

Project description for

The puzzle of the recent fertility decline

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**Lars Dommermuth
Research Department, Statistics Norway
LDO@SSB.NO**

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1. Relevance relative to the call for proposals

In 2017, Norway reached a historical low fertility level with a total fertility rate (TFR) of 1.62. The TFR dropped from 1.98 in 2009 and such a dramatic fall in fertility within few years is unusual. In a comparative perspective Norway has switched from being a country with one of the highest fertility levels in Europe to just above average. The point of departure for our research proposal is this puzzling demographic change, which challenges established theories and existing knowledge. The proposal is highly policy relevant. There is great demand for more knowledge about the underlying mechanisms behind this change to develop suitable policy strategies. The observed decline in fertility is unexpected and sharp, and similar changes are observed in Sweden, Finland, Iceland and Denmark (see Figure 1). Such a synchronous development in neighbouring countries is unusual and can have long-term consequences. Modern societies face major challenges to remain sustainable: the future of the welfare state is dependent on taxes from men and women participating in the labour market as well as young people's willingness to bring children into the world. A decline in fertility accelerates the ageing of societies and poses a threat to long-term economic prosperity and the generational contract of the welfare state. Thus, there is need of more understanding about the fertility decisions among young men and women in Norway in a comparative perspective. Many European countries have witnessed low fertility for a long period and one may ask whether young people in Norway and the other Nordic countries are adapting fertility behaviour from countries with traditionally much lower fertility than in the North, and if so, why this is happening now.

Bringing together a team of leading fertility experts in Norway, the other Nordic countries and across Europe, this proposal aims to identify causes for the decreasing fertility among young people. First, we aim to assess whether the underlying mechanisms behind the fertility decline is the same in the Nordic countries and whether it is linked to increasing economic uncertainty following the global financial crisis in 2008. Second, we aim to go beyond traditional explanations of fertility behaviour and assess whether shifts in union dynamics and changing partner-, housing- or labour markets are drivers behind the fertility decline. Third, we aim to assess how young people in Norway make fertility plans under uncertain economic circumstances and whether they react different to uncertainty compared to young people in other economic and social contexts. Fourth, we aim to compare trends in fertility behaviour in Norway with European countries already experiencing a long-lasting decline in fertility rates. We assess whether certain social groups across Europe face similar barriers to family formation and how changing age norms and family values across Europe influence fertility decisions.

In line with the call for proposals, the proposal is at the forefront of international research. The project advances theory building on demographic and social change and promotes new research approaches in this field, including an experimental lab to evaluate the impact of perceived economic uncertainty on fertility plans. We apply state-of-the-art methods to take full advantage of the unique opportunities of administrative register data for socio-demographic research. The project includes a strong comparative perspective and a close cooperation with leading experts and research environments promotes high scientific quality. The proposal builds on previous research projects, is closely linked to ongoing international research networks for register based fertility research and a research project financed by the European Research Council, and will use data from a European Research Infrastructure Consortium (European Social Survey). Thus, the implementation of the project would create an excellent basis for future research proposals directed to the European Research Council. The project also supports the scientific career of young research talents in the research team and among the cooperation partners.

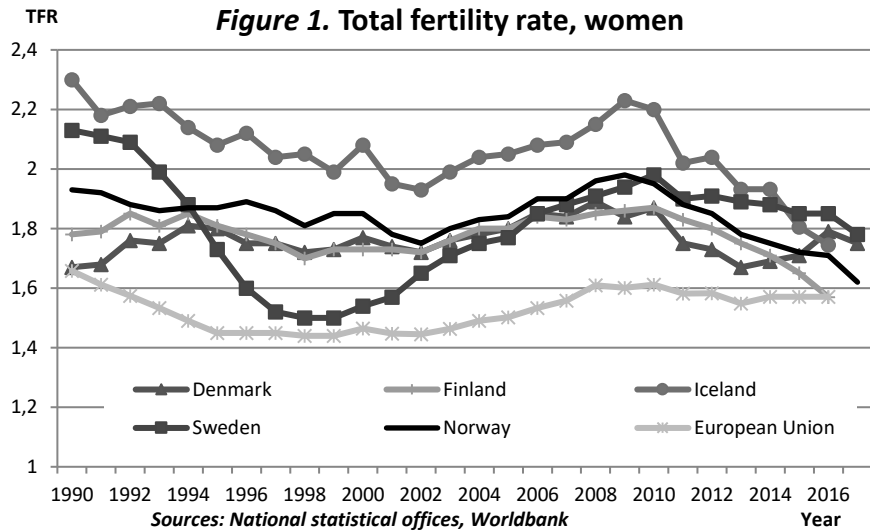
2. Aspects relating to the research project

Background and status of knowledge

The recent fertility decline is a puzzle, but some initial attempts have been made to explain the observed decline in TFR in Norway since 2010. Decomposing female fertility rates by parity, age groups and educational background (Lappegård & Dommermuth, 2015) and parity specific analyses of birth ratios (Hart et al., 2015) indicate that declining first birth rates are a main driver behind the ongoing fall in TFR. A long-

lasting decrease in third births and higher order parities accelerates the observed decline in TFR, while second-birth rates remain comparatively stable. An appropriate question is whether the same underlying mechanisms are driving the similar fertility decline in the other Nordic countries (see Figure 1). This is by no means given, as a parallel downward trend in the Nordic countries is unusual and can be caused by changes in different birth parities or age groups.

Existing sociological and demographic analyses indicate that fertility behaviour relates to a number of individual and contextual factors (for reviews, see e.g. Balbo et al., 2013; Dommermuth et al., 2015). Importantly, not all of these factors have the same potential to stand behind the recent decline in fertility. For example, individual health, genetic factors or inter-generational transmissions of fertility have not undergone dramatic changes in the past decade, and are therefore



unlikely to play a significant role for the recent fertility decline. Hence, we focus on specific factors that can be drivers behind the observed changes in fertility rates. This includes educational attainment, employment, perceived uncertainty, developments in family behaviour, values and age norms on the individual level, and their interaction with contextual factors, such as (un-)employment rates, job and housing markets.

The theoretical framework of the Second Demographic Transition (Lesthaeghe, 2010; van de Kaa, 1987) has played a central role in analyses of changing family behaviour. The theory emphasizes that socioeconomic conditions, notably the educational revolution and rising female employment, as well as value changes towards individualization, are underlying forces behind changes in family behaviour, including the emergence of cohabitation, out of wedlock births, postponement of parenthood and increasing dissolutions rates. In line with these theoretical arguments, Billari and Liefbroer (2010) provide clear evidence that these changes first emerged in Northern Europe, while other European regions followed suit with varying pace. It is hypothesised that the increasing number of choices (cohabitation vs. marriage, union dissolution and repartnering, postponed childbearing and childlessness, etc.) leads to more heterogeneity in the prevalence, timing and sequence of family events. For instance, recent statistics on union status suggests that young Norwegians now postpone union formation (Statistics Norway, 2018), which has been stable at a comparatively low age for a long time. Whether changing union formation patterns are related to the recent decreases in first births rates is an unanswered question so far.

The New Home Economics theory (Becker, 1981) and the Second Demographic Transition (van de Kaa, 1987) have postulated a close link between increasing educational attainment and labour force participation of women on the one side and postponement of births and declining number of children on the other side. However, there is growing evidence that the long-standing negative relationship between women's socioeconomic position and childbearing is subject to considerable shifts. Around the turn of the millennium, TFRs increased in a substantial number of highly-developed countries and it was pointed out, that this increase was positively associated with socioeconomic development and female labour market participation, but conditional on gender equality (Myrskylä et al., 2013). The theoretical argument behind this finding is that a good work-family balance has a positive impact on fertility for men and women (Esping-Andersen & Billari, 2015, Goldscheider et al., 2015; McDonald, 2000). Correspondingly, policy analyses indicate a cumulative positive impact of female employment combined with paid parental leave, public childcare and financial transfers to parents on fertility (Luci-Greulich & Thévenon, 2013). On the micro-level, results from Germany indicate that the introduction of parental leave benefit had a positive impact on fertility decisions of especially highly-educated women (Bujard & Passet, 2013), while in Nordic countries childlessness has increased particularly among lower educated women (Jalovaara et al., forthcoming). This suggests, that nowadays other social groups face hindrances for family formation than

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previously. Disentangling these developments will push forward our understanding of demographic changes and is highly policy relevant, as ongoing changes may be to some degree an unintended side effect of one-sided family policies. Even with generous and stable family policies, as in the Nordic countries, a new social divergence can emerge, especially in periods with economic uncertainty or under varying frame conditions. A study on the spatial diffusion of childbearing in cohabitation in Norway indicates that local male unemployment rates were an important factor behind the initial emergence of this phenomenon (Vitali et al. 2015). This leads to the question, if corresponding links between uneven frame conditions and individual behaviour stand behind the current decline in fertility and new social differentials in childbearing decisions.

Local housing markets, which are less investigated so far with respect to birth decisions, are one example of such a link. On societal level, certain associations between specific homeownership regimes and low fertility were found (Mulder & Billari, 2010), while a secure housing situation is positively correlated to fertility intentions on the individual level (Vignoli et al., 2013). This implies that changes in local housing markets, such as a high rise in housing prices or specific developments in the housing stock towards smaller dwelling, are a potential driver behind changing fertility rates. It is likely that the impact of such frame conditions on individual childbearing decisions varies by socioeconomic background.

Another obvious contextual factor is economic uncertainty. The decline in fertility in Norway and many other European countries emerged after the global financial crisis of 2008. Previous research indicate that stagnation or fall in the gross domestic product and rise in unemployment rates go hand in hand with a decline in TFR (Sobotka et al., 2011). Also, on the individual level, economic uncertainty is likely to affect childbearing decisions. Work income is the most important source for gaining the necessary economic means to take care of a family. This is crucial in the Nordic countries, as for example the eligibility to paid parental leave is directly linked to employment. Hence, income and employment are positively correlated with fertility and particularly first births in these countries (Hart, 2015; Jalovaara & Miettinen, 2013; Kornstad & Rønsen, 2017; Lundström & Andersson, 2012). For Norwegian women, the positive association between employment and first births, as well as the negative correlation between unemployment rates and first births has increased significantly after 2010 compared to previous years (Dommermuth & Lappegård, 2017). Nevertheless, it remains unclear why the decline in the TFR in Norway has continued despite declining unemployment rates. The economic situation is similar in the other Nordic countries, and a comparative approach, including male fertility and other contextual factors on sub-national level (such as employment market indicators, female and male youth unemployment, housing stock), stand out as a promising next step to detect underlying reasons for the fertility decline in these societies.

Another possible driver behind the fertility decline is the perception of economic uncertainty. Applying a Consumer Confidence Index (CCI), based on households' sentiment about their current and future financial situation, Comolli (2017) found that a decline in the CCI generates a drop in the TFR on the macro level. However, whether and to which degree individual perception of uncertainty is connected to personal fertility plans and decisions is unclear. The effects might be especially important in countries where the financial crisis did not lead to strongly increased unemployment rates, but nevertheless experience a strong decline in fertility, as for example in Norway.

In Norway and many other European countries, the share of women with higher education has exceeded the proportion of men with higher education. Importantly, in recent years with a steep fertility decline, the share of women with higher education has not increased substantially. Hence, women's educational attainment cannot explain the recent decline in TFR in Norway (Dommermuth & Lappegård, 2017). However, the gender revolution in education has contributed to a shift in the partner market with an overweight of highly educated women. This is not compatible with traditional patterns of union formation where men "partner down" and women "partner up" and may create a new kind of mating squeeze (Van Bavel, 2012). Socioeconomic differentials have been suggested, where e.g. higher educated men and lower educated women are the least likely to remain unpartnered (Wiik and Dommermuth, 2014). In addition, the degree of the mating squeeze may vary geographically within societies, as research on moving patterns and partner markets suggests that especially women move from rural to urban areas (Eckhard & Stauder, 2018).

Parallel to changing conditions in the partner market, union dynamics have undergone major changes towards higher instability in young adulthood (Dommermuth & Wiik, 2014). Interestingly, there is a positive correlation between divorce rates and total fertility on the country level and Van Bavel et al. (2012) asked whether there is an individual-level explanation for this phenomenon. They found that a past divorce experience was generally negatively associated with the number of children ever born. This and comparable studies are limited to married and divorced couples, disregarding the high prevalence of cohabitation in most

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European societies today. This raises the question how union careers including all union types are related to the number of children born. Increasing instability in union careers and growth of unions with step-children may strengthen the decline in fertility rates.

Value changes are often understood as underlying driving forces behind the emergence of cohabitation and increasing divorce rates (van de Kaa, 1987). Similarly, changes in family values and norms may affect fertility rates. Based on European surveys from 1979 to 2012, Sobotka and Beaujouan (2014) showed that the average ideal family size declined gradually over decades. However, as the trend is relatively similar across Europe, this does not mirror the strong observed differences in TFRs or cohort fertility between European societies. The ideal family size, which is now closely clustered around 2.2 in most European countries, seems to be related to a strong two-child norm. Therefore, questions on ideal family size may not capture adequately actual value changes that can influence childbearing decisions.

The gap between ideal family size or fertility intentions and actual number of children or realized births has also been observed on the individual level (Philipov, 2009; Régnier-Lollier & Vignoli, 2011). Social norms seem to be an important factor for individual fertility intentions (Dommermuth et al., 2011; Kuhnt & Trappe, 2016). Based on cross-sectional data from 2006, Billari et al. (2011) found that age norms for motherhood were earlier and stronger than for fatherhood. At the country level the presence of social age deadlines for the childbearing of women was negatively associated with later fertility rates. Van Bavel and Nitsche (2013) also showed that in regions with older ideal ages for parenthood, the progression to second births was lower for women with younger ages at first birth, and vice versa. This calls for new research approaches, analysing how age norms on family behaviour have changed in the past decade and to which degree they are related to individual childbearing decisions and the observed decline in fertility on the societal level.

Approaches, hypotheses and choice of method

Theoretical approaches

The proposed research project will rely on well-established theoretical frameworks and recently proposed theories of social change and fertility of contemporary advanced societies. This includes the Second Demographic Transition (Lesthaeghe, 2010; van de Kaa, 1987), the Gender Revolution theory (Goldscheider et al., 2015) and Multiple Equilibria approaches (Esping-Andersen & Billari, 2015). As lined out in the background section in this proposal, the Second Demographic Transition theory captures well the development on the national level but is less meaningful for understanding ongoing changes on the sub-national and individual level. Both the Gender Revolution theory and the multiple equilibrium model provide frameworks of macro- and micro interlinkages which allow us to theoretically and conceptually relate contextual conditions (such as welfare state configurations on the national level, regional changes in population composition as well as local labour and housing markets) to family behaviour at the individual level. As the project builds on these theories and tests their validity empirically, the project will contribute to the ongoing development of theoretical frameworks in family demography and sociology.

Empirical approaches.

The proposed project will be organized in four separate, but closely related, work-packages (WP) to investigate potential mechanisms behind the recent decline in fertility rates. The ongoing changes in the fertility behaviour in Norway stand central in the proposed project and are embedded in a strong comparative perspective including the Nordic countries and other European societies and regions. In line with our theoretical understanding, the macro-micro link is an important part of the analyses in all WPs.

WP 1. The fertility decline in the Nordic countries

The aim of the first WP is to reveal the underlying mechanisms behind the dramatic fertility decline in the Nordic countries. Even though TFRs have fallen almost synchronous since 2010 in the Nordic countries, we do not know whether they are driven by the same factors in each country. For instance, we know that a decline in first birth rates has been crucial for the fall of the TFR in Norway, but not whether this also applies in the other Nordic countries. Using detailed individual level register data from the Nordic countries, we first disentangle childbearing processes by parities on the background of age and education, for both women and men. Based on these results we will also know which parity transitions and age groups we must observe especially in other analyses. Second, including contextual regional-level indicators on economy in each country, such as job markets and unemployment rates, we investigate the influence of increasing economic

uncertainty, following the global financial crisis in 2008, on the changing fertility rates. We hypothesise that the strength and durability of macro-micro links vary by economic regions on the sub-national level, as certain sectors were affected stronger by the crisis than others. From these analyses we will identify whether certain social groups now face greater barriers to childbearing across different contexts than earlier, and thus provide valuable new insight for all Nordic countries, including Norway.

WP 2. In-depth analyses of the fertility decline in Norway

In this WP we go in-depth into the Norwegian case and the aim is to investigate possible new mechanisms behind the dramatic drop in fertility over the recent years. First, we ask whether increasing postponement of first births are influenced by changes in the union and family formation processes of men and women. Recent descriptive statistics on union status suggest that young Norwegians postpone first union formation, which in turn may lead to decreasing first births. We will study the interrelationship between union formation and the transition to first birth. We apply a proportional hazard model for first birth, taking into account both individual level characteristics such as the timing and type of the first co-residential union, and contextual factors. The latter includes changes in the composition of local partner markets, as for example an unbalanced sex ratio or mismatch between higher and lower educated men and women.

Second, we ask whether other changes in union and family dynamics, such as increasing dissolution rates and selective re-partnering chances with and without stepchildren, have consequences for childbearing decisions for men and women in Norway. As both union formation and union dissolution might influence fertility decisions and fertility decisions might influence decisions about unions, we will make use of statistical methods that are accounting for joint determination of fertility and unions. To gain a better understanding of the effects, we use the estimated model for simulation experiments, focusing on the interrelationship between union formation, union dissolution and childbearing. Based on the estimated model we can simulate the total number of births for women and men in different union types and quantify if and how much of the decreasing fertility level is a result of increasing cohabitations and union dissolutions.

Third, we ask whether changes in local housing and labour markets as well as regional economic changes are driving forces behind the decreasing fertility in Norway. Here we focus on all births and as we have repeated observations (up to four births) of the women in the sample, we can consider the effects of unobserved heterogeneity by estimating the transitions to first, second, third, and fourth birth simultaneously (Heckman & Singer, 1984).

Forth, we investigate the main drivers behind the increasing proportion of childlessness, especially among men. We will focus on the same contextual measures as for the third research question and apply spatial panel models to identify determinants for the diffusion of childlessness across Norway over the last thirty years.

WP3. Fertility decisions and perceived economic uncertainty

Economic uncertainty may both be related to individual risk factors mainly related to the labour market and more general uncertainty felt by people in times of economic turbulence (Sobotka et al., 2011). Even though the global financial crisis in 2008 did not hit Norway as hard as many other countries, we could observe a subsequent dramatic drop in fertility level in Norway. This implies that perceived uncertainty may be important, perhaps as important as actual uncertainty. To study this question, a ERC Consolidator Grant (Economic Uncertainty and Fertility in Europe, grant number DLV-725961) is set up to assess how people make fertility plans under uncertain economic circumstances, recognizing their heterogeneity in perceiving and tolerating uncertainty. In cross-country controlled laboratory experiments, the project studies how people perceive, and react to, uncertainty. We have been invited to participate in this study given we can provide funding for the experiment in Norway. The lab experiment will account for person-specific risk aversion using lotteries. Participants will respond to a battery of questions and for each of them they are asked to decide between two options, one “risky” and one “safe”, as a measurement of individual risk aversion. Mock newspaper stories and media clips will be presented to participants to manipulate the perception of a critical situation. From the pooled dataset resulting from the cross-country laboratory experiments, statistical analysis aims to evaluate the impact of perceived economic uncertainty on fertility plans. The comparative setting will give a better understanding of whether and how young adults in Norway react different from young adults living in different economic and social conditions.

WP 4. Trends in fertility behaviour and the transition to adulthood in Europe

In contrast to many other European countries, Norway had up to 2010 relatively high and stable fertility rates. Comparing Norway with countries that already earlier experienced a strong and long-lasting decline in fertility rates, will increase our understanding of the recent development in Norway and give us a better understanding of the long-term consequences of such a development. First, we ask whether links between fertility and socioeconomic background varies over time and across different contexts. Based on longitudinal individual level register data from European countries, we analyse the development of male and female age at first birth and cohort fertility by socioeconomic status, migration background, and national and regional context. Bringing in this macro-micro linkage is crucial to detect possible regional variation in social polarisation.

Next, we ask whether changing age norms and family values may be drivers behind changes in the transition process to adulthood and the decline in fertility in the past decade. In a first step we analyse how values and age norms closely related to the transition process to adulthood have changed from 2006 to 2018 in Europe. This includes age norms on leaving the parental home, union formation, marriage, transition to mother- and fatherhood and the approval of specific family behaviours as cohabitation, out of wedlock births, dual-earner careers of parents and childlessness. In a second step we analyse if and how younger cohorts of European women and men adapted new patterns in the transition process to adulthood. We expand existing empirical approaches, as we also consider educational careers and the entrance into the labour market as part of the transition process. Applying sequence analyses, we investigate if the increasing number of potential behaviours has led to the hypothesised heterogeneity of transition patterns on the individual level. In a third step, we investigate the link between specific values (approval of childlessness) and age norms (age limits for childbirths for men and women) on the one side and childlessness among different cohorts of men and women on the other side. We examine the relevance of individual socio-economic background for this linkage and across different European regions with varying institutional settings. These analyses are based on two rounds of the European Social Survey (2006, 2018).

Data sources and methodological approaches

Most WPs in this research proposal will apply individual-level administrative register data for international comparative and in-depth analyses for Norway in an innovative manner. Such data have several advantages in demographic analyses. The fertility behaviour of women *and* men, which are often disregarded in existing research, can be analysed. Further, (small) vulnerable groups can be identified and we can distinguish between native and foreign-born inhabitants. Register data offer the rare possibility to examine subnational regional disparities, also in comparative analyses. WP1 is based on longitudinal population register data (including all basic demographic information, such as date of birth, marriage, divorce, childbirths, death, kin ties, immigration status) from the Nordic countries, enriched with information on socioeconomic background. Our co-operation partners and their respective working groups in Finland and Sweden have direct access to these register data in the Nordic countries.

For the analyses on Norway (WP2), we take advantage of having direct access to information from several Norwegian registers beyond the population register. This includes the National Database on Education, the event database FD-trygd (including longitudinal data on income, social welfare, etc.), and the Ground Parcel and Address register. Based on these data sources, information on all cohabiting persons, including those without children, are available since 2005. The data can be linked using a unique personal identification key.

For the comparative analyses on register data including other European countries (WP 4), we build on the “Register-Based Fertility Research Network”. This network is co-ordinated by our collaboration partner Jessica Nisén (Max Planck Institute for Demographic Research). A working group on human development and fertility (headed by Prof. Mikko Myrskylä, Director of the Max Planck Institute for Demographic Research) has already established that the register datasets in the countries of the network contain the attributes necessary to conduct analyses on changes in fertility behaviour.

In the same work package, we will use two rounds of the European Social Survey (ESS) for comparative analyses on age norms and childbearing behaviour in Europe. The ESS is a cross-national survey and ESS data are available free of charge for research. Most European countries, including the Nordic countries, participated in all rounds of the ESS. So-called core modules are included in each round of the ESS and provide socio demographic and household information. The additional module “Timing of Life” was implemented for the first time in 2006 (Round 3 of the ESS) and is part of the 9th ESS-round (2018). The

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module collects data on crucial life events (e.g. age at first co-residential union, marriage, first childbirth, total number of children born), corresponding age norms (including ideal age for become mother and father, as well as lower and upper age limit for transition to mother- and fatherhood) and acceptance of family behaviour (such as acceptance of childlessness or out of wedlock-births). A split ballot design is implemented in this module, which allows to compare both the perceptions of women's and men's lives, and the judgments made by men and women.

Data for WP3 will be collected in controlled laboratory experiments. Based on a pilot test, a final protocol is currently finalized by our cooperating partner Daniele Vignoli and his research team. This protocol will be provided to participating countries to carry out computer lab sessions.

Regarding the comparative analyses based on register data (WP1 and WP4), we want to point out that the access to these data sources is usually restricted to researchers and research institutions in the respective country (with certain exceptions, as France). Therefore, the principal investigator (PI) of the research project will develop standardized coding schemes for data preparation and analyses, in close collaboration with the project partners. One analytical strategy will be to pool together multiple-frequency datasets which offer in aggregated form information on the frequency of combinations of individual attributes. These can be analysed as if individual data were available (Kulu et al., 2017). A second strategy will be to agree on harmonisation standards for specific attributes on individual level (such as educational and socioeconomic background) and contextual level (definition of sub-national levels and corresponding indicators for job market, population composition, etc.) and then to share software codes which allows the project members in the different countries to conduct analyses in a comparative manner. The PI of the proposal and project members have already conducted successfully similar comparative analyses (e.g. Jalovaara et al., forthcoming; Wiik & Holland, 2017). Our cooperation-partner in Sweden, Gunnar Andersson, leads a project to increase such cross-national use of Nordic register data in demographic research.

We make use of ordinary regression techniques (all WPs), different hazard models and panel models, accounting for unobserved heterogeneity (WP1, WP2 and WP4). In the estimations of the model for birth transitions and union careers (WP2), we consider that birth transitions are determined jointly with union formation and union dissolution. To deal with the potential endogeneity problem in the estimation of this type of model we intend to use a simultaneous hazard regression framework similarly to the one presented in Lillard (1993). In the analyses of birth transitions in Norway under the control of different local indicators (WP2) we have several observations for each individual as we observe transitions to first, second, third and fourth birth. This allows us to consider the effects of unobserved heterogeneity across individuals on fertility in the model specifications. The effect will be assumed fixed for given individual across his/her births. Spatial panel models (e.g. Viatli et al., 2015) will be applied in the analysis of the diffusion of childlessness. The team members of the project are highly experienced in data processing of register and survey data, and familiar with the different statistical techniques necessary to conduct the proposed analyses.

3. The project plan, project management, organisation and cooperation

Project management and organisation

The progress plan for the project is provided in the grant application form. The Research department in Statistics Norway is the host institution for this project, which is one of the leading demographic units in Norway. The Research department is dedicated to high-quality research in the fields of demography, sociology and economics, mainly based on administrative register data. Analysing current and long-term changes in fertility and family behaviour and identifying causes for these developments, fits well with the long-term strategies of the Research department and Statistics Norway in general.

Senior researcher *Lars Dommermuth* (PhD in sociology) will be the principal investigator (PI). Dommermuth has experience as a PI and contributes regularly to research projects financed by the Norwegian Research Council and currently co-ordinates the Norwegian contribution to project funded by the Horizon 2020 research program of the European Research Council. He has an extensive and active international network within family demography in particular and in social sciences more generally. Fertility is one of his main research interests and he has conducted a number of analyses based on administrative register data and survey data in this field, focusing on Norway as well as in a comparative perspective.

The interdisciplinary research team at Statistics Norway has expertise on areas in the core of this project: *Kenneth A. Wiik* (sociologist, Head of Research) has extensive knowledge about union formation and union dissolutions. He has broad experience working with comparative data and has led several research

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projects. *Tom Kornstad* (economist, Senior Researcher) is particularly interested in statistical methods and statistical modelling and has worked extensively on structural models of labour supply, childbearing and hazard models in general. His experiences from estimating and simulating joint hazard models of fertility and labour market participation models based on Norwegian population data will be used in WP2. *Janna Bergsvik* (PhD-candidate in sociology) focuses in her research on links between spatial, social and normative context and trends in family behaviour.

Collaboration

All collaborators are well known to the PI. At the national level, the project will collaborate with Prof. *Trude Lappegård* (Department of Sociology and Human Geography at the University of Oslo). Lappegård is an international expert in fertility research and has been the PI for several major research projects in this field, financed by the Norwegian Research Council. Lappegård will contribute to analyses in all WPs and lead the controlled laboratory experiment in Norway (WP3). She is experienced in international comparative data collection based on such protocols (Lappegård & Noack, 2014; Perelli-Harris et al., 2014) and as one of the project leaders of the Norwegian Generations and Gender Survey.

The project has a strong international profile and four collaborators from Europe will participate in different parts of the project. Firstly, the project will collaborate with the project for “Register-based Research in Nordic Demography” led by *Gunnar Andersson*, Head of Stockholm University Demography Unit. Andersson has established a highly recognized research team, with access to population registers from Nordic countries. His own research interest conforms with the here proposed project. Secondly, we will collaborate with *Marika Jalovaara*, University of Turku. She is head of a research project on family dynamics and social inequalities and has extensive experience in analyses of Finish register data and comparative research on fertility. Andersson and Jalovaara will contribute to WP 1 and WP4. Thirdly, the project will take advantage of a close collaboration with the “Register-Based Fertility Research Network”, coordinated by *Jessica Nisén* at the Max-Planck Institute for Demographic Research. The network brings together leading demographers from more than ten European countries, using register data in analyses of fertility behaviour. The network has already had two annual working meetings. A new meeting will be arranged during the European Population Conference in June 2018 and the annual working meeting will take place in December 2018. Nisén leads a first collective project of this network (Shifts in the Fertility-Development Nexus at the Macro and Micro Level) and is an expert in inequalities of fertility outcomes. Nisén and the network take part in WP4. Fourthly, in WP3 we will collaborate with *Daniele Vignoli*, Professor of Demography at the University of Florence. He leads the “Economic Uncertainty and Fertility Project in Europe”, funded by the European Research Council under the European Union’s Horizon 2020 research and innovation programme. He and his research team currently finalise the experimental protocol which will guide the controlled laboratory experiment for WP3. Vignoli will support our implementation of the experiment and we will collaborate in analyses of the generated data.

Budget

For details about budgets, see the grant application.

4. Key perspectives and compliance with strategic documents

Compliance with strategic documents

The research department in Statistics Norway is dedicated to high quality research. One of the main goals of the department is to use and develop high quality administrative register data and survey data to promote research based on these sources. The research team has long experience in analysing family behaviour using advanced statistical methods and rich data.

Relevance and benefit to society

Research about demographic changes in general and fertility in special, is of great relevance for policymakers and the society. The ongoing decline in fertility rates challenges the sustainability of European societies, including Norway. Welfare states are of great demand for labour and young people’s willingness to have children. A decline in fertility accelerates the ageing of societies and increasing childlessness threatens the inclusion in family life. Research on mechanisms behind changing fertility rates is a precondition for the development of suitable policy strategies.

Environmental impact

We are not aware of any environmental impacts in connection with this project.

Ethical perspectives

The project utilises data on individuals. The research team has long experience in handling such data, and all research will be undertaken in accordance with legal restrictions given by the Norwegian Data Inspection, internal guidelines in Statistics Norway and the institutions of the collaborating partners. In WP3 we propose a data collection in a controlled laboratory experiment. A similar data collection is part of a ERC research project, including corresponding ethical guidelines. Currently, the protocol for experiment and data collection and an informed-consent-form for participants is finalised as part of the ERC research project. Already before the completion of the protocol, the Ethical Committee of the University of Florence has given a conditional approval to the experiment and we will apply for corresponding ethical approval in Norway if the proposal will receive funding.

Gender issues (Recruitment of women, gender balance and gender perspectives)

Gender perspectives and gender dynamics are scientific core issues of the proposal. The project team and the collaborators consist of both men and women and the proposal promotes the early scientific career of two female researchers. The PI and other project members have also previously published research with a strong focus on gender equality and contributed to research projects with an explicit gender perspective.

5. Dissemination and communication of results

Dissemination plan

The main outlet for our research will be at least 12 publications in international peer-reviewed journals and presentations at research conferences. Based on specific expertise and interests of the participating researchers, the research activities are systematically spread across the project period. In line with the schedule of cooperation partner Vignoli, WP3 is placed at the beginning of the project period. WP4 is partly based on a new round of ESS data, which presumably will be available in 2020. As data from the latest round will have the same structure as the previous comparable round from 2006, data preparation can also be initiated if access to the recent round is somewhat delayed. This strategy will allow us to produce and submit the related deliverables in good time. A detailed dissemination plan is included in the grant application.

Communication with users

The main users of our results, apart from the research community itself, are policymakers and the general public. The project will establish a web-page, presenting the project, team members, main findings and ongoing activities to the research community and the general audience. We will also communicate our results through open research seminars. For more details, see the grant application.

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