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Reflection

Should we be concerned about low fertility? A discussion of six possible arguments

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Øystein Kravdal[1]

Abstract

OBJECTIVE
The low fertility in high-income countries has raised concerns among the public, politicians, and social scientists. In this paper, six possible arguments for considering low fertility as a 'problem' – in the sense that political interventions might be warranted – are presented and discussed.

CONCLUSION
One argument, which is widely recognized and clearly relevant, is that low fertility exacerbates ageing and leads to lower population growth, which may have adverse aggregate-level economic effects. The environment may also be affected, but more likely in a positive way. A second argument focuses on low fertility stemming from subfecundity and possibly inadequate access to fertility treatments, which may be a source of strong dissatisfaction. Two other individual-level arguments are based on the idea that intentions to have few or no children may not actually align with individuals' own best interests, or that there is a gap between desired and intended fertility. However, the first idea lacks sufficient empirical evidence, while the second requires additional supporting ideas to form a strong argument for considering low fertility a problem. The fifth argument, about the possibility that low fertility may influence parents and children in ways that have economic and other implications for society, is also very challenging to substantiate empirically. The sixth argument is based on an entirely different perspective, where low fertility is considered as partly a result of economic uncertainty or other individual or societal factors that themselves constitute a problem, given their broadly adverse consequences for individuals' wellbeing.

CONTRIBUTION
The presentation and discussion of these arguments may help structure and clarify future discussions about whether steps should be taken to increase fertility.

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1. Introduction

The total fertility rate (TFR) is currently below 1.8 in almost all high-income countries, and is at or near record lows in many. For example, in 2022 the highest TFR in the EU-27 was 1.79 (France) and the average was 1.46 (Eurostat 2024). The TFR in the US was 1.66 (Centers for Disease Control and Prevention 2024), while it was 1.26 in Japan (Ministry of Health, Labour, and Welfare of Japan 2024). South Korea was at the bottom with 0.78 (Korean Statistical Information Service 2024). Even in the Nordic countries, known for their generous childrearing subsidies and low economic uncertainty, the TFR has fallen below 1.5, following a sharp decline over the last 15 years (Nordic Statistics Database 2024). Moreover, cohort fertility at age 45 is typically below 2 in high-income countries, and in some – such as Germany, Italy, and Japan – it is as low as 1.5 (Zeman et al. 2018).

This low fertility has raised concerns among the public, politicians, and – perhaps to a lesser extent – demographers and other social scientists. However, the precise arguments have largely dealt with the potentially adverse effects of low fertility through changes in population size and structure, while there has been less focus on the benefits of these demographic changes. Arguments that could be made regarding the effects of having few or no children on the individuals and families themselves have received little attention or been vague. In this paper, I specify and discuss six different types of arguments to consider when discussing whether low fertility is, or signals, a 'problem', in the sense that a societal response, typically in the form of political intervention, might be warranted. Hopefully, such a comprehensive, reflective review may contribute to making future academic, political, and public discussions about responses to low fertility better structured, clearer, and broader, without drifting into irrelevant issues.

To be more specific about the types of arguments being addressed, one concerns the effects of low fertility on population size and age structure. This may be considered an externality or macro-level argument, as it involves the effects of individuals' reproduction on other people. However, individuals' or couples' reproduction also has implications for their own and their families' lives and wellbeing, and some of these effects (referred to below as individual-level effects for simplicity) could also be viewed as 'problematic', even though they are, to some extent, expected and desired by the individuals and factored in when they form their fertility intentions. Arguments involving such individual-level effects can be referred to as micro arguments. A third main type of reason for perhaps being worried about low fertility is that it could have externality effects that do not involve population size and structure, but rather are societal implications of the effects on the individuals themselves. This may be referred to as an indirect-externality argument (or a combined micro-macro argument) and has attracted very little attention. A fourth perspective to consider is that low fertility may not, in itself,

have adverse societal or individual-level effects, but may be the result of individual or societal factors that contribute negatively to people's wellbeing. This may be referred to as an 'underlying-factors' argument. These four main types of argument are relevant in all low-fertility contexts.

In this paper the individual-level arguments are further divided into three types, rooted in the three concepts of fertility desires, fertility intentions, and actual fertility. One argument concerns the possibility that the intentions may not align with the individuals' own interests due to unexpected effects of childbearing. Another addresses the gap between desires and intentions, which can lead to frustration and dissatisfaction, and the third focuses on the gap between intentions and actual fertility, which may have a similar impact.

In the first part of the paper I specify each of the six arguments and explain their background. It is particularly important to clarify the individual-level argument regarding unexpected effects, which is quite complex and has thus far been presented somewhat implicitly. This argument may attract more attention in the future, as it can be seen as a natural extension of the externality argument. I also discuss the relevance of the arguments, when there may be reasonable doubts about it, and the underlying empirical evidence. Although relevant in principle, the indirect-externality argument and the individual-level argument about unexpected effects have rather weak empirical underpinning. A few findings from a recent, unique Norwegian survey are presented to illustrate and support the latter argument. Additionally, I mention – although do not discuss in detail – what types of interventions each of the arguments could lead to. The conclusions are summarized in Table 1. In the second part of the paper (Section 4), I elaborate on how an older and smaller population may affect society. As mentioned, this is the most common argument in the low-fertility debate, and it may also be considered more compelling than the micro arguments and the combined micro-macro argument.

Table 1: Summary of arguments

Type of argument	Brief judgement of argument	Possible policy steps
1. Low fertility exacerbates ageing and leads to lower population growth and perhaps even decline, which is harmful to society (externality argument)	Definitely relevant, but there is uncertainty about these aggregate-level effects. If they are weak, there is less justification for intervention.	Try to increase fertility, especially through (further) subsidization of childrearing costs
2. Fertility intentions are not in people's own interest, as they would on average have been better off with more children (individual-level argument)	It makes sense to wonder whether there is a discrepancy between expected and actual effects of childbearing, but hard to establish evidence for such a gap.	If good evidence of a gap exists: Provide information, subsidize childrearing costs
3. There is a gap between intended and desired fertility: Many of those who have few or no children – in accordance with their intentions – would (under better circumstances) have liked to have more children (individual-level argument)	The argument is incomplete. Must also argue why there may be a public responsibility to meet this kind of desire or 'dream', rather than others. Relevant supplementary argument: externality.	Subsidize childrearing costs
4. There is a gap between intended and actual fertility: Some have few or no children, even if they intended to have more children, because of subfecundity or infecundity (individual-level argument)	May be a good argument for intervention.	Support fertility treatment, provide information on fecundity, economic incentives for earlier childbearing
5. Low fertility affects the life of the (potential) parents and the children themselves, and in ways that may have adverse implications for others (indirect-externality argument)	The idea of indirect externalities makes sense, but hard to establish evidence.	If good evidence exists: Provide information, subsidize childrearing costs
6. Low fertility does not have adverse effects on individuals or society, but is a result of factors (such as income uncertainty) that may have such effects (underlying-problem argument)	Relevant, but a different type of argument	For example, improve economic opportunities, especially among the most disadvantaged

2. Fertility desires, fertility intentions, and actual fertility

Before discussing the various arguments, it is necessary to clear up some concepts. Couples may often have concrete ideas about whether they want to have a child within a subsequent quite short period (say, 1–2 years), based on their current life situation and expectations about the future. They may then take into account their purchasing power, the costs of having a child, and their views about the value of having a child compared to spending time and money on other sources of satisfaction, which depends on the various ways they anticipate that a child will impact their lives (Easterlin and Crimmins 1985). Additionally, they may be influenced by norms regarding childbearing, which may partly reflect the fertility level in their society (Bergsvik, Cools, and Hart 2023). Women without a partner may also have concrete ideas about whether they want a child soon, while still single, but are more likely to arrive at a negative conclusion. For single men, having a child would be practically difficult, so they may not give much thought to

whether they want a child soon (Carone, Baiocco, and Lingiardi 2017). If they do consider it, the conclusion is very likely to be negative.

Let us refer to these concrete ideas as short-term fertility intentions (in line with Philipov 2009). A difference can arise between these short-term intentions and actual fertility in the relevant period because of subfecundity or infecundity including miscarriages (pushing fertility down), inadequate contraception not offset by abortion (pushing fertility up), or (presumably small) revisions of the interest in having a child soon that may occur even within such a short interval. Thus, the total number of children women have had on average by age 45 may be considered the result of a series of short-term fertility intentions formed at different points in time (as single, when few want a child very soon, or in collaboration with a partner), minus a component because of subfecundity or infecundity, plus a contribution from inadequate contraception. For simplicity, this sequence of short-term fertility intentions, which reflect actual life circumstances at relevant time points, will be referred to below as intended fertility or fertility intentions.

When women or men are asked about the number of children they want to have within a longer time period such as the remaining reproductive age span, many give answers that exceed their actual fertility in that period and therefore likely also what has just been defined as their intended fertility. This is seen both when comparing aggregate-level data (Beaujouan and Berghammer 2019) and when considering individuals (Berrington and Pattaro 2014). This pattern suggests that many individuals' expectations about their future circumstances are overly optimistic or outright unrealistic. They may simply ignore current obstacles such as not having a partner or suffering from poor health or assume they will disappear, or they may later meet problems they have not expected, such as unemployment. To some extent, it may be reasonable to say that what people report are their 'dreams' about fertility. Below, I refer to wanted fertility over the longer term as fertility desires.

To avoid confusion about the terminology, it should be noted that 'fertility intentions' is often used in the literature to describe childbearing plans over a longer future period that are more concrete than 'desires', but that can nevertheless be revised during that period in response to actual life circumstances (Berrington 2024; Badolato 2025). What I have called 'desires' are sometimes referred to as 'long-term intentions' (Beaujouan and Berghammer 2019) or even 'fertility ideals', particularly if the formulation of the question clearly invites people to disregard reality (Brinton et al. 2018). Others might use 'ideals' to describe perceived norms and social expectations regarding childbearing. The important point for the discussion below is that there may be a difference between what people want based on various more or less realistic judgements – whatever they are called – and the subsequent series of short-term intentions based on their actual life situation.

3. Which types of arguments are good, and which types of interventions would be reasonable in light of these arguments?

3.1 Argument 1: Low fertility exacerbates ageing and leads to lower population growth and perhaps even decline, which is harmful to society (an externality argument)

3.1.1 The demographics

If fertility in a country is very low for 10 years, the proportion of children and adolescents relative to the working-age population consisting of those aged, say, 20–64 years (i.e., the young-age dependency ratio) will be smaller than if fertility had not been as low. The proportion of older individuals compared to those in the working-age population (the old-age dependency ratio) is unaffected by the very low fertility in this 10-year period. However, compared to a situation with higher fertility, the low fertility will result in a smaller number of individuals in the working-age population later, and thus a higher old-age dependency ratio. If the low fertility persists, there will be few children and adolescents in the longer term compared to in the higher-fertility scenario. This is due to both a smaller number of individuals in the reproductive age group and the relatively few children each of them has. There will also be a relatively high old-age dependency ratio.

An example of this pattern, taken from a recent Norwegian population projection, is shown in Table 2. According to this projection, for several decades the sum of the young-age and old-age dependency ratios (i.e., the total dependency ratio, which is the inverse of the proportion in the working-age population minus one) is lower under the low-fertility assumption than under the medium-fertility assumption. This is because a lower young-age dependency ratio under the low-fertility assumption is combined with an old-age dependency ratio that is similar to that under the medium-fertility assumption, or at least not so much higher that it offsets the lower young-age dependency ratio. Later, the total dependency ratio is higher under the low-fertility assumption than under the medium-fertility assumption because the higher old-age dependency ratio dominates the lower young-age dependency ratio. Additionally, the low-fertility assumption leads to a declining population over the second half of the 21st century, whereas the medium-fertility assumption results in modest population growth during that period.

Table 2: Young-age dependency ratio (A), old-age dependency ratio (B), total dependency ratio (C), proportion in the working-age group (D), and total population size, according to population projections for Norway, 2022–2100[a]

	Medium-fertility assumption [b]					Low-fertility assumption [b]				
	A= N_{0-19} / N_{20-64}	B= N_{65+} / N_{20-64}	C= A+B	D= N_{20-64}/ N =1/(C+1)	N (mill)	A= N_{0-19} / N_{20-64}	B= N_{65+} / N_{20-64}	C= A+B	D= N_{20-64}/ N =1/(C+1)	N (mill)
2022	0.386	0.309	0.695	0.590	5.43	0.386	0.309	0.695	0.590	5.43
2030	0.362	0.360	0.722	0.581	5.66	0.344	0.360	0.704	0.587	5.60
2040	0.364	0.441	0.805	0.554	5.89	0.309	0.441	0.750	0.571	5.71
2050	0.376	0.487	0.863	0.537	6.03	0.302	0.496	0.798	0.556	5.72
2060	0.371	0.548	0.919	0.521	6.10	0.297	0.578	0.875	0.533	5.65
2070	0.372	0.594	0.966	0.509	6.15	0.290	0.655	0.945	0.514	5.52
2080	0.385	0.643	1.028	0.493	6.20	0.298	0.747	1.045	0.489	5.38
2090	0.379	0.646	1.025	0.494	6.20	0.302	0.790	1.092	0.478	5.19
2100	0.375	0.651	1.026	0.494	6.20	0.299	0.797	1.096	0.477	4.98

Source: [a] Statistics Norway 2024
Notes: N refers to the total population size and N_{0-19}, N_{20-64}, and N_{65+} refer to the size of the populations in the respective age groups.
[b] Medium-fertility assumption: TFR down from 1.55 observed in 2021 to 1.49 in 2024, increasing to 1.70 in 2035, and constant thereafter.
Low-fertility assumption: TFR down from 1.55 observed in 2021 to 1.30 in 2022, and constant thereafter.
In addition to these two alternative fertility assumptions, it is assumed that (1) the improvement in life expectancy continues and (2) net immigration remains at the 2020 level except for a temporary increase in 2021–2023 because of the war in Ukraine.

A similar pattern can be observed for the total European population: The total dependency ratio, defined as the number of individuals younger than 20 or older than 64 relative to those aged 20–64, is lower until about 2075 under the low-fertility assumption than under the median-fertility assumption, after which it becomes higher. The two assumptions differ by 0.5 children. More specifically, the total dependency ratio increases from 0.70 in 2024 to 0.79 under the low-fertility assumption and to 0.88 under the median-fertility assumption in 2050 (calculated by the author from United Nations 2024), then rises to 0.92 under both assumptions in 2075, increasing further to 1.16 under the low-fertility assumption and 0.99 under the median-fertility assumption in 2100.

To simplify, low fertility makes the population older and smaller than it would have been if fertility had not been as low. In the hypothetical situation where birth rates and death rates remain constant and where there is no international migration, the age structure will remain constant after a couple of generations. This so-called stable population will shrink over time if fertility is below the replacement level, and the lower the fertility the older the population and the greater the decline.

While cohort fertility is the most important determinant of long-term trends in population size and structure, the timing of fertility also plays a role. For example, with a given cohort fertility, the annual population growth will be smaller if the mean age at childbearing is higher. For simplicity, the discussion in this paper deals almost exclusively with cohort fertility.

The population size and age structure probably have economic, environmental, and other societal effects, although existing studies have not provided a clear picture of the strength or even the direction of these effects (see elaboration in Section 4). In other words, there are externality effects (or macro-level or aggregate-level effects) of individuals' childbearing: it has implications for others. If it is feared that the overall effects of a smaller and older population (compared to a higher-fertility scenario) may become a significant burden within a relevant time frame, political attempts to 'do something about low fertility' may be justified. However, it is important to recognize that low fertility can be advantageous for a period because of the lower young-age dependency ratio, and that successful efforts to increase fertility may cause temporary disadvantages because of a higher young-age dependency ratio than when there are no such policies.

3.1.2 Potential political interventions

Most importantly, steps may be taken to enhance fertility intentions. For example, initiatives to create a more flexible work environment for parents, including weaker expectations regarding long work hours, might have some impact. An even more promising strategy may be to increase childrearing subsidies: more generous child allowances up to a certain age, one-time bonuses at the time of birth, or parental leave arrangements, or improved access to affordable childcare. Expansion of childcare in particular seems to have contributed positively to fertility in some countries (Bergsvik, Fauske, and Hart 2021; Guetto, Alderotti, and Vignoli 2025), although there have often been other objectives behind this expansion. Such childrearing subsidies would contribute to improve the wellbeing of those who choose to have more children because of them, as well as the wellbeing of reproductive-age individuals whose fertility is not affected but whose children become less expensive to raise and who may also derive other advantages. Others in society will benefit from the presumed externalities of higher fertility. Whether they experience a total welfare improvement depends on whether the tax amounts needed for the policies could have generated greater advantages for them if they had been retained for personal use. Clearly, the relevance of policies aimed at increasing intended fertility through reduced childrearing costs would depend on whether generous support systems already exist.

In some countries, the pressure to succeed in education is particularly intense or tuition fees in higher education (or in private primary and secondary schools) are very high (Jones 2019; Johnstone 2020). This adds to parents' economic and other childrearing burdens. Therefore, in principle, fertility intentions might be enhanced through initiatives

to reduce the costs of education or a shift towards a less competitive attitude, but this may not be easy to achieve.

A better economic situation among adults of reproductive age may also have a positive influence on fertility intentions. It is not theoretically evident that higher incomes for men would strengthen the interest in having children, as a higher income might also lead people to spend more on each child. However, some evidence suggests a positive link between men's earnings and fertility (Hart 2015; Trimarchi and van Bavel 2020; Kolk 2023). Additionally, many studies have shown relatively high birth rates among those who have a job (van Wijk, de Valk, and Liefbroer 2022), while unemployment – or the fear of it – is negatively associated with fertility (Alderotti et al. 2021). Better economic opportunities for women may also push fertility up, although this is less likely in contexts where limited access to childcare results in high opportunity costs of childbearing for women with high wages (Butz and Ward 1979; Kornstad and Rønsen 2018; Trimarchi and van Bavel 2020).

However, it is challenging for governments to make broad economic improvements, and while it is possible that this would positively influence birth rates, this approach may prove to be a costly way to achieve higher fertility compared to the subsidies mentioned earlier. Unfortunately, we know little about this, and whether it might be more efficient if all improvement took place in the poorest segment of the population. On a more positive note, economic improvement would undoubtedly result in many other benefits. I return to that in section 3.6.[2]

Fathers tend to be less involved in homework and childcare than mothers, the difference being larger in some countries than others (Kan et al. 2022). A low level of paternal involvement may have an impact on fertility (Raybould and Sear 2021), partly through weakening women's preferences for having children rather than spending time and resources on other sources of satisfaction. In principle, fertility might therefore be stimulated through policies aimed at increasing men's participation in the home. In some countries a portion of parental leave is reserved for men, although not necessarily with higher fertility as the desired endpoint. Such policies may have impacted families' daily lives (André, Cammu, and Meuleman 2025), but effects on fertility have not been observed, at least not in the studies with the most robust statistical designs (Bergsvik, Fauske, and Hart 2021).

Information campaigns that aim more directly at changing people's views about the net value of having children might also be considered, with implications for fertility intentions. For example, the message could be that 'you can feel better if you help your

[2] Higher fertility could also be expected if housing prices were reduced through political initiatives, as this could be considered as freeing up families' economic resources for other purposes. Additionally, lower housing prices might contribute to lower childrearing costs. However, there is more complexity involved and it is not easy to draw clear conclusions from the existing evidence (Clark and Ferrer 2019; van Wijk 2024).

country by having a child'. However, while attempts to influence preferences have been made in some countries (Gietel-Basten, Rotkirch, and Sobotka 2022), there is little knowledge about their effects. Intended fertility would likely also go up if more people lived with a partner, but political measures to stimulate fertility through partnership formation have only rarely been implemented (Strijbosh 2015).

Birth rates might also be increased through interventions aimed at reducing the gap between actual and intended fertility. For example, studies have indicated that improved access to fertility treatment may push fertility up (Bergsvik, Fauske, and Hart 2021). Other strategies for addressing fecundity problems are discussed in Section 3.4. It is also possible, in principle, to increase fertility by restricting access to contraception or abortion, as has been done in a few countries (Keil and Andreescu 1999; Gietel-Basten, Rotkirch, and Sobotka 2022). Clearly, this extreme type of intervention would reduce the wellbeing of individuals who have more children than they intend, and most people would therefore probably be opposed to it, even if these additional children contribute positively to society despite being initially unwanted by their parents.

If any of these policies were to succeed in raising fertility, the increase might lead to changes in norms and preferences that could further boost fertility, as indicated above. Finally, it is important to note that some of these policies may also be justified by the arguments discussed below (Arguments 2–6), or by completely different considerations. For example, there may be an interest in increasing child allowances from a child welfare perspective even in the absence of a particularly low fertility, and some groups may advocate for restricting abortion rights based on ethical reasons.

3.2 Argument 2: People's fertility intentions are not in their own interest, as on average they would be better off with more children (an individual-level argument)

3.2.1 The idea

The preceding argument was about the effects of individuals' or couples' childbearing on the wellbeing of others in society. A reasonable next step is to consider whether having no or few children may be detrimental to the individuals or couples themselves, and whether such effects might justify political intervention. Similarly, would those with several children be better off with even more? This idea may sound strange, because don't people know how childbearing will affect their lives, and only intend to have a(nother) child if the total effect is positive? No, they only have expectations, and children may influence the parents in ways that are more negative or more positive than expected. When they are older, some individuals may conclude that the total influence of having

children was more positive than anticipated, and that they might have had a better life if they had intended to have – and had – more children. If this is more common than the opposite, it could be argued that, on the whole, people tend to have fewer children than is in their own best interest.

I have not seen this point explicitly made in scholarly literature, but there have been hints in this direction (Fahey and Speder 2004), and a Danish fertility intervention in which sports heroes proclaimed how valuable their children were to them and that they were not as hard to raise as expected (personal communications, Søren Ziebke) seems to have been based on the idea of overly pessimistic expectations about parenthood. Because this argument about the (perhaps unexpectedly positive) effects of childbearing on the parents themselves can be seen as a natural extension of the externality argument, it may well receive more attention in future discussions.

To elaborate on the argument, people typically form their fertility intentions based on economic considerations plus their expectations about how a child will affect their lives in other ways, for better or worse and in the short and long term (as mentioned in Section 2). For example, many probably anticipate that having a child will result in less sleep for a few years, less time for their own leisure activities – which may create considerable dissatisfaction (Bittman and Wajkman 2000) – or occasional serious worries about the child's wellbeing. On the positive side, they may anticipate joy from interacting with the child (Nelson et al. 2013; White and Dolan 2009), a stronger feeling of meaning and purpose in life, and practical and emotional support in old age (Brandt Haberkern, and Szydlik 2009; Wenger et al. 2007). They may intend to have a child if these expected rewards outweigh the downsides, and if the childrearing costs are not considered too high compared to their purchasing power.

People are probably able to predict quite well the rewards from interacting with children and watching them grow, as this touches on deeply held values about what is important in life. However, even these consequences of parenthood may not unfold exactly as expected, and other consequences, including childrearing costs, may differ more from expectations. Expectations about future purchasing power may also be quite wrong. Additionally, there may be consequences that parents in principle should be able to take into account but which they ignore, and then consider retrospectively when reflecting on how having children has influenced them. Thus, several years after the childbearing period, some parents may feel that raising a child has been less rewarding or more burdensome than expected, and that life might have been better with fewer children. Conversely, others may think that parenthood has been more positive than anticipated, and conclude that they would have been better off with more children. Even the childless, with no personal experience of childrearing, may come to regret not having intended to have a child.

One possible pattern is that it is more common to regret the intention to have no (more) children than to regret the birth of one or more intended children. If this is the case, the currently low fertility could be considered a problem because the intended fertility (presumably quite close to the actual) has not been in the average individual's own interest in the longer term.

Clearly, two partners may have different expectations about how having children will influence their life, and they may also have different views about the actual consequences. In this paper, the term 'fertility intentions' refers to the intentions of single women or women in partnerships, formed in collaboration with their partner (for the sake of convenience, given the comparison with individual fertility desires and actual fertility). The intentions of partnered women reflect both partners' expectations regarding the effects of having children (Badolato 2025). When discussing whether intentions align with individuals' best interests, the most relevant comparison is with the woman's later evaluation of the actual consequences when she also takes into account how her partner has been affected. However, this evaluation can be especially challenging if the relationship has dissolved. It is also possible that a woman, if asked about expectations and actual implications, will report her own views, without considering those of her partner, which will not accord so well with the complete range of thoughts behind the fertility intentions. For simplicity, I ignore such complexities related to partner disagreement and partnership stability in the discussion in this section.

3.2.2 Evidence and intervention

While it is reasonable to wonder whether a discrepancy exists between the expected and actual consequences of having children, it is obviously difficult to establish good empirical evidence for such an expected–actual gap. If interviewed, many individuals would likely struggle to assess how having a child has affected them compared to expectations, and it would be even more difficult – perhaps especially for the childless – to assess the impact of a hypothetical birth of a(nother) child. Additionally, parents may be reluctant to express regret about the birth of a child, if they arrive at such a conclusion.

Nevertheless, some evidence has been gathered through various qualitative analyses (Moore and Abetz 2019) and surveys. For instance, Piotrovsky et al. (2024) compare individuals who regret the birth of one or more children with those who do not, using data from a small-scale survey. Unsurprisingly, they find that those who regret childbearing are more likely to report that parenthood has been a more negative experience than expected. Among those without regrets, few think reality has surpassed their expectations. Larger and more representative studies have suggested that approximately 10% have childbearing regrets, although many of these individuals may

not have wanted a child in the first place (Piotrowski 2021; YouGov 2021). Conversely, it has been shown that about 25% wish they had more children (YouGov 2021), but this figure likely includes many individuals with fecundity problems and may also reflect the difference between intended and desired fertility. In one small study of intentionally childless individuals, very few regret their decision (DeLyser 2012), while one-third report regrets in another such study, based on particularly few observations (Jeffries and Konnert 2002).[3]

If it were possible to establish better evidence suggesting that regret over not having had more children is more common than regret over having had too many – because of a tendency to be too pessimistic about the expected net benefits of children – what could be done to solve this 'problem'? This research could be shared with younger individuals who are forming childbearing intentions, but it may not be very helpful to know that older cohorts on average have underestimated the value of children. They may believe that the experience of older cohorts has little relevance, or that they themselves are not like average individuals. For example, they may think that they are less fond of interactions with young children than most others, and therefore unlikely to regret having few or no children. Additionally, even if they consider the information relevant and acknowledge that they might indeed be too pessimistic, how would they incorporate this insight into their fertility intentions? Another version of this type of intervention might be to simply remind the public of the positive aspects of parenthood, under the assumption that this would make individuals better equipped to form intentions that serve them well.

Another potential approach could be to subsidize fertility. This would be analogous to policies in other areas. For example, if it is believed that people underestimate the benefits of eating vegetables, the government may reduce the price. In the case of childbearing, the idea would be that if the state covers more of the childrearing costs, some individuals would intend to have a child they otherwise would not have because they expect the child to affect them positively under these new circumstances, while in reality the child would be even more valuable to them. In this way, the state essentially purchases individual welfare at a relatively low cost. However, such subsidies would be funded by taxes, including those from taxpayers beyond reproductive age, whose life quality may be reduced by this expense. This is not a scenario where everyone can benefit, such as when there are positive externalities. That said, the total welfare of the population may nevertheless improve, depending on the balance between the value of the

[3] There is a quite large literature on how childbearing is associated with later subjective wellbeing (Balbo and Arpino 2016; Pertold-Gebicka and Spolcova 2022), but these studies do not shed light on how common it is to experience unexpectedly positive or negative consequences of having children. For example, even if it is shown that individuals with two children are more satisfied than those with one, or that the birth of a second child increases individuals' satisfaction, it cannot be concluded that those with one child have underestimated the value of children and would have been happier if they had had a second child (Kravdal 2014).

alternative uses of the additional tax amounts and the gains achieved by individuals who have more children than they otherwise would.[4]

In principle, a comprehensive package of initiatives aimed at improving the economic situation of adults of reproductive age could operate in the same way as childrearing subsidies. However, as noted earlier, this may be a less effective strategy.

3.2.3 Consequences of childbearing that are less widely known

Childbearing likely also has effects on parents that most people are not aware of and therefore do not consider when forming fertility intentions. For example, evidence suggests that the number of children may influence the risk of certain diseases, a fact that is probably not widely known.[5] Therefore, a possible policy approach would be to disseminate information to the public about the current state of expert knowledge on these lesser-known effects of childbearing. People may then form intentions that are more in accordance with their interests.

However, the current evidence about these effects is not very strong. For example, it is well established that childlessness – and to lesser extent low parity – is associated with lower mortality among both women and men when controlling for certain obvious confounders (Barclay et al. 2016). It is also theoretically plausible that a causal effect runs from parity to health or mortality. Nevertheless, such a causal effect is hard to identify empirically. Additionally, people are likely to find it difficult to form intentions when childbearing reduces the probability of some outcomes while increasing the

[4] Note that the goal of all these potential interventions is to increase people's fertility intentions so that on average they align better with their own interests. Making contraception less available, which some might consider an alternative strategy, has entirely different implications: it raises actual fertility above the intended. While this could, in principle, benefit individuals whose fertility intentions cannot be increased by the suggested interventions to accord with their own interests, such a policy would also be clearly detrimental to those who – based on sound judgement – try to avoid (further) childbearing, and who would be adversely affected if they nevertheless had a child.

[5] To provide a more detailed account of the lesser-known health effects, some of the implications of childbearing that many probably do consider, regarding, for example, changes in lifestyle and the availability of support, may in total have long-term effects on health that they perhaps do not have in mind. Furthermore, there may be lifestyle changes with implications for health that they are less aware of, such as less risk-taking behaviour (Wang, Kruger, and Wilke 2009), being subjected to stronger social control (Joutseneemi et al. 2007; Kendig et al. 2007), and better integration into the community (Knoester and Eggebeen 2006; Nomaguchi and Milkie 2004). In addition to lifestyle effects and other effects that may be described as 'social', there are probably also more purely biological effects of having children, linked to various physiological processes triggered by pregnancy or breastfeeding. This is, of course, only relevant for women. For example, literature suggests that the number of pregnancies may influence the mother's risk of developing certain types of cancer (Collaborative Group on Hormonal Factors in Breast Cancer 2002; Salehi et al. 2008; Russo and Russo 2007) or other diseases (Naver et al. 2011; Skilton et al. 2009; Kravdal et al. 2020) through various physiological mechanisms. There is probably not much public knowledge about these biological effects.

probability of others which may or may not be considered more important. Making this even more complex, people's knowledge varies: some subgroups may already consider certain less-known effects when forming intentions. Subsidizing childrearing could again be an option, if all these effects that are presumably unknown to most people could be accurately estimated and summed up to a total effect on wellbeing, and if this total effect is positive. However, it is unlikely that we will ever be able to calculate such a total effect. Stated differently, politicians may decide to support childbearing based on an idea that having children will on the whole improve parents' wellbeing because of effects they have not themselves considered, but the evidence for this is currently not strong.

3.2.4 An empirical example

A 2024 wave of the Norwegian Mother, Father, and Child Cohort survey (Magnus et al. 2016) includes a large number of parents (but excludes childless individuals) and provides insights into their experiences with parenthood in comparison to their expectations.[6] The survey also includes questions that address regrets about ceasing childbearing among individuals who were fecund but intended to have no more children. This group is particularly relevant to the discussion regarding the possibility that people's fertility intentions may not be in their own interest.

All mothers older than 45 were asked about their childrearing experiences, and 85% of them answered that having children had brought more meaning and joy than expected (Table 3). On the negative side, 39% said that raising children had been more burdensome or stressful than anticipated. Forty-seven per cent (19,794 out of 42,360) reported the most positive deviations from expectations, in the sense that they both thought children had brought more meaning and joy than expected and that rearing children had not been more burdensome or stressful than expected. Three per cent (1,315 out of 42,360) gave the opposite answers, i.e., they experienced the most negative deviations from expectations.

[6] MoBa is a population-based pregnancy cohort study conducted by the Norwegian Institute of Public Health and is regulated by the Norwegian Health Registry Act. Pregnant women from all over Norway in 1999–2008 were invited to participate, and 41% of them accepted. The cohort includes approximately 95,200 mothers (who have had 1,145,000 children) and 75,200 fathers.

Table 3: Distribution of answers to questions about discrepancies between expected and actual effects of childbearing among mothers older than 45 years [a]

	B: "Having child(ren) has given more meaning and joy than I expected"				
A: "Raising child(ren) has been more burdensome or stressful than I expected"	Yes	No	Unsure	Missing	Total (proportion of grand total 42,360)
Yes	13,893	1,315	1,139	25	16,372 (38.6%)
No	**19,794**	2,298	756	45	22,893 (54.0%)
Unsure	2,365	153	416	8	2,942 (6.9%)
Missing	64	9	2	78	153 (0.4%)
Total (proportion of grand total 42,360)	36,116 (85.3%)	3,775 (8.9%)	2,313 (5.5%)	156 (0.4%)	42,360

Note: [a] In a 2024 wave of the Norwegian Mother, Father and Child Cohort (MoBa) survey, respondents were asked the following questions:
"Here are two statements about experiences with raising children. Do they describe what you feel yourself?
A: Raising child(ren) has been more burdensome or stressful than I expected,
B: Having child(ren) has given more meaning and joy than I expected".
The group with the most positive deviation from expectations (A=No, B=Yes) is indicated in bold type, while the group with the most negative deviation from expectations (A=Yes, B=No) is indicated with underlining.

Mothers older than 45 who stated that the reason for not having more children was that they had not wanted another child were asked: "Imagine, entirely hypothetically, that you had nevertheless had another child. How do you think this would have influenced the quality of your life up to now?" Among those who were still living with the co-parent five years after the last child was born (not an important restriction), 35% reported that having another child would have affected their lives somewhat positively (19%) or very positively (16%) (Table 4, column 4). Only 38% said they would have been negatively affected – an answer reflecting that their intention to stop childbearing was also reasonable enough in hindsight. However, caution is necessary when considering the interpretations, given how difficult it is to make assessments about the impact of a hypothetical child. For example, some may have been unrealistically positive.

Not surprisingly, the 46% who had the most positive experiences of childrearing compared to their expectations were most likely to say they would have been positively affected by having even more children: 42% gave this response (Table 4, column 1). By contrast, only 14% of those who had the most negative experiences with childbearing gave the same answer (Table 4, column 2).

To conclude, a quite large proportion of the interviewed mothers appear to have had better experiences with childrearing than they expected, and it also seems that many (especially among those with positive experiences) may have been too pessimistic when intending not to have additional children. However, while a considerable proportion might have had a better life if they had intended to have, and had, more children, the

survey does not provide information about the opposite – the extent to which those with the most negative childrearing experiences regretted the birth of an intended child.

Table 4: Distributions of women's answers to a question [a] about how they would have been affected by having another child

	Discrepancy between expected and actual effects of childbearing			
"Imagine, entirely hypothetically, that you had nevertheless had another child. How do you think this would have influenced the quality of your life up to now?"	The most positive deviation from expectations (A=No, B=Yes; bold types in Table 3)	The most negative deviation from expectations (A=Yes, B=No; underlined in Table 3)	All other levels of deviation from expectations	All
Very negatively	4.6%	25.8%	10.1%	8.1%
Somewhat negatively	23.2%	41.4%	35.6%	30.1%
No impact	30.4%	19.1%	23.4%	26.5%
Somewhat positively	20.0%	9.9%	18.9%	19.1%
Very positively	21.6%	3.7%	11.7%	16.0%
Missing	0.2%	0.1%	0.3%	0.3%
Total	100.0%	100.0%	100.0%	100.0%
Number of respondents (proportions)	12,032 (46.0%)	863 (3.3%)	13,284 (50.7%)	26,179 (100.0%)

Note: [a] In a 2024 wave of the Norwegian Mother, Father and Child Cohort (MoBa) survey, women who said that they had not had more children because they had not wanted another child, and who still lived with the father of their youngest child 5 years after the birth of the lastborn child, were asked the following question: "Imagine, entirely hypothetically, that you had nevertheless had another child. How do you think this would have influenced the quality of your life up to now?".
See Table 3 for explanation of A and B.

3.2.5 Extensions of the argumentation

The focus of this paper is on the number of children a woman or man ultimately has, i.e., cohort fertility. However, the arguments presented above also apply to the age at first birth and birth interval lengths (which have implications for completed fertility and, given that, population growth). This is because individuals often consider these two reproductive components as well when forming intentions about whether to have a child quite soon, but they may be too pessimistic or optimistic when assessing their effects. There may also be types of effects they are not aware of. Are they, for example, aware of the higher risk of breast cancer that presumably results from a relatively high age at first birth (Lambertini et al. 2016)?

Another relevant issue is that the number of children parents have, and the timing of those births, may also influence the children's wellbeing through both biological and social mechanisms. Many parents may have ideas about how a child may be affected by birth interval lengths or their parents' age (Barclay and Myrskylä 2016), and they may factor in those ideas when forming their fertility intentions (alongside expectations about how children will affect their own lives). It is probably also common for parents to

contemplate the value of having siblings. For example, they may believe that children with siblings tend to develop particularly good social skills, as shown in some studies (Downey and Condron 2004), but also fear disadvantages because siblings may compete for economic resources and parental attention. Some studies have indeed indicated negative associations between the number of siblings and educational outcomes, although there is doubt about this, and having exactly one sibling may be advantageous compared to being an only child (Mogstad and Wiswall 2016; Sheppard and Monden 2020). However, the parents may again be too pessimistic or too optimistic, leading to fertility intentions that are not in their children's interest, despite their goal of providing the best possible life for their offspring. Unfortunately, there is little evidence about this difference between expected and actual effects on children.

3.2.6 Summary

To summarize, when discussing whether low fertility is a 'problem' that warrants intervention, in principle it is relevant to point out that people's fertility intentions may not be in their own or their family's best interests. However, there is currently little evidence to support such a pattern, and establishing a better empirical platform is clearly very difficult. Hypothetically, if the evidence existed, information campaigns or, perhaps more effectively, childrearing subsidies might be possible interventions.

3.3 Argument 3: There is a gap between intended and desired fertility: Many of those who have few or no children – in accordance with their intentions – would (under better circumstances) have liked to have more children (an individual-level argument)

To start with an example, a 25-year-old woman may say in an interview that she would like to have three children. This was referred to above as fertility desires. However, the series of concrete short-term intentions formed at that age and later when she considers her actual life situation (and that of her partner, if any), may only sum up to two children, which she will also have in the absence of subfecundity and inadequate contraceptive use. It has been argued – or at least implied – in some scientific reports and policy documents (e.g., Commission of European Communities 2006; Fahey and Spéder 2004; Badolato 2025; Guetto, Alderotti, and Vignoli 2025; UNFPA 2025), as well as by some politicians, that this gap between desired and intended fertility is a source of

dissatisfaction for the individuals and therefore is a 'problem' that may warrant public intervention.[7]

If there are economic reasons for the gap between desired and intended fertility, which is probably a common situation (UNFPA 2025), one potential policy response would be to try to increase the incomes of adults of reproductive age. However, this would not only reduce the probability that individuals experience a desired–intended fertility gap; it would also enable them to satisfy various desires unrelated to reproduction. I discuss this from another perspective in Section 3.6. Another possible intervention would be to specifically target the desired–intended fertility gap through more generous childrearing subsidies. Some individuals would then be able to have the child they desire (or 'dream of'), and the generally reduced childrearing costs may also improve the wellbeing of parents whose fertility is unaffected by the intervention, while the costs of this intervention would be largely covered by others.

The latter strategy raises an important question: Is it the responsibility of the public to help meet the desire for a child in particular? There are many other unfulfilled desires (a point also made in a similar discussion by Lutz 2007). For instance, some people may want a nice vacation house or a luxury car but lack the financial means for this, while others may wish they had the economic opportunity to attend weekly opera performances or take annual exotic trips. It would be unreasonable to subsidize everything that people would like to own or do through the taxes everyone pays.[8] In the absence of positive externality effects (Arguments 1 and 5), what rationale could justify prioritizing certain desires, including childbearing, over other desires, meaning that individuals having these other desires would contribute to a pool of subsidies without benefitting from it themselves?

Could it be argued that reproduction is so fundamentally important to most people that becoming a parent is almost a human right or – taking a less extreme position – that childrearing subsides would lead to a greater improvement in individual wellbeing than any alternative subsidy of the same magnitude? While many people do consider it extremely important to become parents, and also value further childbearing very highly, others may not share this view. They may have entirely different desires that, although perhaps perceived as strange or even distasteful by some, hold the same significance for them as the desire for a(nother) child does for others. More specifically, certain types of tax reduction might enable Jill and Jack to purchase the vacation house they have been dreaming of, and a childrearing subsidy of the same magnitude might allow Susan and

[7] Beaujouan and Berghammer (2019) wrote that a gap between what I have called desired and intended fertility became one of the main justifications for family policies, but without providing any citations.

[8] People would then essentially pay for each other's consumption, although if the richest contribute more than others to the tax-funded subsidies without making correspondingly more use of these subsidies, the system would involve (a rather peculiar type of) redistribution, which is typically viewed as a meaningful goal for a state.

Stephen to have their fourth child. It is not obvious that Susan and Stephen will necessarily benefit the most.

Some people may find the comparison between having a child and purchasing cars or vacation houses appalling. However, it is in line with widely accepted fertility theories, where a core issue is that people decide between having another child and using their resources for something completely different (Doepke 2015).

Furthermore, the gap between intended and desired fertility may not be solely due to economic factors. For example, the absence of a suitable partner is another significant reason (Testa 2007; UNFPA 2025). Single individuals are less likely to intend to have children than those in marriages or consensual unions. This lack of a partner is a situation that is difficult to address through political measures.

In conclusion, the existence of a gap between desired and intended fertility is not, on its own, a good argument for considering low fertility as a problem that warrants intervention. It is also necessary to assess whether there are externality effects (such as involved in Arguments 1 and 5) or other compelling reasons (which are harder to see) that could justify prioritizing support for fulfilling childbearing desires over other types of desires.

A different perspective would be to argue that a gap between desired and intended fertility at least indicates the potential for success if attempts are made to enhance fertility intentions – perhaps motivated by externality considerations such as in Argument 1. However, what would the content of a pronatalist intervention be? That depends on the constraints the respondents may have disregarded when expressing their fertility desires and the unexpected barriers they have met. There is little knowledge about this in many countries, although some insight has been gained (UNFPA 2025).

3.4 Argument 4: There is a gap between intended and actual fertility: Some have few or no children, even if they intended to have more children, because of subfecundity or infecundity (an individual-level argument)

Having few or no children is not necessarily the result of low fertility intentions; it may also be due to subfecundity or infecundity (or legal or other barriers to fecund women or men without a partner who intend to have a child, but let us for simplicity ignore that). This situation is often a source of deep sadness for those affected. Would it be reasonable to consider this gap between intended and actual fertility a 'problem', warranting public support?

In some cases, a gap may arise even though existing treatment regimes could compensate for the subfecundity or infecundity, as individuals may be unable to afford

the treatment. Should the state, therefore, contribute to reduce treatment costs?[9] On the one hand, this might seem no more justified than helping to close the gap between intended and desired fertility caused by high childrearing costs, which, as just argued, may be no more reasonable than reducing any other gap between desires and actual behaviour (disregarding possibly positive externalities, such as in Arguments 1 and 5). On the other hand, support for fertility treatments might be considered a fundamentally different matter, as health is involved. There is widespread public agreement in many countries that the state has a special responsibility to assist individuals with health problems.

Another relevant issue is that many currently subfecund or infecund individuals might have been better able to have a child at an earlier age. They may have been aware that fecundity decreases with age but nevertheless decided to make their first attempt at parenthood at a relatively advanced age because of the various advantages of a late first birth, including a higher probability of achieving their educational goals and of building the economic foundation they want to have before becoming parents (see papers by Vasireddy et al. 2023, van Wijk, de Valk, and Liefbroer 2022, Vignoli 2013, and Santow and Bracher 2001 on how education, employment, and work experience are associated with fertility). However, it is also possible that the impact of age on fecundity has not been considered, primarily because of a lack of knowledge (Sørensen et al. 2016). It may then be argued that individuals' intention to avoid childbearing at a relatively young age, while thinking that they may instead try to have a child later, may not be in their best interest. This is not because of the types of unexpected effects of childbearing dealt with in Argument 2, but because they at a higher age may not be able to have the child that they then intend to have. In this case, one possible intervention is to provide information to adults of reproductive age about fecundity. Another possibility, building on the discussion around Argument 2, is to offer economic incentives for entering parenthood early. For example, an amount could be added to child allowances for parents who are young, as recently suggested by a commission appointed by the Norwegian government (Norwegian Government 2025).

Policies aimed at creating jobs for the youngest adults and increasing their wages (for example, by reducing the rewards for seniority) could also enhance fertility intentions at relatively low ages. Additionally, initiatives that help young people complete their education in a shorter time (without compromising their accumulation of human capital) might have a similar impact. Furthermore, campaigns promoting the value of having children might, if successful, also lead to earlier attempts to have children.

[9] In other cases, where the fecundity problem is untreatable, there may be nothing to do except fund research that can result in better treatments later.

3.5 Argument 5: Low fertility affects the life of the (potential) parents and the children themselves, and in ways that may have implications for others (an indirect-externality argument)

In addition to the direct externalities of childbearing mentioned above, there may be indirect externalities, in the sense that some of the effects on the parents and children (addressed in Section 3.2, where the focus is on these individuals' own wellbeing) may impact others in society. For example, if being childless or having only one child contributes to poorer health, the demand for healthcare will rise, thus increasing public healthcare costs. It could also be argued that childless individuals may lack certain experiences that could disadvantage them in public discussions or leadership roles. Furthermore, if a couple has only one child, that child may face certain disadvantages, such as less developed social skills (Downey and Condron 2004), which could affect the interactions with others in the workplace or elsewhere. An only child may also be disadvantaged with respect to education, but this may also be the case for those with many siblings due to competition for resources (Mogstad and Wiswall 2016; Sheppard and Monden 2020). Additionally, and with more relevance in some countries than others, having few children may positively influence women's participation in the workforce (Kleven, Landais, and Leite-Mariante 2024), potentially strengthening gender-equality ideals in society.

However, there is much uncertainty about the individual-level effects of childbearing. For example, while several studies have shown associations between low fertility and higher mortality or poorer health (Barclay et al. 2016), these associations do not (as also noted in Section 3.2) only reflect causal effects. Also, there is doubt about the possible effects of the number of siblings, and they may be working in opposite directions. Regarding the next step in the causal chain, it seems highly probably that poorer health resulting from having no or few children – if such an effect exists – would be a disadvantage for society, although quantifying these implications is challenging. Conversely, higher education due to reduced competition with many siblings for parental resources (which would add to the larger public investments in education that may be possible with generally low fertility, as discussed in Section 4) would undoubtedly have a positive impact on society. Some of the other potential individual-level effects have less clear societal implications.

Let us now ignore the absence of strong evidence and just assume that the total effect of having a child will affect the individuals positively and that these individual-level effects also will have a total positive impact on society. If the individuals or couples do not intend to have a child because they do not anticipate this positive influence on their lives, providing information or offering childrearing subsidies could be two potential policy responses, as discussed in Section 3.2. These initiatives could yield a dual benefit, as they could not only enhance individual wellbeing but also provide advantages for

society as a whole. All parties may benefit, depending on how the taxpayers could otherwise have used the additional tax allocated to these initiatives. In other words, the presence of indirect externalities would bolster the rationale for the measures proposed in Section 3.2.

However, in principle, the overall impact on society may be positive even if the actual total effect on the individuals is negative (or vice versa, but let us for simplicity ignore that possibility now). For instance, from some parents' perspective there may be drawbacks to childbearing, such as sleep deprivation or constraints on leisure activities, that overshadow the possibly positive effects, such as more support and better health in the longer term and having better socialised children. These drawbacks may not harm other people much, while they may benefit from the better health and socialisation. In other words, the balance may be tipped towards the positive at the societal level. What measures could be implemented if evidence of such a pattern existed?

One possibility might be to inform (potential) parents that although they expect a child to affect them adversely (and therefore do not intend to have a child), and the reality may be quite similar, the actual effects of a child on their lives would in total benefit society. Would they be likely to take this into account and have a child after all? If so, it would be remarkable altruism.

A more reasonable strategy might, again, be to reduce childrearing costs or to try to increase intended fertility through other interventions. This could motivate some people to have more children than they otherwise would, because they would perceive a larger family as advantageous for themselves under the new circumstances. This perception may also turn out to be correct, and the effects on them and their children would have further positive societal implications. Again, all parties could benefit in principle.

3.6 Argument 6: Low fertility does not have adverse effects on individuals or society, but is a result of factors, such as income uncertainty, that may have such effects (an underlying-factors argument)

Arguments 1–5 are based on the idea that low fertility itself – or relative to fertility intentions or desires – has negative effects on individuals or society that may justify political intervention. Regardless of whether any of these five arguments for considering low fertility as a problem are accepted as reasonable, an entirely different perspective could be taken by claiming that low fertility is an indication of other problems (Sigle 2023).

Possible ways to increase fertility were discussed in Section 3.1, based on general ideas about factors influencing fertility – fertility intentions, fecundity, and contraceptive use. The question from the present perspective is whether some of these factors that may

have contributed to low fertility may not only serve as levers for pro-natalist policies but also constitute a problem in their own right due to their broadly adverse consequences.

The most relevant such factor may be economic uncertainty. In some countries, many young people are unemployed or have low incomes for other reasons, or they fear such a situation. Clearly, a low income may also make it difficult to have, for example, the kind of leisure, housing standards, or social life that most people want. There may be a political interest in mitigating this low-income problem; for example, through transfers to individuals in the lower segments of the income distribution. Some individuals with fertility desires that exceed intentions because of economic problems may use the additional income to have a child, while others may use it to increase their wellbeing in other ways. Referring back to Argument 3, this would be a more 'neutral' strategy than helping people fulfil only one type of desire or 'dream' by subsidizing childrearing specifically. It would also be better targeted, because some gaps between fertility desires and intentions are not due to economic hurdles, or there is no such gap, and then childrearing subsidies are unnecessary.

Intentions to have few children may also, in some countries, result from a lack of flexibility in the workplace or inadequate access to affordable childcare. Like low income, these fertility-reducing factors may represent significant welfare problems themselves, justifying political interventions that may increase fertility as a by-product. Going further back in the causal chain, a state that assumes little responsibility for individuals' wellbeing beyond just basic safety needs may be a factor behind low fertility. However, a 'small' state should not necessarily be viewed as a general 'problem'; some population groups benefit from this, and opinions will vary.

In countries where young people experience less economic uncertainty, and where it is easier to balance childrearing and employment, intentions to have few children may be driven primarily by a particularly strong enthusiasm for alternative sources of satisfaction, such as owning certain luxury items or engaging in exciting leisure activities, which is not necessarily a problem either. It is also important to note that low fertility is partly a consequence of widely appreciated societal changes, such as educational expansion, particularly for women. A weaker normative pressure regarding family matters has probably also contributed negatively to the birth rates and may be viewed by many as a positive development.

4. Elaboration of the externality argument

4.1 Economic consequences of an older population

4.1.1 Basic ideas

The economic consequences of population ageing over time have attracted much scholarly attention from both theoretical and empirical perspectives. Assuming that no work is done outside the working-age group, much of the analysis and discussion has been based on the following simple idea: The total production per person in the population (Y/N) equals the proportion in the working-age group (N_{wa}/N) multiplied by the productivity in the working-age population (Y/N_{wa}). The productivity may, in turn, be considered as given by the proportion who actually work in this age group ($z = N_w/N_{wa}$) multiplied by their average number of working hours ($h = H_w/N_w$ where H_w is the total number of hours worked) and their average hourly productivity ($p = Y/hN_w$).

As mentioned in Section 3.1, compared to a scenario with higher fertility, low fertility will for many years result in a lower ratio of young people to the working-age group (the young-age dependency ratio). However, for a couple of decades the old-age dependency ratio will be the same in the two situations. Thus, the population will be older than with higher fertility, in the sense that the average age will be higher, but the proportion in the working-age group (N_{wa}/N) will also be higher. Over time, the lower fertility will increase the old-age dependency ratio, and this may eventually become the dominant component, resulting in a larger total dependency ratio and a smaller proportion in the working-age group compared to the higher-fertility scenario. Concerns about 'ageing' usually refer to such a situation, where the average age is relatively high and the working-age share is relatively small (compared to the past, rather than compared to another hypothetical situation, as here). In that case, if the productivity in the working-age population (Y/N_{wa}) is the same as it would have been with higher fertility, or at least does not exceed that level, the overall per capita production in the population (Y/N) will be lower than in a scenario with higher fertility. Additionally, the working-age group may have an older age structure if fertility is low. This can adversely affect z, h, and p, and consequently both Y/N_{wa} and Y/N, because a higher age typically reduces an individual's probability of working, the number of hours worked, and hourly productivity (Cai and Stoyanov 2016).

Making this even more complex, individual productivity (p) depends not only on human capital, which may decrease with age, but also on other types of capital, and it is not clear how these are influenced by the population age structure. On the one hand, if the absolute number of workers is low, the existing physical capital will be shared by fewer workers, which could boost their productivity. On the other hand, older individuals

typically save less than those in the working-age group, which contributes to an adverse effect of an old age structure on total savings. Studies of how ageing may influence savings and capital availability have produced mixed results (Bloom et al. 2015; Hu, Lei, and Zhao 2021; Lee and Shin 2021; Maestas, Mullen, and Powell 2023).[10]

On a more positive note, lower fertility does not only result in a lower young-age dependency ratio, which may eventually be more than offset by a higher old-age dependency ratio. It may also positively influence the work activity (z and h) among the relatively young in the working-age group who are potential parents of young children. This may in turn lead to high productivity (Y/N_{wa}) compared to a scenario with higher fertility. Especially the women are likely to work more the fewer children they have , while men may be less affected (Kleven, Landais, and Leite-Mariante 2024).

The above discussion focuses on total production. However, in a population with a larger number of old individuals than young, a shift in the type of production – not least towards healthcare – may be necessary for welfare distribution purposes. This transition would require preparing the workforce with essential skills for the healthcare sector and providing the necessary capital (e.g., buildings, equipment). It may also be necessary to encourage more individuals to work in the healthcare sector. Simultaneously, workforce and capital can be reallocated from education and other sectors that primarily serve the young. If this change occurs very slowly, the needs of the elderly may not be met as well as desired. However, a slow change could result in greater investment for each student, increasing their later productivity, with benefits for the entire society. I return to this below.

Another relevant issue is that to the extent that healthcare services are produced in the public sector – due to concerns about welfare distribution within the population – an older population may lead to an expansion of that sector (Bodnár and Nerlich 2022). This could result in changes in taxation levels or the taxation system, potentially creating work disincentives. Some might also argue that the same type of work is done less efficiently in the public sector than in the private sector, in which case an expansion of the public sector could reduce total production.[11]

It should be noted that healthcare is most extensively used in the last few years of life and that the health within a given age group of elderly is improving (Seshamani and Gray 2004; Bloom, Canning, and Fink 2010). Therefore, the demand for healthcare may

[10] The issue is further complicated if how countries are linked to each other is taken into account. For example, Liu and McKibbin (2022) have argued that capital tends to flow from ageing to less ageing economies, with benefits for both types of countries.

[11] Note that it is not obvious how the key economic indicators should be constructed to be as relevant as possible. When total production, or GNP, is calculated (in the national accounts), a value must be attributed to production across all sectors. How should public healthcare be valued? In principle, if it is set very low and if, for example, low-skilled workers are moved from private services or manufacturing into public healthcare as a result of the ageing, the calculated total production could decrease, although this reduction does not necessarily tell us much about the changes in the wellbeing of the population.

not increase as sharply over time as the proportion of old individuals. Furthermore, the presumably better health in the future and generally increasing life expectancy may motivate relatively old individuals to work longer (Hu, Lei, and Zhao 2021) and lead to higher productivity among older workers (Cylus and Tayara 2021), i.e., influence z, h, and p. However, while this health improvement may dampen the potentially adverse effects of an ageing population from now until a certain year in the future, it is less relevant to take it into account when discussing how a low-fertility versus high-fertility scenario will influence the economic situation in that future year – which is the perspective of this paper.

4.1.2 Adaptation and feedback

Fortunately, some of these possible problems caused by an old population with a low working-age share (compared to a situation with higher fertility) can be mitigated through political initiatives or even automatic feedback mechanisms. For example, the workforce could be expanded by raising the mandatory retirement age, by weakening formal incentives for early retirement, or by making workplaces more senior-friendly to encourage later retirement (Bloom, Canning, and Fink 2010; Bloom et al. 2015). The latter may also increase the number of hours worked by old people in the workforce. In other words, there would be changes in z or h (using the above terminology), or some production may take place at an age above the current definition of the working-age population. Furthermore, in some countries it may be possible to increase work participation among women (e.g., by providing better childcare arrangements), immigrants (through better integration policies), or individuals with health issues. Also, it may be possible to make the progression through education more efficient, enabling individuals to complete their studies at an earlier age without accumulating less human capital. Additionally, the workforce could, in principle, be expanded through increased immigration (from countries with younger populations), although there are also challenges associated with a higher proportion of immigrants, and it has been shown that ageing due to low birth rates cannot be fully offset by a realistic level of immigration as immigrants also age over time (Coleman 2002).

The potentially adverse effects of an older population on per capita production may also be mitigated through various productivity-enhancing mechanisms (i.e., increases in p). For example, new technology may be introduced that is especially helpful to old workers, and thus weakens the negative link between age and productivity (Park, Shin, and Kikkawa. 2022). Additionally, production may be shifted towards sectors where age is less of a disadvantage (Cai and Stoyanov 2016). It is also possible that labour shortages in an older population could stimulate technological innovations that increase

productivity for workers of all ages. In support of this idea, Acemoglu and Restrepo (2017) find no negative link between ageing and per capita GDP, and their analysis suggests that ageing may drive technological advances such as the adoption of robots, and perhaps even result in particularly strong growth in per capita GDP.

Another strategy in the face of an older population (and perhaps especially if the old-age dependency ratio is not extremely high) could be to prioritize the young explicitly, rather than only unintentionally through a too slow reallocation of resources towards production that better serves the needs of old people, as mentioned earlier. Investment in education might be maintained at current levels or only moderately scaled back, allowing for more resources to be used per student (without necessarily extending the duration of education). This approach could boost workforce productivity in the long term. While the working-age population and the elderly may experience reductions in per capita consumption and investments as the young are prioritized, they may benefit later, or there may at least be advantages for those reaching old age in the near future. Interestingly, a theoretical analysis by Lee and Mason (2010) suggests that reduced fertility and the resulting ageing could have a positive total impact on per capita consumption and GDP, due to increased spending on each child's education. More recently, Lutz et al. (2019) have highlighted the critical role of education – relative to demographic trends – in economic growth, and Myrskylä et al. (2024) have shown empirically that the potential disadvantages of lower fertility may be offset by higher investments in education. However, based on an analysis similar to that carried out by Lutz et al. (2019), Kotschy, Suarez Urtaza, and Sunde (2020) criticize them for exaggerating the importance of education.

4.1.3 Empirical studies of per capita GDP

Several empirical studies have addressed the effects of ageing on GDP per capita (through such processes as mentioned above). A few have already been noted. Additionally, Maestas, Mullen, and Powell (2023) find that the increasing proportion above age 60 in the United States in recent decades (coupled with a decrease in the relative size of the working-age group) reduced the annual growth of per capita GDP by 0.3 percentage points. Taguchi and Latijn (2023) observe similar adverse effects of a reduction in the working-age share in European countries. By contrast, Eggertson, Lancastre, and Summers (2019) report a positive effect of an increasing old-age dependency ratio on per capita GNP growth, attributing it to increased capital per worker, although this effect is only evident up to the 2008 financial crisis.

When the economic effects of ageing are analysed, the common strategy is to define individuals older than a certain fixed age – such as 65 years – as 'old' and not contributing

to the working-age group. However, as alluded to above, many individuals above this threshold remain resourceful and in good health, and could continue to be productive members of the workforce if given the opportunity. Notably, a recent analysis by Kotschy and Bloom (2023) shows that while the anticipated reduction in the working-age share in OECD countries – based on standard definitions – is likely to reduce annual per capita GDP growth, the adverse effects would be halved if 'old' were instead defined as having fewer than 15 years of remaining life expectancy.

While these empirical investigations have addressed the impact of an increasingly old population over time in a country, the results are clearly also relevant for our discussion of the implications of low versus higher fertility – which in the long run will lead to a larger proportion of old people and a smaller working-age share, i.e., exacerbated ageing, compared to the higher-fertility scenario.

4.2 Economic consequences of population decline

Low fertility not only makes the population older than it would otherwise be; it also leads to lower population growth and potentially even decline.[12] However, few countries have experienced population decline to date, making it challenging to gather strong empirical evidence on its economic consequences.

In discussions about high population growth, the Malthusian argument about less land and other natural resources per person is often raised. However, this resource dilution does not necessarily reduce per capita production, as it may be offset by advances in technology so that each worker is equipped with better 'tools'. This may be facilitated by human inventiveness and savings from previous production, although generating such savings may be challenging in poor societies. On a more positive note, a larger population can bring advantages through specialisation and scale, even in modern contexts with extensive international trade. For example, certain types of national infrastructure may not need to expand proportionally with population growth, resulting in lower per capita infrastructure costs for larger populations. Additionally, it has been argued that inventiveness is positively linked to the total number of brains. Empirical studies have not provided a clear conclusion regarding the effects of high population growth on economic growth, but some relatively recent studies suggest adverse effects at least in some settings. See, for example, a review of ideas and statistical analyses by Headey and Hodge (2009).

Conversely, low population growth, or population decline, might present economic advantages, as fewer people would share the natural resources and capital than in a

[12] For example, the latter happens in the long run if fertility is below 2.07 (the replacement level in high-income countries) and there is no net immigration.

situation with higher population growth. However, as a version of the scale argument, a declining population also means fewer contributors to the development and maintenance of infrastructure.

A recent theoretical study concludes that sustaining growth in per capita income may prove challenging if the population declines (Mino and Sasaki 2023). A negative conclusion is also reached by Jones (2022), based on a theoretical model where one key idea is that a smaller population size reduces the 'stock of ideas'. According to his findings, a declining population would lead to stagnation in per capita income, unless fertility subsidies were swiftly implemented. Furthermore, Christiaans (2011) finds in his theoretical analysis that population decline would reduce per capita income.

By contrast, Sasaki and Hoshida (2017) argue theoretically that population decline could positively affect per capita growth. A theoretical analysis by Elgin and Tumin (2012) suggests a similar pattern. Additionally, Ross and McDonald (2002) and Lee et al. (2014) conclude that low fertility, leading to ageing and population decline, might have a slightly positive effect on living standards. However, Lee et al. note that such positive outcomes might only occur with moderately low and not extremely low fertility levels, and emphasize the likely strain on public finances, necessitating reforms. Finally, an empirical analysis of largely Eastern European countries indicates that population decline can coexist with increasing per capita GDP (Lianos, Pseiridis, and Tsounis 2023).

4.3 Environmental consequences of population decline and ageing

While high population growth might offer some economic advantages, which in some settings could even predominate and lead to overall positive effects, it is hard to imagine that the effect on the environment can be positive. An increasing demand for food, energy, and various less essential products from a larger national population may, for example, contribute to more (possibly irreversible) land degradation in that country, higher pollutant and greenhouse gas emissions, and reduced per capita availability of clean water.[13] Some of these consequences – and especially greenhouse gas emissions – have broader global effects.

A very simple idea (Ehrlich and Holdren 1972) is that the environmental impact of individuals is given by I = PAT, where P is the population size, A is the income per person (i.e., affluence), and T denotes the environmental impact per income unit per person (which depends on technology). If A and T are unrelated to population size, doubling the population would double the environmental footprint. However, population growth and size may influence both income and technology, and if we now turn to the possibility of a smaller population, this can only harm the environment if, contrary to the

[13] A degraded environment may, in turn, affect later fertility and mortality (Muttarak 2021).

concerns about adverse economic effects of population decline discussed above, it leads to a larger AT, and if this outweighs the smaller P. Such a response may not sound very plausible. Similarly, it would seem reasonable that given a growing population, smaller growth would be better for the environment than larger growth. In line with this simple argument, it has been found that European regions with low population growth have experienced the smallest increases in CO_2 emissions and urban land use (Weber and Sciubba 2019). On the extreme side, Crist et al. (2022) have recommended limiting families to one child for environmental reasons.

However, even if low population growth or decline offer such environmental benefits, this may matter little compared to various changes that are not linked to the level of population growth, and which contribute in the opposite direction. For example, incomes may continue to increase in coming years regardless of population changes, and we may adopt new lifestyles with greater adverse impact on the environment. In other words, if we experience a reduction in P, this may coincide with strong upward shifts in A and T, resulting in a larger environmental footprint even though the smaller population itself is an advantage. This argument about a relatively small contribution from population changes has been particularly prominent in discussions about climate gas emissions (Bradshaw and Brook 2014; Kuruc et al. 2023), although some have also argued that the role of population has been under-emphasized in this debate (Bongaarts and O'Neill 2018).

Ageing may also have favourable environmental effects, as older individuals tend to spend less on, for example, transportation, durable goods, and clothing than the young (Bodnar and Nerlich 2022; McDonald, Forgie, and MacGregor 2006). In support of this idea, Wang et al. (2023) find a slightly weaker link between per capita GDP and greenhouse gas emissions in older populations. However, other studies have shown less clear environment–ageing associations (Liddle and Casey 2022).

4.4 Other aggregate-level effects of low fertility

Other types of aggregate-level effects of low fertility have also been discussed. For example, it has been argued that countries with low population growth may struggle to maintain or increase their military strength, with potential implications for their global influence (Coleman and Rawthorn 2011). Ageing may have a similar effect (Sciubba 2023). Countries experiencing population decline may also gradually lose influence simply because of the smaller total size of their economies.

Furthermore, in countries with sparsely populated areas, low population growth could hinder the ability to sustain infrastructure and services in those areas (Felmingham, Jackson, and Zhang 2002; Coleman and Rowthorn 2011). Concerns about these

challenges may trigger outmigration, further reducing the local population size and exacerbating the problem (Christiaans 2017).

5. Final comments

Should we be concerned when observing low fertility? The (direct) externality argument for considering low fertility a problem (Argument 1), which has received the most attention in political, public, and scholarly discussions, is undeniably reasonable. However, compared to higher fertility, low fertility may be a disadvantage particularly in the long run, when the old-age dependency ratio is higher and the working-age share is smaller, while in the short term there may be benefits from the low young-age dependency ratio that accompanies low fertility. Furthermore, there is disagreement about the implications of the smaller working-age share that ultimately results from low fertility, and also about the effects of the smaller population growth and possibly even population decline that low fertility will cause. Some evidence indicates adverse societal effects, perhaps warranting steps to increase fertility through, for example, childrearing subsidies, while other evidence suggests that there may be advantages, not least for the environment. It is especially the studies on the economic effects of an older age structure that reach a negative conclusion, although these effects may be mitigated if sound adaptation strategies are implemented (see also the relatively optimistic general view expressed by Bloom and colleagues 2010, 2015). Ideally, pro-natalist policies should not be established without carefully evaluating which types of interventions might be effective in the context under consideration (Bergsvik, Fauske, and Hart 2021; Guetto, Alderotti, and Vignoli 2025), the costs of these interventions, and the extent to which higher fertility will benefit society.

It can also be argued, albeit with some reservations, that to the extent that low fertility results from subfecundity or infecundity, it constitutes a problem that could be addressed through public support for fertility treatments (Argument 4). Additionally, it may be valuable to provide the public with information about fecundity and to take steps to influence people's ideas about suitable fertility timing through economic incentives. This issue has become increasingly relevant over recent decades as attempts to become parents have been delayed to steadily higher age, and it is likely to become even more pressing in the future.

It is more difficult to draw conclusions about three of the other arguments that are discussed. Argument 2 regarding childbearing intentions possibly not being in individuals' own interest and Argument 5 regarding indirect externalities are based on general ideas that make sense but are difficult to substantiate empirically. This paper includes survey results which suggest that many Norwegian mothers may have had better

experiences with childrearing than they expected, and that they may even have been too pessimistic when deciding to cease childbearing. However, an important part is missing with regard to Argument 2 because the survey does not provide information about the opposite, i.e., how common it is to regret the birth of a child. The few earlier studies of these issues in other countries, which have been qualitative or based on smaller samples, have obvious limitations and the results are conflicting. Unfortunately, the Norwegian survey sheds no light on whether childbearing may have types of effects that most people are not aware of, and therefore do not take into account when forming their fertility intentions or when evaluating how they have been affected by childbearing. For example, it is possible that having children may be better for people's health than they realize, but it is very difficult to establish solid evidence for this.

As regards Argument 3 about desired fertility exceeding intended fertility, the conclusion is that it cannot stand alone and must be supplemented by other arguments. In particular, its relevance depends on whether there are externality effects of childbearing (Arguments 1 and 5).

The Arguments 2, 3, and 5 have not yet been prominent in political or scientific discussions, but may receive more attention in the future, and hopefully the discussion in this paper makes it more likely that they will be used reasonably. If the arguments are accepted, increases in childrearing subsides are a possible policy step. Additionally, various types of information campaigns might be helpful.

An entirely different but clearly relevant perspective is that low fertility may not be a problem for individuals or for society; rather, low fertility may stem from factors that are problematic on their own due to their broadly adverse consequences (Argument 6). One example is income uncertainty for certain groups within the population or more generally. If measures are implemented to address these underlying issues, fertility may also increase, but that would only be a by-product and not the goal.

It should also be noted that childrearing subsidies do not need to be motivated by the goal of satisfying people's fertility desires, concerns about too pessimistic expectations regarding the implications of having children, or the externality effects of low fertility. Instead, the goal could be to ensure the wellbeing of children already born by shifting some of the costs from parents to the public.

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7. Data availability

The data used in this paper can only be used in collaboration with the Centre for Fertility and Health at the Norwegian Institute of Public Health.

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