Ultra-low fertility: case studies

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The goal of this document is to review countries that currently have or at some point had fertility that was well below replacement, plus some others that seem headed in that direction, and then discuss what can be said.

We'll be relying on the following measures in our discussion: *crude birth rate*, *total fertility rate*, *completed cohort fertility* (CCF), *CCF40* (completed cohort fertility till age 40, for which data for more recent birth cohorts is available. In some cases, we will also use data on the *abortion rate* and *abortion ratio*, on measures of *surviving kids per woman*, and on fertility broken down by age, educational level, and other correlates.

1 Resources used

1.1 Papers

The following papers were generally useful. There are also more papers listed for specific countries or specific issues.

- *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government (available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`). 209 pages.

- *Welfare States, Family Policies, and Fertility in Europe* by Gerda Neyer (Stockholm University). Available online at `http://www.su.se/polopoly_fs/1.105072.1350482738!/menu/standard/file/WP_2012_10.pdf`. 33 pages.

- *Family Sizes in Europe: Evidence from the 2011 Eurobarometer Survey* by Maria Rita Testa, available online at `http://www.oeaw.ac.at/vid/download/edrp_2_2012.pdf`. 100 pages.

- *The end of "lowest-low" fertility?* by Joshua R. Goldstein, Tomas Sobotka and Aiva Jasilioniene, *Population and Development Review*, Volume 55,Number 4, Page 663 - 669(December 2009). Available online at `http://www.demogr.mpg.de/papers/working/wp-2009-029.pdf`.

1.2   Books

I relied on these books to get a general sense of the field, but did not use them much directly for this write-up.

- *The Empty Cradle* by Philip Longman (2004) (book for general audiences).

- *What to Expect When No One's Expecting* by Jonathan V. Last (2013) (book for general audiences).

- *Ultra-low fertility in Pacific Asia: Causes, trends, and policy issues* (collection of academic chapters for academic audiences).

I had also read some other books which provided outlines of some arguments but are not very closely related:

- *Shall the Religious Inherit the Earth?* by Eric Kaufmann.

- *The Means of Reproduction: Sex, Power, and the Future of the World* by Michelle Goldberg.

- *Fatal Misconception* by Matthew Connelly.

1.3 Sources for raw data

My sources are below. The document as written here relies almost entirely on HFD data, but I looked at the other data for some related investigations that I didn't end up including.

- Human Fertility Database (HFD), available online at `http://www.humanfertility.org`. The data here is of best quality and also includes cohort fertility. It is limited to a few countries, but many countries of interest are in the list here.

- United Nations data compiled by Gapminder, available at `http://www.gapminder.org`.

- Data from the Eurobarometer survey taken from the paper about the Eurobarometer.

- World Bank data, available at `http://data.worldbank.org/`.

- Eurostat data, available at `http://epp.eurostat.ec.europa.eu/statistics_explained/`

2 Reasons for variation in fertility levels and trends

2.1 General reasons for decline

Below is a general list of reasons. We'll explore the plausibility of individual reasons in our case studies by country and region.

1. Changes in ideal family size and desired fertility, i.e., changes in people's ideals of how many children there should be in a family:

    (a) This may be because of beliefs that parents should invest more per child.

    (b) Decline of pronatalist religions.

    (c) Ultra-low fertility traps, where people form fertility desires by looking at existing family sizes, and consistently undershoot their desires, so that family sizes go down steadily.

2. Pre-fertility: It's harder for people to find stable marital partners.

   (a) Decline of arranged marriage.

   (b) People can have sex without getting into a relationship. People can also have a relationship without it leading to marriage or long-term cohabitation. People can cohabit without marrying.

   (c) Increase in substitutes for human mate companionship (sex toys, virtual girl-friends, expensive vacations).

3. Fertility: Greater availability of abortion and contraception making it easy for people to avoid overshooting family size targets. On the other hand, infertility treatment and increase in the childbearing age window have not improved as dramatically. (The ultra-low fertility trap explanation combines this in a feedback loop with declining desired fertility).

4. Expected costs of having children relative to counterfactuals:

   (a) People have higher expectations of how much they should invest per child.

   (b) Working women have a greater opportunity cost of becoming stay-at-home mothers, and working + raising kids is stressful.

   (c) Urbanization increases the cost of land and therefore increases the marginal cost of adding new family members.

   (d) Pets substitute for children.

2.2 Urbanization

Relevant literature:

- *Why Do Fertility Levels Vary between Urban and Rural Areas?* by Hill Kulu, Regional Studies, Volume 47,Number 6, (Year 2013). Based on a study of Finland.

Draft version available online at `http://peer.ccsd.cnrs.fr/docs/00/71/49/30/` `PDF/PEER_stage2_10.1080%252F00343404.2011.581276.pdf`

- *Migration and Fertility: A Review of Theories and Evidences* by RG Magelantle and K Navaneetham, *Journal of Global Economics*, Volume 1, Number 1 (2013). Available online at `http://www.esciencecentral.org/journals/migration-and-fertility-a-review-o` `pdf`,

Both papers consider the puzzle of why fertility is lower in urban areas than in rural areas. The first paper distinguishes between *compositional* factors (people who settle in urban areas desire low fertility) and *contextual* factors (urban environments suppress fertility intentions). The second paper considers four explanations:

- Fertility desires transmitted through the family context in which people are born, so that people who grow up in rural areas desire larger families than those who grow up in urban areas.

- Fertility desires determined in adulthood based on where one lives in adulthood, so that people who live in urban areas come to desire fewer children.

- Fertility desires determine one's choice of location (the compositional factor in the first paper).

- Migration itself suppresses fertility, by disrupting life, separating people from spouses, etc.

2.3   Ideal family size and desired fertility

One useful paradigm for the study of fertility levels and trends is that of ideal family size and desired fertility. Unfortunately, we do not have a reliable way of measuring these, and there are inherent ambiguities even in terms of what these mean. The following information is available:

- *Family Sizes in Europe: Evidence from the 2011 Eurobarometer Survey* by Maria Rita Testa, available online at `http://www.oeaw.ac.at/vid/download/edrp_2_2012.pdf`.

- *Intended and Ideal Family Sizes in the United States, 1970-2002* y Kellie J. Hagewen and S. Philip Morgan, *Population and Development Review*, Volume 31,Number 3, Page 507 - 527(September 2005). Available online at `http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2849141/`.

- *Evidence bearing on the construct validity of "ideal family size"* by Roger B. Trent, *Population and Environment*, Volume 3, Fall/Winter 1980. Available online at `http://www.jstor.org/stable/27502916`.

- *Attitudes towards ideal family size of different ethnic/nationality groups in Great Britain, France, and Germany* by Roger Penn and Paul Lambert, *Population Trends*, Volume 108, (Summer 2002). Available online at `http://www.maths.lancs.ac.uk/~penn/papers/roger/Attitudes%20to%20Ideal_Family%20Size%20in%20Western%20Europe.pdf`.

- *The emergence of sub-replacement family size ideals in Europe* by Joshua Goldstein, Wolfgang Lutz and Maria Rita Testa, Population Research and Policy Review, Volume 22, Page 479 - 496 (Year 2003). Available online at `http://dx.doi.org/10.1023/B:POPU.0000020962.80895.4a`.

- *Desired Fertility and the Impact of Population Policies* by Lant Pritchett, Population and Development Review, Volume 20, Number 1, Page 1 - 55(March 1994). Available online at `http://are.berkeley.edu/courses/ARE298/Readings/Pritchett1.pdf`.

2.4 Pronatalist belief systems

Understanding the different categories of pronatalist belief systems can help us understand both why ideal and desired fertility declined and how they might go up again in the future.

The typology here is hand-created; I couldn't find an existing reference with a good typology.

1. Beliefs related to personal preference or virtue ethics:

    (a) Having children is fun or personally fulfilling.

    (b) Procreation is an important goal of life, and it is therefore virtuous to fulfill this goal better by having more children.

2. Beliefs related to expanding a subpopulation or continuing a particular genetic line:

    (a) Continuing the family line: Some families want children so that they can pass on their inheritance and continue the family line.

    (b) Increasing the number of people who share one's beliefs and values: The beliefs and values of children are positively correlated to those of parents, due to a combination of genetics and upbringing.

    (c) Increasing the size of one's national, religious, or regional community. National leaders sometimes extol their populations to have more children in order to be more patriotic.

3. Beliefs related to economic stability and growth:

    (a) Having children to care for one in old age.

    (b) Maintaining a healthy dependency ratio in the future so that the economy can function well in the short term and retirement pension systems stay solvent.

    (c) Increasing population for more economic growth and technological progress (this view has been popularized by economists such as Julian Simon and Michael Kremer).

It's generally hard to cleanly separate these belief clusters. In particular, (1) and (2) generally go together. Religious and national leaders often combine exhortations of patriotism with claims that having children is an act of supreme virtue. Some commentators

have argued that minority groups often encourage these strategies in order to outgrow hostile majorities. This is called the revenge of the cradle.

This needs to be viewed in conjunction with the heritability of fertility, discussed later.

2.5 Antinatalist belief systems

Here are some categories of belief systems. The typology is hand-created; I couldn't find an existing reference with a good typology.

1. Beliefs related to personal preferences or virtue ethics:

   (a) Children aren't fun to have, or are more pain than gain.

   (b) Not having children (and more generally, not getting married and not having sex) is a marker of virtue. This type of view is common among strata of society that praise detachment and otherworldliness.

2. Beliefs related to the social costs of having children:

   (a) Belief that the world is overpopulated and needs fewer, not more, children. Concerns about overpopulation are generally tied to concerns about resource scarcity and linked with environmentalism.

   (b) Belief that the economy will not be able to sustain a high dependency ratio, or that there will be too few jobs etc. These are not related to the absolute magnitude of population but more to the age structure and/or the economy's ability to cope.

2.6 Magic middle belief systems

Some belief systems provide magic numbers on how many children to have. People who subscribe to these belief systems are neither pronatalist nor antinatalist in an absolute sense (though they may be viewed as *more* pronatalist or *more* antinatalist than others).

Common examples:

1. The *two-child ideal* is an ideal of a family with two children. The two-child ideal has been promoted extensively by governments, and continues to be promoted in societies with fertility levels above replacement. Originally, the promotion of the two-child ideal was done with the view that if most people have two children, fertility will hover at replacement, leading to stable long-term population. In practice, fertility rarely directly stabilizes at that level. If it drops to that level, it's likely to continue dropping further. This is largely because people systematically undershoot their fertility desires.

2. Some families have a *one-child ideal*, where they believe in having a single child and investing heavily in that child.

3. Some families have sex-specific child ideals. For instance, some families want to keep having children till they have a boy. Some families want to keep having children till they have at least one boy *and* at least one girl. These sex-specific child ideals are not common in most of the developed world, but son preference is common in India and East Asia.

2.7   Paths to replacement fertility or higher fertility

There are three broad categories of paths (the typology is hand-created but agrees qualitatively with standard sources):

1. Uncontrolled fertility (the historical path): People didn't consciously attempt to restrict the number of kids, nor did they think of that as something that could or should be controlled.

2. Strong pronatalist belief systems in a significant fraction of the population.

3. Pronatalist policies that make it easier to have more kids.

The three categories look different. (1) isn't sustainable in the face of low infant mortality, knowledge about contraceptive practices, and increased education and modernization.

(2), on the other hand, can thrive in subcultures even in modern economies and societies. In modern societies with low infant mortality and contraception availability, (2) leads to significant disparities in fertility between the subgroups that subscribe to the belief systems and those who don't (in societies with poor maternal health and high infant mortality, the fertility gap between explicit pronatalists and others is relatively low since the main determinant of number of kids is not people's explicit desire to have kids but their reproductive health; the gap in surviving kids per woman is similarly low). Communities that use (2) may partly rely on deliberately mimicking (1): for instance, they may deliberately deny contraception to their members as a way to mimic the natural high fertility that occurs in an environment where people don't view themselves as being in control of their fertility choices.

(3) is possible in modern society, but requires a huge state apparatus, and is likely to lead to a less skewed distribution of fertility: it's more likely to promote two-child ideal families than to lead to a small fraction of women with very high fertility. Much of the discussion here is of (3), because these seem easiest to effect through policy, are most compatible with the modern economy and society, and seem likeliest to work well on large numbers of people.

2.8   The heritability of fertility

To the extent that the fertility of parents and children is related, this could lead to high-fertility groups outnumering low-fertility ones, and more importantly, it may mean that overall fertility is unlikely to decline too much as long as there are even a few high-fertility groups present.

The inheritance of high fertility may be through the presence of fertility-promoting genes. If so, defection from the high-fertility group would not matter, because the genes

would just spread to the general population.

On the other hand, the high correlation between parent and child fertility could be specifically due to cultural reasons. In this case, people leaving the group with high fertility could lead to a decline in overall fertility.

This heritability could be part of the explanation for the turnaround in TFR values around 2005 around the world, though hard evidence of this doesn't seem to exist as far as I know.

Relevant literature:

- *Shall the Religious Inherit the Earth?* by Eric Kaufmann (book for general audiences).

- *Religion, fertility, and genes: a dual inheritance model* by Robert Rowthorn, *Proceedings of the Royal Society, Biological Sciences*, Volume 278 (2011). Available online at `http://dx.doi.org/10.1098/rspb.2010.2504`. The paper has also been discussed online at `http://www.jasoncollins.org/heritability-of-religion-and-fertility/` and `http://blogs.discovermagazine.com/gnxp/2011/01/the-inevitable-rise-of-amish-machin`

Some explicitly identified populations with high fertility include Orthodox Jews, Mormons, Amish, Hutterites, Mennonites, some Muslim subpopulations, and some Christian subpopulations.

2.9   The ultra-low fertility trap

This trap was posited to explain the continued decline in fertility to levels well below replacement, combined with evidence that desired fertility levels were also dropping to below replacement levels in some countries (such as Germany).

- Initially, women have high fertility desires but delay childbearing and then end up not having as many children as they want.

- Others growing up in and around them see a new norm of smaller families, and set their own fertility desires in accordance with the new norms. They therefore set lower fertility goals for themselves.

- However, many of them do not meet those lower fertility goals either, setting yet lower norms for the next generation.

The key reason why the trap continues in a downward direction is that, in this theory, people are much more likely to *undershoot* their fertility desires than to overshoot them. People who desire 2 children are much more likely to end up with only 1 child than to have 3 children, and are much more likely to be childless than have 4 children. This distinguishes the modern era from the past: in the past, women met their fertility desires on average, because the amount of overshooting and undershooting roughly canceled one another (on the whole, there may have been slightly more overshooting than undershooting).

Relevant literature:

- *The Emergence of Lowest-Low Fertility in Europe During the 1990s* by Hans-Peter Kohler, Francesco C. Billari and Jose Antonio Ortega, Population and Development Review, Volume 28,Number 4, Page 641 - 680(2002). Available online at `http://web.usal.es/~jaortega/invest/KBO_pdr2002.pdf%E2%80%8E`

- *The emergence of sub-replacement family size ideals in Europe* by Joshua Goldstein, Wolfgang Lutz and Maria Rita Testa, Population Research and Policy Review, Volume 22, Page 479 - 496 (Year 2003). Available online at `http://dx.doi.org/10.1023/B:POPU.0000020962.80895.4a`.

- *Desired Fertility and the Impact of Population Policies* by Lant Pritchett, Population and Development Review, Volume 20, Number 1, Page 1 - 55(March 1994). Available online at `http://are.berkeley.edu/courses/ARE298/Readings/Pritchett1.pdf`. This is for the historical comparison.

3 A framework for classifying policies related to fertility

3.1 The broad framework

We will look at policies related to fertility in four broad categories:

1. Propaganda: These directly tell people to have more or fewer kids. Many countries used propaganda (in addition to other policies) to promote the two-child ideal. Some countries have attempted pronatalist propaganda. Singapore is notable for its use of propaganda (switching from promotion of the two-child ideal 1966-1983 to pronatalist propaganda 1986 onward).

2. Marriage policy: Policy that affects how easily people can get married and stay married. Marriage promotion policies are indirectly pronatalist insofar as people are more likely to have kids within marriage than outside. Some governments have adopted marriage promotion policies with pronatalist goals. Governments rarely use anti-marriage policies for antinatalist goals, but some of their policies effectively end up discouraging marriage.

3. Fertility-related policy: This refers to policy directly relevant to childbearing. It includes policies related to abortion legality and funding, contraception availability and funding, prenatal and neonatal care availability and funding, and infertility treatments.

4. Post-fertility policy (more commonly called family policy, child-centered policy, or child care policy, though these terms may have different shades of meaning depending on context): This refers to policies that are related to the care of children once they are born. It could include changes to taxes and subsidies based on the number of children in the household. It could include the availability of and funding for schools, day care, and after-school programs. It could include linking one's number of children with government subsidies to retirement savings programs.

The overall verdict on these seems to be:

1. Propaganda in the antinatalist direction may have been effective, but pronatalist propaganda doesn't seem to have been effective. The country with the biggest propaganda machine (Singapore) has had one of the steepest declines in fertility.

   That said, while *government* propaganda in isolation hasn't worked well, propaganda from a more diverse range of sources together (religious authorities, celebrities, local leaders, etc.) could work well.

2. Marriage policy hasn't been changed much in many countries, so its effectiveness hasn't been tested much. But there's a tension between promoting marriage too much and promoting fertility: since many births occur out of wedlock, and that's a fast-growing segment of births, having strong norms of "marry before you have kids" might lead to declines in fertility.

3. Fertility-related policy may have had effects on fertility declines in earlier years, but do not seem to explain the decline to ultra-low levels. There doesn't seem to be any correlation between the abortion and contraception policies and birth rates, either historically within a country or between countries.

   Again, the *extreme* of fertility-related policy would work: ban all abortion and all contraceptives (including condoms, birth control pills, etc.). If this is done, people will still want to have sex, and they'll end up having more babies than they want. But even there, the effect is relatively mild, though probably sufficient to edge countries back to replacement. See Lant Pritchett's paper *Desired Fertility and the Impact of Population Policies*, available at `http://are.berkeley.edu/courses/ARE298/Readings/Pritchett1.pdf`. In any case, that's not a realistic alternative. Just making abortion illegal but keeping contraceptives legal won't have the desired effect.

4. Family policy is the policy that has most explicitly been tried for pronatalist purposes. The effects of child care policy have been mild. Generally, policies that

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provide short-term cash incentives lead to temporary spikes in fertility before return to the long-run trend (perhaps only delaying the decline by a couple of years). Policies that are much more ambitious, such as the creation of day care centers or after-school programs, can sometimes lead to a flatlining of fertility (ending a downward trend) but not a dramatic reversal. The best-case scenario for such policies seems to be France, where fertility has edged back to replacement levels, but much of the credit goes to migrant populations with above replacement birth-rates.

3.2 A closer look at family policies

The case studies here will compare child-centered policies in different countries. Here, we summarize the different categories of child-centered policies. The classification is natural, and something similar is found in the report *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government (available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`).

1. Directly pecuniary policies: These include taxes, tax breaks, subsidies, and matching for retirement savings, related to the birth or presence of children.

2. Policies about the relation between child care and employment: These include policies that require or encourage employers to provide (fully or partly) paid leave to mothers and fathers, or policies that encourage employers to tweak their matched savings programs based on the number of children.

3. Provision of facilities: These include free schooling, day care centers and after school programs.

3.3 Classification of family policies based on their goals

Affecting fertility is not the only goal of family policies. There may be other goals such as reducing illegitimacy, reducing abortion, reducing child abuse, making sure children have

enough to eat, etc.

Gauthier (1996) says that family policies generally involve trading off three dimensions: family solidarity (this generally but not exclusively refers to promoting traditional family structures), gender equality (more opportunities for women in the workplace, more opportunities for men in childcare), and fertility. The four types of family policies he considers are:

1. Pro-traditionalist, which focuses on promoting traditional conceptions of family solidarity. This is generally somewhat pronatalist and somewhat anti-gender equality in stated goals in practice. In effect, though, it seems that pro-traditionalist policies in the context of modern urban economies tend to do a bad job of raising or even preventing the decline of fertility. The prototypes are Germany and Southern and Eastern European countries.

2. Pro-egalitarian, which focuses on promoting gender equality. This is neutral by default to family solidarity and to fertility, but it could be combined with pronatalist policies. Examples include Sweden.

3. Pro-natalist, which focuses on promoting fertility, often through a mix of pro-traditionalist and pro-egalitarian policies. Examples include France, Japan, and Singapore. Of these, France leans more in the egalitarian direction while Japan and Singapore lean more in the traditionalist direction. France has been a success, whereas Japan and Singapore have (arguably) been failures.

4. Non-interventionist with means-tested benefits and some forms of recourse: Examples include UK, USA, and Australia. These generally aim to support families when they are in trouble, but otherwise steer clear of explicit goals for families. They similarly support equality in principle but do not try to promote it proactively (promotion of gender equality may be more by allowing litigation against discrimination than by requiring employers to take specific steps). These generally seem moderately

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but not extraordinarily successful: fertility is somewhat below replacement but not dramatically so (fertility hasn't dipped below 1.8 in any of these countries).

Overall verdict: explicit pro-natalist policies such as those in France, that lean somewhat more in the direction of egalitarianism than traditionalism, seem to work best. But the pro-egalitarian and non-interventionist models also have reasonably good track records. The worst approaches seem to be those that rely heavily on traditionalism in the modern urban or industralized setting.

For more, see the report *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government (available online at `http://www.familycouncil.gov.hk/ english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`). This compares the UK, France, Germany, Sweden, and Singapore.

3.4   Welfare state typologies

Gauthier's classification of family policies is closely related to Esping-Andersen's welfare state typology, intended largely for European (and other middle- to high-income) welfare states.

- *Conservative welfare state* where the welfare state is designed to promote and encourage conservative, traditional values. This includes Germany, Italy, and other Southern and Eastern European welfare states.

- *Liberal welfare state* where the welfare state is minimalistic and typically means-tested, intended to help people out as a last resort rather than create universal entitlements. Examples are the countries in the Anglo-American tradition, such as the US, UK, Canada, and Australia (note that many of these have universal health care, which is a more social-democratic feature, but otherwise fit the liberal welfare state model).

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- *Social-democratic welfare state* where welfare state provisions are universal and intended to promote equality as well as other progressive values on a large scale. The Nordic countries, particularly Sweden, are examples.

There is some relation between the Esping-Andersen typology and Gauthier's classification of family policy. Conservative welfare states generally coincide with pro-traditionalist family policy, liberal welfare states generally coincide with non-internventionist family policy, and social-democratic welfare states generally coincide with pro-egalitarian family policy.

3.5 Three broad directions of policy evolution

According to the report prepared for the Hong Kong government, the family policies of different governments are all converging in a similar direction, with the point of convergence somewhere between what France and Sweden currently have. In particular:

1. Pro-traditionalist models are being discarded in favor of models that support working women. In particular, models that favor only cash compensation are being phased out and supplemented by models that focus on supporting resources (day care centers and school enrichment), leave policies, and cash.

2. More importance is given to diversity in family structure. Point (1) may suggest that the new family policy would exclusively cater to double-earner families. But this isn't what's happening. What's happening is a mix of a general shift towards supporting double-earner families with an understanding that a diverse range of family forms need to be supported. These include single parent families, cohabiting unmarried partners, married dual-income families, married single-income families, etc. Even more unconventional family structures such as same-sex couples adn polygamous couples may eventually receive recognition and support.

3. More emphasis on work-life balance. For women, this represents a shift away from

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a binary choice between career devotion and raising children. For men, it reflects a shift away from having the complete responsibility of being a breadwinner with little social reward or responsibility for spending time on childcare.

4   Fertility by region of the world

This section briefly discusses important geographic and ethnic clusters in the world for fertility analysis.

4.1   The Nordic countries

These include the Scandinavian countries (Sweden, Norway, and Denmark) plus the countries Iceland and Finald. These have a Germanic heritage but are no longer culturally that close to the German-speaking countries.

Nordic countries have generally been characterized by egalitarian family policies and social-democratic welfare states. They generally have fertility levels in the 1.8-2 range (most recent TFR values are Sweden: 1.987, Finland: 1.864, Norway: 1.98. This is below replacement but not ultra-low. Sweden is the most extreme and interesting in terms of egalitarian policies and not focusing on explicit pro-natalism for the most part, so its success is informative. The most recent available CCF40 values are Sweden: 1.924 (1970 cohort), Norway: 2.008 (1969 cohort), Finland: 1.836 (1969 cohort).

4.2   The German-speaking countries

These include Germany (which is often subdivided into East Germany and West Germany for analytic purposes), Austria, and Switzerland. These all have a pattern of low fertility. Most recent TFR values are Germany: 1.394, West Germany: 1.386, East Germany: 1.46, Austria: 1.438, Switzerland: 1.518. Completed fertility values are also believed to be similarly low, though sufficiently recent data is not available. The most recent CCF40 values: Germany: 1.453 (1970), Austria: 1.577 (1970).

The German-speaking countries are characterized by these features: fertility did not experience major recoveries and generally did not swing as much up and down as the rest of Europe. Rather, it stayed down after the first post-baby-boom decline, and the decline was deeper than in other countries. Moreover, desired fertility levels themselves are at or below replacement, setting the region apart from other places with ultra-low fertility.

Relevant literature: *Fertility in Austria, Germany and Switzerland: Is There a Common Pattern?* by Tomas Sobotka, Comparative Population Studies, Volume 36,Number 2-3, Page 263 - 304 (Year 2011). Available online at `http://dx.doi.org/10.4232/10.CPoS-2011-11en`.

4.3   Eastern Europe

Eastern European countries saw a huge fertility decline after the fall of the Soviet Union. In some of them, fertility is on the upswing. High incidence of abortion is one of the factors in the fertility decline.

I haven't investigated any country in the region in depth.

4.4   Southern Europe

Southern European countries such as Italy, Spain, Portugal, etc. combine low TFR values with desired fertility that is at or above replacement. These have conservative social structures combined with modern economies. The challenges are very similar to those in Germany, with the key difference that desired fertility is not that low, and the gap between desired and actual fertility is higher.

For instance, according to the Human Fertility Database, the most recent TFR value for Portugal in 2009 was 1.319. The most recent available CCF40 was Portugal is 1.663 for the 1969 birth cohort.

4.5 East and South-East Asia

Countries in this cluster include Japan, South Korea, China, Hong Kong, Singapore, Taiwan. Of these, Japan was the earliest to drop below replacement. All are well below replacement, with China the highest (TFR about 1.6-1.7). Taiwan has experienced the lowest TFR, and overall, Taiwan and Singapore have the lowest TFR values. However, many of these countries have superstitions associated with births in specific years, so TFR data is not that good an indicator of long-term trends. With the exception of Japan and Korea, they are all dominated by Chinese populations. Even the populations of Japan and Korea share important genetic and cultural similarities with the Chinese population.

Most recent TFR values: Japan: 1.35-1.4 (depending on year and data source), Taiwan: 1.265 (2012), Singapore: 1.275 (2012), South Korea (1.303), China (1.663).

CCF40 data is available only for Japan. CCF40 for Japan for the 1969 birth cohort was 1.444.

Relevant literature:

- *Ultra-low fertility in Pacific Asia: Causes, trends, and policy issues* (collection of academic chapters for academic audiences).

- *Very Low Fertility in Asia: Is There a Problem? Can It Be Solved?* by Sidney B. Westley, Minja Kim Choe, and Robert D. Retherford. Available online at `http://www.eastwestcenter.org/fileadmin/stored/pdfs/api094.pdf`.

- *The Second Demographic Transition in Asia? Comparative Analysis of the Low Fertility Situation in East and South-East Asian Countries* by Makoto Atoh, Vasantha Kandiah, and Serguey Ivanov, *Japanese Journal of Population*, Volume 2, No. 1 (March 2004). Available online at `http://www.ipss.go.jp/webj-ad/webjournal.files/population/2004_3/atohdoc2004mar.pdf`.

The East-West Center is a good source for research on East Asian fertility trends.

5 Japan

We'll concentrate on Japan 1973 onward. 1973 was the last year when Japan had above-replacement fertility. The remarks here are based on a combination of direct analysis of Human Fertility Database data and reading papers in the literature that deal with Japan. The direct analysis was helpful as a reality check.

5.1 Relevant literature

1. *Japan's Baby Bust: Causes, Implications, and Policy Responses* by Robert D. Retherford and Naohiro Ogawa. Available online at `http://www.eastwestcenter.org/fileadmin/stored/pdfs/POPwp118.pdf`. This paper provides a comprehensive review both of causes for the fertility decline and of remedial actions taken by the government. After noting that most policies didn't work, the authors suggest trying more of the same, but at a larger scale, albeit they're skeptical of how well it will work.

2. *Trends in fertility by education in Japan, 1966-2000* by Robert D. Retherford, Naohiri Ogawa, Rikiya Matsukara, and Hajime Ihara. This paper discusses the interplay of fertility and education level. Available online at `https://www.eastwestcenter.org/sites/all/modules/filemanager/files/Research_Program/Retherford_fertility_Japan2004.pdf`.

5.2 Most recent fertility values

Period fertility measures (2009, Human Fertility Database):

- Crude birth rate: 8.5 per 1000 people

- Total fertility rate: 1.361

- TFR40 (births to mothers up to age 40): 1.324

Completed cohort fertility measures:

- Completed cohort fertility for 1959 birth cohort (most recent): 1.87

- CCF40 for 1969 birth cohort (most recent): 1.444

5.3 CCF and CCF40 data

Data is from the Human Fertility Database. We include data for birth cohorts starting 1955, although data for earlier birth cohorts is available.

Cohort	CCF	CCF40
1955	1.977	1.961
1956	1.946	1.929
1957	1.918	1.9
1958	1.909	1.89
1959	1.87	1.85
1960	unavailable	1.805
1961	unavailable	1.762
1962	unavailable	1.719
1963	unavailable	1.672
1964	unavailable	1.66
1965	unavailable	1.595
1966	unavailable	1.493
1967	unavailable	1.506
1968	unavailable	1.497
1969	unavailable	1.444

Unfortunately, the completed cohort fertility data is incomplete, and even this data became available after 2010. So there isn't much research that examines the completed cohort fertility. Most research that exists uses patterns in the total fertility rate and other period fertility measures.

5.4 Causes for fertility decline

See below for a list:

1. *Economic performance*: According to the Japan baby bust paper, the period till 1973 was characterized by stable economic performance. In 1973, oil prices rose worldwide, and this hit Japan badly because Japan imported all of its oil. The Japanese economy was hurt, and employers started looking for more non-union labor to combat rising costs of union labor. This included many women who had earlier done part-time work at home. As a result of this change, the singulate mean age at marriage, which had held stable till 1973, started rising again. It's unclear whether economic performance can explain continued fertility decline.

2. *Abortion*: The availability and cost of abortion are insufficient to explain fertility decline since 1973. It is possible that tightening abortion somewhat will increase fertility by around $10 - 20\%$ (at most), but that would still not bring it anywhere near replacement. The following observations are relevant:

    (a) Abortion has been legal in Japan since 1948. While it seems to have had a huge effect on fertility at the time of its introduction (though we don't have reliable data since pre-1948 fertility data is not high-quality), it is inconsistent both with the data and with common sense that it would exert an impact on the *trend* since 1973.

    (b) Both the abortion ratio (abortions per 1000 live births) and abortion rate (abortions per 1000 women of childbearing age) peaked in the late 1950s (around 1955-1958) and have since been in steady decline. A quick sense of magnitude: the peak abortion ratio was 716.4 (1957), the ratio in 1973 was 334.9, and the ratio in 2010 was 198.5. The peak abortion rate was 55.5 (1955), the value in 1973 was 25.6, and the value in 2003 was 13 (data for other years hasn't been computed by the data source, though it could be computed in principle). In

other words, pregnancies aren't being substituted by abortions.

(c) Abortion laws became marginally tighter (via the 1996 amendment to the Eugenic Protection Law) and then looser again (2006). These changes to the laws had no discernible effects on abortion or fertility trends.

(d) If we assume that every abortion were substituted by a birth, and that the age distribution of abortions is same as that of pregnancies, the fertility rate adjusting for abortions declined from about 2.85 in 1973 to about 1.65 in 2009. This is an even sharper decline than what actually occurred.

Some numerical correlation values:

(a) Abortion-adjusted and abortion-unadjusted fertility measures are highly correlated (assuming that each abortion substitutes for a pregnancy). Explicitly, the actual value of crude birth rate correlates 0.915 with the abortion-adjusted value. Similarly, the actual value of total fertility rate correlates 0.897 with the abortion-adjusted value.

(b) The abortion ratio has a *positive* (though small) correlation with fertility measures. This is largely because both were declining over time, rather than because of a direct relationship between abortion and fertility. But it does go in a direction opposite to the story that increasing abortion means decreasing fertility. Explicitly, the correlation between the abortion ratio and the crude birth rate is 0.279 and the correlation between the abortion ratio and the total fertility rate is 0.142.

3. *Contraception*: Contraception fails as a convincing explanation either for the level or the trend in fertility:

(a) Condoms, the main contraceptive technology used in Japan, have been available since well before 1973.

(b) Birth control pills, which have been suggested as causally responsible for reducing fertility significantly in the West, became properly legal only in 1999. The legal availability of these did not have an impact on either abortion or fertility trends. `http://www.nbcnews.com/id/5726375/` (NBC article) documents the reluctance of the Japanese to use birth control pills.

4. *Marriage*: The conjunction of these three reasons can provide a partial explanation of declining fertility. Note that some of the trends may have reversed in recent years:

(a) Fewer people are getting married: The age of first marriage is increasing, and the proportion of ever-married people is declining.

(b) Marriages are less stable: A larger fraction of marriages end in divorce, and the duration of stable marriage is declining.

(c) Marriage is a *de facto* precondition for having children: People are highly reluctant to bearing and rearing children outside marriage.

Causality is unclear: it is likely that a large part of the decline in marriage arises from the fact that having children is considered one goal of marriage, and people's reduced desire for children makes marriage correspondingly less appealing. *Some* of the causation probably runs in the direction from the decline of marriage to the decline in fertility. In particular, the following hypotheses are consistent with this direction of causation:

(a) A decline in the traditional custom of arranged marriages.

(b) The absence of any corresponding rise in love marriages, i.e., people are not finding romantic partners themselves at a rate that would make up for the decline in arranged marriages.

(c) A declining overall interest in romance, with sex toys and video games substituting for real-world romance for many males, and travel-based lifestyles substituting for romance for females.

5. *Inflexible family structure: women in the workplace*:

   (a) Females in Japan are highly educated and the workplace has many openings for young single females. This is a change relative to 30-40 years ago.

   (b) In comparison, the career options for *married* women, particularly *married women with children*, are poor. This is due to a combination of explicit discrimination against hiring such women, and the absence of flexible work policies (such as work-from-home, flexible hours, leave for childcare). Workers are expected to work the standard "male" 50-hour week. In addition, men do not help around the house enough, but have high expectations of good housework, requiring women to work more in the house.

Note that the absence of options for mothers in the workforce isn't new – what's new is the presence of options for single females.

In particular, this means that:

   (a) Career-oriented females find it unattractive to marry and have children.

   (b) Men face a greater financial burden from marriage and childrearing than if women could also earn: they have to support two adults *and* however many children they have. This makes marriage and childrearing unattractive for males as well. Note that this isn't a factor that has changed much directly, but it has in a more oblique sense: with a larger number of single men and women working, wages are bid down to the levels that singles need to survive so it's harder for married men earning for their entire families to command the dramatically higher income needed for that.

6. *High and increasing costs of childrearing*:

   (a) The Japanese education system features a great deal of cutthroat competition, including private cram schools that impose significant out-of-pocket expenses,

plus a lot of stress regarding whether one's child will get coveted university spots. It has been claimed that these costs have been increasing over time, making it less attractive to have children.

(b) Land prices are high and rising, and household-sharing between extended families has been on the decline, so larger families tend to be a lot more expensive than smaller families because of the need for more physical space.

7. *Pets*: Japanese are said to have a pet craze, so they are increasingly turning to pets to substitute for children.

5.5 Timeline of fertility-relevant events

The part of the timeline related to pronatalist policy is taken from the baby bust paper. The part of the timeline related to abortion law is taken from Wikipedia. TFR values are taken from the Human Fertility Database. The year of reference is bolded.

- 1972: The government officially switched direction to a pronatalist direction.

- 1991 (pronatalist child care policy): The Childcare Leave Act was passed by Japanese government aimed at helping working mothers. TFR values: 1.576, 1.543, **1.537**, 1.506, 1.464.

- 1994 (pronatalist child care policy): The government passed a four-year Angel Plan 1995-99 (officially known as the "Basic Direction for Future Childbearing Support Measures") with the primary goal being to establish more day-care centers to make parenting easier (and thereby, more attractive). TFR values: 1.506, 1.464, **1.507**, 1.426, 1.43.

- 1996 (abortion tightening): The government replaced the Eugenic Protection Law by the Maternal Health Protection Law, making abortion illegal except in case the fetus had significant defects or in case of danger to the mother's health. TFR values: 1.507, 1.426, **1.43**, 1.392, 1.388.

- 1999 (pronatalist child care policy): The government passed a New Angel Plan building on the earlier Angel Plan, to build more day-care centers and after-school support. TFR values: 1.392, 1.388, **1.347**, 1.318, 1.29.

- 1999 (contraception availability): Birth control pills were legalized, see `http://www.nbcnews.com/id/5726375/#.UvuvUoXl68w`. TFR values: 1.392, 1.388, **1.347**, 1.318, 1.29.

- 2001 (pronatalist child care policy): Employment Insurance Law was amended, specifying that 40% salary was to be paid to regular full-time employees on childcare leave. TFR values: 1.347, 1.359, **1.336**, 1.318, 1.29.

- 2002 (pronatalist child care policy): "Plus One" plan announced by the government, encouraging fathers to take five-day paternity leave following childbirth. TFR values: 1.359, 1.336, **1.318**, 1.29, 1.288.

- 2003 (pronatalist): The Japanese government passed "Next Generation" law and "Law for Measures to Support the Development of the Next Generation." These required any business with more than 300 workers to create a "plan" for raising the fertility level of its workers. TFR values: 1.336, 1.318, **1.29**, 1.288, 1.254.

- 2004 (pronatalist, fertility-related policy): The government began offering subsidies for infertility treatments. TFR values: 1.318, 1.29, **1.288**, 1.254, 1.313.

- 2006 (abortion policy): abortion was officially made legal conditional to the mother's consent. TFR values: 1.288, 1.254, **1.313**, 1.331, 1.36.

5.6 Qualitative description of family policy

Japan's historical family policy, starting out post-World War II, has been characterized as pro-traditional in Gauthier's classification of family policy (i.e., it gives primacy to supporting family solidarity rather than promoting gender egalitarianism or fertility).

Thus, Japan's initial pronatalist efforts (started in 1972) were in a pro-traditional context. In particular, the efforts were largely designed in the context of helping two-parent families raising children conventionally, with the male working outside the home and the female raising the children. As is characteristic of such policies, the focus was on pecuniary incentives rather than service provision.

However, the increasing workforce participation of women and their reluctance to marry at the cost of their careers led the Japanese government to shift in the direction of providing support explicitly targeted at mothers working part-time and full-time. Examples are the Angel Plan announced in 1994 and rolled out 1995-1999, and the New Angel Plan announced in 1999 and rolled out over the next few years. These built many day-care centers and afterschool programs.

At present, the Japanese government tries to help both types of family structures: those where women work and those where they don't. Families where women work are often given additional privileges: they can send their children to day care centers and preschools that have a richer range of hands-on activities and operate for more hours in a day. In cases where the mother stays at home, the day care centers and preschools are designed to provide a more rigid academic curriculum and operate for fewer hours of the day (with the expectation that the mother will take care of the child for the rest of the time).

5.7 Similar countries to look at

The following countries are sufficiently similar to Japan that they may be worth looking at: Taiwan, South Korea.

6 Singapore

Singapore started out with an anti-natalist policy in the 1960s, around the time of independence. This was reversed in 1983 (for high-skilled people) and in 1986 (for everybody

else). Both the antinatalist and pronatalist propaganda and policies of Singapore were in-your-face and strong, and yet seem to have been very ineffective. We discuss the fertility trends in Singapore.

6.1 Relevant literature

- *Changes in the fertility policy of Singapore* by Saw S.

- *A Cross-National Comparison of Family Policy*, a special report prepared for the Hong Kong government, available at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`

- *Late marriage and low fertility in Singapore: the limits of policy* by Gavin Jones, *Japanese Journal of Fertility*. Available online at `http://www.ipss.go.jp/webj-ad/webjournal.files/population/2012_Vol.10/Web%20Journal_Vol.10_05.pdf`.

- This blog post links to the two preceding articles: `http://marginalrevolution.com/marginalrevolution/2013/12/why-does-singapore-have-such-a-low-birth-rate.html`

- The book *What to Expect When No One's Expecting* by Jonathan Last has a section discussing Singapore.

- Papers on the fertility decline in East and South-East Asia often discuss Singapore.

6.2 Most recent fertility values

The Human Fertility Database does not include information about Singapore. According to UN data (not very reliable) the total fertility rate in 2012 was 1.275. There is no systematic data on completed cohort fertility.

6.3 History of fertility-relevant events

The events here are pieced largely from the account in Last's book and also the report for the Hong Kong government.

- 1966: The government of Singapore established a "Family Planning and Population Board" which used a combination of persuasive and coercive tactics. The government launched a propaganda campaign with emphasis on the importance of the two-child ideal.

- 1983: The government switched to a pro-natalist policy, providing tax breaks to highly educated women who had three or more children, while giving cash incentives to women with low levels of education who refrained from having more than two children.

- 1987: The government initiated a "New Population Policy" encouraging *everybody* to have more children. The "Two is Enough" messages were replaced by messages of the "Have Three or More Children If You Can" form.

- 2000: The government announced "Baby Bonus" programs as well as "Child Development Accounts" that provided government-matched long-term savings for kids.

6.4 Qualitative description of family policy

The Singapore government has been relatively unusual in that it has, since the beginning, been very in-your-face about its propaganda message and has combined a wide range of coercive and persuasive tactics. They switched from widespread antinatalist propaganda to widespread pronatlaist propaganda, relying on the same machinery in both cases. Their current model can be characterized as pro-natalist with a pro-traditionalist bent.

The policy has widely been deemed to have had little effect on fertility. The introduction of the changes didn't usually lead to any changes in the total fertility rate in the short run. Dragon Years seem to have done more for fertility in the short run, but may

not have affected completed fertility. We don't have a clear picture regarding completed cohort fertility.

However, note that Singapore has $15-50\%$ higher fertility than comparable metropolitan areas in East Asia. The reasons are unclear, but maybe part of the credit goes to pronatalist policies.

6.5 Similar countries to look at

The following countries are sufficiently similar to Singapore that they may be worth looking at: China, Taiwan, Hong Kong. For geographic proximity, comparison with Malaysia may be helpful.

7 France

France historically had low fertility relative to Europe (in the late 19th and early 20th century). Pro-natalism began in a mild form in 1938 and started picking pace in 1978. France is touted as a success story because the fertility rate is approximately at replacement. However, fertility rate for native-born French women is about 1.7 and that for migrants is about 2.2-2.5 (see discussion later about ambiguity in measuring migrant fertility). So it's not an unqualified success.

7.1 Relevant literature

- *France: High and stable fertility* by Laurent Toulemon, Ariane Pailhe, and Clementine Rossier. Available online at `http://dx..doi.org/10.4054/DemRes.2008.19.16`.

- *Fertility Among Immigrant Women in France: New Data, a New Approach* by Laurent Toulemon. Available online at `http://paa2006.princeton.edu/papers/61103`.

- *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government (available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`). This includes France alongside the UK, Germany, Sweden, and Singapore.

- *Welfare States, Family Policies, and Fertility in Europe* by Gerda Neyer (Stockholm University). Available online at `http://www.su.se/polopoly_fs/1.105072.1350482738!/menu/standard/file/WP_2012_10.pdf`.

7.2 Most recent fertility values

The Human Fertility Database does not have cohort fertility data for France. The most recent value of total fertility rate is from 2010 at 2.014.

Other research suggests that total fertility rate for French natives is around 1.7 (in the 1.6-1.8 range) and that for immigrants, naively measured, is 2.5, but when adjusted for biases, is 2.2.

7.3 Bias in fertility estimation for migrants

Many females have their children in the few years immediately after migrating. They postpone children until they have migrated, and stop having children after the few years immediately after migration. A major driver here is marriages between male natives of the country and female migrants.

In particular, this means that if a country has recently become a lot more welcoming of migrants than it was in the past, recent migrants are overrepresented in the migrant count at every age. Thus, all the age-specific fertility rates for migrants are inflated due to dominance by recent migrants. The total fertility rate is therefore also an overestimate.

Even if there *hasn't* been a dramatic increase in migration, the age-specific fertility rates are still an overestimate, because the years spent by migrants prior to migrating, where they have low fertility, are not included in the denominator when computing age-

specific fertility rates. For instance, the people who migrate at age 21 and then have children add to the fertility in that age, but the people who migrate later (say, at age 25) aren't being counted in the denominator for people at age 21.

The paper on French immigrant fertility discusses this bias.

There is no data on completed cohort fertility of female migrants that I'm aware of, so we have to rely on TFR values.

7.4 History of fertility-relevant events

Important events:

- 1938: The state created the Family Code (Code de la famille), which provided an annual stipend (colloquially known as the "Housewife's Allowance") to parents for each child.

- 1978: Housewife's Allowance was abolished, replaced by state-run day-care centers and a National Family Allowance Fund. The stipend just covered the costs of sending the kids to the new day-care facilities: As a result, the downward trend in fertility reversed for the 4-5 years immediately following the change, but then resumed.

- 1997: The "New Family Policy" was announced. This provides increased subsidies to families with multiple children, with the per-child subsidy increasing as the number of children increases. The policy was refined over the coming years.

7.5 Qualitative description of family policy

Family policy in France is characterized as pro-natalist in Gauthier's classification of family policy: it is designed to promote fertility through any means whatsoever. France includes inducements to have kids that are directed at working mothers (these include provision of day care centers, family leave, and tax credits) as well as at stay-at-home mothers (these include cash allowances). Overall, the purpose is not to encourage either of the

two arrangements over the other but rather to encourage having more children within whatever arrangement one happens to choose.

8 Sweden

Sweden is interesting because it largely followed the gender-egalitarian model in Gauthier's classification, yet was almost as successful as France. It also differs somewhat from the other Nordic countries in that it had a bigger dip in its total fertility rate in the mid-1990s, but with no apparent effect on completed cohort fertility.

8.1 Relevant literature

- *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government (available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`).

- *Why does Sweden have such high fertility?* by Jan M. Hoem, availabe online at `http://www.demogr.mpg.de/papers/working/wp-2005-009.pdf`.

- *Welfare States, Family Policies, and Fertility in Europe* by Gerda Neyer (Stockholm University). Available online at `http://www.su.se/polopoly_fs/1.105072.1350482738!/menu/standard/file/WP_2012_10.pdf`.

8.2 Most recent fertility values

Period fertility measures (2010, Human Fertility Database):

- Crude birth rate (CBR): 12.34 per 1000 people.

- Total fertility rate (TFR): 1.987.

- TFR40 (births to mothers up to age 40): 1.914.

Cohort fertility measures:

- Completed cohort fertility (CCF) for the 1960 birth cohort was 2.058.

- Completed cohort fertility up to age 40 (CCF40) for the 1970 birth cohort was 1.924.

8.3 CCF and CCF40 data

Data is from the Human Fertility Database. I've only included data 1955 onward, although earlier data is available.

Cohort	CCF	CCF40
1955	2.035	1.997
1956	2.042	2.003
1957	2.052	2.013
1958	2.057	2.016
1959	2.048	2.005
1960	2.058	2.011
1961	unavailable	1.981
1962	unavailable	1.982
1963	unavailable	1.971
1964	unavailable	1.957
1965	unavailable	1.952
1966	unavailable	1.938
1967	unavailable	1.929
1968	unavailable	1.926
1969	unavailable	1.921
1970	unavailable	1.924

8.4 Fertility trends

Sweden had a decline in fertility in the 1990s, reaching a low of about 1.6 in the middle of the decade. The low fertility is explained by economic performance. Further, historians of

fertility believe that there was no effect on completed cohort fertility (although full data is still unavailable) and the main effect was simply to squeeze births later.

8.5   Qualitative description of family policy

Sweden's family policy has been classified as gender-egalitarian by Gauthier (1996) and it's a classic example of a social-democratic welfare state in the Esping-Andersen typology. It has the following distinctive features (relative to other countries discussed here, though not all that distinctive from other Nordic countries):

- Welfare state privileges inhere in the individual. In particular, benefits related to children inhere in the child. This means that the government is relatively agnostic to the mode of family arrangement. Family arrangements vary from married couples to cohabiting couples to single parents (usually mothers) who consciously decide to be single parents.

- According to one researcher, the framing of the policy is different from that of other nations even when the overall goals are the same. For instance, rather than saying that the policy makes it easier for mothers to work, Swedes would prefer the formulation that it makes it easier for people to work and have children, suggesting that parenthood is not viewed as a defining identity.

- To the extent there's a bias, it's in the direction of encouraging people, both mothers and fathers, to both work and parent.

While encouraging fertility is part of the goal of the policy, it is not distinctively pro-natalist in the sense that French policy is. It just so happens that the policies to make life easier for children and their parents might end up promoting fertility. This differs even from other Nordic countries, such as Finland, that adopted some explicitly pro-natalist policies as early as 1985.

Sweden illustrates that pro-natalism and egalitarian policies can certainly work well together. But the implementation of this type of solution requires a fairly large state, and implementing this sort of policy in a country such as the US would require a lot of changes and potentially creates a significant threat to the economic dynamism of the country.

9 United Kingdom

9.1 Relevant literature

- *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government, available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`.

- *Welfare States, Family Policies, and Fertility in Europe* by Gerda Neyer (Stockholm University). Available online at `http://www.su.se/polopoly_fs/1.105072.1350482738!/menu/standard/file/WP_2012_10.pdf`.

- *Public policy and fertility* portal page maintained by the Institute of Fiscal Studies in the UK has many papers on the relation between public policies (both those explicitly targeted at fertility and those with other goals, such as changes to welfare benefits). The page is at `http://www.ifs.org.uk/projects/201`.

- *Why has the fertility rate risen over the last decade in England and Wales?* by the Office of National Statistics, `http://www.ons.gov.uk/ons/rel/vsob1/birth-summary-tables--englan` `2011--final-/sty-fertility.html`.

- *Socio-demographic comparison between those UK families with up to two children and those with three or more* by Susanny Whiting, available online at `http://populationmatters.org/documents/family_sizes.pdf`.

9.2 Most recent fertility values

Period fertility measures (Human Fertility Database, 2011 data):

- Crude birth rate (CBR): 12.8 per 1000 people

- Total fertility rate (TFR): 1.923.

- TFR40: 1.853.

Cohort fertility measures (Human Fertility Database):

- Completed cohort fertility for 1961 birth cohort: 1.952

- CCF40 for 1971 birth cohort: 1.823

9.3 CCF and CCF40 data

The data here is from the Human Fertility Database.

Cohort	CCF	CCF40
1959	1.983	1.94
1960	1.98	1.935
1961	1.952	1.905
1962	unavailable	1.884
1963	unavailable	1.876
1964	unavailable	1.869
1965	unavailable	1.857
1966	unavailable	1.843
1967	unavailable	1.842
1968	unavailable	1.845
1969	unavailable	1.836
1970	unavailable	1.832
1971	unavailable	1.823

9.4 Qualitative description of family policy

In Gauthier's classification, the UK has a non-interventionist family policy. Benefits are means-tested and restricted to a small subset, rather than treated as universal entitlements or intended to promote specific family structures. Families choose how many children to have largely of their own accord. Women often juggle childcare and employment.

In the 1990s, with the substantial increase in the number of single mothers, the UK made some changes to welfare policies to encourage labor market participation and discourage single parenthood.

10 Germany

10.1 Relevant literature

- *A Cross-National Comparison of Family Policy* prepared for the Hong Kong government, available online at `http://www.familycouncil.gov.hk/english/files/research/Cross_National_Comparison_of_Family_Policy.pdf`.

- *Welfare States, Family Policies, and Fertility in Europe* by Gerda Neyer (Stockholm University). Available online at `http://www.su.se/polopoly_fs/1.105072.1350482738!/menu/standard/file/WP_2012_10.pdf`.

- *Fertility in Austria, Germany and Switzerland: Is There a Common Pattern?* by Tomas Sobotka, Comparative Population Studies, Volume 36,Number 2-3, Page 263 - 304 (Year 2011). Available online at `http://dx.doi.org/10.4232/10.CPoS-2011-11en`.

10.2 Most recent fertility values

Period fertility measures (Human Fertility Database, year 2010):

- Crude birth rate (CBR): 8.29 per 1000 people

- Total fertility rate (TFR): 1.394

- TFR40 (births to women up to the age of 40): 1.349

Completed cohort fertility measures (Human Fertility Database):

- Completed cohort fertility for 1960 birth cohort (most recent): 1.659

- CCF40 for 1970 birth cohort (most recent): 1.453

10.3   CCF and CCF40 data

Data is from the Human Fertility Database. We only include data for birth cohorts 1955 onward, even though earlier data (starting with the 1941 birth cohort) is available.

Cohort	CCF	CCF40
1955	1.674	1.654
1956	1.671	1.649
1957	1.66	1.637
1958	1.662	1.638
1959	1.661	1.636
1960	1.659	1.632
1961	unavailable	1.608
1962	unavailable	1.586
1963	unavailable	1.559
1964	unavailable	1.534
1965	unavailable	1.515
1966	unavailable	1.486
1967	unavailable	1.458
1968	unavailable	1.446
1969	unavailable	1.445
1970	unavailable	1.453

10.4 Qualitative description of family policy

According to the Esping-Andersen typology, Germany has a conservative welfare state. In Gauthier's classification, it has historically been pro-traditionalist, though it is gradually moving in a pro-natalist direction. Some historical features, as described by the comparative analysis of family policies for the Hong Kong government, have been:

- Subservience to the church (Catholic and Christian Democratic traditions)

- Subservience of the state to the family

- Strong belief in the traditional family model where the male is te breadwinner and the female takes care of the children at home.

Most social services in Germany, including child care services that could help working mothers reconcile work and family life, are provided by non-governmental sectors. The state has provided financing but not provision.

The German welfare state is relational, and the state relies on strong family obligations, with the state's provision of services subservient to these.

Germany is characterized by low fertility and low gender equality (relative to other comparably wealthy countries). The fertility may not be unique to Germany: Austria and Switzerland (geographically and linguistically close) show similarly low fertility despite different government policies.

Note that although the German state is subservient to religious institutions, the German people have low religiosity levels (compared to, say ,the US, which has a stricter separation of church and state). In some sense, therefore, the state institutions are out of sync with the people's attitudes.

For further details, see the report with analysis of family policies for the Hong Kong government.

10.5 West and East Germany: some differences

The fertility patterns in West and East Germany were quite different prior to reunification, and even after reunification, there are some important differences between their fertility patterns.

In West Germany, the main driver of low and declining fertility seems to be a high and increasing incidence of childlessness, and this is partly driven by women not marrying, or choosing not to have children. Desired fertility has declined to sub-replacement levels.

In East Germany, the driver of low fertility seems to be that many women have one child and then stop, partly because of bleak economic prospects. Childlessness is less of a driver of low fertility.

East Germany also has wider fluctuations in total fertility rate relative to completed cohort fertility. TFR values in East Germany went to below 0.8 around 1995-2000 before recovering, but completed cohort fertilities did not dip that low.

11 Russia

11.1 Relevant literature

(I wasn't able to find recent academic literature specifically related to Russia. Most of the literature I found was from 2001 or earlier).

I link to some explanatory pieces:

- *Explaining fertility trends in Russia* by Kazuhiro Kumo, 2 June 2010, Vox. Available online at `http://www.voxeu.org/article/explaining-fertility-trends-russia`.

- *Fertility Decline and Recent Changes in Russia: On the Threshold of the Second Demographic Transition* by Sergei V. Zakharov and Elena I. Ivanova, for RAND. Available online at `http://www.rand.org/pubs/conf_proceedings/CF124/CF124.chap2.html`.

- *Marriage and Fertility in Russia of Women Born between 1900 and 1960: A Cohort Analysis* by Sergei Scherbov and Harrie van Vianen. Available online at `http://dx.doi.org/10.1023/A:1011820132402`.

11.2 Most recent fertility values

Period fertility measures (Human Fertility Database, year 2010):

- Crude birth rate (CBR): 12.61 per 1000 people.

- Total fertility rate (TFR): 1.569.

- TFR40: 1.538.

Cohort fertility measures (Human Fertility Database):

- Completed cohort fertility (CCF): 1.849 for 1960 birth cohort (most recent available).

- CCF40: 1.572 for 1970 birth cohort (most recnet available).

11.3 CCF and CCF40 data

Data is from the Human Fertility Database. It goes back to 1941, but we only include the data 1955 onward for brevity.

Cohort	CCF	CCF40
1955	1.854	1.842
1956	1.845	1.834
1957	1.874	1.862
1958	1.862	1.85
1959	1.86	1.847
1960	1.849	1.836
1961	unavailable	1.786
1962	unavailable	1.737
1963	unavailable	1.707
1964	unavailable	1.68
1965	unavailable	1.659
1966	unavailable	1.636
1967	unavailable	1.611
1968	unavailable	1.6
1969	unavailable	1.587
1970	unavailable	1.572

11.4   Abortion, contraception, and fertility

Russia is interesting in that contraception was illegal for a fairly long time period, even though abortion was legal. As a result, women used abortion as a contraceptive, leading to very high abortion rates. In recent years, both abortion and fertility rates have been dropping. Very recently (since 2005) there is evidence of fertility rising again. We do not have sufficient data on recent completed cohort fertility to know if this trend is reflected in completed fertility.

12 United States

12.1 Relevant literature

The literature here was quickly collated and is not necessarily the best or most representative. The US does not have an ultra-low fertility problem, so I didn't spend a lot of time tracking down papers for the US.

- World Population Data Sheet 2012 for the US, published by the Population Reference Bureau. Available online at `http://www.prb.org/Publications/Datasheets/2012/world-population-data-sheet/fact-sheet-us-population.aspx`

- *Fertility Differentials across Race-Ethnicity and Generational Status: Incorporating Non-Hispanic Immigrants*, available online at `http://paa2013.princeton.edu/papers/130798`

- *U.S. Abortion Policy and Fertility* by Jacob Alex Klerman, available online at `http://www.rand.org/pubs/research_briefs/RB5031.html`.

12.2 Most recent fertility values

Period fertility measures (Human Fertility Database, year 2010):

- Crude birth rate: 12.94 per 1000 people

- Total fertility rate: 1.928

- TFR40: 1.874

Completed cohort fertility measures:

- Completed cohort fertility for 1960 cohort: 2.018

- CCF40 for 1970 cohort: 2.068

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12.3 CCF and CCF40 data

Data is from the Human Fertility Database.

1955	1.981	1.944
1956	1.984	1.946
1957	1.986	1.947
1958	1.994	1.954
1959	2.01	1.967
1960	2.018	1.974
1961	unavailable	1.981
1962	unavailable	1.989
1963	unavailable	2
1964	unavailable	2.011
1965	unavailable	2.024
1966	unavailable	2.045
1967	unavailable	2.062
1968	unavailable	2.061
1969	unavailable	2.055
1970	unavailable	2.068