1998). Below we give two examples of a micro-simulation. The first micro-simulation was run with a goal to assess the macro-level consequences of an increase in women's employment on fertility, among others (Aassve et al. 2006). The second was designed with a purpose to project future macro-level outcomes (Wachter 1997).

The first study was conducted in two steps. First, using British Household Panel Study, the authors estimated a multi-process hazard model of five interdependent processes: childbirth, union formation, union dissolution, employment entry, and employment exit. They found the employment parameter in the fertility equation to be strongly negative. The micro-simulation conducted in the second step showed, however, that increasing the hazard of employment entry by 10% and decreasing the hazard of employment exit by another 10% led to a decline in the proportion of women having their second child before age 40 by 0.2 percentage points only. This was much less than one could have expected from the analysis of the parameter estimates in the fertility equation. The underlying reason was that employment affected fertility also in an indirect way – it had a positive impact on the time spent in a union which in turn facilitated childbearing. In short, the negative direct and positive indirect effect of employment on fertility cancelled each other out, resulting in very small general effects of employment on fertility. This study clearly demonstrated that interpreting parameters from a hazard model only is not enough to conclude on the subsequent macro-level developments. One has to take the interactions between the process into account as well.

9

Micro-simulation models have been also designed with a purpose of projecting future population outcomes. One of such complex micro-simulation models – SOCSIM - was built at the University of California, Berkeley (Wachter 1997). It was designed in order to give insight into the future size and structure of kin networks and consequently to allow an assessment of the availability of support for the elderly in the ageing populations. Contrary to the standard macro-level population projections it provides information not only on the old-age dependency ratio, but also on the kin relationships (children, grandchildren, siblings as well as step- and half-kin). The power of the SOCSIM model was illustrated by Wachter (1997) who argued that projecting kin relationships is particularly important in countries experiencing rapid increases in divorce and remarriage. It is not that these changes in the patterns of union formation in dissolution affect the old-age dependency rate but they lead to a situation in which each person is connected to more members of the younger generation (children, step-children, grandchildren and step-grandchildren).

Towards the empirical implementation of the theoretical model: implications for data collection and avenue for future research

The arguments presented in this paper are summarised in Figure 2. It introduces the theoretical model of methodological individualism into the family demography research (see also Muszyńska 2007: 169, Philipov et al. 2009: 17). The theoretical scheme is supplemented with information on analytical methods that could help in a comprehensive explanation of the mechanisms and factors driving the change in family-related outcomes, as observed at the macro-level. In short, multi-level event-history models are suggested for the operationalisation of the situational and action formation mechanisms. Meta-analyses and agent-based computational models are viewed to be most suitable for quantifying the transformational mechanism.

We believe that in the future it will be possible to implement this full theoretical model in one single study in the field of family demography. The major challenge to be faced at that stage is the collection of suitable data. Conducting a multi-level event-history analysis requires, together with all other life-history careers, data on migration histories of the individuals as well as time-series contextual data. Likewise, performing

a micro-simulation requires information on several individual life histories that are often tightly linked. Such data are not available to date. One should note, however, that substantial advancement in this direction has been made within the Generations and Gender Programme (GGP) (Vikat et al. 2007, Kveder, 2009). The international harmonised database will include several individual life histories of respondents residing in over twenty developed countries. It will be additionally supplemented by the Contextual Database, containing high quality data at the national or regional level (Spielauer 2006). Furthermore, other contextual indicators can be found in the Family Database developed by the OECD or in the Portal developed within the RECWOWE project (Reconciling work and welfare in Europe). Nonetheless, a serious drawback of the GGP is the very limited information on migration histories of the respondents, impeding the possibilities to link the longitudinal individual data with the time-series of contextual indicators. Future data collection programmes should be careful to eliminate this shortcoming.

Figure 2 – Integration of the theoretical model for the explanation of family and fertility dynamics with the most suitable methods for its implementation.
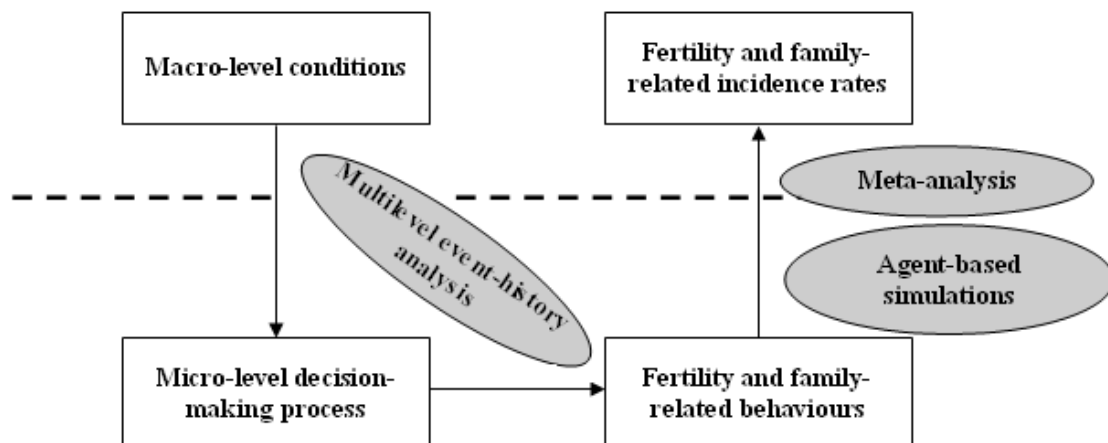
References

Adserà, A., 2005, *Vanishing children: From high unemployment to low fertility in developed countries*. "American Economic Review", vol. 95, no 2, 189-193.

Aassve A., Burgess S., Propper C. and Dickson M., 2006, *Employment, family union and childbearing decisions in Great Britain*, "Journal of the Royal Statistical Society", vol. 169, no 4, 781-804.

Billari F.C., 2006, *Bridging the gap between micro-demography and macro-demography*, [in:] Caselli G., Vallin J. & Wunsch G. (Eds.), *Demography: analysis and synthesis* Vol. 4 (pp. 695-707), Academic Press (Elsevier), New York.

Billari F.C. and Ongaro F., 2000, Quale ruolo per una demografia computazionale? [*Which Role for a Computational Demography?*], proceedings of the XL Riunione Scientifica della Società Italiana di Statistica, Firenze, 04 26-28 2000, pp. 245-256.

Blossfeld H.P., 1996, *Macro-sociology, Rational Choice Theory, and Time A Theoretical Perspective on the Empirical Analysis of Social Processes*. "European Sociological Review", vol. 12 No. 2, 181-206.

Borra S. Racioppi F., 1995, *Modelli di analisi per dati complessi: l'integrazione tra micro e macro nella ricerca multilevel* [Modelling complex data structures: a bridge between micro and macro analysis in multilevel research], [in:] Società Italiana di Statistica, *Continuità e discontinuità nei processi demografici. L'Italia nella transizione demografica* (pp. 303-314), April 20-21 1995, Università degli Studi della Calabria, Arcavacata di Rende: Rubbettino, Soveria Mannelli.

Coleman, J. S., 1990, *Foundations of social theory*, Harvard University Press, Harvard.

Courgeau D. and Lelievre E., 1997, *Changing Paradigm in Demography*, "Population: An English Selection", vol. 9, no 1, 1-10.

De Bruijn B. J., 1999, *Foundations of demographic theory: choice, process, theory*, Thela Thesis, Amsterdam.

De Rose A., 1995, *Uniformità di modelli individuali e divergenze di modelli collettivi nello studio dei comportamenti familiari* [Micro-level homogeneity and macro-level eterogeneità in familiar behaviour analysis], [in:] Società Italiana di Statistica, "*Continuità e discontinuità nei processi demografici. L'Italia nella transizione demografica*" (pp. 323-330), April 20-21 1995, Università degli Studi della Calabria, Arcavacata di Rende: Rubbettino, Soveria Mannelli.

Engelhardt H., Kogel T., & Prskawetz A., 2004, *Fertility and women's employment reconsidered: A macro-level time-series analysis for developed countries, 1960–2000*. "Population Studies", vol. 58, no 1, 109–120.

Hedström P. and Swedberg R., 1999, *Social mechanisms. An analytical approach to social theory*, Cambridge University Press, Cambridge.

Kögel T., 2004., Did *the association between fertility and female employment within OECD countries really change its sign?,* "Journal of Population Economics", vol. 17, 45-65.

Kveder A., 2009, *Generation and Gender Program – Micro-Macro Data Source on Generational and Gender Ties, Proceedings of the Conference*, [in:] Italian Statistical Society, *Statistical Methods for the Analysis of Large Data-Sets* (pp. 35-38), Invited Papers, September 23-25, 2009, Pecsra (Italy).

Matysiak A. and Vignoli D., 2008, *Fertility and Women's Employment: A Meta-Analysis*, "European Journal of Population", vol. 24, no 4, 363-384.

Micheli G. and Rivellini G., 2000, *Un contesto significativamente influente: appunti per una modellazione multilevel ragionata* [A Significantly Influent Context: Suggestions for a Theory-Laden Multilevel Modelling], proceedings of the XL Riunione Scientifica della Società Italiana di Statistica, Firenze, 04 26-28 2000, pp. 257-272.

Muszyńska M., 2007, *Structural and cultural determinants of fertility in Europe,* Warsaw School of Economics Publishing, Warsaw.

Philipov D., Théveron O., Klobas J., Bernardi L. and Liefbroer A., 2009, *Reproductive Decision-Making in a Macro-Micro Perspective (REPRO). State-of-the-Art Review*. European Demographic Research Papers 2009(1), Vienna Institute for Demography. http://www.oeaw.ac.at/vid/repro/assets/docs/ed-researchpaper2009-1.pdf

Pinnelli A., 1995, *Introduzione alla sessione "Dimensione micro e macro dei comportamenti demografici: quadri concettuali e modelli di analisi* [Introduction to the session], [in:] Sosietà Italiana di Statistica, *Continuità e discontinuità nei processi demografici. L'Italia nella transizione demografica* (pp. 285-290), April 20-21 1995, Università degli Studi della Calabria, Arcavacata di Rende: Rubbettino, Soveria Mannelli.

Rindfuss R. R., Guzzo K. and Morgan S. P., 2003, *The changing institutional context of low fertility*, "Population Research and Policy Review", vol. 22, 411–438.

Rosina A. and Zaccarin S., 2000, *Analisi esplicativa dei comportamenti individuali: una riflessione sul ruolo dei fattori macro* [The Role of Macro Effects on Individual Behaviour] (pp. 273-284), proceedings of the XL Riunione Scientifica della Società Italiana di Statistica, Firenze, 04 26-28 2000.

Salvini S. and Santini A., 1999, *Dalle biografie alle coorti, dalle coorti alle biografie* [From biographies to cohorts, from cohorts to biographies], [in:] F. Billari, A. Bonaguidi, A. Rosina, S. Salvini and A. Santini (Eds.), *Quadri concettuali per la ricerca in demografia*, Serie Ricerche teoriche, Dipartimento di Statistica "G. Parenti", Firenze.

Santini A., 2000, *Introduzione alla sessione specializzata "Analisi micro e macro negli studi demografici"* [Introduction to the session], proceedings of the XL Riunione Scientifica della Società Italiana di Statistica, Firenze, 04 26-28 2000, pp. 241-243.

Shadish W. R., Cook T. D. and Campbell D. T., 2002, *Experimental and quasi-experimental designs for generalized causal inference*, Houghton Mifflin, Boston.

Schmitt C., 2008, *Gender-specific effects of unemployment on family formation: a cross-national perspective*. SOEP Discussion Paper No 127. Berlin: DIW.

Spielauer M., 2006, *The Contextual Database of the Generations and Gender Programme*, MPIDR Working Paper WP-2006-030, Rostock.

Testa M. R. and Grilli, L., 2006, *The influence of childbearing regional contexts on ideal family size in Europe,* "Population (English edition)", vol. 61, no 1-2, 99-127.

Udehn L., 2002, *The changing face of methodological individualism*, "Annual Review of Sociology", vol. 28, 479-507.

Van Imhoff E. and Post W., 1998, *Micro-simulation models for population projection*, "*Population* (English Edition)" vol. 10, no 1, 97-136.

Vignoli D. and Matysiak A., 2009, *"Reconciling" Micro and Macro in Family Demography Research: An update*, [in:] Italian Statistical Society, Proceedings of the Conference "Statistical Methods for the Analysis of Large Data-Sets" (pp. 31-34.), Invited Papers, September 23-25, 2009, Pescara (Italy).

Vikat A., Spéder Z., Beets G., Billari F. C., Bühler C., Désesquelles A., Fokkema T., Hoem J. M., MacDonald A., Neyer G., Pailhé A., Pinnelli A. and Solaz A., 2007,

Generations and Gender Survey (GGS): *Towards a better understanding of relationships and processes in the life course,* "Demographic Research" 17, Article 14, 389-440.

Voss P., 2007, *Demography as a Spatial Social Science*, "Population Research and Policy Review", vol. 26 no 4, 457-476.

Wachter K., 1997, *Kinship Resources for the Elderly*, "Philosophical Transactions: Biological Sciences", vol. 352, no 1363, 1811-1817.

Wagner M. and Weiss B., 2006, *On the Variation of Divorce Risks in Europe: Findings from a Meta-Analysis of European Longitudinal Studies*, "European Sociological Review", vol. 22, no 5, 483-500.

Waldorf B. and Byun P., 2005, *Meta-analysis of the impact of age structure on fertility*, "Journal of Population Economics", vol. 18, 15-40.

Willekens, F. de Beer J. and van der Gaag N., 2005, *MicMac From demographic to biographic forecasting.* Paper prepared for presentation at the Joint Eurostat -ECE Work Session on Demographic Projections, September 21 -23, 2005, Vienna.

Zaccarin S. and Rivellini G., 2002, *Multilevel analysis in social research: An application of a cross-classified model*, "Statistical Methods & Applications", vol. 11, 95-108.