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The influences of the Covid-19 lockdown on migrant and native fertility intentions

Abstract

During the Covid-19 pandemic, the Norwegian government imposed a lockdown to prevent the spread of the disease. The long-term effects of the lockdown are widespread and largely unknown. Previous studies show that the most vulnerable citizens, a group which often consists of migrants are likely to be hit first and hardest by the lockdown. Other studies showed that this impacts fertility intentions. This research asks the question of whether fertility intentions are impacted by being a migrant or not during Covid-19 in Norway. To check if the Covid-19 lockdown had an impact on fertility, the Gender & Generation Survey from 2010 and 2020 are used for comparability. Using a logistic regression model, no statistical significance was found that having an intention to have a child was impacted by migration status in both waves.

Keywords: Gender and Generation Survey, Fertility intentions, Migration, Norway, Lockdown, Covid-19

Table of contents

1. Introduction	1
1.1 Background	1
1.2 Societal relevance	1
1.3 Research problem.....	1
1.4 Academic relevance.....	2
2. Theoretical framework	2
2.1 Fertility intention vs fertility outcome.....	2
2.2 Migrant fertility.....	3
2.3 Education and fertility.....	3
2.4 Age and fertility.....	3
2.5 Fertility intentions and socio-economic status.....	4
2.6. Lockdown in Norway.....	4
2.7 Covid-19 and gender roles.....	4
2.8 Conceptual model.....	5
2.9 Hypothesis	6
3. Methodology	6
3.1 Data collection instrument.....	6
3.2 Ethical considerations.....	8
4. Results	9
4.1 Have fertility intentions evolved over the years?.....	9
4.2 Have fertility intentions in Norway between 2010 and 2020 changed because of the Covid-19 pandemic?.....	11
4.3 Is there a difference in experiencing the lockdown, between natives and migrants caused by the Covid-19 pandemic in Norway and what role did it give fertility intentions of both?.....	12
5. Conclusion	13
6. Discussion & Reflection	14
7. Future research	14
References	15
Appendix	17

1. Introduction

1.1 Background

During the Covid-19 pandemic, the Norwegian government imposed a lockdown on their population to reduce the spread of the virus. The lockdown restrictions caused by the Covid-19 virus contained measures which enclosed places, businesses, and a big part of the general social life. Therefore, the Covid-19 restrictions hit business sectors financially hard, resulting in workers getting losing their jobs or companies going into bankruptcy. This meant people lost their jobs and thus income. According to Pouliakas and Branka (2020) and Fana et al. (2020), the most vulnerable segment of the workforce, such as migrants, temporary contract workers and lower-educated workers were hit the hardest by the lockdown. Additionally, this leads to an increase in levels of inequality and poverty across all of Europe (Palomino et al., 2020). Fiske et al. (2022) even state that socio-economic inequalities have not only been revealed but also reinforced and exacerbated by the pandemic. Starting or expanding your family is a financial restraint. Therefore, this can have an impact on the fertility intention of the population. The country of research is Norway, as Norway is the first western European country that completed its Round 2, (2020) questionnaire from the Gender and Generations Studies. Therefore, as Norway's demographics resemble most developed, wealthy Western European countries, this research might resemble the outcome of other Western European countries.

1.2 Societal relevance

The societal relevance of this research is to understand the effects the lockdown restrictions had or have on the intentions to have a child of the population of Norway. This bears societal relevance as municipalities and governments need to plan for future and contemporary policymaking decisions, like constructing houses, funding pensions, and creating social policy whilst ensuring inequality in the population does not rise. Therefore, it is important to know the effects of the lockdown on important factors such as intentions to have children. Intentions to have a child can predict actual birth rates together with demographic and socioeconomic factors and cultural norms. A comprehensive evaluation of changes in fertility intentions should account for these various socio-cultural factors (Preis et al, 2020). On top of that, being deprived of the chance to have children is a violation of human rights (reproductive rights are human rights, 2013). Therefore, fertility intentions are of societal relevance and need to be studied.

1.3 Research problem

This research aims to gain a deeper understanding what the effects are of the Covid-19 pandemic on the relation between intention to have a child and migrant status in Norway. Migrants, temporary workers, women, and the lower educated workforce are hit hardest by the lockdown (Pouliakas and Branka, 2020, Fana et al, 2020). This leads to a decrease in purchasing power, and an adverse implication for childbearing (Aassve et al., 2020). These factors can have an impact on the intention to have a child for all layers of the Norwegian population, regardless of migration status. It is important to know what implications these factors have on the fertility of different classes for contemporary and future policymaking. Hence the main research question: 'To what extent has the lockdown influenced the relationship between migrant status and fertility intentions in Norway?

To help answer this question, sub-questions are formulated:

Sub question 1: Have fertility intentions evolved over the years?

Sub question 2: Have fertility intentions in Norway between 2010 and 2020 changed because of the Covid-19 pandemic?

Sub question 3: Is there a difference in experiencing the lockdown, between natives and migrants caused by the Covid-19 pandemic in Norway and what role did it give fertility intentions of both?

1.4 Academic relevance

The academic relevance of this paper is the research gap in fertility and fertility intentions during the Covid-19 pandemic. The recently released Gender & Generations Survey from Norway presents fertility intention numbers during this period. Research regarding whether there is a discrepancy between natives' and migrants' fertility intentions during this period also remains a gap in the existing literature. Additionally, fertility outcome vs fertility intentions has not been studied yet during this period. However, because the pandemic only recently ended, there aren't a lot of fertility outcome numbers yet, so that is beyond the scope of this paper.

Furthermore, previous research on fertility shows that factors such as education, age and socio-economic status influence the fertility intentions of a couple. This research takes this into account and uses these factors in its tests to check if these theories hold in light of the Covid-19 pandemic in Norway. By doing so, it adds to the existing academic literature.

2. Theoretical framework

2.1 Fertility intention vs fertility outcome

There is a contrast between fertility intentions and giving birth, called the fertility outcome. Fertility outcome fails to match reported fertility intentions (Bachrach and Morgan, 2013). On average, all females eventually gave birth to fewer children than they intended and expected in their birth year cohort. On top of that, more often than intended, females remained childless (Beaujouan and Berghammer, 2019). In line with this, research on fertility intentions at the micro-level has shown that positive fertility intentions are not always realized and tend to overestimate subsequent childbearing, while negative fertility intentions are a good predictor of the absence of births (Dommermuth, Klobas and Lappegård, 2015).

However, intentions to have a child remain a strong predictor of childbearing at the individual level and an important indicator at the aggregate level. In contrast, they can be misleading, as fertility intentions are simplified and mask the more complex mental and social phenomena that drive their intentions (Bachrach and Morgan, 2013). For example, intentions and actual fertility respond differentially to the opportunities and constraints that structures define the meanings that they instantiate. Because fertility intentions may be rooted in deeply valued, long-standing paradigms about the family, the actual fertility on contemporary structural conditions (Bachrach and Morgan, 2013). In addition, realizing intentions may be affected by actual enablers and constraints (e.g., low-income status) (Dommermuth et al, 2020). Despite fertility intentions not being as absolute as they look, there is a general agreement in the literature that fertility intentions are relevant predictors of fertility.

2.2 Migrant fertility

Most studies on migrant fertility have focused on immigrant women from high-fertility countries in a Western context. For these women, both the assumptions of adaptation and the assumptions of interrelated events predict a relatively high TFR right after arrival, followed by a decline with the duration of stay. However, when women from low-fertility countries migrate to countries with higher fertility, the adaptation hypothesis would predict low but increasing TFR, whereas the hypothesis of interrelated events still would suggest elevated TFR after arrival. Results show that even women from low-fertility countries often have higher fertility rates in the first years after immigration to Norway, supporting the hypothesis of interrelated events (Tønnessen and Mussino, 2020). Kulu (2005) found no significant variation among migrants with different origins when migrating to the same destination. Therefore, Kulu, (2005) stopped researching the effect of various destination environments on the fertility of migrants with different origins. There can be made a difference between migrants and natives in terms of fertility. For example, African women have a higher fertility rate than natives in any location. However, when a couple migrates to a where fertility norms are different from their native country, the fertility of the migrant usually morphs in the destination country's fertility norm (Mussino, Cantalini, 2020). However, most importantly, the relationship between migration and fertility remains complicated and often very contextual (Majelantle RG, 2013). It depends on countless variables in the life course of the migrant. For example, age, relationship status, financial security, wellbeing, etc. Therefore, researching migrant status in combination with fertility remains highly complex.

2.3 Education and fertility

Contrary to most countries, Norway is an exception to the rule that the higher the women's education is, the lower the mean number of children is. Additionally, higher educated women are more likely to remain childless, except for Norway and the Czech Republic (Beaujouan and Berghammer, 2019).

Females with lower education have more children than women with higher education on average. However, the difference turns out to be smaller than what might be expected based on the vast difference in the timing of the first birth (Rønsen, 2004). For example, in Norway, Lappegård (2001) finds that childlessness is almost as low among women with no education beyond secondary school as nurses and teachers with a university degree. After becoming a mother, the females with a university degree have a higher expected number of children at age 40 than the lower educated females (Lappegård, 2001). This indicates that fertility and education level do not follow a linear relationship.

2.4 Age and fertility

The respondent's age seems to play a significant role in the pathway from fertility intentions to the first birth. Respondents older than the group 25–29 years are less likely to realize their fertility intention. However, only the hazard ratio of respondents aged 35–39 years differs significantly from the 25-29 age group (Dommermuth et al, 2015). Additionally, age can affect attitudes as a background variable, but it also acts as a control variable as fertility declines with age (Cavalli & Klobas, 2013). The consistency between positive fertility intentions ('I intend to have another child') and subsequent behaviour is less strong but still important. Positive fertility intentions are persistent predictors of fertility, even after controlling for background and life-course variables in a different institutional setting (Testa & Toulemon, 2006), (Kuhnt & Trappe, 2013). Finally, female fertility is best before the age of 35, and for men, it is before the age of 45 years. Therefore, it can be stated that ageing beyond 35 is a negative factor for fertility intentions. (Balasch and Gratacós, 2011).

2.5 Fertility intentions and socio-economic status

Couples who read a negative economic scenario report lower fertility intentions, while those who read a positive economic scenario report higher fertility intentions. The effect of exposure to the negative scenario was stronger than the effect of exposure to the positive scenarios (Lappegård et al, 2022). Therefore, it can be stated that there is an effect of future economic scenarios on fertility intentions. Exposure to a negative future economic scenario will have a negative effect on fertility intentions. Additionally, exposure to a positive future economic scenario increases fertility intentions (Lappegård et al, 2022). Moreover, they did not find significant difference in fertility intentions between males and females with different economic scenarios.

Additionally, income seems to be positively related to the realization of fertility intentions. As the probability of realizing childbearing intentions of respondents with an income above the median is positive and significant with a 95% confidence interval (Dommermuth et al, 2020). This adds to the theory that the higher the socio-economic resources, education, and job security are, the likelihood of realizing positive fertility intentions increases (Testa & Toulemon, 2006; Régnier-Loilier and Vignoli, 2011).

2.6 Lockdown in Norway

The Covid-19 virus hit Norway in March 2020. The Covid-19 pandemic in Norway resulted in more than 1.4 million cases, and over 3000 deaths (Ritchie et al, 2022). Therefore, the Norwegian government issued a large number of measures to reduce the risk of spreading the disease on 12th March 2020 (Status - tall og statistikk rundt koronavirus, 2022). Examples of these measures are the closure of borders to foreigners, the closure of schools, and the shutting down of several businesses and events such as cultural events, sports events, gyms and swimming pools. Businesses in the hospitality industry such as clubs, bars, pubs, and any establishment serving food would have to ensure that visitors could stay at least one meter apart.

This meant little to no physical contact or social activities for the population. The government's policies aimed to minimize human contact to reduce the spread of the virus while aiming to reduce the economic damage. However, the pandemic hit the lower cohort of the workforce (migrants, lower educated workers) financially the hardest, as they were the first to be made redundant in times of economic adversity (Pouliakas and Branka, 2020) & (Fana et al, 2020). Additionally, because the pandemic hit the lower socio-economic classes harder than the upper/middle class, socio-economic inequality has risen during the pandemic (Fiske et al, 2022). Starting or expanding your family is a financial restraint. Therefore, this can have an impact on the fertility intention of the population.

2.7 Covid-19 & gender roles

Voicu and Bădoi (2021) discuss the effects of the Covid-19 pandemic on fertility intentions and gender roles in specific. However, as Voicu and Bădoi (2021) is written during the tail end of 2020, they do not have a lot of fertility data yet, because the lockdowns and pandemics started around March 2020. Therefore, as the effects of the pandemic are probably more long-term, and births take on average almost 9 months, Voicu and Bădoi (2021) use a theoretical approach to analyse the connection between the Covid-19 crisis and fertility through the lens of gender roles and social values. They also use the concept of economic crises, stating that future research can use their framework to compare the 2008-2010 financial crisis to the pandemic economic crisis.

From Voicu and Bădoi (2021), it can be taken that a Covid-19 infection has only a marginal impact on biological fertility. The authors also claim that it is collateral damage caused by the Covid-19 damage for example social insecurity and economic insecurity. Due to the pandemic, companies got in trouble financially, possibly making people jobless. This can cause a less stable financial position for people, meaning getting a child might be an irrational decision. Historically, the gender role division is decided by the position of the couple in the labour market. The one with the best position in the labour market generally does the least unpaid work in the household (Hofacker et al. 2011), the Covid-19 pandemic is questioning the current division of tasks within a couple because the labour market is becoming disrupted and access external care services is diminishing (Voicu and Bădoi, 2021).

2.8 Conceptual model

To visualise the aim of this research, a conceptual model is drawn. Figure 1 shows that it is tested whether being a migrant, has a relationship with the intention of a respondent to have a child. The control variables are used as mediator variables. A mediator variable is a variable that causes mediation in the dependent (being a migrant, yes or no) and the independent variable, the intention to have a child, (yes or no in this case). In other words, it explains the relationship between the dependent variable and the independent variable. The mediating control variables used are age, gender, education, and the current number of children of the respondent. Mediators are possible explanations for a relationship between migrants and intentions to have a child. This conceptual model illustrates the variables and factors needed to answer **the main research question** of this paper. How does the Covid-19 lockdown, affect migrant and native fertility in Norway compared to 2010?

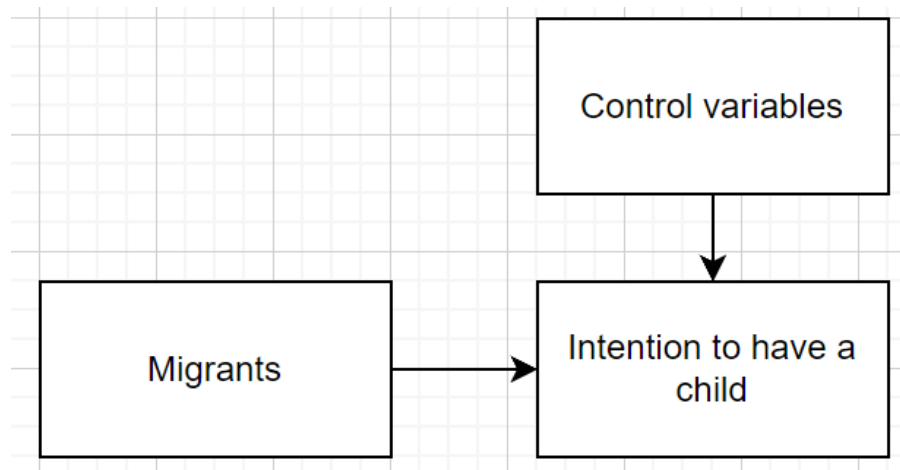


Figure 1: Conceptual model for the 2010 GGS, (Author 2022)

Additionally, a second conceptual model is made for the GGS Round 2 (2020) data. The difference is that 4 Covid-19 factors are added as mediator variables. These 4 Covid-19 variables are financial security during Covid-19, mental health change during Covid-19,

effects of Covid-19 on the relationship and the change in satisfaction of work during Covid-19.

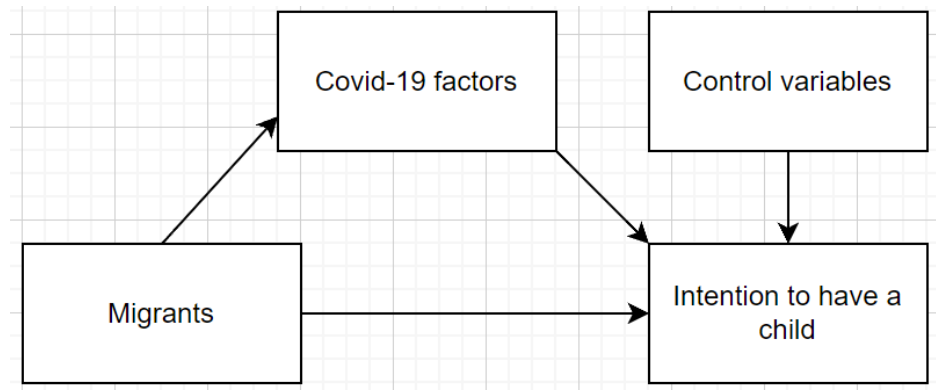


Figure 2: Conceptual model for the 2020 GGS, (Author, 2022)

2.9 Hypothesis

To research whether migration status had an impact on the intention to have a child in the population of Norway, the following null Hypothesis is formed for the quantitative research: H0: In the population, there is no relationship between migration status and the intention to have a child.

If this tests for significance in the logistic regression model, we can reject the null hypothesis and assume that there is a relationship between migration status and intentions to have a child in the Norwegian population. If this does not test for significance, the null hypothesis cannot be rejected and we can assume with 95% confidence that there is no relationship between migration status and the intention to have a child in the Norwegian population.

3. Methodology

3.1 Data collection instrument

For this research, the Generations and Gender Survey will be utilised, later to be named GGS. The datasheets analysed are Round 1 (2010) and Round 2 (2020) of Norway. The GGS is a cross-national longitudinal survey of family and relationship dynamics that is currently undertaking a new round of data collection (Vikat et al, 2007). The sampling method used is simple random sampling. This ensures the sampling remains simple and safeguards the data against sampling bias. The sample frame consists of the registered population of Norway. The type of frame is the Norwegian population register. The frame size is 2.665.000 persons aged 18-54 years by 2020-11-01 with 1.368 million males and 1.297 million females. The sample size of the survey is 15000, with an expected non-response of 60% Oversampling was done to combat non-responses. This makes the total sample size of the survey around 5000 respondents (Dommermuth et al, 2021).

The data was collected through telephone interviews, self-administered postal interviews and the use of registered data. The targeted population was incentivized to participate and finish the survey by a chance of winning a 1000 Norwegian Kronen gift card. The funding of the data collection was done by the Ministry of Children and Families, Ministry of Labour & Social Affairs, the Norwegian Research Council (Project number 300870) and authorized

by the statistical research department of Norway (Dommermuth et al, 2021). Therefore, the quality of the data is of a good level. The sampling strategy is simple random. Approximately representing an estimated 99% of the target population of Norwegian inhabitants aged 18-55. Additionally, the funding was carried out by a non-profit institution that could collect data for research purposes. This also safeguards the data from being manipulated or altered, as the operating researchers have no plausible gain in altering the data. The data is well-protected. The data is only accessible for a valid reason, that aims to analyse the number for the better of society. All in all, GGS stated that while they encountered some Covid-19 related difficulties while carrying out the survey, it did not impact the outcome of the data (Dommermuth et al, 2021).

Norway is one of the first Western-European countries that have completed GGS Round 2. Therefore, it contains data in light of the Covid-19 pandemic, as the data collection happened between 20 November and 22 December 2020. This was also a period where Covid-19 was present in the Norwegian society for over 6 months (Dommeruth et al, 2020). These were implemented in the Norwegian GGS to research the Norwegian government because, during the survey, the Norwegian government increased their Government Response Index. This is an index, covering a governments' responses, closures and containment measures. This index rose during the pandemic, and for comparative data concerning other countries, these 4 Covid-19 related questions were added.

The variables that are specifically of interest are the following: 'Intention to have a child at all' (2010& 2020). This is the dependent variable of the research, used to gauge if any of the other variables would increase the likelihood to have another child or decrease. This variable is tested against the four Covid-19 variables that are added specifically for Norway Round 2. These four variables: Financial security, Mental health, Relationship and Satisfaction with work are all important factors to start a family. These variables are expressed as scale variables, with '1' being definitely worse, and '7' being definitely better. The descriptive statistics of these variables can be found in the tables in the appendix. All these questions were formulated as: Has your satisfaction at work changed during the Covid-19 lockdown? With the respondent has the options definitely worse, worse, somewhat worse, unchanged, somewhat better, better or definitely better, making this an ordinal variable. Using logistic regression analysis, it can be tested whether these variables increase or decrease the chance that the respondent intends to have a child.

Furthermore, the variable 'born in the country of the survey' is tested against the dependent variable, to check if there is a significant difference between natives and migrants in the intentions to have a child. Both these variables are binomial variables. The following mediator variables are included in this test as control variables: Age, Gender, Highest achieved education expressed in ISCED levels, and the total number of children respondents have at the time of the survey. This data was available for both Round 1 (2010) and Round 2 (2020) of Norway's GGS. Therefore, with a little recoding of the data, the two rounds can be compared to each other. The education variable is expressed at the ISCED level, the International Standard Classification of Education, explained in Tables 5 and 6 in the appendix (Worldbank, n.d.).

To have two comparable datasets, some data was modified to maximise comparability. In Round 1 (2010), respondents only had the option to respond with definitely yes, or definitely no on the question: Do you intend to have a child at all? In Round 2 (2020), respondents also had the option probably yes and probably no. Probably yes is recoded to definitely yes, and probably no is recoded to definitely not in Round 2. Additionally, Round 2 (2020) had the option, 'do not know' and 'unsure' as responses. These were recoded as missing variables, to keep the comparability as high as possible in

between the rounds, as they were no option in Round 1 (2010). Furthermore, Round 1 (2010) did not have an age limit in their survey. Seeing as Round 2 (2020) capped their respondent's age at 55, this research filtered out all cases from Round 1 (2010) to age ≤ 55 to avoid skewing the results, as respondents aged 55+ are less likely to intend to have more children. Finally, in Round 1 (2010), the education level ISCED 5 was missing, so ISCED 5 was recoded to ISCED 6, where Round 1(2010) stopped counting. Additionally, Round 2 (2020) reached as far as ISCED 8. Therefore, I recoded ISCED 7 and ISCED 8 to ISCED 6. So the new variable ISCED 6 contains ISCED 5,6,7 and 8 in both datasets.

The data from Norway's GGS Round 1 (2010) can be directly compared to Norway's GGS Round 2 (2020). When comparing these two datasets, a logistic regression model will be utilised. This statistical test models the probability of a binary event, (in this case fertility intention,) taking place by having the log odds (the logarithm of the odds) for the event. Variables such as 'age', 'gender', 'education' and 'current amount of children' join the main independent variable 'migrant status'. In regression analysis, logistic regression is estimating the parameters of a logistic model. The outcome predicts whether intentions to have a child have positive or negative odds by being a migrant.

To answer sub-question 2, the Covid-19 variables will be used in addition to the existing 2020 model from Norway's round 2 GGS 2020, comparing these data to Norway's GGS Round 1, (2010). When comparing the variable 'fertility intentions', a conclusion about family intentions pre-Covid and post-Covid can be made. To make a statistical statement about this, a regression model will be run to check if the dependant variable (fertility intentions) is expected to increase (coefficient positive) or decrease (coefficient negative). The confidence interval used in this research will be 95%. Therefore, when a test comes back significant, we can state with 95% confidence that the result is correct. However, statistics tell a lot but are never deterministic. Therefore, it should be treated as a good indicator, but never as a 100% fact.

Having answered sub-question 1 and 2, the answer to sub-question 3 will become clear, as the tests will show whether fertility changed from our base data in 2010 and 2020. Additionally, sub-question 2's model will confirm whether the difference in fertility intentions is due to the Covid-19 or not. Therefore, the answer for sub-question 3 will arise from the answers to sub-question 1 and 2.

3.2 Ethical considerations

The Gender and Generations Programme, later to be called the GGP, is the instance that carried out the data collection. They ensure that they survey their questionnaires in full compliance with the General Data Protection Regulation (GDPR, EU 2016/679). The data collection was supervised with ethical oversight of the GGP ethics board and the Data Protection Office of the Dutch Royal Academy of the Arts and Sciences (KNAW) (GGP Research Ethics – GGP, 2022).

Under GDPR, the GGP processes personal data in the public interest, for scientific, research and statistical purposes per Article 89(1). The GGP Coordination Team follows the Dutch Code of Conduct for Research Integrity. The GGP Coordination Team ensured that the GGP Data Agreement is signed between the GGP and Norway. Any personal contact information never reaches the GGP Coordination Team, as stated in the GGP Data Agreement (GGP Research Ethics – GGP, 2022).

The GGS fieldwork operation model and data management plan have been approved by the GGP Ethics Board and the Dutch Royal Academy of Arts and Science Data Protection Officer, as well as conform to the GDPR. The questionnaire has been approved by the GGP Ethics Board as well (GGP Research Ethics – GGP, 2022).

Furthermore, the data provision is exclusively addressed to researchers through the registration process. Researchers who apply for GGP data must sign the GGP Terms of Acceptable Usage. The GGP Terms of Acceptable Usage regulate relevant data protection issues and outline the requirements for potential users who wish to apply for data use (GGP Research Ethics – GGP, 2022). Therefore, all the core ethical principles such as voluntary participation, informed consent, confidentiality, safe storage of data, and anonymity are safeguarded.

4. Results

This section summarizes the results of the logistic regression models. The models are run to answer the main research question to find out to what extent the lockdown influenced the relationship between migrant status and fertility intentions in Norway. The omnibus test of the models is significant for all the models with a p-value of 0,000. Therefore, the logistic regression models conducted in this research are statistically significant.

4.1 Have fertility intentions evolved over the years?

As can be seen in Table 1, age has a negative impact on intentions to have a child in 2010. For every one-year increase in respondents' age, the odds of intention to have a child is 30% less. Therefore, as the significance level for this variable is 0,00 it can be stated that in this survey, ageing has a negative impact on intentions to have a child. This adds to the theory of Balasch and Gratacós, (2011) that ageing beyond 35 is bad for fertility. Although it is not visible in this research, it would be interesting to divide the respondents into age groups, but that is beyond the scope of this research. 30% less intention per year is possibly skewed, as the data shows that the youngest respondent was already 22, and in 2020, the youngest was 18. The descriptive statistics are available in Table 10&11. For the 2020 model, visible in Table 2, ageing has a far less negative impact, with the odds ratio being 0.996, meaning that with every year the respondent ages, the odds of intention to have another child decreases by around 0.5% per year. However, the result is insignificant in the model, and is nearly 0, so not much can be derived from this result.

Additionally, both the 2010 and 2020 models (table 1&2) state that already having children, negatively impacts the intention to have another. However, in both models, the current number of children of the respondents test insignificant in relation to 'intention to have a child'. Furthermore, in 2010, females had on average more intention to have a child than men, in 2020, the same can be said, although in 2020 the model tests insignificant, but only just.

Migrant status seems to affect intentions to have a child in both years. The results show migrants are 28.5% more likely to intend to have a child than a native in 2010, and ~11% more in 2020 respectively. However, both these results test insignificant in the model, but it is worth noting they point in approximately the same direction but the confidence intervals are too wide to conclude a possible change over time. Therefore, foreign-born have a higher probability to want more children.

Beaujouan and Berghammer, (2019) state that Norway is an exception to the general rule that higher educated women are more likely to remain childless. However, the result of this

research neither confirms nor denies this theory, as the ISCED levels are grouped, it might have skewed the data. Additionally, almost all of the ISCED levels test insignificant in the model. When ignoring the significance levels, it can be said that ISCED-4+5, post-secondary and short-cycle tertiary-educated respondents are most likely to intend to have a child. When looking at the highest educated respondents, ISCED-6, the result does not show that these respondents have the least intention to have a child. This does add to the theory of Beaujouan and Berghammer (2019) that Norway is an exception in that higher educated women are more likely to remain childless.

All in all, the models from both years do not differ a great deal. Even though not all the variables test significant, most of them show by and large the same results and numbers. Therefore, this research assumes that fertility intentions have not changed over the years.

Table 1: Logistic regression table Intention to have a child, 2010

	Sig.	Exp(B)	95% C.I. for EXP(B)	
			Lower	Upper
Step 1 ^a				
Born in country of interview? Yes=1 No=2	,342	1,285	,766	2,156
Highest Education Level of Respondent	,021			
Highest Education Level of Respondent ISCED 0	1,000	,000	,000	.
Highest Education Level of Respondent ISCED 1	,999	,000	,000	.
Highest Education Level of Respondent ISCED 2	,092	,456	,183	1,136
Highest Education Level of Respondent ISCED 3	,300	,625	,258	1,519
Highest Education Level of Respondent ISCED 4	,812	1,140	,388	3,351
Highest Education Level of Respondent ISCED 6	,696	,838	,346	2,031
Age	,000	,701	,686	,716
Number of children Respondent	,082	,927	,851	1,010
Sex Respondent Male=1 Female=2	,000	1,516	1,313	1,750
Constant	,000	171644,148		

a. Variable(s) entered on step 1: Born in country of interview?,

Highest Education Level of Respondent, Age, Number of children Respondent, Sex Respondent.

Table 2: Logistic regression table intention to have a child 2020

		Sig.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Step 1 ^a	Born in country 1=yes 2=no	,330	1,108	,901	1,362
	Education Level (ISCED 2011)	,000			
	Education Level ISCED 0+1	,289	,321	,039	2,624
	Education Level ISCED 2	,002	1,715	1,221	2,410
	Education Level ISCED 3	,758	,968	,789	1,188
	Education Level ISCED 4	,000	4,311	3,513	5,291
	Education Level ISCED 6	,890	,980	,731	1,312
	Age	,188	,996	,989	1,002
	Total number of children	,348	,978	,933	1,025
	Sex respondent male =1 female =2	,023	1,186	1,024	1,375
	Constant	,000	,359		

a. Variable(s) entered on step 1: Born in country, Education Level (ISCED 2011), Age, Total number of children, Gender.

4.2 Have fertility

intentions in Norway between 2010 and 2020 changed because of the Covid-19 pandemic?

In Table 3, the Covid variables are included in the logistic regression model, to check whether it makes a difference in intentions to have a child. Although still insignificant, in 2020, when adding the Covid variables, the odds ratio for the variable 'Born in country' went from 1.108 to 1.138, barely making a change. Therefore, it can only be assumed that the Covid-19 pandemic has not affected the relationship between migration status and fertility intentions. Additionally, this result does not show us a significant change in fertility intentions between 2010 and 2020 because of the Covid-19 pandemic.

In Round 2 of the GGS, the respondents were surveyed with the question of whether their mental health got better or worse during the Covid-19 pandemic. This result shows that a person whose mental health got worse during the Covid-19 pandemic experiences a decrease of 25% of the odds ratio to intend to have a child compared to someone whose mental health has not gotten worse during the Covid-19 pandemic. This result is significant at the 5% level.

Furthermore, Table 1&2 show us inconsistent implications in the education variables. Therefore, it can be concluded that education and fertility intentions do not follow a linear relationship as Lappegård (2001) observed.

Table 3 Logistic regression table intention to have a child 2020, with covid variables

		Sig.	Exp(B)	95% C.I. for EXP(B)	
				Lower	Upper
Step 1 ^a	Born in country yes=1 no=2	,284	1,138	,898	1,443
	Education Level(ISCED	,000			
	Education Level ISCED 1	,973	,962	,098	9,433
	Education Level ISCED 2	,006	1,716	1,165	2,529
	Education Level ISCED 3	,939	,991	,791	1,243
	Education Level ISCED 4	,000	4,607	3,667	5,789
	Education Level ISCED 6	,575	,910	,653	1,267
	Age	,118	,994	,987	1,001
	Total number of children respondent	,356	,976	,926	1,028
	Sex respondent male=1 female =2	,023	1,207	1,026	1,421
	COVID-19 outbreak: Financial security 1= definitely worse 7= definitely better	,000	1,166	1,078	1,263
	COVID-19 outbreak: Mental health 1= definitely worse 7= definitely better	,000	,752	,686	,824
	COVID-19 outbreak: Relationship 1= definitely worse 7= definitely better	,060	1,089	,997	1,191
	COVID-19 outbreak: Satisfaction work 1= definitely worse 7= definitely better	,038	1,079	1,004	1,160
	Constant	,000	,276		

a. Variable(s) entered on step 1: Born in country, Education Level (ISCED 2011), Age, Total number of children, Gender, COVID-19 outbreak: Financial security, COVID-19 outbreak: Mental health, COVID-19 outbreak: Relationship, COVID-19 outbreak: Satisfaction work.

4.3 Is there a difference in experiencing the lockdown, between natives and migrants caused by the Covid-19 pandemic in Norway and what role did it give fertility intentions of both?

Table 3 factors in the Covid-19 variables that are connected to the Covid-19 lockdown. When comparing table 2, where the Covid-19 variables are excluded, with table 3, it can be confirmed that when factoring in the Covid-19 variables, the fertility intentions of natives and migrants barely change. This does not entirely line up with the findings of Tønnessen and Mussino (2020), who state that women from low-fertility countries often have higher fertility rates in the first years after immigration to Norway. However, the female migrants' origin is beyond the scope of this paper. Furthermore, this also neither denies nor confirms the theory that women from high fertility countries have a slowly declining fertility rate once entering Norway. (Tønnessen and Mussino, 2020). This as well can only be confirmed when looking at the country of origin of the migrants. Although the result of this test is insignificant, both coefficients of fertility intentions point by and large in the same direction. Additionally, it cannot be stated that natives and migrants experienced the lockdown differently from each other. Therefore, we cannot reject the null hypotheses, meaning that there is no statistically significant proof that intentions to have a child are related to migrant status.

The pandemic hit the lower cohort of the workforce hardest, a cohort that often contains a large percentage of migrants. This meant that this cohort faced the most economic adversity and insecurity. (Pouliakas and Branka, 2020) & (Fana et al, 2020). According to Lappegård et al (2022), exposure to a negative economic scenario has a negative effect on fertility intentions. Moreover, Dommermuth et al (2020) state that income is positively related to the realization of fertility intentions. This adds to the theory that the higher the socio-economic resources, education, and job security are, the likelihood of realizing positive fertility intentions increases (Testa & Toulemon, 2006; Régnier-Loilier and Vignoli, 2011). Therefore, it was expected that after adding the Covid-19 variables, the migrants were less likely to intend to have children than natives. However, this cannot be concluded from this model as the migrant is still ~13% more likely to intend to have a child than the native (although insignificant in the model).

5. Conclusion

The aim of this paper has been to research if fertility intentions were related to migrant status in Norway. The relationship between migration and fertility is a complicated case and often very contextual (Majelantle RG, 2013). It depends on a lot of factors in a person's life. Think about age, wellbeing, financial security, relationship status, etc. However, In all 3 models, we cannot reject the null hypotheses, meaning that there is no statistically significant proof that intentions to have a child are related to migrant status. Moreover, this research assumes that fertility intentions in Norway have not evolved over the years 2010-2020. It finds that in 2020, with every year the respondent's age, the odds of them intending to have a child decreases by 0.5%.

Furthermore, in 2020, when adding the Covid variables to the original 2020 model, the odds ratio for the variable 'Born in country' went from 1.108 to 1.138, barely making a change. Therefore, it can be concluded, that the Covid-19 pandemic has not affected the relationship between migration status and fertility intentions. Additionally, this result does not show us a significant change in fertility intentions between 2010 and 2020 because of the Covid-19 pandemic. Additionally, this research finds that a person whose mental health got worse during the Covid-19 pandemic experiences a decrease of 25% of the odds ratio to intend to have a child compared to someone whose mental health has not gotten worse during the Covid-19 pandemic. This result is significant at the 5% level.

Moreover, migrant status seems to affect intentions to have a child in both research years. The results show migrants are 28.5% more likely to intend to have a child than a native in 2010, and ~11% more in 2020 respectively. However, both these results test insignificant in the model, but it is worth noting they point in approximately the same direction but the confidence intervals are too wide to conclude a possible change over time. When controlling for the Covid-19 variables, no noteworthy change appeared in the data. Although statistically insignificant, it appears that the lockdown affected the natives and migrants equally.

Pouliakas and Branka (2020) & Fana et al (2020) argue that the lockdown affects migrants' jobs and job security the most on average. While the research cannot see the job security of the migrants, when factoring in the Covid-19 variables in table 3, intentions to have a child barely change for migrants. Migrants remain ~13% more likely to intend to have a child if the model would've tested statistically significant. This observation goes against Lappegård et al (2022), who states a negative economic scenario has a negative effect on fertility intentions. Testa & Toulemon (2006) and Régnier-Loilier and Vignoli, (2011) state

that the higher the socio-economic resources, the higher the chance to realize fertility intentions. Therefore, when adding the Covid-19 control variables, the expectation was that the migrants were less likely to intend to have children than the natives. However, this cannot be concluded from this model as the migrant is still ~13% more likely to intend to have a child than the native population of Norway (although insignificant in the model).

Finally, table 1&2 do not show consistent outcomes regarding education levels and intentions to have a child. Therefore, it can be concluded that education and fertility intentions do not follow a linear relationship as Lappegård (2001) observed.

6. Discussion & Reflection

Because the statistical models returned inconclusive due to statistical insignificance, it is difficult to derive a proper conclusion from these tests. Therefore, a deeper check might be needed in future research to confirm the fit of the data for statistical tests. A further point of reflection is that the nationality of the migrant in Norway is beyond scope of this paper. It would be very interesting to check if migrants from low-fertility countries make up for the migrants of traditionally high-fertility countries. Therefore, a check for heterogeneity in the migrant variable would be interesting. This can be an idea for future research. Furthermore, for fertility research, in the future, it might be handier to cluster ages into age groups, as fertility realization often comes between the same age groups and not so much at a later age.

7. Future research

This paper solely focused on Norway, as Norway was the first Western European country to post the GGS round 2 data. An idea for future research would be to compare the Round 2 (2020) data to the Round 3 (2030) data, comparing a Covid-19 struck year with a regular year.

Additionally, possible future research would be to compare the Norwegian results to adjacent or similar countries like Sweden, Denmark or Finland to check for a pattern in results, or to confirm that this research is incomparable cross-nationally. Furthermore, this research did not make a distinction in the migrant's place of birth. Therefore, the results could be influenced as a Western European migrant's fertility intentions resemble the native Norwegian's fertility intention as opposed to for example an African migrant's fertility intentions. Therefore, for future research, it would be interesting to divide the migrants class into groups such as Sub-Saharan, Middle Eastern, Western European etc. In this way, it will be visible to see if some groups of migrants were hit harder by the lockdown effects on fertility intentions or if some groups lesser hit. Finally, in the data, it is not clear which migrants have been surveyed. For example, it could well be the higher segment in the socioeconomic class that filled out the survey, potentially skewing results. There was no data on wages, only on the highest level of achieved education. For instance, the lockdown potentially could've been so restraining on the lowest socio-economic class of migrants, that they were forced to leave Norway, meaning that they did not fill out the survey, again, skewing results. Another idea for future research is to divide the respondents into age groups, as this research just uses ages 18-55. According to the theory of Balasch and Gratacós, (2011) ageing beyond 35 is bad for fertility. Therefore, seeing if fertility levels severely differ beyond 35 would be worth researching.

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Appendix

Table 4:

COVID-19 outbreak: Financial security

Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	Definitely worse =1	216	4,3	4,9	4,9
	Worse =2	270	5,4	6,1	11,0
	Somewhat worse =3	718	14,3	16,3	27,4
	Unchanged =4	2628	52,2	59,7	87,1
	Somewhat better =5	273	5,4	6,2	93,3
	Better =6	184	3,7	4,2	97,5
	Definitely better =7	111	2,2	2,5	100,0
	Total	4400	87,5	100,0	
Missing	Refusal	103	2,0		
	Not applicable/no response/reporting error	53	1,1		
	System	475	9,4		
	Total	631	12,5		
Total	5031	100,0			

Table 5:
COVID-19 outbreak: Mental health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely worse =1	177	3,5	4,0	4,0
	Worse =2	310	6,2	7,0	11,1
	Somewhat worse =3	1095	21,8	24,9	35,9
	Unchanged =4	2467	49,0	56,0	91,9
	Somewhat better =5	189	3,8	4,3	96,2
	Better =6	110	2,2	2,5	98,7
	Definitely better =7	58	1,2	1,3	100,0
	Total	4406	87,6	100,0	
Missing	Refusal	103	2,0		
	Not applicable/no response/reporting error	47	,9		
	System	475	9,4		
	Total	625	12,4		
Total	5031	100,0			

Table 6
COVID-19 outbreak: Relationship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely worse =1	63	1,3	1,4	1,4
	Worse =2	132	2,6	3,0	4,4

	Somewhat worse =3	545	10,8	12,4	16,8
	Unchanged =4	2802	55,7	63,8	80,6
	Somewhat better =5	493	9,8	11,2	91,8
	Better =6	266	5,3	6,1	97,9
	Definitely better =7	93	1,8	2,1	100,0
	Total	4394	87,3	100,0	
Missing	Refusal	110	2,2		
	Not applicable/no response/reporting error	52	1,0		
	System	475	9,4		
	Total	637	12,7		
Total		5031	100,0		

Table 7

COVID-19 outbreak: Satisfaction work

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Definitely worse =1	252	5,0	5,8	5,8
	Worse =2	336	6,7	7,8	13,6
	Somewhat worse =3	881	17,5	20,3	33,9
	Unchanged =4	2068	41,1	47,7	81,6
	Somewhat better =5	405	8,1	9,3	91,0
	Better =6	233	4,6	5,4	96,4
	Definitely better =7	158	3,1	3,6	100,0
	Total	4333	86,1	100,0	
Missing	Refusal	128	2,5		
	Not applicable/no response/reporting error	95	1,9		
	System	475	9,4		
	Total	698	13,9		
Total		5031	100,0		

Table 8

Highest Education Level of Respondent 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
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Valid	ISCED 0 - pre-primary education	5	,1	,1	,1
	ISCED 1 - primary level	12	,1	,1	,2
	ISCED 2 - lower secondary level	1771	19,1	19,1	19,2
	ISCED 3 - upper secondary level	3617	38,9	38,9	58,2
	ISCED 4 - post secondary non-tertiary	320	3,4	3,4	61,6
	ISCED 6 - second stage of tertiary	3411	36,7	36,7	98,4
	no response/not applicable	153	1,6	1,6	100,0
	Total	9289	100,0	100,0	

Table 9
Highest Education Level of Respondent 2020

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ISCED 0 - pre-primary education	11	,2	,2	,2
	ISCED 1 - primary level	191	3,8	3,8	4,1
	ISCED 2 - lower secondary level	908	18,0	18,2	22,3
	ISCED 3 - upper secondary level	670	13,3	13,5	35,8
	ISCED 4 - post secondary non-tertiary	354	7,0	7,1	42,9
	ISCED 6 - second stage of tertiary	2845	56,5	57,1	100,0
	Total	4979	99,0	100,0	
Missing	Refusal	34	,7		
	Not applicable/no response/reporting error	18	,4		
	Total	52	1,0		
Total		5031	100,0		

Table 10 Descriptive statistics for age in 2010
Statistics

Age

N	Valid	9289
	Missing	0
Mean		39,2945
Median		40,0000
Std. Deviation		9,50457
Range		33,00
Minimum		22,00
Maximum		55,00

Table 11: Discriptive statistics for age in 2020

Statistics

Age

N	Valid	5031
	Missing	0
Mean		36,8086
Median		37,0000
Std. Deviation		10,69420
Range		37,00
Minimum		18,00
Maximum		55,00