# The Impact of COVID-19 on Fertility behaviour and Intentions in the Republic of Moldova*

Tom Emery† Judith C. Koops‡

March 5, 2021

**Abstract**

The COVID Pandemic could affect fertility behaviour and intentions in many ways. Restrictions on service provision may reduce access to family planning services and increase fertility in the short term. By contrast, the economic uncertainty brought about by the pandemic and its impact on mental health and well-being may reduce fertility. These various pathways have been explored in the context of high income countries such as the United States and Western Europe, but little is known about middle income countries. In this paper we asses the impact of the COVID pandemic on fertility intentions and behaviour in the Republic of Moldova, a middle income country in Eastern Europe, using the Generations and Gender Survey. This survey was conducted partially before and partially after the pandemic, allowing for detailed analysis of individual circumstances. The results indicate that the pandemic reduced contraceptive use by 40%. Conversely couples were also 41% less likely to be trying to conceive after the onset of the pandemic, although medium term fertility intentions were unchanged. Indicators therefore suggest that in the medium term fertility intentions may not be affected by the pandemic but access to family planning services and deferring attempts to conceive may change which individuals have children and when.

**Keywords:** COVID-19 pandemic, Fertility, Moldova, Contraceptive use, Sexual and Reproductive Health

*Particular thanks to the UNFPA Moldova, National Bureau of Statistics of the Republic of Moldova and the Ministry of Health, Labour and Social Protection of the Republic of Moldova for support in conducting the Gender and Generations Programme in the conduct of the study. This analysis in this paper was conducted in collaboration with the UNFPA Moldova and the Ministry of Health, Labour and Social Protection of the Republic of Moldova in response to the onset of the COVID-19 Pandemic during the fieldwork of the Moldovan GGS in 2020. Both parties reviewed and provided comments on earlier and current versions of the analysis. The contents of this publication do not necessarily reflect the views or policies of the UNFPA Moldova and the Ministry of Health, Labour and Social Protection

†Erasmus University of Rotterdam

‡Netherlands Interdisciplinary Demographic Institute & University of Groningen

# 1 Introduction

It is expected that the COVID-19 pandemic will influence fertility levels (**?**). Similar to previous crises – like the 2008 economic crisis - economic uncertainty can reduce the intention to have a child and therefore depress fertility behaviour. However, there is also something unique about the current crisis, namely, the pandemic's possible impact on access to family planning. The most effective and common way to reduce fertility is with the use of modern contraceptives. However, due to the current health-crisis, access to family planning services may actually be reduced in some contexts. In addition, the COVID-19 pandemic is different because it restricts the movement of people, people are at home more, and this may influence family relations and sexual activity(**?**). Tension between intentions on the one hand and actual behaviour on the other makes it unclear how the pandemic will affect the overall fertility level.

Most of the existing research on the impact of the pandemic on fertility behaviour has been concentrated on developed economies (Luppi et al. 2020). Aassve et al. (2020) argue that the impact of the pandemic on fertility will largely be shaped by the socio-economic context of individuals. They argue that in high income countries, damage to work-life balance and the access to assisted reproductive technology will negatively affect fertility. This will be amplified by the increase in economic uncertainty, which evidence from the great recession of 2008 suggests will depress fertility levels. By contrast rural areas of low-income countries could observe an increase in fertility as access to family planning is curtailed and general development hampered or even declined (Aassve et al., (2020).

Where they see greater uncertainty about the impact on fertility is middle income countries and particularly urban areas within them. In such places, Aassve et al. (2020) argue that it is unclear if reduced access to family planning would lead to an increase in fertility and whether this would offset any decrease in fertility brought about by the uncertain economic outlook. The puzzle presented is a complex one with multiple influences on the fertility intention and behaviour of individuals. Attempts have been made to conceptualize this and produce more precise workable hypotheses but these again focus on high income countries (Voicu and Bădoi 2020). Whilst fertility data for 2020 will soon reveal the short-term impact of the pandemic on fertility, the aim here is to examine the role played by these competing causal pathways in shaping fertility behaviour at the individual level in a middle-income country such as the Republic of Moldova. In middle income countries it should also be noted that the impacts of the pandemic are likely to affect the population for longer given that vaccine role out is expected to be far slower in middle income countries than in high income countries.

# 2 Existing Research

## 2.1 Fertility intentions

Research on the impact of the pandemic on fertility behaviour has been largely concentrated on high income countries, predominantly in Western Europe and North America. The evidence here has suggested a fall in fertility intentions in line with the hypothesis put forward by Aassve et al. (2020). Luppi, Arpino and Rosina (2020) demonstrated that fertility intentions had fallen in Spain, France, Italy, Germany and the UK but that this manifested itself differently in each context. In Italy, falls in fertility intentions were amongst the highly educated under 30's whereas in Germany the patterns were geo-spatially concentrated in areas with the highest infection rates.

Research in Shanghai has demonstrated that fertility intentions amongst couples remain unaffected by the pandemic, especially if the couple themselves have faith in government and public health measures (Zhu et al. 2020). This is the only research to date that we were able to identify that wasn't focused on a high income, western society. They also noted that those who intended to defer pregnancy plans were particularly worried about the impact of the virus itself on the health of the mother and fetus.

Wilde et al. (2020) used data on google search terms to estimate that births would fall by 15% year on year by November 2020, reflecting a change in search term trends related to pregnancy and contraception. They also noted that the fall was expected to be even higher amongst low income households and those from minority groups. This observation is consistent with understanding that economic uncertainties effect on fertility behaviour will be greatest amongst those with the fewest resources. However, the effect is very large and would represent a fall in fertility that is several times larger than that observed with the onset of the great depression in 2008.

## 2.2 Sexual and Reproductive Health during the COVID-19 Pandemic

COVID-19 and the associated social restrictions have raised concerns that access to family planning services could be restricted with significant consequences for family planning. The United Nations Population Division has suggested that the pandemic could result in 60 million fewer users of modern contraceptive methods worldwide (Dasgupta et al. 2020). The impact of the pandemic is expected to be particularly acute in low and middle income countries. Projected declines are expected to be largest for injectables (-20%), condoms (-10%) and the pill (-10%). The condom and the pill are pervasive in Eastern Europe and therefore the impact in this region could be particularly strong (Eeckhaut et al. 2014). Furthermore, it is expected that rural populations access to family planning services will be disproportionately affected during the pandemic

as supply lines and services are more thinly distributed (Dasgupta et al. 2020).

Despite this there is currently little empirical data on the access to sexual and reproductive health services during the pandemic in low and middle income countries. The implicit assumption appears to be that access to family services in high income countries would be unaffected by the pandemic and associated restrictions on movement and businesses (Aassve et al., 2020; Luppi, Arpino  Rosina, 2020. The rationale for this belief is somewhat understandable as some forms of contraception are readily available. However, during the lockdown the office hours of doctors and various clinics were reduced, and services altered. Lindberg et al. (2020) showed that around 28% of childbearing age in the United States worried about their access to sexual and reproductive health care due to the pandemic and 39% saying they had delayed or cancelled such care services due to the pandemic. These concerns and limitations on access are greater amongst marginalized or vulnerable populations.

In addition to contraceptive use, a lockdown may lead to an increase in sexual activity Rudolph and Zacher (2020). However, several surveys conducted during the pandemic have shown this to not be the case and that instead sexual activity appears to have declined (Jacob et al. 2020). In addition to access to family planning services, there is also the risk that the disease itself may affect fertility levels. There is tentative evidence that the disease disproportionately effects male gonads and there is a potential risk of male sterility, although evidence is as of yet inconclusive (Jirge et al. 2020).

## 2.3 The progression of the pandemic in the Republic of Moldova

The aim of this paper is to examine the impact of the COVID pandemic on fertility in a middle income country. However, the analysis is limited to the Republic of Moldova which has several characteristics which make it atypical for middle income countries. The World Bank defines a middle income country as one in which GNP per capita is between $4,046 and $12,535. As of 2019, the Republic of Moldova is at the bottom end of this range at $4,320. Most of these countries also lie in Latin America, Asia and Africa, however the Republic of Moldova is a middle income country that borders the European Union and Ukraine.

The Republic of Moldova also has specific features which are of relevance to the pandemic's impact. Due to the Republic of Moldova's proximity to countries with significantly higher income levels and extensive free-trade and association agreements with those countries the degree of out-migration and seasonal work migration is exceptionally large in the Republic of Moldova. Estimates by the UNFPA suggest that around 9.9% of the working age population is abroad for work Prodan (2016))[1]. This also means that remittances make up almost 12.5% of Gross Domestic Product (Ito 2017). Such extensive migration has in itself been

[1]population and migration estimates are currently under extensive revision. At the time of writing these figures were yet to be published but it is anticipated that the total population will be substantially lower

shown to be disruptive to fertility intentions and their realization. In addition, the Republic of Moldova also has low fertility levels of around 1.77. Due to extensive out migration and low fertility, the Republic of Moldova is a rapidly ageing society and its demographic resilience is a key policy concern for the Moldovan Government and especially regarding the impact of COVID-19 on wider socio-economic development.

The progression of the pandemic in the Republic of Moldova was similar to that of many countries in Eastern Europe with low and moderate rates of infection relative to Western Europe in the early phase of the pandemic through March and April. However, there has been a steady rise in cases through the Summer and Autumn months. The spread of the virus through the country has not been even. Leova, Drochia, Ocnita and Soroca had the highest contagion rates in the country peaking at around 1.3, with the capital Chișinău recording a rate of 1.1. Rural areas had much lower contagion rates than these urban centres.

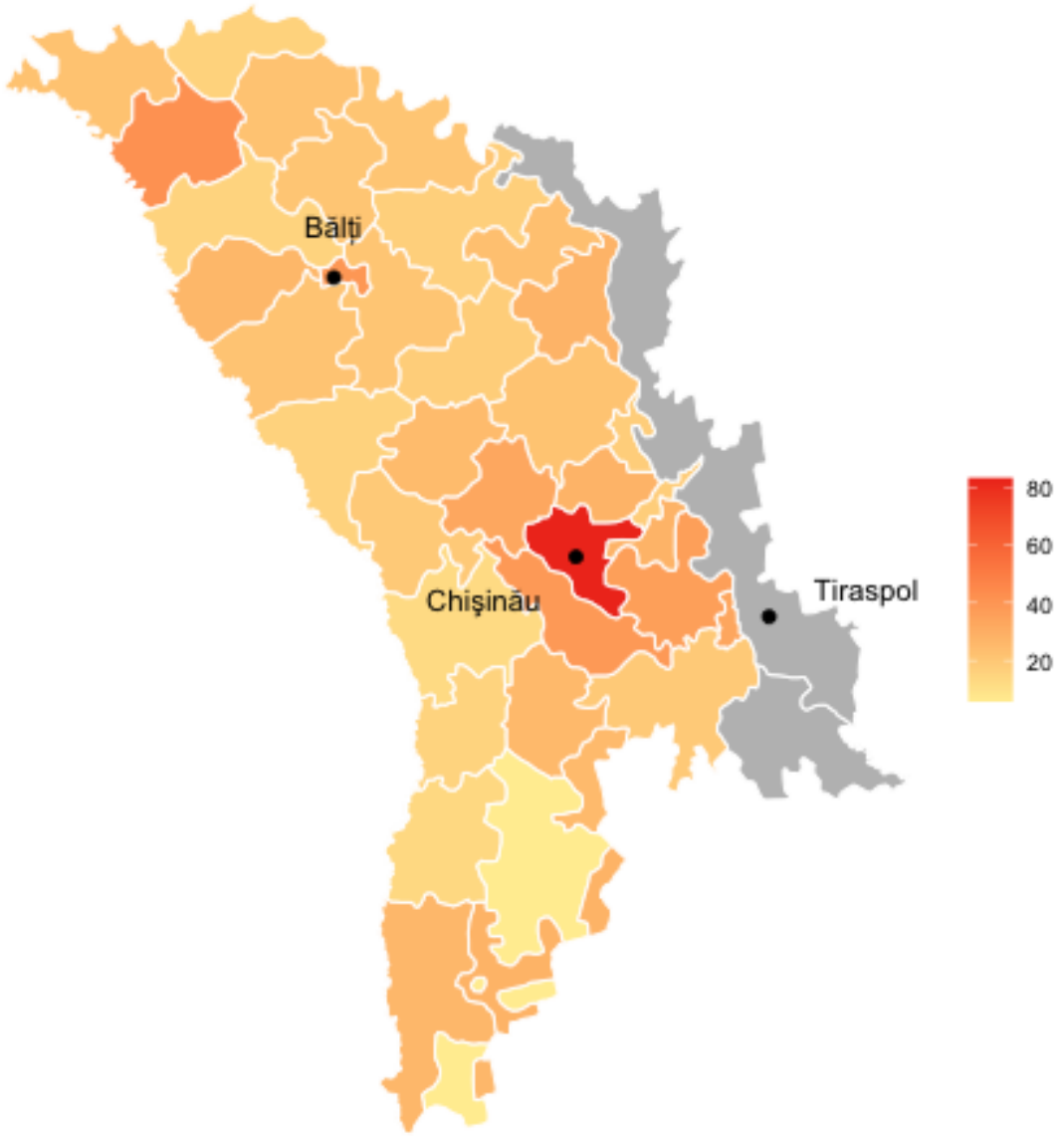


Figure 1: Cases of COVID-19 per thousand as of 21st December

With regards to the regulations put in place, the Republic of Moldova was under an extensive lockdown from March through mid-May. All schools were closed, as were most places of work. From mid-May, regulations were relaxed to allow recommencement of some activities as long as they allowed for adequate physical distancing of 1.5 meters. This allowed for the partial reopening of schools before the summer break though reduced class times or rotational timetables were used to ensure compliance with regulations. As of 24th September, the distance required between individuals was reduced to 1 meter, allowing for schools to reopen more extensively and a further normalization of activities. These restrictions were in place through

to the end of fieldwork.

With regards to access to contraceptive methods in the Republic of Moldova, existing research shows that modern methods are far less common in the Republic of Moldova than in Western Europe but that socio-economic differences in contraceptive use are not identifiable (Janevic et al. 2012). During the strictest parts of the lockdown non-emergency medical consultations were postponed which may suggest a shift away from modern methods requiring medical consultation towards more widely available contraceptive methods. It is very unclear however as to whether the lockdown itself has increased socio-economic inequalities in access to contraceptive methods.

Travel restrictions required the quarantining of individuals arriving from other countries. This is of particular importance in the context of the Republic of Moldova given the large rates of out migration and remittances. Travel restrictions to neighbouring countries therefore represented a severe disruption to economic and family activities.

## 2.4 Reasoned Action Approach & Hypotheses

To address the research question at hand, we adopt a reasoned action approach (Fishbein and Ajzen 2011) to study changes in capacities, intentions and behaviour over the course of the pandemic. The reasoned action approach argues that intentions and behaviour are shaped by individuals perceived behavioural control. These intentions then shape behaviour and this is moderated by the barriers and facilitators of the planned behaviour. This approach is particularly useful in this context as it clearly delineates between shifting perceptions of the individual and external exogenous influences on behaviour. This helps address the question of whether the primary influences of the pandemic on fertility are associated with its impact on the perceptions of individuals or concentrated on the practical and logistical constraints that the pandemic imposes on individuals. This is a crucial distinction as recent research has shown that perceived barriers and uncertainty can have a significant impact on behaviour, irrespective of whether the barrier is actually realized (Vignoli et al. 2020). For these reasons the approach has been valuable and widely used in the fertility literature and was the basis for the design of the Generations and Gender Survey (Gauthier et al. 2018).

By applying the reasoned action approach to data on the Republic of Moldova over the onset of the pandemic in 2020, this paper aims to not only estimate the change in intentions and behaviour brought about by the pandemic but also the degree to which these changes are associated with a shift in norms, perceived behavioural control or actual behavioural control. In doing so it will provide empirical insights to the puzzle presented by Aassve et al. (2020) regarding the impact of the pandemic on middle income

countries such as the Republic of Moldova.

Based on existing empirical findings, the reasoned action approach, and the specific Moldovan context we derive the following hypotheses with regards to changes in fertility intentions and behaviour over the course of the pandemic:

*H1: Sexual Activity will be lower after the onset of the pandemic than before.* Existing research on mental well being and sexual relations during the pandemic has tended to show a decline in sexual activity during the pandemic, although these have not been as well studied in middle income countries (Jacob et al. 2020).

*H2: Modern Contraceptive use will be lower after the onset of the pandemic*

Existing research and theories regarding the impact of the pandemic have generally suggested that access to contraception will decline but that this decline will be acutest for those methods which require family planning services, at least at the initial stage of starting a contraception plan Lindberg et al. (2020).

*H3: The decrease in the use of modern contraceptive use will be greatest in rural areas*

One of the key distinctions made by Aassve et al. (2020) in their prediction of the fertility impact of COVID is between rural and urban areas and this relates in part to the potential differential impact on access to family planning services in rural areas during the pandemic.

*H4: Respondents will be less likely to be actively trying to get pregnant after the onset of the pandemic than before.*

In addition to a drop in sexual activity and access to family planning services, it is also expected that there will be a decline in the proportion of couples who are actively trying to conceive. This is likely due to economic uncertainty and potential wider mental health impacts.

*H5: Fertility intentions will be lower after the onset of the pandemic than before.*

Finally, it is expected that due to the aforementioned shifts in access to family planning services, changes in sexual activity as well as negative impacts of economic uncertainty, the fertility intentions in the Republic of Moldova to fall.

*H6: Fertility intentions will decline most amongst households who have lost income due to the pandemic.*

In addition to a differential impact through access to contraception, existing research on exogenous shocks and fertility have demonstrated that households whose income is directly hit by the shock exhibit the biggest drops in fertility intentions and this has been supported by existing evidence on the impact of COVID-19 (Vignoli et al. 2020). We build upon this research by estimating the effect of personal loss of income due to the pandemic on fertility intentions. In addition, we examine whether low socio-economic status in and of itself can explain differences in intentions.

# 3 Data & Methods

## 3.1 Data

The data for this study is taken from the Generations & Gender Survey (GGS). The GGS is cross-national longitudinal survey of family and relationship dynamics that is currently undertaking a new round of data collection. The questionnaire was designed by an international team of demographers through the Generations and Gender Progamme (GGP) (Vikat et al. 2007). This questionnaire was then translated into Romanian and Russian and validated by the UNFPA and GGP.In the Republic of Moldova the fieldwork was overseen by the UNFPA in coordination with the National Bureau of Statistics of the Republic of Moldova. The target sample was the residential population aged 15-79. All interviews were conducted as face-to-face. Around 15% of the area and population of the Republic of Moldova are made up of a break away region called Transnistria which is defacto independent of the state. This regions was not covered in the data collection.

Fieldwork commenced on the 29$^{th}$ January 2020. On the 16$^{th}$ March fieldwork was paused indefinitely due to physical distancing measures put in place across the Republic of Moldova. Fieldwork recommenced on the 2$^{nd}$ July and was then conducted continuously until 30$^{th}$ November 2020. This resulted in 10,044 interviews. In the context of the actual prevalence of the disease, the study covers a period in which the number of cases were increasing. 3,055 interviews were conducted before the onset of the pandemic and a further 6,989 interviews were conducted afterwards. More information about the fieldwork procedures can be found on the GGP website and accompanying documentation (https://www.ggp-i.org/data/methodology/).

The overall response rate was 62.9%. Response rates in Chișinău were much lower than the rest of the country at 41.6% reflecting a trend that is well known for surveys in Eastern Europe (Fokkema et al. 2016). This was despite extensive measures being undertaken to improve the response rate in Chișinău. The overall item non-response rate was very low at 3.9% and even lower in the fertility section at 0.66% which includes several highly sensitive questions, many of which are used in this analysis.

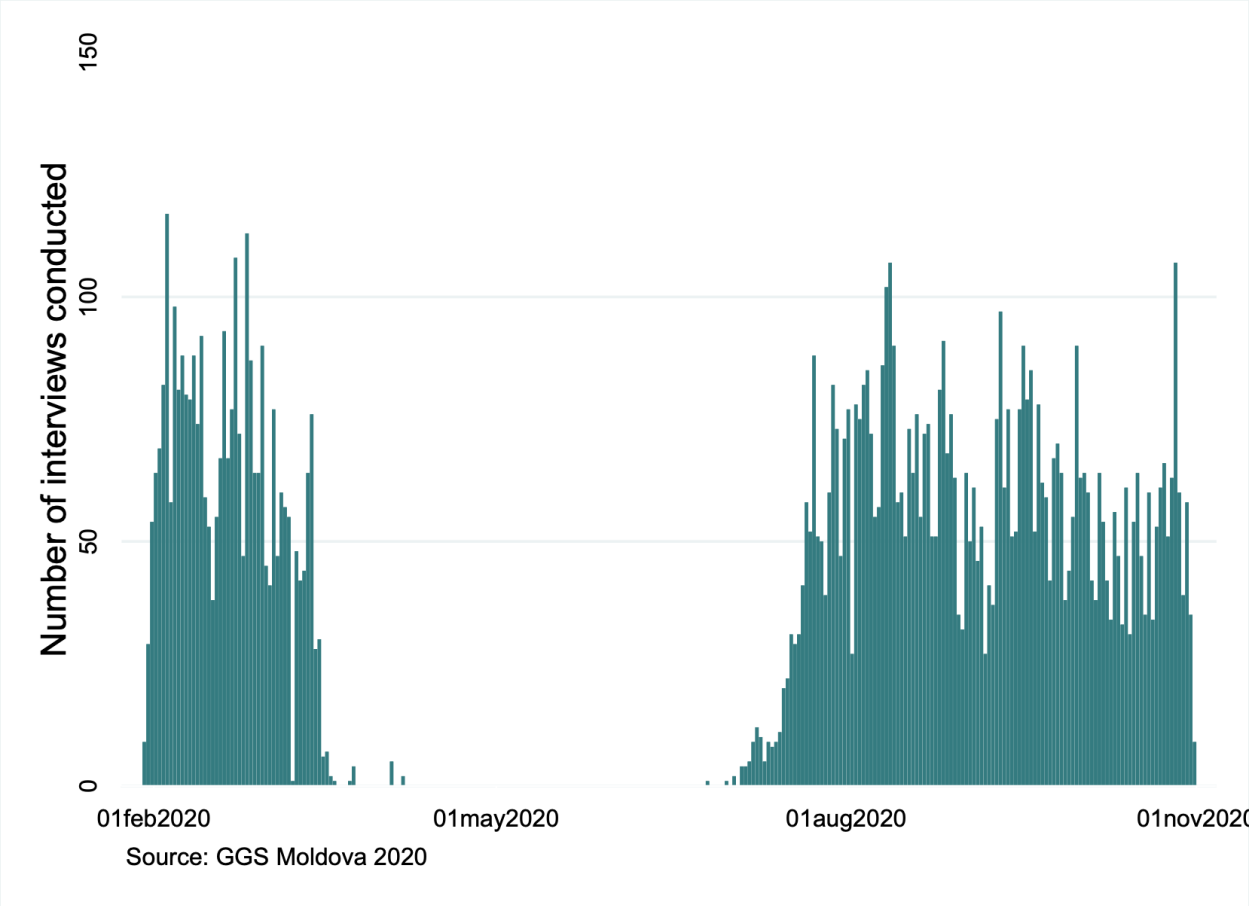


Figure 2: Number of Interviews per day in the Moldovan GGS

After the survey was interrupted due to COVID, the UNFPA and Moldovan National team requested that several items be added to measure the subjective experience of the pandemic and whether respondents felt that the pandemic had negatively affected various aspects of their lives[2]. These questions were placed at the end of the interview to avoid effecting the core questionnaire.

## 3.2 Variables

The hypotheses set out above refer to four separate dependent variables. Sexual activity is measured using question FER13 [3]. Contraceptive usage is measured using FER12 [4] Those who selected a contraceptive method were coded as 1 to reflect contraceptive usage (CU) and those who didn't were coded as 0. To measure whether a couple is actively trying to get pregnant FER10a was used [5].

[2]More information about these items can be found here: https://www.ggp-i.org/wp-content/uploads/2020/10/GGP-COVID-Memo.pdf

[3]Did you have sexual intercourse in the past 4 weeks? Yes or No

[4]Are you or your partner using or doing any of these things to prevent pregnancy at this time? Please name all of the things you use or do. Condom, Pills, IUD, Diaphragm, Foam/Cream/Jelly/Suppository, Injectables, Implants, Pesona, Morning after pill, Withdrawal, safe period method, vaginal ring, female condom.

[5]Are you or your current partner trying to get pregnant? Yes or No"

Table 1: Dependent Variables

| | (1) Pre Lockdown | | (2) Post Lockdown | |
|---|---|---|---|---|
| | mean | sd | mean | sd |
| Had intercourse | 0.851 | 0.356 | 0.886 | 0.318 |
| Contraceptive Use | 0.626 | 0.484 | 0.489 | 0.500 |
| Trying to Conceive | 0.087 | 0.283 | 0.059 | 0.235 |
| Fertility Intention | 0.331 | 0.471 | 0.349 | 0.477 |
| Observations | 733 | | 1908 | |

To measure a respondents fertility intention FER14 was used [6]. It should be noted that the questions are only asked to women aged 18-49 and men who have a female partner aged 15-49. If the respondent or their partner were pregnant at the time of the interview were also excluded from the analysis. If they were not sure yet, they were included in the analysis. Those without a co-resident partner were asked these questions but we restricted the analysis to those with a partner and aged 18-40 in order to focus the analysis on those individuals most likely to have medium term fertility intentions.

Table 2: Independent Variables

| | (1) Pre Lockdown | | (2) Post Lockdown | |
|---|---|---|---|---|
| | mean | sd | mean | sd |
| Age | 36.412 | 7.683 | 35.814 | 7.617 |
| Sex of Respondent [Ref = Female] | 0.357 | 0.480 | 0.328 | 0.470 |
| Education Level | 0.337 | 0.473 | 0.362 | 0.481 |
| Employment Status | 0.659 | 0.474 | 0.653 | 0.476 |
| Number of Coresident Children | 1.597 | 1.146 | 1.552 | 1.045 |
| Urban Resident | 0.475 | 0.500 | 0.335 | 0.472 |
| Willingness to answer [1-10] | 9.430 | 1.093 | 9.466 | 0.869 |
| Observations | 733 | | 1908 | |

Independent variables of interest that are used in the analysis are age, sex, educational level[7], employment status[8], region, whether they live in an urban or rural area, and whether they have co-resident children. Questions on the impact of the pandemic on household income were only asked to the sample interviewed after the onset of the pandemic. For this analysis, those who responded that there was a large or very large

[6] Do you intend to have a/another child during the next three years? Please take into account only biological children. Definitely yes, probably yes, unsure, probably no, definitely no."

[7] measured as whether an individual has tertiary qualifications or not

[8] whether someone is in paid employment or on leave from paid employment

impact on their household income were coded as 1 and the rest, including those who were interviewed before the onset of the pandemic, were coded as 0. The summary all the variables used can be found below:

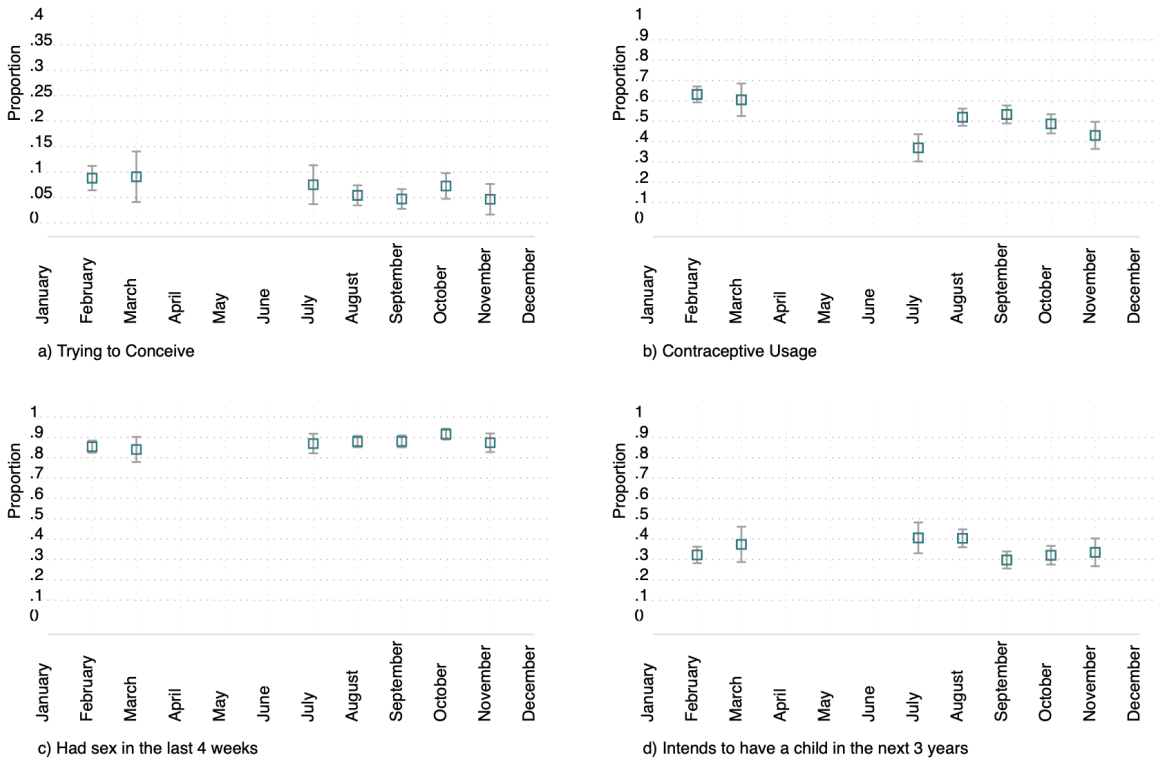


Figure 3: Proportion of 18-49 year old's that are currently trying to conceive, using modern contraceptive methods, that have had sex in the last four weeks and that have fertility intentions in the next 3 years

### 3.3 Analytic Strategy

For the analysis, the hypotheses are tested in turn using a logit model, using a dichotomous indicator to represent the period before and after the onset of the pandemic. However, the onset of the pandemic has itself been made up of several stages in the Republic of Moldova. To test the findings in these models, they were also run with time specified as a categorical month variable to allow for variation in the impact of the pandemic over time. Generally, the effects were stable over the months preceding the resumption of fieldwork and so the simpler pre and post measure is used but where monthly variations are statistically significant, they are reported.

Post stratification weights were applied based on age, gender and region of residence. The primary internal validity concern relates to the progression of fieldwork in the Republic of Moldova and its association with the progression of the pandemic. In survey research it is common to observe that specific groups respond

earlier in the fieldwork period than others. It is likely that these different groups will have different fertility intentions and behaviours and this thus threatens to bias the estimates. It is likely that those which are hardest to reach are those more likely to migrate or be less settled and these are also those individuals least likely to be intending to have children. However, the fieldwork in the Republic of Moldova was structured such that various districts of the sample were exploited at different times and were exhausted before the fieldwork team moved on to the next district. The onset of the pandemic coincided with the completion of the first round of districts which may go someway to mitigating this effect. The districts examined in each round of fieldwork were approximately representative of the country as a whole.

However, to further test against this potential bias, models were run which including variables indicating respondent willingness to participate and the number of others present during the interview. Physical distancing measures meant that some interviews were conducted outdoors or in larger rooms and there was therefore potentially less privacy in fieldwork after the onset of the pandemic, leading to increased social desirability bias. Whilst these variables did exhibit a correlation with fertility behaviours and intentions, their inclusion in the models didn't not change the significance or direction of the coefficients reported here.

# 4 Results

The first set of results are presented in table 3. Model 1 indicates that respondents after the lockdown were 38%[9] more likely to report having had sex than respondents prior to lockdown and this is significant at $p < 0.05$. This runs counter to the first hypotheses and suggests that there has in fact been a small increase in sexual activity after lockdown. When looking at the basic descriptive statistics by gender, the difference between pre and post lockdown is larger amongst women (82% v 86%) than men (92% v 94%).

The second model indicates that modern contraceptive usage was reduced by 40%[10] by the lockdown. This is a large downturn and is inline with the second hypothesis and the assertion by Aassve et al. (2020) that contraceptive usage would be constrained. The third model tested whether there was a difference in the impact of the lockdown between urban and rural areas. The coefficient was positive and significant suggesting that the impact on access was indeed lesser in urban areas (see figure 4).

The fourth model shows that respondents were 42%[11] less likely to be trying to conceive post lockdown than prior, dropping from 8.7% to 5.7%. That is a large drop off in those actively trying to conceive and it supports the fourth hypothesis. The fifth and sixth models revealed no differences in the medium term fertility intentions of respondents between pre and post lockdown and there was no difference identified between those who were financially impacted by the lockdown and those who weren't.

In terms of the robustness of the results, the exogenous nature of the pandemic means that the most noticeable confounding factors are associated with the fieldwork process itself. Respondents in the second part of the fieldwork may have been more reluctant respondents. We do note that the perceived willingness to answer questions was associated with lower levels of contraceptive use, which is to be expected from a non-cooperative respondent. This is unlikely to explain large differences however, as the difference in means between pre and post lockdown is approximately 0.01 for a 10 point scale. A fall of one standard deviation in the perceived willingness to answer would result in just a 1 percentage point shift in the estimated probability of reporting contraceptive usage.

[9] $exp(0.324) = 1.38$
[10] $1 - exp(-0.517) = 0.404$
[11] $1 - exp(-0.532) = 0.587$

Table 3: Logit Models - 1

| | (1) Had sex | (2) CU | (3) CU | (4) Trying | (5) Intention | (6) Intention |
|---|---|---|---|---|---|---|
| main | | | | | | |
| Post Lockdown | 0.325* | -0.517*** | -0.733*** | -0.532** | 0.0151 | -0.0171 |
| | (2.28) | (-5.34) | (-5.65) | (-2.85) | (0.13) | (-0.12) |
| Age | -0.00924 | -0.0203*** | -0.0198*** | -0.0298** | -0.124*** | -0.124*** |
| | (-1.05) | (-3.64) | (-3.54) | (-2.75) | (-16.17) | (-16.18) |
| Male | 1.061*** | -0.322*** | -0.316*** | 0.0266 | 0.677*** | 0.678*** |
| | (6.28) | (-3.58) | (-3.51) | (0.14) | (6.07) | (6.08) |
| Number of Coresident Children | -0.0642 | 0.0741 | 0.0781 | -0.620*** | -0.580*** | -0.581*** |
| | (-1.09) | (1.86) | (1.96) | (-6.53) | (-10.36) | (-10.36) |
| Tertiary Education | 0.270 | 0.247** | 0.232* | -0.0839 | 0.0180 | 0.0176 |
| | (1.76) | (2.59) | (2.43) | (-0.43) | (0.15) | (0.15) |
| Working | 0.368** | 0.0705 | 0.0688 | 0.0954 | -0.0368 | -0.0331 |
| | (2.72) | (0.77) | (0.75) | (0.49) | (-0.32) | (-0.29) |
| Urban Resident=1 | 0.189 | 0.165 | -0.178 | 0.132 | 0.324** | 0.322** |
| | (1.27) | (1.74) | (-1.08) | (0.69) | (2.80) | (2.77) |
| Willingness to answer [1-10] | 0.0417 | -0.238*** | -0.244*** | 0.131 | 0.0473 | 0.0495 |
| | (0.63) | (-4.81) | (-4.93) | (1.25) | (0.86) | (0.90) |
| Others Present | 0.164 | 0.292* | 0.291* | -0.269 | -0.0539 | -0.0534 |
| | (0.86) | (2.45) | (2.44) | (-1.00) | (-0.37) | (-0.37) |
| Post Lockdown X Urban Resident=1 | | | 0.493* | | | |
| | | | (2.54) | | | |
| Drop in Income=1 | | | | | | 0.0557 |
| | | | | | | (0.45) |
| Post Lockdown X Drop in Income=1 | | | | | | 0 |
| | | | | | | (.) |
| Constant | 1.093 | 3.183*** | 3.392*** | -1.741 | 3.721*** | 3.700*** |
| | (1.52) | (6.02) | (6.32) | (-1.59) | (6.27) | (6.22) |
| Observations | 2286 | 2384 | 2384 | 2218 | 2113 | 2113 |

$t$ statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

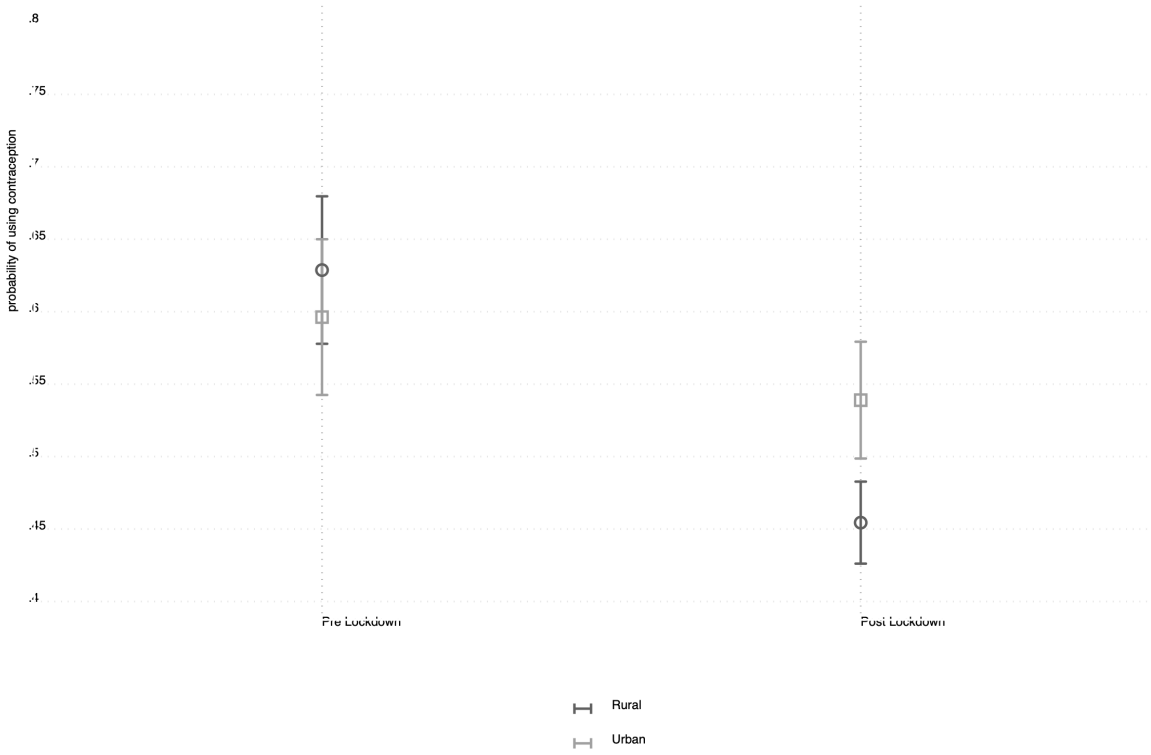


Figure 4: Marginal effects of contraceptive use pre and post lockdown

We also considered the role of others being present during an interview. This was included because there was a change in fieldwork protocols after lockdown which may have influenced responses as it was harder to hold interviews alone. When a spouse is present, it is likely that responses to questions on contraception and sexual behaviour will change. This was also only apparent for contraceptive usage in models 2 and 3 but interestingly, those with others present reported higher levels of contraceptive usage which is contrary to expectations.

The results of the analysis indicate large shifts in aggregate short term fertility behaviour, whilst medium term intentions remain constant. What remains to be understood is whether the decrease in contraceptive use in particular is largest amongst those who have medium term fertility intentions or whether it is a decrease amongst those who don't. In the terms of the United Nations definition of Sustainable Development Indicator 3.7.1, this is distinction between an unmet family planning needed associated with limiting or spacing of children.

Amongst those with medium term fertility intentions, usage of contraception fell from 62% pre lockdown to 45%. Amongst those without any medium term fertility intentions, it fell from 66% to 50%. This is a large decrease in both groups which suggests that there are substantial increases in the unmet needs with

regards to both limiting and spacing of children.

# 5 Conclusion

This paper seeks to understand the impact of the COVID-19 Pandemic and associated social measures on fertility behaviour in the Republic of Moldova. 75% of the world's population live in middle income countries such as the Republic of Moldova according to the world bank, and as laid out by Aassve et al., the potential impact of the pandemic on fertility behaviour in these countries is hard to anticipate. This paper offers some insights into the complex impact the pandemic has had on fertility behaviour but ultimately reinforces the assertion made by Aasvve et al, that the long term demographic impact is hard to ascertain. The coming years will represent a period of significant uncertainty for population projections.

In terms of the overall impact on fertility there are several notable findings from this paper. Firstly, we observe a dramatic fall in the proportion of respondents trying to conceive of around 41%. If this was reflected in a similar fall in the birth rate the demographic consequences would be considerable. However, the medium term fertility intentions do hold steady in our analysis, suggesting that there might be a delay in births rather than a permanent decline in the birth rate. The extent to which this is true is unknown and will only become evident as the impact of the pandemic both in terms of its public health impact but also its wider social and economic impact become apparent. This paper can not reflect on whether these deferred conceptions will be realized because that is simply not knowable yet. Further research is needed to ascertain whether a J, V or L shaped recovery in fertility is expected.

The other factor that Aassve et al. point to which complicates the picture in middle income countries, is the access to family planning services. There was a considerable decrease of around 40% in contraceptive usage during the pandemic, amongst those couples with and without medium term fertility intentions. It was expected that this would be offset by a fall in sexual activity associated with the socio-economic impact of the pandemic but this was not observed. This greatly increases the risk of unplanned pregnancies and births and the consequences that has for both the parents and child. It could well be that the unplanned births partially offset the fall in conception efforts amongst those with medium term fertility intentions.

However the micro-level analysis presented here illustrates that this point is in many ways only secondary. The more pressing and long term issue is the potential increase in unplanned pregnancies and regression in active control that individuals have over their family planning. The consequence of the pandemic on fertility in middle income countries could therefore be an increase in births amongst those who were not planning on having children and a decrease in births amongst those who were. If this were the case, it would represent a shift in fertility from the planned to the unplanned and a reduction in reproductive agency of women.

There are several limitations we can point to in this paper. Most importantly, the analysis is effectively a repeated cross-sectional study. The differences we observe are between and not within individuals. A

longitudinal study would offer far greater insights into the shifts in fertility behaviour and the underlying dynamics. Unfortunately this was not possible with the data at hand. There are longitudinal panels which offer such data in high income countries (For example see Luppi et al. (2020)). We are unaware of any such longitudinal data for middle income countries however and the impact of the pandemic on fertility in such a context was the main focus of this paper.

The second limitation is the focus of the analysis purely on survey data. Survey data provides subjective measures and insights into cognitive processes that are exceptionally valuable for fertility research. However, there have been notable developments in the use of new forms of data in the study of demography, such as google trends data, that could prove useful in validating the results found here **?**. Doing so lies outside the scope of this paper given that the theoretical framework is deeply embedded within the survey data used and because the analysis of these new data forms require sufficient detail and attention that this paper can not accommodate. The limitations to this paper are not negligible and we would urge researchers to evaluate and validate these findings further before using them as the basis for population policy.

Finally, the study focuses on the Republic of Moldova as an example of a middle income country. The Republic of Moldova is however a very unique and atypical country. Unlike most middle income countries it is in Europe and has a land border and association agreement with the European Union which have a significant gravitational impact on the economy and wider society. Whilst the Republic of Moldova does exhibit limits in the access to family planning in line with many middle income countries, it does not exhibit some of the crucial challenges that Aassve et al. referred to. The urban-rural divide in access to family planning in the Republic of Moldova may not be so great given that the country is relatively small in both area and population when compared with more notable middle income countries such as China, India, Indonesia or Brazil. It is the demographic impact in these larger and more populous countries that will ultimately shape the demographic consequences of the pandemic. Nevertheless, the analysis here provides insights into a middle income country when high quality data is sparse and helps elucidate some of the micro level dynamics at play in such contexts.

This paper has provided insights into fertility behaviour at the micro level in a middle income country context that is often understudied and yet of critical importance in understanding the wider demographic implications of the pandemic. The data used has enabled us to look at multiple dimensions of fertility behaviour and how they interrelate. There is strong evidence for large short-term effects on fertility behaviour. Crucially, for those with no medium term fertility intentions there is a significant increase in unmet family planning needs and yet for those with medium term fertility intentions there is apparent deferment in actively trying to conceive. It will be vital that this is continuously studied as time passes in order to understand how short term and medium term intentions converge over time as the impact of the pandemic becomes

apparent.

# 6 Bibliography

## References


Arnstein Aassve, Nicolò Cavalli, Letizia Mencarini, Samuel Plach, and M Livi Bacci. The covid-19 pandemic and human fertility. *Science*, 369(6502):370–371, 2020.

Aisha Dasgupta, Vladimíra Kantorová, and Philipp Ueffing. The impact of the covid-19 crisis on meeting needs for family planning: a global scenario by contraceptive methods used. *Gates Open Research*, 4(102): 102, 2020.

Mieke CW Eeckhaut, Megan M Sweeney, and Jessica D Gipson. Who is using long-acting reversible contraceptive methods? findings from nine low-fertility countries. *Perspectives on sexual and reproductive health*, 46(3):149–155, 2014.

Martin Fishbein and Icek Ajzen. *Predicting and changing behavior: The reasoned action approach*. Taylor & Francis, 2011.

Tineke Fokkema, Andrej Kveder, Nicole Hiekel, Tom Emery, and Aart C Liefbroer. Generations and gender programme wave 1 data collection: An overview and assessment of sampling and fieldwork methods, weighting procedures, and cross-sectional representativeness. *Demographic Research*, 34:499–524, 2016.

Anne H Gauthier, Susana Laia Farinha Cabaço, and Tom Emery. Generations and gender survey study profile. *Longitudinal and Life Course Studies*, 9(4):456–465, 2018.

Katsuya Ito. Remittances and the dutch disease: Evidence from the republic of moldova. *International Economic Journal*, 31(3):462–469, 2017.

Louis Jacob, Lee Smith, Laurie Butler, Yvonne Barnett, Igor Grabovac, Daragh McDermott, Nicola Armstrong, Anita Yakkundi, and Mark A Tully. Covid-19 social distancing and sexual activity in a sample of the british public. *The journal of sexual medicine*, 2020.

Teresa Janevic, Pallas W Sarah, Ismayilova Leyla, and Bradley H Elizabeth. Individual and community level socioeconomic inequalities in contraceptive use in 10 newly independent states: a multilevel cross-sectional analysis. *International Journal for Equity in Health*, 11(1):69, 2012.

Padma Rekha Jirge, Sadhana Patwardhan, Dilip Paranjape, Shishir Narendra Jirge, Deepali Atul Bhomkar, Shruti Mahesh Chougule, Anita Salpekar, and Deepak Modi. Resuming assisted reproduction services during covid-19 pandemic: An indian experience. *medRxiv*, 2020.

Laura D Lindberg, Alicia VandeVusse, Jennifer Mueller, and Marielle Kirstein. Early impacts of the covid-19 pandemic: Findings from the 2020 guttmacher survey of reproductive health experiences. *New York: Guttmacher Institute*, 2020.

Francesca Luppi, Bruno Arpino, and Alessandro Rosina. The impact of covid-19 on fertility plans in italy, germany, france, spain, and the united kingdom. *Demographic Research*, 43:1399–1412, 2020.

Mariana Prodan. The impact of migration on the labour market. republic of moldova case study. 2016.

Cort W Rudolph and Hannes Zacher. "the covid-19 generation": A cautionary note. *Work, Aging and Retirement*, 2020.

Daniele Vignoli, Raffaele Guetto, Giacomo Bazzani, Elena Pirani, and Alessandra Minello. A reflection on economic uncertainty and fertility in europe: The narrative framework. *Genus*, 76(1):1–27, 2020.

Andres Vikat, Zsolt Spéder, Gijs Beets, Francesco C Billari, Christoph Bühler, Aline Désesquelles, Tineke Fokkema, Jan M Hoem, Alphonse MacDonald, Gerda Neyer, et al. Generations and gender survey (ggs) towards a better understanding of relationships and processes in the life course. *Demographic research*, 17:389–440, 2007.

Malina Voicu and Delia Bădoi. Fertility and the covid-19 crisis: do gender roles really matter? *European Societies*, pages 1–16, 2020.

Joshua Wilde, Wei Chen, and Sophie Lohmann. Covid-19 and the future of us fertility: what can we learn from google? 2020.

Chenfeng Zhu, Jiahao Wu, Yan Liang, Li Yan, Chuqing He, Luting Chen, and Jian Zhang. Fertility intentions among couples in shanghai under covid-19: A cross-sectional study. *International Journal of Gynecology & Obstetrics*, 151(3):399–406, 2020.