

May 14, 2012

Why Such Wide Fertility Variation among Low Fertility Countries?

Ronald R. Rindfuss
East-West Center
And
University of North Carolina, Chapel Hill

DRAFT: This is a work in progress. Arguments will be added and more references supplied. And the text already included will be refined. So comments, suggestions, arguments are most welcome. Send them to Ron_Rindfuss@unc.edu

Acknowledgements. This paper has benefited enormously from collaborations on fertility and family topics with numerous demographers in recent years including Sara Brauner-Otto, Larry Bumpass, Minja Choe, David Guilkey, Karen Benjamin Guzzo, Maria Midea M. Kabamalan, Øystein Kradval, Peter McDonald, Melinda Mills, S. Philip Morgan, Egbert te Velde, Noriko Tsuya, as well as many of my earlier collaborators. While they may not agree with everything in this paper, discussions with them over the years have sharpened my thinking on why there is so much fertility variation in low fertility countries. The paper also benefited from ongoing empirical research which has been partially funded by a grant from NICHD (5R01HD042474).

INTRODUCTION

Fertility rates at or below the replacement level are now a reality in an increasing number of countries, and in those countries with very low fertility levels the implications have been discussed from diverse perspectives. Environmentalists welcome the prospect of smaller populations, while policy makers worry about the continued viability of existing social welfare programs as the ratio of retirees to the working age population climbs. Nationalists are frightened at the prospect of a surge of immigrants. Business and government leaders worry about a shrinking labor force. Some fret that an aging population will lack artistic, entrepreneurial and intellectual vitality, while others are anxious a shrinking population will sap national pride.

As the world moves toward the end of the demographic transition, what has emerged is significant *variation* in fertility levels among those countries that have had replacement or below replacement level fertility for two or more decades. Substantial variation is found in both period and cohort fertility rates. The question is why? What might account for this variation? This variation is the opposite of what one might expect given arguments about the second demographic transition (e.g.) and runs contrary to UN's fertility assumptions in their international population projections (Basten et al. 2012). In this paper, after briefly describing contemporary fertility variation, we examine the arguments and review the evidence regarding low fertility variation, paying attention to both substantive findings and methodological issues involved in reaching those findings. We argue that the explanations likely lie in broad, macro, institutional differences across countries, and the manner in which these macro factors interact with micro-level individual and couple characteristics. The countries considered here include those within Europe and North America, as well as Japan, Taiwan, Singapore, Australia and New Zealand.

BACKDROP

As a starting point, it is important to recognize that massive structural transformations have occurred, beginning in the late 1960s in some countries, which affect the lives of young men and women. These changes happened to a varying degree and at varying times across all these low fertility countries. They serve as backdrop for the main emphasis of the present paper and I use a broad brush describing them.

Educational attainment has increased substantially, as has its importance in the career paths of young men and, especially, young women. The education process now extends well into potential childbearing years, and as a result factors that might affect when and how many children people have overlap with the factors that affect educational attainment. Put differently, education and fertility are now endogenous, making it substantially more difficult to examine the effect of one on the other. Further, in most countries, the increase in educational attainment has been steeper for women than men, such that recent cohorts of women are achieving higher levels of education than men. The result, and this is crucial for the arguments below, is that women increasingly want to be in the labor force, with careers in meaningful fields where they have a chance to make a difference.

In addition to the rise in educational attainment, there has been a steep rise in the proportion of women in the labor force, either with a job or actively looking for one. This has been especially the case for mothers of preschool age children. And labor

markets have changed such that there are more service jobs available – jobs traditionally filled by women. Further, collective action by women (sometimes with assistance from men), sometimes called the “women’s movement,” has pressed for the elimination of discrimination against women in the labor market. While this movement has achieved mixed success across the countries considered here, it has opened jobs to women that heretofore were restricted to men. In many cases these are well-paying jobs that have non-monetary rewards as well. As women’s education has increased and as more job opportunities have become available, women have increased monetary and non-monetary incentives to be in the labor force.

Further, a collection of interrelated trends, commonly termed “globalization,” has led to the migration of manufacturing jobs from high-wage to low-wage countries affecting both men and women but with a greater effect on women. These include manufacturing jobs that were typically occupied by men with comparatively low education levels. These were jobs that had a sufficient pay level such that their occupants were able to live a middle-class lifestyle. The loss of well-paid manufacturing jobs has hurt the financial position of men with limited levels of educational attainment, making those men less attractive as spouses or partners.

Finally the contraceptive revolution that began in the early 1960s with the introduction of the Pill, lessened the link between intercourse and childbearing. Many would argue that the contraceptive revolution facilitated the postponement of childbearing because it eased concerns about unintended pregnancies among those who wished to postpone parenthood but did not want to postpone having intercourse (see for example Frejka 2008a).

The structural transformation in educational institutions and the labor market in low fertility countries coupled with the freedom facilitated by the contraceptive revolution have resulted in a social and economic world greeting today’s young adults that is vastly different from that which their grandparents faced. The nub of the arguments for why we have such wide fertility variation today rests on how individuals, couples, institutions and countries adapted to these structural transformations.

WIDE FERTILITY VARIATION

Whether we use period or cohort rates, there is wide variation in fertility levels among countries that have had fertility at or below replacement level for two or more decades. Kohler and his colleagues (2002) coined the term “lowest low fertility” to designate period total fertility rates (TFR) at or below 1.3. Replacement fertility for most low fertility countries is between 2.0 and 2.1. Is a difference of 0.7 or 0.8 children per woman a big difference? The answer is yes. Consider that in a stable population a TFR of 2.0 implies a 50% reduction in population size in 530 years but the halving would only take 44 years with a 1.3 TFR (Toulemon 2011).

We use data from Haub (2012) for 39 countries¹ for the period 1996-2011. For the most recent year for which a TFR is available, Iceland had the highest at 2.2 and Taiwan the lowest at 0.9. Near Iceland at the high end are Ireland and New Zealand at 2.1 and Sweden, United Kingdom and France at 2.0. Joining Taiwan at the low end are

¹ I use 39 of the 48 countries in his table of “Fertility Rates for Low Birth Rate Countries, 1995 to the most recent year available.” Excluded are two communist countries (China and Cuba), Israel which has had a TFR near 3.0 for the entire period, and the six countries that constituted the former Yugoslavia (Slovenia, Croatia, Bosnia-Herzegovina, Macedonia, Montenegro, and Serbia).

Latvia, Singapore and South Korea at 1.2 and Hungary, Moldova and Romania at 1.3. While an increasing age at first birth is found in all the countries, there is considerable variation in the beginning value, pace and most recent values (Mills et al. 2011, Table 1).

These 39 countries also vary in their TFR trends, direction and volatility, over the past 15 years. In 21 countries there were increases in the TFR, with most of the increases in the last few years, likely associated with a slowing of the trend towards delayed childbearing (see Bongaarts and Sobotka 2012; Goldstein et al. 2009). There were declines in 7 countries. And for 11 countries the TFRs at the end of the 15 years were essentially the same as in 1996, and often with fluctuations in between. An example of the latter is Latvia which had a TFR of 1.2 in 1996 and 2010, with convex trend between those years, reaching an apex of 1.5 in 2008.

Further, for most of these countries, 29 to be specific, the difference between the highest TFR and the lowest TFR is 0.29 or less – a fairly narrow band of variation. Germany is the extreme case of stability. Between 1996 and 2010, the difference between the highest and lowest TFR in Germany is 0.07, which is little more than rounding error. Indeed, the former West Germany has been at a TFR of 1.4 since the 1970s (Goldstein and Kreyenfeld 2011). At the other extreme, Taiwan had a difference of 0.87 between its highest and lowest TFRs. For Moldova and South Korea, the difference is 0.49, and for Bulgaria and Sweden the difference is 0.48.

The relationship between fertility and marriage has also changed and increasing diversity has emerged (Klüsener 2012). In 2010 in Japan the proportion of births outside of marriage was 2% (National Institute of Population and Social Security Research 2010: 67). In contrast, in Iceland, 64% of the births were non-marital (EUROSTAT 2012). In between these extremes, the proportion of non-marital births is: Greece (7%), Italy (21%), Norway (54%) and Estonia (59%). For the countries with high levels of non-marital fertility, most of the non-marital births are occurring within cohabiting unions (Klüsener 2012).

While cohort data is available for fewer countries, variation in completed fertility (Frejka and Sobotka 2008; OECD 2012) and in completed parity distributions (Frejka 2008b) is clearly evident. For the 1965 birth cohort, women in New Zealand have a completed fertility rate of 2.3 compared to 1.5 for Italian women (OECD 2012, Chart SF2.1.B). The proportion childless in the 1963 birth cohort in Portugal is 0.05; the comparable proportion for Italy's 1965 birth cohort is 0.24 (Frejka 2008b).

So, in brief, substantial variation exists across low fertility countries in levels, trends, and parity progression ratios. Iceland's TFR is more than two times larger than Taiwan's, and New Zealand's completed fertility rate is almost a full child higher than Italy's. In the next section some terms crucial to the remainder of the paper are defined, and then we turn to the question of what factors might possibly explain this variation.

SOME TERMINOLOGY

Since terms like institutions, norms and policy can be defined differently by various authors and disciplines, we define our use of them relying on Portes (2006). We begin with *values*, which represent moral doctrine, are resistant to change, and are commonly measured at the individual level by *attitudes* toward moral issues and appropriate behavior. The symbolic elements needed for human interaction, including values and language, constitute *culture*. *Norms*, which are built on values, proscribe appropriate and inappropriate behavior. Norms are the restraining elements of culture, and come together

in *roles* which are parcels of sanctioned behaviors of various social-structural positions, including student, worker, mother and father. Institutions are the set of norms, formal and informal, that guide relationships among role occupants in structured social interactions. *Policies* are formal norms or rules within institutions, and exist until formally changed.

Institutions, with their informal norms and formalized policies, influence the behavior and social interactions of individuals and households. But the reverse is also the case: the behavior of individuals and household influence institutions. As such, institutions are not static, but typically the pace of institutional change is glacial.

Finally we frequently use the terms *micro* and *macro*. In the context of fertility, micro here means the intentions, preferences and behavior of individual women and men. Macro, on the other hand, refers to the broader social context in which people live. This social context includes the institutional, policy, normative and value structure of a place. Place can refer to a variety of different levels, including the local neighborhood, the city or town, state or province, and country. All are relevant, but most of the important institutional and policy factors reviewed here operate at the country level, and they will receive the most emphasis. Further, macro can also refer to the ethnic/racial, religious and/or language group to which one belongs. African Americans, Hispanics and non-Hispanic whites in the U.S. provide an example. While acknowledging that such groups can play an important role in fertility differences in low-fertility countries, with Mormons in the U.S. being a salient example, such differentials tend to be country-specific, sometimes idiosyncratic, and are beyond the scope of the present paper.

A CONCEPTUAL OVERVIEW

Figure 1 provides a conceptual overview, a figurative roadmap, of factors affecting fertility, differentiating between micro and macro levels. Figure 1 also makes it clear that fertility is something that can and does occur over time, and as time passes both the macro climate can change as well as the attributes of individuals and their partners (if they have a partner). The figure is at a high level of abstraction, but it still illustrates the complexity of understanding the fertility process in today's low fertility countries. The figure acknowledges that if a micro factor operates at the country level it is likely a constant for that country and, hence exceedingly difficult to empirically demonstrate its effect on fertility in a methodologically defensible manner.

Consider first the box in the center of the figure showing micro level processes. As is self-evident, bearing children is an individual-level process, and, as such, both theoretical and empirical work needs to address individual level variation. To indicate that causality can flow in both directions for many attributes of women and their (potential) partners the arrows within this central box do not have heads. The long American literature on the causal relationship between education and fertility provides a good example (CITATIONS TO BE PROVIDED). This review is concerned with social factors, but the figure shows that biological factors are also important, and the biological component adds uncertainty to the plans of women and their partners. (See te Velde et al. 2012 for a review of the relation between deliberately postponing fertility and the likelihood of having difficulty conceiving and carrying a pregnancy to birth.) Partner attributes can affect the relationship between the various attributes of a woman and her childbearing; partnering with a person who already has children is an example (e.g. Thompson et al. 2012).

The box at the bottom of Figure 1 makes it clear that, for individual women and their partners, childbearing could occur over a relatively long time period, 30+ years. During this time, many characteristics of the woman might change including her education, income, career prospects, and her responsibilities to others. As the result of migration, the context within which she is embedded could change. The same is true for her partner and /or potential partners. The passage of time could produce additive or interactive effects. An example of the latter is the effect of a woman's parents' education on the timing of her first birth: in the teen years the effect tends to be negative as the better-educated parents provide examples, incentives and resources to avoid childbirth at an age considered too young, but if she reaches age 30 still childless the effect becomes positive presumably because the better educated parents not only want to become grandparents but also because they are likely to have the resources to help at the margin in the decision-making process (Rindfuss et al. 2007). Similarly, at the macro level, institutions, policies and other macro factors change over time. Sometimes that change is relatively slow as is usually the case with broad institutional factors, but the change can be quite rapid as might be the case with the passage of a new policy or a severe economic downturn.

Finally, the two boxes at the top represent macro factors. Culture and shared history are in their own box to emphasize that institutions and policies do not arise *de novo*; rather they are shaped by a country's or a province's culture and shared history. This is a cautionary note that just because a policy has a certain effect in one country or province does not necessarily mean it will have the same effect in another country or province. As such, culture and shared history can influence institutions and policies as well as influence the effect that institutions, policies and other factors have on the micro-level fertility process.

ASSUMPTION: Women (and men) want to have children.

Mid-Twentieth Century demographers had solid, intuitively appealing reasons why people wanted to have children, including the need for agricultural helpers in non-mechanized farm work and someone to care for them in old age in settings where pension and welfare schemes were absent. In today's low fertility settings, comparable intuitively appealing and logically compelling reasons for why people want to have children have yet to be presented by demographers or others.

A clever and intriguing argument is put forward by Morgan and King (2001) that there is a genetic predisposition to love and support one's offspring, and that doing so is pleasurable. But as they note, this argument probably has more traction for second and higher order children; it does not provide an intuitively appealing argument for why people have the first child. Blake (1979) has made arguments about a normative push to have children resulting from negative stereotypes of those who remain childless. Yet almost a quarter of the Italian women in the 1965 cohort managed to remain childless² despite such negative stereotypes, suggesting that their normative influence on childbearing can be quite mild. Further, in a context like Italy's, where young girls and boys interact with many adults who do not have any children, the expectation is that the

² Note that they remained childless most likely because they had to choose between work and childrearing, about which more will be said below. It is not that they never wanted children. It is likely that early in their childbearing years they wanted to have children under certain circumstances and that those circumstances never materialized.

normative push to have children weakens (Lutz and Skirbekk 2005). Another argument is that children increase the social capital of their parents (Astone et al. 1999; Schoen et al. 1997). Undoubtedly this is the case as one's children's friends and their parents become part of one's own social network, but clearly there are many other ways to increase one's social capital that do not involve the costs (financial and other) of raising children. And finally, the early value of children studies (Bulatao 1981; Hoffman and Hoffman 1973; Hoffman and Manis 1979) directly asked why people wanted to have children. The answers tended to emphasize affection (to have someone to love) and fun (to have someone to play with). Even if we grant the assumption that people can correctly articulate the reasons why they do what they do, a formidable assumption, there are other ways of obtaining affection and fun. In short, while these and other arguments as to why people have children may have some merit, neither standing alone nor collectively do they provide a compelling and intuitively appealing rationale for having children.

This situation is in contrast to arguments against having children, or having 2-3 children, which include that they are expensive, that they require substantial guidance, and that raising them can conflict with career goals, volunteer efforts or leisure pursuits. Further, young children, especially infants and toddlers, but not limited to them, require supervision 24/7. Yes, even when young children are sleeping in most low fertility societies it is expected that a responsible adult is nearby if the child suddenly needs assistance. The responsibility for this supervision typically falls on the mother – although there certainly is no necessary reason why this needs to be the case. So if mother is going to work at a job, go out for an evening or help a friend with something, she either brings the child with her or arranges for someone else to supervise the child. And if plan A on a given day is not going to work, perhaps because the child is sick, the mother has to be ready with plan B, which in many cases requires her to stay home from work or skip an evening of planned activities.

Why is this asymmetry between reasons for having children and not having them important? It suggests that given today's fertility rates that there is probably more room for declines than increases. It also suggests that those doing population projections and forecasts should not put a symmetrical band around their medium fertility assumptions, but rather should allow the lower bound to be a greater distance from the medium assumption than the upper bound. Finally, it suggests that any institutional or policy changes designed to affect fertility will have to have extra oomph to have a noticeable impact to increase fertility given that the reasons for having children are not as compelling as the reasons for not having them.

ASSUMPTION: Women (and men) want to be in the labor market

A strong assumption of this paper is that women and men want to be in the labor market, that is, they want to work³. For the countries under consideration, that men want to work has been a given for decades and no more will be said here except to note that in those countries that have instituted policies to encourage fathers to take paternity leave the uptake has been very slow, reinforcing the male as breadwinner model (CITATIONS TO BE PROVIDED).

³ "Work" is used here as a synonym for being in the paid labor force. This is not to imply in any way that work within the home is not work. Rather work is used as a synonym for being in the paid labor market simply for linguistic ease.

The proportion of women in the labor force, including those with very young children, has increased markedly in recent years, and that trend alone is probably sufficient evidence that women want to work. This is not to argue that some women do not want to be full-time mothers and housewives for part of their adult years. Clearly some do. Rather the point is that for large proportions of women, work is a desirable and important part of their lives.

A key question is what motivates women to be in the labor force. A common assumption among economists (e.g. Apps and Rees 2004; Recoules 2011; Viitanen 2005) is that the sole motivation for women to work is to gain/increase their income. While money is indeed a powerful motivator, there is considerable evidence that it is neither the only one nor the most important. For example, Kalleberg and Marsden (2011) examine workers' work values⁴ for the U.S. 1973-2006 and find during the 23 year period that work which is "important and gives a feeling of accomplishment" was the single most important value in each cross-sectional survey. Income consistently came in second. Clark (2005), using data from the International Social Survey Programme (ISSP) West Germany, Great Britain, U.S., Hungary, Netherlands, Italy and Norway, also finds that income does not rank as the highest or most important aspect of a job⁵. In both studies, the lower ranking of income was more evident for women than men. Further, interaction with co-workers can provide another attraction of being in the labor market (Roberts 2007). Anecdotal evidence also suggests that women want to work for a variety of reasons in addition to the remuneration that jobs provide.

Now why is it important that there are multiple motivations for women to work? It means that we cannot assume that women have a weak attachment to the labor force -- an assumption that may have been responsible for Easterlin's (1981) predictions about the future course of American fertility not materializing. Rather, we need to assume that women have various and strong motivations to be in the labor force.

ASSUMPTION: Changeable, but forward-looking and human agency.

Although it has long been settled that women (and their partners) make fertility plans and decisions one birth at a time (Namboodiri 1981, 1983; Ryder 1973; Udry 1983), and that most women who remain childless do so through a series of postponement decisions rather than an early decision to never have any children (Veevers 1973, 1979), it is also important to remember that those entering the childbearing years have occupational and fertility expectations, and that these expectations help shape their planning and behavior (e.g. Hoem et al. 2006; Rindfuss et al. 1999; Tesching 2012). These expectations and plans might be vague, but even vague plans can influence behavior.

⁴ The question used in 16 rounds of the General Social Survey is:

Would you please look at this card and tell me which **one** thing on this list you would **most** prefer in a job?

High Income

No danger of being fired

Working hours are short, lots of free time

Chances for advancement

Work that is important and gives a feeling of accomplishment

Which comes **next**?

Which is **third** most important?

Which is **fourth** most important?

⁵ The ISSP uses the following job values: high income, flexible work hours, good opportunities for advancement, job security, interesting job, allowed to work independently, allowed to help other people and useful to society.

Perhaps the best example is the association between field of study in school and completed fertility (Hoem et al. 2006; Tesching 2012). Women who study fields that prepare for occupations more compatible with the mother role, such as primary school teacher or nurse, have higher completed fertility than those who prepare for less mother-friendly fields. Even if sorting out the causality is close to impossible, just the association between field of study and childbearing is strong circumstantial evidence for the effect of early plans and expectations. These early plans, however vague, suggest human agency as it is termed in the life course literature (Elder 1998). These early plans are likely to change (Rindfuss et al. 1999; Tesching 2012), as young women learn what is involved in both the mother and worker roles. The important point here is that there are both early goals and that they are mutable, and that understanding variation in fertility across low fertility societies requires consideration of both early plans and what might make them change. The changeable component has implications for the predictive power of fertility preferences and intentions. It is well-known that fertility intentions do not anticipate period factors, such as the recent Great Recession, and as a result are not helpful in anticipating sharp changes in period fertility rates. This was dramatically illustrated by the American 1970 National Fertility Study and the inability of its intentions data to foretell the subsequent sharp downturn in U.S. fertility (Ryder and Westoff 1976). On the other hand, since then, fertility intentions have been closely related to actual fertility for both period and cohort rates. But this close relationship occurs as a result of a high proportion of individuals under- and over-shooting their earlier intentions, and in the aggregate these “miss-predictions” have tended to cancel one another (Hagewen and Morgan 2005; Morgan and Rackin 2010).

CORE DILEMA FOR WOMEN: Role incompatibility

Taking these three assumptions together (women want to have children, want to work, and plans in both spheres exist but are mutable) brings us to the core dilemma for most women in low fertility countries: the mother and worker roles tend to be incompatible. This is an argument that has been around for a long time (Davis 1937; Myrdal 1941; Presser and Baldwin 1980; Rindfuss 1991; Stycos and Weller 1967), yet it is as relevant today as when Kingsley Davis was writing three-quarters of a century ago. Indeed it is more relevant today because of the increased educational attainment for women and their desire to use that education in the labor force.

The core of the role incompatibility argument is that it is difficult to simultaneously be in the mother and worker roles. *A fundamental proposition is that anything which eases this incompatibility, that is, any factor that permits a woman to juggle these two roles will lead to earlier and higher fertility levels.* These factors can be quite subtle, such as the hours when stores are open for time-harassed mothers to shop, convenience of transportation between one’s house and place of work, and/or the availability of high-quality, reasonably-priced pre-prepared food that can ease the time demands of preparing family meals. In short, some quite simple aspects of everyday life can make a difference. Some of the relevant factors can be less subtle, such as the availability of acceptable, affordable, convenient child care centers, overt discrimination in the labor market against mothers, and the lack of available/affordable housing for young couples.

Perhaps the most discussed aspect of the mother-worker role incompatibility is the association between TFRs and female labor force participation (FLFP). Both

traditional sociological and economic theory predict a negative fertility and FLFP relationship at the macro and micro levels. And in the 1960s and 1970s the cross-sectional, country-level correlation between TFR and FLFP was negative. Rindfuss and Brewster (1996) first reported the emergent positive relationship between fertility and FLFP using 1998 data. Since then, this switch from a negative to a positive association has been widely reported (Ahn and Mira 2002; Brewster and Rindfuss 2000; Del Boca 2002; Esping-Anderson 1999; Rindfuss et al. 2003). This switch in the sign of the relationship has been of more interest to economists than sociologists or demographers, perhaps because of the central role that money plays in economic theories. Theoretical and empirical speculation about the causes of this change focused on different institutional responses across countries to the changed social structural landscape (increased educational attainment, increased FLFP, the contraceptive revolution and globalization) (e.g., Bonoli 2008; Bratti and Tatsiramos 2008; Fernández and Fogli 2006; Hirazawa and Yakita 2009; Matysiak and Vignoli 2008; Morgan and Taylor 2006; Rendall et al. 2009).

Note that the father and worker roles have tended not to be incompatible because fathers traditionally did not interrupt their job demands to assist in childrearing, because fathers spend far less time on household tasks than mothers, and fathers take less responsibility for day-to-day supervision of children. To the extent that progress is being made towards gender equality this situation will change. We will then see emergent role incompatibility between the father and worker roles, and this will likely be antinatalist even in settings where the incompatibility between the mother and worker roles has been reduced. The reason it will likely be antinatalist is that in the gender segregated labor markets of the typical low fertility country the male-dominated jobs tend to be less family friendly than female-dominated jobs.

Finally, along with role incompatibility, there is considerable theoretical work suggesting that financial issues are also critical, including the cost of children and/or opportunity costs (CITATIONS TO BE PROVIDED). Hence a second general proposition in the literature is that anything that reduces the cost of children (direct and/or opportunity) should result in earlier and more childbearing. But the evidence, although somewhat weak, is that time and role preference conflicts are more important than monetary issues. One indicator for this conclusion is the rather weak effects found for policies that provide parents with extra income (Assave et al. 2006; Cohen et al. 2007; Gauthier 2007; Gauthier and Hatzius 1997; Kearny 2004; Laroque and Salanie 2004; Milligan 2005; Whittington 1992; Zhang et al. 1994).

MICRO-MACRO FERTILITY INFLUENCE DOMAINS.

While any aspect of everyday life as well as long-term influences can make it easier or more difficult to combine the mother and worker roles and/or affect the cost of raising children, some are more prominent and found in all countries. Chart 1 shows the more prominent factors possibly affecting the timing and quantum of fertility: education, labor market, child care, housing, transportation, gender equity, and welfare state policies. These constructs have both micro and macro aspects, which are shown in separate columns in Chart 1. Within the macro-level, sometimes there are policy instruments that are used to attempt to deliberately influence fertility. Other times policies may affect fertility, but do so inadvertently. The inadvertent policies are important to consider because a country may be trying to influence fertility behavior in one direction, but have

a variety of inadvertent policies that are influencing policy in another direction. An example of an inadvertent policy would be one that required banks to hold larger reserves which, in turn, led to a tightening on lending which led to greater difficulty for young adults to purchase a house or apartment.

Many of the institutional elements listed in Chart 1 operate at the country level in most countries. Welfare state policies are an example. Further, the list of institutional elements is extensive but not exhaustive (nor was it meant to be exhaustive). This combination of numerous variables operating at the country level creates an empirical problem that is not easily solved in a methodologically defensible manner. The problem is that there are relatively few low fertility countries relative to the number of variables that need to be controlled thus creating a degrees of freedom problem – a topic to which we return below.

Another point relative to the extensive list of institutional variables in Chart 1 is that many combinations are possible that could lead to fertility levels around replacement and similarly many combinations that could lead to quite low levels of fertility. Thus policy makers wishing to increase (or decrease) fertility levels need to consider the full array of options available, including those that inadvertently affect fertility, and decide which fit best with the culture, history and norms of the country, as well as with the available budget.

It is beyond the scope of this paper to discuss every micro and macro factor listed in Chart 1. But to illustrate, we select several to discuss in detail, starting with education. The education discussion will be longer than the rest to illustrate the complexities shown in Figure 1 as well as Chart 1.

EDUCATION.

At the micro level, there are three educational aspects expected to affect fertility: enrollment, attainment and field of study. All three can be endogenous with respect to fertility. Educational attainment is the variable that has been part of the study of fertility the longest and conventional demographic wisdom has been that educational attainment has a negative effect on fertility. However, evidence has been emerging from the Nordic countries that the negative education and fertility gradient has been disappearing for women and that among men a positive relationship has emerged (CITATIONS TO BE PROVIDED). As discussed below, the individual-level relationship between educational attainment and fertility likely varies with the institutional situation within a country. Enrollment in school is consistently found to be linked to delays in childbearing and the reason is straightforward: it is difficult to simultaneously be a student and a parent, especially a mother (CITATIONS TO BE PROVIDED). Finally, more recent evidence discussed above, suggests that some women choose their field of study such that their education leads to a job in a family-friendly field. Further, Tesching (2012) finds that those who go back to school after their first child predominantly choose a family-friendly field of study.

At the macro level, educational systems differ markedly across the countries considered here. For example, in some countries, such as the United States, many educational policies are set at the local level for primary and secondary schools, and at the tertiary level by individual schools and even individual instructors. In other countries, such as Austria, numerous educational policies are set at the country level, including major curricula aspects. Why might this matter for fertility? In countries where control

of aspects of the educational system is centralized one would expect more standardization and such training specificity means that employers have a better idea of what graduates actually know (CITATIONS TO BE PROVIDED). This, in turn, might make the school-to-work transition smoother, leading to earlier childbearing (Rindfuss and Brauner-Otto 2008).

Countries can also differ in the availability of schools, specifically at the tertiary level, which can affect educational attainment as well as competition for jobs. In Korea, for example, approximately 80 percent of recent high school graduates have gone on to college – a proportion far higher than many other low-fertility countries. To the extent that the Korean labor market will not have sufficient job openings suitable for the skills, interests and expectations of college graduates then these young women and men might face unemployment or settle for jobs that frustrate them. This in turn could lead to later and lower childbearing.

The openness of educational systems or the ease of re-entry after a break from school is another aspect that can affect fertility timing and quantum. While the majority experience in the countries covered here is to finish all the formal education one might ever obtain prior to becoming a parent (e.g. Corijn and Klijzing 2001), the flexibility of being able to go back to school after one's child(ren) reach an age where parental care has been reduced in intensity would make it easier to sequence education, fertility and work. For example, in Norway, where the educational system is open and flexible, an examination of the education and fertility histories of members of the birth cohort of 1964 who became parents revealed that 21 percent of the women and 20 percent of the men had a higher level of completed education at age 39 than when they first became a parent (Kravdal and Rindfuss 2008). In contrast, in Japan, for ages 20-30 for birth cohorts 1960-1970, only 1 percent returned to school after being out of school (Rindfuss et al. 2008). To pick another example, at ages 30-39 in New Zealand 12 percent are enrolled in school compared to 3 percent in Italy (OECD 2006, Table C1.2). We expect that the openness of the Norwegian and New Zealand educational systems is related to their higher fertility levels; education decisions are less permanent, can be reversed and young adults know this when they are contemplating becoming a parent.

Institutional aspects of the educational system likely affect the relationship at the micro level between education and fertility. Our expectation is that the more flexible and open the educational system, especially if coupled with greater gender equality, flexible labor markets and available child care, the less steep the negative education-fertility gradient. Unfortunately we do not have education and completed fertility data available for a wide variety of countries⁶, but some suggestive data are available. Two countries with relatively small differences for women in completed childbearing by education are Norway and Sweden. For Norway the 1960-64 birth cohorts, the relationship looks like this: lower secondary – 2.1 children, upper secondary – 2.0, some college – 2.0 and college graduate or more – 1.8 (Kravdal and Rindfuss 2008, table 2). And for Sweden the 1960 birth cohort, it is lower secondary – 2.2, upper secondary – 2.1, and post

⁶ Most countries no longer collect children ever born data on their census, and so the main source for an earlier generation of demographers for cohort differences in children ever born by education is no longer available. Population registers have the requisite information, but very few countries have population registers. And most fertility surveys do not have a large enough sample of women at the end of the childbearing period to provide reliable estimates.

secondary 1.9 (Tesching 2012, table 3.1). In contrast for Taiwan for women aged 40-49 in 2008, it is primary – 2.7, junior high – 2.6, senior high – 2.1, college – 1.5 (Yu-hsuan Lin, personal communication). Taiwan has a much less flexible education system, along with less gender inequality and less available child care, and it has a substantially steeper education-fertility gradient⁷. As the proportion of women with tertiary education increases in the more recent cohorts, the fertility level of college-educated women will become increasingly important component of a country's overall fertility levels.

Differences in educational systems also affect the costs (monetary and other) of children. If public schools are of poor quality, parents may choose to send their children to private schools. The hours schools are open vary. The longer during the day schools are open, the lower the mother-worker role conflict. In Germany, primary schools end their day early in the afternoon; in contrast, in France schools are open with after school programs until 6:00 pm. Tutoring programs can be time intensive for the mother (getting children to and from, and supervising homework the tutors assign). In several East Asian countries there is considerable pressure to enroll students in after-school tutoring programs, sometimes called “cram schools.” For example in Korea, over four-fifths of primary school children are in cram schools and Korean households spend 10 percent or more of their annual household income on such schools and tutoring (Basten et al. 2012).

LABOR MARKET.

With the massive increases in female education which have occurred, being in a job, using that education has become an integral component for women during the young adult and middle age years. As noted above, while income is an important motivator for being in the labor force, it is by no means the only one. Women (and men) want jobs that are challenging, interesting, with co-workers who are engaging. While a job is important, satisfaction from that job is also important – perhaps more important. And young adults will sometimes wait until the “right” job is available, with the wait postponing childbearing. The wait may involve obtaining an initial job in the field studied in school or it may involve reaching a certain rung on a career ladder, such as tenure in a university or partner in a law firm. Further, to the extent that women are discriminated against for promotions because employers worry that women will leave the job upon the birth of a child, and to the extent that this discrimination is well-known among young women, a likely reaction among women who desire a career is to postpone childbearing until a desired series of promotions was achieved or they might decide to remain childless.

Today at the country level there is a positive association between period TFRs and the female labor force participation (FLFP) rate: the countries with the greatest percentage of women in the labor force also have the highest fertility levels. This positive FLFP-TFR relationship was first reported by Rindfuss and Brewster (1996). Since then a number of papers documented that the FLFP-TFR relationship was negative in the 1970s and crossed over to positive sometime during the 1980s (CITATIONS TO BE PROVIDED). There has been considerable speculation on the emergence of this positive correlation, and much of it suggesting that how institutions, especially the labor market, accommodated and adapted to the increased preference for women to be able to use their increased educational attainment in meaningful jobs in the labor market (CITATIONS TO BE PROVIDED).

⁷ We recognize that the more recent decline from very high levels of fertility in Taiwan relative to Norway and Sweden could also be part of the difference, but likely a small part.

Labor markets vary considerably in the extent to which the jobs of those already employed are protected (Brzinsky-Fay 2007; Wolbers 2007). As the degree of job protectionism increases, it is difficult for employers to fire those they already employ even if the company experiences an economic downturn, and, in reaction, employers are reluctant to hire additional workers until they are certain that they will need the new workers for the long term. A high degree of job protectionism tends to result in higher levels of youth unemployment, which leads to later and lower levels of childbearing (Bernardi and Nazio 2005; Kurz et al. 2005; Rovny 2011).

There are two related issues. One is the growth in contingent jobs, that is, jobs without job security. Contingent jobs tend to have lower wage rates than secure jobs. And typically they do not have standard fringe benefits, such as health insurance and pension plans. A greater proportion of contingent jobs creates more uncertainty among young workers and would be expected to lead to later childbearing. The second related issue is the existence and extent of an active labor market policy, which is the presence of programs that retrain unemployed individuals for emerging occupations so that the unemployed can obtain a new job. There is evidence that the presence of training programs for the unemployed is related to higher fertility because they ease the re-entry of mothers into the labor force and reduce the length of unemployment spells for their husbands/partners (Nelson and Stephens 2012).

In addition to active labor market policies, aspects of the manner in which firms recruit workers can impact the ease with which mothers can re-enter the labor market if they left it to rear young children. Japan offers an example of a hiring system that disadvantages mothers attempting to re-enter the labor force because play an important role in placing students in permanent jobs, that is jobs with security and benefits (Inui 2003; Ishida 1998; Kerckhoff 1995). Under the “new graduate recruitment system,” schools facilitate contacts between graduating students and employers wishing to fill job openings. Mothers planning to re-enter the job market would not have the assistance in the matching process and are, thus, much more likely to obtain a contingent job than a regular one. The nature of this hiring process is well-known within Japan and is likely to lead to higher levels of childlessness and later childbearing among those who do have a child.

The availability of part-time jobs can lower the mother/worker incompatibility, and can facilitate the re-entry of mothers into the labor force (Rosenfeld 1996). But part-time jobs tend not to be career jobs, with possibilities for advancement into positions with more responsibility, higher pay and greater independence, and, as such, might not be attractive to women with tertiary education. The Netherlands, which has a higher percentage of part-time positions than any other country examined here, is an exception with respect to part-time career jobs. In the Netherlands, the government, trade unions and employers got together to bring about the establishment of professional, career-type part-time jobs (Hakin 2007). A Netherlands-style part-time job system should be pronatalist.

HOUSING.

In most of the countries discussed here it is expected that young adults will move out of the parental household into their own dwelling unit prior to having children. Japan is an exception and we discuss that exception first. In Japan the normative expectation is that first-born sons and their wives will live in his parents’ dwelling unit. There is some

evidence that this arrangement is pronatalist in that the paternal grandparents can watch the children while the mother works (Morgan and Hiroshima 1983). There are also arguments that the Japanese expectation for first-born male post-nuptial living arrangements might lead to lower fertility through postponed marriage in a country where virtually all childbearing occurs within marriage: Japanese women are now hesitant to enter an arrangement whereby they are expected to take care of their husband's parents as well as their own children and with almost no help provided by their husband (Rindfuss 2004).

If living with parents is not the preferred housing solution, then young women and men face decisions about location, cost and owning versus renting. Consider purchasing a dwelling unit first. Cost is one obvious element: the higher the average selling price, other things being equal, the more difficult to purchase a dwelling unit, and hence later and lower childbearing would be expected (e.g. Hughes 2003; Lauster 2006). Selling prices can be affected by many factors, including those that were enacted without the intention of having a negative impact on fertility. Various zoning policies would provide examples.

In addition to cost, the ability to finance a dwelling unit purchase is crucial since few young adults would be in a position to pay cash. Countries differ substantially with respect to mortgage availability (Chiuri and Jappelli 2003). Required mortgage downpayments have been as high as 40-50 percent in Spain and Italy, and under 10 percent in the UK and the US. (Jappelli and Pagano 2002; Mandic 2008; Mulder 2006). Mortgage lenders prefer to reduce their risk by knowing as much as possible about the credit worthiness of applicants, but the availability of detailed credit reports varies widely across countries (Chiuri and Jappelli 2003; Jappelli and Pagano 2002). Further, the ease with which lenders can foreclose if borrowers stop paying on the mortgage also affects the willingness of banks to lend and the rate at which they lend, and foreclosure laws vary substantially across countries (Chiuri and Jappelli 2002; Mandic 2008; Mulder 2006b; Stephens 2003). Any and all of these factors that negatively affect the availability and terms of mortgages likely vary inversely with fertility tempo and quantum.

Housing subsidies (such as tax schemes, direct cash payments, rent control and a normative climate that encourages parents and other relatives to assist young adults with their housing expenses) (Aassve et al. 2007; Haurin et al. 1997; Iacovou 2002; Schröder 2008; Stevens 2000), should lead to earlier and more childbearing. This is especially the case if the subsidies are substantial⁸.

The mix of housing types, single- or multi-family, also varies across and within countries. Those in single-family detached houses tend to have an earlier age at first birth than those in multi-family units (Mulder and Wagner 2001; Kulu and Vikat 2007). However the causality here is ambiguous. It is quite possible that couples anticipating having a child in the near future perceive a single-family detached house to be more conducive to childrearing and move into a single-family house prior to the conception/birth.

There are also neighborhood factors that could affect fertility. For example, we would expect that the availability of safe, low-crime neighborhoods would make childrearing easier, leading to earlier and more fertility. Similarly, child-friendly

⁸ There may be a point, however, when the subsidies are so substantial that they serve as a disincentive for a young person to "settle down" and assume adult roles including becoming a parent.

infrastructure, such as sidewalks, parks and playgrounds, and nearby primary schools, should be pronatalist.

GENDER EQUITY

At the individual level, gender begins with the sex of the individual. But then it quickly extends to the values (as indicated by attitudes), expectations, and behavior of the individual with respect to the extent that familial/household and labor force roles are sex-typed (or should be). For example, does the individual think that household tasks should be equally shared, that men should be responsible for traditional male household jobs and women for traditionally female ones, or that women should be responsible for all household tasks. Clearly the views and behaviors of women and their (potential) partners with respect to the household and childrearing division of labor goes a long ways towards defining the level of incompatibility between the wife/mother roles and the worker role (e.g. Mason and Oppenheim 1997; McDonald 2000a, b; Neyer 2006).

At the macro level, the first thing to note is that the gender equity structure of a country is not like the education or labor market institutions which cover a single major human domain. Rather gender equity cross-cuts and permeates all the other institutional domains. To see this, contrast a gender-equal society with a male dominant one. In a gender neutral country one would expect primary school teachers, some of whom are men, to encourage both girls and boys to reach their full potential in mathematics, employers to offer equal promotion opportunities to men and women as well as providing family-friendly work schedules, and public transportation managers to insure that subways and trains accommodate women in the last trimester of their pregnancy and parents pushing a baby carriage. In contrast, in a male-dominant society, one would expect primary school teachers, very few of whom are male, to favor boys in math, employers to reserve supervisory positions for males and not concern themselves with work-family conflicts, and public transportation managers to cram as many people as possible into their trains as busses as possible, especially during rush hour.

It is the pervasiveness of the gender system that makes it so fundamentally central to the level of fertility in a country because it permeates the decisions of managers and policy makers. Consider the example of Japan's tax and pension systems which contain earnings thresholds that if crossed by the person earning the least in a marriage, usually the wife, trigger tax liability increases for the other spouse (sometimes yen for yen) and trigger the necessity for the lower earner to now contribute to both the pension and health insurance systems (Akabayashi 2006; Yu 2002). This system likely contributes to marriage and fertility delay. And such tax and benefit rules were probably instituted on the assumption of a male breadwinner model without explicit thought for their fertility implications.

Male-dominant societies tend to have an unequal division of labor at the couple level, and such inequality has been linked empirically to lower fertility levels (Miller-Torr and Short 2004; Mills et al. 2008; Olah 2003). Linking the micro and macro, Hook (2010) shows that men do a lower share of housework in countries where both work hours and parental leave are long; men do a greater share of housework in countries where there is more public child care available and where men are entitled to parental leave.

METHODOLOGICAL CHALLENGES

Recent reviews have repeatedly indicated the challenge of assessing the impact of institutional factors on fertility in a methodologically defensible manner (Björklund 2006; Hoem 2008; Letablier et al. 2009; Mills et al. 2010; Neyer and Andersen 2008). First, the institutional factors listed in Chart 1 have not been manipulated in an experimental design, and thus the most powerful method has not been used. Second, the sheer volume of potentially important institutional factors makes it difficult to isolate the effect of just one or two. Third, institutional factors typically operate at the country level, creating a degrees of freedom problem given how few countries have had low fertility for a sufficiently long time (DiPrete et al. 2003). Fourth, using micro data, it is difficult to identify the effect of an institutional factor unless it varies within a country. Within-country variability is not present in all relevant institutional factors, making this analytic approach not viable for the full range of institutional factors thought to affect fertility. Furthermore, even if it were possible to ascertain the impact on fertility of a specific policy within a specific country, that tells us little about the effects of policies in other countries that might have different cultures and histories.

The institutional factors that have received the most empirical attention are direct cash benefits such as baby bonuses and family allowances (Aassve et al. 2006; Cohen et al. 2007; Fomenko 2009; Laroque and Salanié 2004; Milligan 2005), indirect transfers such as tax exemptions (Gauthier 2007; Kearny 2004; Whittington 1992; Zhang et al. 1994), policies aimed at improving work-family compatibility such as maternity leave and the provision of child care (Castles 2003; Datta Gupta et al. 2008; Del Boca 2002; Hank and Kreyenfeld 2003; Letablier et al. 2009; Rønsen 2004), and differences in labor market institutions (Adsera 2004; Mills et al. 2005). Findings regarding their effects on fertility have been inconsistent - likely due to using aggregate fertility rates, restricting the analysis to one or two countries, using data of questionable quality, and including endogenous variables. To illustrate, when examining the effect of child care availability in Norway (Rindfuss et al. 2007, 2010) we ran models controlling and not controlling for endogenous aspects of the 435 Norwegian municipalities. When not controlling, the effect of child care availability was negative – the opposite of theoretical expectations; when controlling for these endogenous macro factors the child care availability effects were positive, as expected.

At the multi-country level, arguably the best empirical attempt to date is the recent paper by Kalwij (2010). Importantly, this paper includes micro-level fertility data combined with macro time-varying institutional indicators for 16 countries, random individual-specific effects to avoid dynamic selection bias, fixed country effects to control for endogenous aspects of the countries, and a reduced form model that avoids making untenable assumptions about such processes as labor force participation or partner selection. Yet, there are numerous questionable aspects of the analysis. The micro-level data used does not distinguish biological children from adopted, foster and step children. The structure of the sample selected is such that Ns available in the earliest years across all 16 countries combined are extremely small (e.g., about 229 in 1980, 458 in 1981). Thus the institutional factors operating during the earliest years contribute little to the estimated coefficients. Concomitantly, the earliest years contain a truncated age distribution. The estimated model includes the woman's education as an exogenous variable, even though there are compelling arguments that it might be endogenous. The model includes 9 time-varying country-level variables. With only 16 countries, one

would worry about the stability of results; and indeed the one sensitivity test reported (table 6, p513) suggests instability. Finally, the estimated model does not include institutional factors that may inadvertently affect fertility.

SUMMARY

To summarize, considerable variation exists, and has existed for more than a decade, in fertility levels, timing and trends among those countries that have long had low fertility levels. Some of these countries have fertility levels at or near replacement while others have had below-replacement fertility for so long that their populations have begun declining. Obtaining a better understanding of the causes of this country-level variation is high on the research agenda of social demographers.

Since the major structural changes that occurred in these low fertility countries beginning in the 1960s, it has become clear that many women want to achieve high levels of education and engage in meaningful jobs/careers. There is also strong evidence that women (and men) want to have children. Given the existing gender division of childrearing, for women, a powerful incompatibility between the worker and mother roles now exists. Intuition and economic theories suggest that the monetary cost of bearing and raising children is important to the decision to have children, but, to date, there has been scant empirical evidence that monetary cost has a major impact on childbearing decisions – apart from timing impacts during recessions, especially the so-called “Great Recession.” Rather, it is a different type of “cost,” opportunity cost or role incompatibility, that likely has had a dominant influence on fertility. Further, while a lot of factors at the individual and couple level have important influences on fertility, such individual-level factors are unlikely to explain the broad country-level fertility differences which currently exist. The country-level differences are more likely to be explained by various institutional differences across countries.

With respect to education, the more that the schools in a country also serve as child care places (young age at starting school, availability of programs before and after school, lunch available at school rather than children needing to go home for lunch), the higher fertility is likely to be. Conversely, the more pressure on parents to enroll their children in after-school tutorial-type programs, the lower fertility is likely to be. The higher the societal expectation for educational attainment for individuals, the later childbearing is likely to start and the lower overall fertility. The more open the educational system, that is the ease with which one can re-enter after having dropped out for awhile, the earlier and higher fertility is likely to be.

The structure of the labor market affects the incompatibility of the mother and worker roles, and the ability of young men to obtain and retain jobs that have adequate pay and benefits. Labor markets that are inefficient in matching young adults with employers, perhaps because the educational system lacks training specificity or because a high degree of job protectionism exists, are likely to lead to later and lower fertility. Discrimination, overt or subtle, against women is also likely antinatalist, while the availability of meaningful part-time jobs with career ladders is expected to be pronatalist. An increase in contingent jobs, to the extent that they raise uncertainty and lack benefits, likely lower fertility. And parental leave policies, if they are relatively short-term, pay close to replacement wages, and provide job guarantees, would tend to be pronatalist; but extended maternity leaves with low replacement wages are likely antinatalist.

Child care, to the extent that it is considered acceptable, widely available, high quality and low cost, leads to earlier and greater childbearing. Child care can be provided by the government like in the Nordic model, or by the private sector, including non-profit organizations, as is the American model.

With the exception of countries like Japan where there is an expectation that the first-born son and his spouse will reside with his parents, anything that helps young adults obtain a dwelling unit separate from their parents will likely lead to earlier and more childbearing. Aspects of housing markets that can be important include price and availability, ease of obtaining mortgage financing, availability of housing subsidies, sense of neighborhood safety and child-friendliness, and perhaps the mix of single-family versus multi-family housing units.

The transportation infrastructure of a place can also influence mother/worker role incompatibility. Shorter commuting time to work, child care and schools reduce the mother-work incompatibility and thus are expected to result in earlier and higher fertility. The more friendly public transportation is to pregnant women and baby carriages, the more convenient the transportation system is for parents. Similarly, pedestrian-friendly environments reduce parental concerns about the safety of their children and should be pronatalist.

Gender equity in the home, reduces housework and child care burdens on the mother, thus reducing work-mother role incompatibility and increasing fertility. Anticipation of gender equality in the home also is expected to lead to earlier childbearing. Gender equality in the labor market and across various government programs is also expected to be pronatalist.

Finally, welfare state programs that reduce mother-work role incompatibility are expected to result in earlier and more childbearing. Examples include paternity leave, policies that re-train unemployed workers for emerging occupations, and tax systems that favor dual-earner families.

Solid empirical evidence exists for some of these institutional factors, weak evidence for others, and for still others there has not been any research yet. It is important to finish this summary by noting that countries have packages or baskets of these institutional factors, and it is the mix in a given country's basket that influences fertility. While we expect that it is the availability, acceptability, accessibility and cost of child care that has the greatest influence on fertility in a country, a wide range of other institutional factors also can and likely do have an influence. This means that it is important to compare countries on their institutional baskets which, as noted above, is methodologically challenging.

CONTINUED FERTILITY DIVERSITY?

To what extent is the fertility diversity across countries likely to continue for the foreseeable future? The UN in its population projections assumes convergence in fertility levels over the next 20-40 years. What are the odds that the UN will be correct? Our review of the likely factors behind the broad fertility variation that has existed across countries suggests that convergence is improbable. We expect substantial cross-country fertility variation at least until mid-century. As summarized below, our reasoning is straightforward.

First, the theoretical arguments and empirical evidence reviewed here suggest that broad institutional factors, and the policies embedded therein, play a major role in

determining the incompatibility between being a mother and being in the labor force. The level of this mother/worker incompatibility, in turn, has a major impact on a country's fertility level. When the level of incompatibility is high, women typically have to choose between childbearing/rearing and work, resulting in relatively low levels of both.

Further, the institutions considered here (education, labor market, child care system, housing, transportation, gender equity structure, welfare state policies) are broad, tend to be rooted in a country's culture and shared history, and tend to be resistant to change. In addition, it is likely that it is not one single aspect of a country's institutional make-up that is responsible for that country's fertility level; rather it is a country's entire basket across the seven major institutions discussed here that contribute to a country's level of worker/mother incompatibility. Thus, change would be needed in a variety of institutions across numerous countries to produce fertility convergence, and this seems unlikely.

REFERENCES

- Aassve, A., Billari, F. and Spéder, Z. 2006 Societal transition, policy changes and family formation: Evidence from Hungary. *European Journal of Population* **22**, 127–152.
- Ahn, Namkee, and Pedro Mira. 2002. "A Note on the Changing Relationship between Fertility and Female Employment Rates in Developed Countries." *Journal of Population Economics* 15: 667-682.
- Apps, Patricia, and Ray Rees. 2004. "Fertility, Taxation and Family Policy." *Scandinavian Journal of Economics* 106(4): 745-763.
- Astone, N. M., C. A. Nathanson, R. Schoen, and Y. J. Kim. 1999. "Family Demography, Social Theory, and Investment in Social Capital." *Population and Development Review* 25: 1-32.
- Basten, Stuart A, David A. Coleman and Baochang Gu. 2012. "Re-Examining the Fertility Assumptions in the UN's 2010 World Population Prospects: Intentions and Fertility Recovery in East Asia?" Paper presented at the annual meetings of the Population Association of America, San Francisco.
- Blake, J. 1979. "Is Zero Preferred? American Attitudes Toward Childlessness in the 1970s." *Journal of Marriage and the Family* 41: 245-265.
- Bongaarts, John, and Tomáš Sobotka. 2012. "A Demographic Explanation for the Recent Rise in European Fertility." *Population and Development Review* 38(1): 83-120.
- Bonoli, Giuliano. 2008. "The Impact of Social Policy on Fertility: Evidence from Switzerland." *Journal of European Social Policy* 18: 64-77.

- Bratti, Massimiliano, and Konstantinos Tatsiramos. 2008. "Explaining How Delayed Motherhood Affects Fertility Dynamics in Europe." IZA Discussion Paper No. 3907.
- Brewster, Karen, and Ronald R. Rindfuss. 2000. "Fertility and Women's Employment in Industrialized Countries." *Annual Review of Sociology* 26: 271-296.
- Bulatao, R. A. 1981. "Values and Disvalues of Children in Successive Childbearing Decisions." *Demography* 18: 1-25.
- Cohen, A., Dehejia, R. and Romanov, D. 2007. Do financial incentives affect fertility? *NBER Working Paper* 13700, URL: <http://www.nber.org/papers/w13700>
- Davis, Kingsley. 1937. "Reproductive Institutions and the Pressure for Population." *American Sociological Review* 29:289-306.
- Del Boca, Daniela. 2002. "The Effect of Child Care and Part-Time Opportunities on Participation and Fertility Decisions in Italy." *Journal of Population Economics* 15: 549-573.
- Del Boca, D., and M. Locatelli. 2007. "Social Policies, Labour Markets and Motherhood." Pp. 155-181 in *Chapter 5 Motherhood and Participation*, D. Del Boca and C. Wetzels, eds. Cambridge: Cambridge University Press.
- Easterlin, Richard A. 1978. "What Will 1984 Be Like? Socioeconomic Implications of Recent Twists in Age Structure." *Demography* 15(4): 397-432.
- Esping-Andersen, Gøsta. 1999. *Social Foundations of Postindustrial Economies*. Oxford: Oxford University Press.
- EUROSTAT. 2012. <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tps00018&plugin=1>. Accessed 25 April 2012.
- Fernández, Raquel, and Alessandra Fogli. 2006. "Culture: An Empirical Investigation of Beliefs, Work and Fertility." National Bureau of Economic Research Working Paper 11268.
- Frejka, Tomas. 2008a. "Birth Regulation in Europe: Completing the Contraceptive Revolution." *Demographic Research* 19(5): 73-84.
- Frejka, Tomas. 2008b. "Parity Distribution and Completed Family Size in Europe: Incipient Decline of the Two-Child Family Model." *Demographic Research* 19(4): 47-71.
- Frejka, Tomas and Tomas Sobotka. 2008a. "Fertility in Europe: Diverse, Delayed and Below Replacement." *Demographic Research* 19(3): 15-45.

Gauthier, A. 2007. The impact of family policies on fertility in industrialized countries: a review of the literature, *Population Research and Policy Review*, 26, 323-346.

Gauthier, A. and Hatzius, J. (1997). Family benefits and fertility: An econometric analysis, *Population Studies* 51: 295-306.

Goldstein, Joshua R., and Michaela Kreyenfeld. 2011. "Has East Germany Overtaken West Germany? Recent Trends in Order-Specific Fertility." *Population and Development Review* 37(3): 453-472.

Hagewen, Kellie J., and S. Philip Morgan. 2005. "Intended and Ideal Family Size in the United States, 1970-2002." *Population and Development Review* 31(3): 507-527.

Haub, Carl. 2012. "Fertility Rates in Low Birth-Rate Countries, 1996-2011." Population Reference Bureau. <http://www.prb.org/Articles/2012/low-fertility-countries-tfr.aspx>. Accessed 17 April 2012.

Hirazawa, Makoto, and Akira Yakita. 2009. "Fertility, Child Care Outside the Home, and Pay-as-you-go Social Security." *Journal of Population Economics* 22: 565-583.

Hoem, Jan, Gerda Neyer and Gunnar Andersson. 2006. "Education and Childlessness: The Relationship between Educational Field, Educational Level and Childlessness among Swedish Women Born in 1955-59." *Demographic Research* 14(16):381-404.

Hoffman, L. W., and M. L. Hoffman. 1973. "The Value of Children to Parents." Pp. 19-76 in *Psychological Perspectives on Population*, J. T. Fawcett, ed. New York: Basic Books.

Hoffman, L. W., and J. D. Manis. 1979. "The Value of Children in the United States: A New Approach to the Study of Fertility." *Journal of Marriage and the Family* 41(3): 583-596.

Kalleberg, Arne L. and Peter Marsden. 2011. "Changing Work Values in the United States, 1973-2006." Manuscript under review.

Kearny, M. 2004. Is There an Effect of Incremental Welfare Benefits on Fertility Behavior? A Look at the Family Cap, *Journal of Human Resources* 39: 295-325

Kohler, Hans-Peter, F. C. Billari, and J. A. Ortega (2002). "The Emergence of Lowest-low Fertility in Europe during the 1990s." *Population and Development Review* 28(4), 641-681.

Klüsener, Sebastian, Brienna Perelli-Harris, and Nora Sánchez Gassen. 2012. *Spatial Aspects of the Rise of Nonmarital Fertility across Europe since 1960: The Role of States*

and Regions in Shaping Patterns of Change. Working Paper 2012-005. Rostock: Max Planck Institute for Demographic Research.

Laroque, G. and Salanié, B. 2004 Fertility and Financial Incentives in France, *CESifo Economic Studies*, 50, 423-450.

Lutz, Wolfgang and Vegard Skirbekk. 2005. "Policies Addressing the Tempo Effects of Low-Fertility Countries." *Population and Development Review* 31(4):699-720.

Matysiak, Anna, and Daniele Vignoli. 2008. "Fertility and Women's Employment: A Meta-analysis." *European Journal of Population* 24: 363-384.

Milligan, Kevin 2005. Subsidizing the Stork: New Evidence on Tax Incentives and Fertility, *Review of Economics and Statistics* 87: 539-555.

Morgan, S. Philip, and Heather Rackin. 2010. "The Correspondence Between Fertility Intentions and Behavior in the United States." *Population and Development Review* 36(1): 91-118.

Morgan, S. Philip, and Miles G. Taylor. 2006. "Low Fertility at the Turn of the Twenty-First Century." *Annual Review of Sociology* 32: 375-399.

Morgan, S. Philip and Kiyoshi Hiroshima. 1983. "The persistence of extended family residence in Japan: Anachronism or alternative strategy?" *American Sociological Review*, 48:269-281 .

Myrdal, Alma. 1941. *Nation and Family*. Cambridge, MA: Harvard University Press.

Namboodiri, K. 1983. "Sequential Fertility Decision Making and the Life Course." Pps. 444-472 in R. Bulatao and R. Lee, (eds.), *Determinants of Fertility in Developing Countries*, Vol. 2. New York: Academic Press.

Namboodiri, N. Krishnan. 1981. "On Factors Affecting Fertility at Different Stages in the Reproduction History: An Exercise in Cohort Analysis." *Social Forces* 59:1114-1129.

National Institute of Population and Social Security Research. (2010). *Latest demographic statistics 2010*. Tokyo: National Institute of Population and Social Security Research.

OECD. 2012.

http://www.oecd.org/document/0,3746,en_2649_201185_46462759_1_1_1_1,00.html. Accessed 25 April 2012.

Presser H.B. and W. Baldwin. 1980. "Child Care as a Constraint on Employment: Prevalence, Correlates, and Bearing on the Work and Fertility Nexus." *American Journal of Sociology* 85: 1202-1213.

Recoules, Magali. 2011. "How Can Gender Discrimination Explain Fertility Behaviors and Family-Friendly Policies?" *Review of Economics of the Household* 9: 505-521.

Rendall, Michael S., Olivia Ekert-Jaffe, Heather Joshi, Kevin Lynch and Remi Mouglin. 2009. "Universal versus Economically Polarized Change in Age at First Birth: A French-British Comparison." *Population and Development Review* 35: 89-115.

Rindfuss, Ronald R. 1991. "The Young Adult Years: Diversity, Structural Change, and Fertility." *Demography* 28(4):493-512.

Rindfuss, Ronald R. and Karin L. Brewster. 1996. "Childrearing and Fertility" Pp. 258-289 in John B. Casterline, Ronald D. Lee, and Karen A. Foote, eds., *Fertility in the United States: New Patterns, New Theories*. A supplement to Vol. 22, *Population and Development Review*.

Rindfuss, Ronald R., Elizabeth Cooksey and Rebecca Sutterlin. 2012. "Young Adult Occupational Achievement: Early Expectations Versus Behavioral Reality" *Work and Occupations* 26(2):220-263.

Rindfuss, Ronald R., Karen B. Guzzo and S. Philip Morgan. 2003. "The Changing Institutional Context of Low Fertility." *Population Research and Policy Review* 22: 411-438.

Rindfuss, Ronald R., David Guilkey, S. Philip Morgan, Øystein Kravdal, and Karen Benjamin Guzzo. 2007 "Child Care Availability and First Birth Timing in Norway." *Demography* 44(2): 345-372.

Roberts, Glenda. 2007. "Similar Outcomes, Different Pathways: The Cross-National Transfer of Gendered Regulations of Employment." Pp. 140-160 in *Gendering the Knowledge Economy*, eds. Sylvia Walby, Heidi Gothfried, Karin Gottschall, and Mari Osawa. New York, NY: Palgrave MacMillan.

Ryder, Norman B. 1973. "Recent Trends and Group Differences in Fertility." Pp. 57-68 in *Toward the End of Growth, Population in America*, Charles F. Westoff, ed. A Spectrum Book. Englewood Cliffs, N.J.: Prentice-Hall.

Schoen, R., Y. J. Kim, C. A. Nathanson, J. Fields, and N. A. Astone. 1997. "Why Do American's Want Children?" *Population and Development Review* 23: 333-357.

Stycos, J.M. and Robert H. Weller. 1967. "Female Working Roles and Fertility." *Demography* 4:210-17.

te Velde, Egbert, Dik Habbema, Henri Leridon and Marinus Eijemans. 2012. "The Effect of Postponement of First Motherhood on Permanent Involuntary Childlessness and

Total Fertility Rate in Six European Countries since the 1970s.” *Human Reproduction* 27(4): 1179-1183.

Tesching, Karin. 2012. *Education and Fertility: Dynamic Interrelations between Women’s Educational Level, Educational Field and Fertility in Sweden*. Stockholm, PhD Dissertation.

Thomson, Elizabeth, Maria Winkler-Dworak, Martin Spielauer, and Alexia Prskawetz. 2012. “Union Instability as an Engine of Fertility? A Microsimulation Model for France.” *Demography* 49: 175-195.

Udry, J. Richard. 1983. “Do Couples Make Fertility Plans One Birth at a Time?” *Demography* 20:117-128.

Veevers, Jean E. 1973. “Voluntary Childless Wives: An Exploratory Study.” *Sociology and Social Research* 57:356-366.

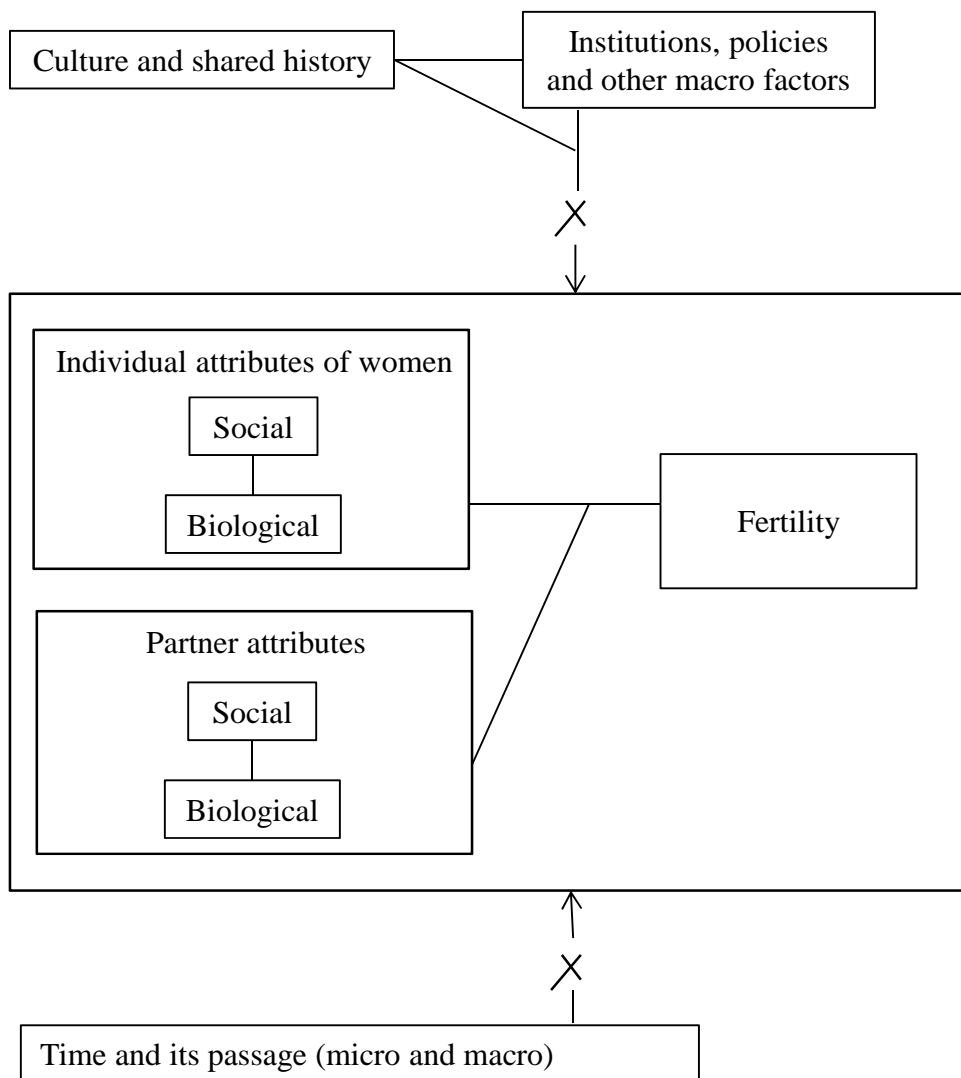
_____. 1979. “Voluntary Childlessness: A Review of Issues and Evidence.” *Marriage and Family Review* 2(2):3-26.

Viitanen, Tarja K. 2005. “Cost of Childcare and Female Employment in the UK.” *Labour* 19(Special Issue): 149-170.

Whittington, L. A. 1992. Taxes and the Family: The Impact of the Tax Exemption for Dependents on Marital Fertility, *Demography* 29: 215–226.

Zhang, J., Quan, J. and van Meerbergen, P. 1994. The Effect of Tax-Transfer Policies on Fertility in Canada 1921–1988, *Journal of Human Resources* 29: 181–201.

Figure1. Framework of Macro and Micro Factors Affecting Fertility



X signifies a potential interaction

Chart 1. Micro and macro factors affecting fertility

Construct	Micro variables	Institutional aspects	Deliberate fertility policy instrument
Education	Attainment Field of study Enrollment	Availability Openness Hours Tutoring After-school programs Training specificity	No
Labor market	Job Career aspects Pay Challenge/satisfaction Co-worker relations Discrimination Parental leave Part vs full time	Entry-level hiring practices Job protection Contingent jobs Unemployment levels Discrimination Part-time availability Parental leave policies Career structures	Some
Child care	Use Attitudes toward	Availability Acceptability Cost Accessibility	Yes
Housing	Live with parents Rent or own Cost Location	Housing market Finance market Infrastructure Subsidies Safety	Some
Transportation	Cost Comfort Ease	Public transit Automobile infrastructure Pedestrian friendly	No
Gender equity	Male or female Attitudes Behavior	Legal aspects Normative aspects	Some
Welfare state policies	Willingness to apply for benefits Skill in applying	Maternity benefits Family allowances Tax benefit transfers Unemployment insurance Active labor market policy spending	Some