Why immigrant fertility in Norway has declined

Declining fertility among immigrant women can be the result of successful integration, or it can be due to other reasons – such as an increased share of immigrant women from low fertility countries or lower fertility among newly immigrated women.
This paper presents a way of isolating the effect of a changed composition of immigrant women from the effect of altered fertility patterns in each subgroup of women. The approach is used to examine possible reasons why the total fertility rate (TFR) of immigrant women in Norway fell from 2.64 in 2000 to 2.12 in 2012, a decrease of 0.52 children per woman.
The main reason why immigrant fertility in Norway has gone down is found among newly arrived immigrant women. They have a lower fertility now than the newly arrived had a decade ago. This change alone accounts for a decrease in the general immigrant TFR of 0.35 from 2000 to 2012. Changed composition of immigrant women with respect to area of origin and duration of stay explains almost nothing.

Introduction

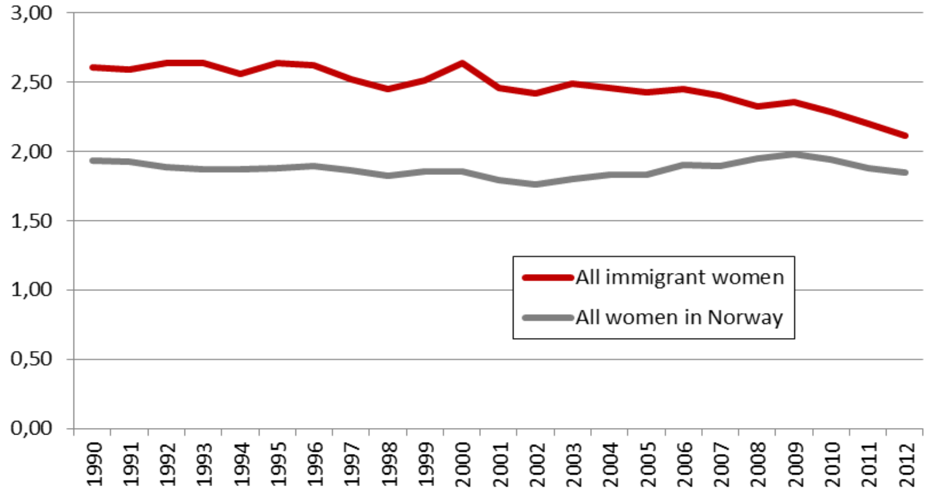
Immigrant women give birth to a substantial part of the children in many Western societies (Sobotka 2008). In some countries, like Norway, more than 20 per cent of the newborns have an immigrant mother. Understanding immigrant fertility and how and why it changes is therefore important not only to learn about the lives of immigrant women and immigrant families, but also for understanding general population changes in Western societies. Knowledge of the forces that have shaped recent immigrant fertility trends may also indicate something about the future trend of immigrant fertility.

Several factors may affect migrant women’s fertility. The literature has put forward a number of hypotheses, which have partly been used to explain why immigrants often have a different fertility than natives, and partly why immigrant fertility changes with a migrant woman’s duration of stay. However, not much work has been done to identify which factors explain the general trends of immigrants’ fertility rates in a country. That is the purpose of this study.

By keeping the number of women in various subgroups (by area of origin and/or duration of stay) constant at 2000 level, and only allowing the age specific fertility rates in each subgroup to change the way it did from 2000 to 2012, it is possible to isolate the effect of changed fertility patterns within the subgroups. And vice versa, if the fertility rates in each subgroup are kept constant at the 2000 level while the number of women in each subgroup is allowed to change, we get the effect of a changed composition. These exercises result in counterfactual paths of TFR among immigrant women, showing what the fertility trends would be like if only certain factors were allowed to change.

The study uses Norwegian register data on all births among immigrant women from 2000 to 2012. In this period, the total fertility rate (TFR) of immigrant women in Norway fell from 2.64 to 2.12 children per women, a decline of 0.52 (figure 1).

Fig. 1: Total fertility rate among immigrant women and all women in Norway, 1990-2012



This paper investigates some possible reasons for this fertility decline among immigrant women in Norway:

1) A changed composition of immigrant women by origin area, with an increased number of immigrant women from new EU-countries where fertility is low.
2) A changed composition with regard to duration of stay; increased duration of residency normally reduces a women's fertility, for instance due to adaption/integration.
3) A combination of 1) and 2): A changed composition of immigrant women with regard to both area of origin and duration of stay.
4) The opposite approach of 3): A changed fertility within each of the subgroups (by origin area and duration of stay). For instance, newly arrived immigrants from a certain origin area may have different fertility now than the newcomers from the same area had previously.

The results from the counterfactual exercises suggest that composition changes do not explain much of the decrease in immigrant fertility in Norway the last decade. Nearly all the decrease can be explained by changed fertility <u>within</u> the subgroups (by origin area and duration of stay). The counterfactual TFR path created in 3 (where the composition of immigrants with regard to both duration of stay and origin area changes the way it actually did from 2000 to 2012 whereas the fertility rates in each of the subgroups are kept constant at the 2000 level) suggest that the composition effect alone would have caused a decrease in immigrant fertility of merely 0.04. On the other hand, the counterfactual path created in 4) shows that the altered fertility within the subgroups (with no changes in composition) would have brought about a fertility decline of 0.48. The actual decline was 0.52.

The findings are further explored by keeping constant both the composition of immigrant women and the fertility rates in some, but not all, groups. By only letting the fertility rates of newly arrived women change, keeping all else constant, the counterfactual TFR for immigrants decreases by 0.35.

Theories of immigrant fertility

Several hypotheses on immigrant fertility have been put forward in the last decades. They are thoroughly presented by for instance Kulu (2005) and Milewski (2007) and are briefly summarized here. The hypotheses are not mutually exclusive, and for an immigrant woman several of these mechanisms may be at play:

- *Socialization:* People are formed by their childhood's values and behaviors. Hence, immigrant women bring with them the fertility patterns of their country of origin.
- *Adaption:* The longer the immigrant women stays in the destination country, the more she is exposed to and adapts to the fertility norms of her new country. So, the difference between immigrant and native fertility will shrink with immigrants' time of residence, and a quick approach may be seen as a sign of successful assimilation or integration.
- *Disruption:* The time before, during and after a migration event can be stressful. Therefore, women will delay childbearing until well after the migration. Some time after settlement in the new country we can expect a catch-up of births due to this postponement.
- *Interrelation of events:* Many immigrant women migrate in order to get married and form a family. For them, the event of migration is linked to the events of marriage and childbearing, which explains why they often have higher fertility in the first period after immigration.
- *Selection and characteristics:* Migrants may be a selected group in important aspects for fertility, such as education and income. This may be the case in the country of origin and/or in the destination country. People leaving a country may be a selected group compared with those who stay (which may explain why the migrants do not always bring with them that country's fertility patterns), and the immigrant women may be a selected group in their new country, with different socio-economic characteristics than the average population (which may explain why some still have different fertility even after long time of residence).

These hypotheses have been used partly to explain why immigrants often have a different fertility than natives, and partly why immigrant fertility changes with immigrant women's duration of stay.

The tendency of immigrant women to have a different fertility than other women in the destination country has been observed in a number of studies (see for instance Fernández and Fogli (2006), Sobotka (2008), Garssen and Nicolaas (2008), Schmid and Kohls (2009); Milewski (2010), Waller, Berrington et al. (2012), Mussino and Strozza (2012), Stichnoth and Yeter (2013) and Persson and Hoem (2014)). Higher fertility is often observed among immigrant women from high-fertility parts of the world, whereas women from low-fertility countries often have lower fertility.[1] Several of the hypotheses above can be used to explain this phenomenon: Immigrant women may have brought with them the fertility norms of their country of birth (*socialization*), they may be a selected group their new country with other socio-economic characteristics than the average natives (*selection and characteristics*), and there may be a composition effect where the total group of immigrant women is dominated by newly arrived women which have migrated in order to form a family or are catching up with childbearing after postponement (*disruption/interrelation of events*).

Also discussed in the literature is the tendency for immigrant fertility to approach native levels as the immigrants' residence time increases. This is found by for instance Mayer and Riphahn (2000), Bélanger and Gilbert (2002), Andersson (2004), Toulemon (2004), Sobotka (2008), Persson and Hoem (2014) and Choi (2014). Many of the hypotheses mentioned above can explain why fertility decreases with a woman's number of years in the destination country: An immigrant woman's fertility can be particularly high in the first years after migration due to *disruption, interrelation of events* and/or *socialization*. This indicates that the fertility in the first period after immigration will be particularly high for women who have postponed childbearing (such as some refugees), women who migrate in order to start a family and women from high-fertility areas. As the woman stays in her new country, she may be influenced by the fertility norms there (*adaption*). This may go directly via the acquiring of new norms, or more indirectly as her socio-cultural characteristics approach the natives'. Lower fertility with higher residence time may also be an effect of the high fertility at the start; the woman may already have got the children she wanted.

Although these hypotheses are mainly used to explain differences between groups of women from different areas of the world, or between groups of immigrant women with different durations of stay, their use may be extended to explaining also changes within subgroups of immigrant women (by origin area or/and duration of stay). This is elaborated in the Discussion section.

[1] There are other studies that do not find clear links between immigrants fertility patterns and the fertility in their countries of origin, see for instance Blau (1992). Also in the present study, some women from low-fertility areas like Eastern EU-members have much higher fertility than their origin area would suggest.

Data, method and descriptive statistics

The data used in these analyses are taken from Norway's population register, an excellent data source which includes complete cohorts of all immigrant women aged 15-49 and all their live births in Norway. To be included in the Norwegian population register, an immigrant needs to (intend to) live in Norway for at least six months, and must have a legal permission to stay. This study includes 128.314 births to immigrant mothers in the period 2000-2012 and a total of 1.636.966 person-years of immigrant women aged 15-49 (less than 90.000 in the first years and almost 200.000 in 2012)[2].

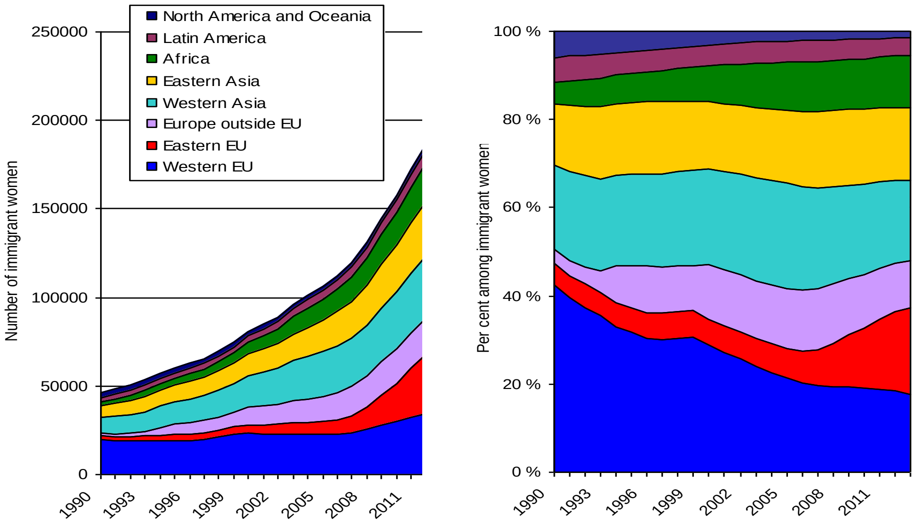
The immigrant women are categorized by age groups (five years' intervals, from 15 to 49 years), duration of residency (four groups: 0-2 years, 3-5 years, 6-9 years and 10 years or more) and by area of origin. The eight areas of origin are:

- Western EU (all countries in Western Europe, and Greece and Cyprus)
- Eastern EU (all the 11 new EU members in Central and Eastern Europe: Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bulgaria and Romania)
- Europe outside EU (Eastern European non-EU countries, including all of Russia)
- Western Asia (all Asian countries west of the border between India and Myanmar/Burma – including Turkey)
- Eastern Asia (all Asian countries east of the border between India and Myanmar/Burma – including China and Mongolia)
- Africa (the whole continent)
- Latin America (South and Central America, including the Caribbean islands)
- North America and Oceania (Canada, US, New Zealand, Australia and the Pacific islands)

Figure 2 shows how the number of immigrant women aged 15-49 years in Norway has increased from 1990, by area of origin. The growth has been particularly strong among immigrant women from the new EU countries. Among all immigrant women (15-49 years) in Norway, the share from Eastern EU has increased from 6 per cent inn 2000 to 19 per cent in 2012, as illustrated in figure 2's right panel.

[2] The numbers on immigrant women are mid-year populations.

Fig. 2: Number of immigrant women (15-49 years) in Norway by origin area (left panel) and distribution of immigrant women (15-49 years) by origin area (right panel), 1990-2012



The main fertility measure used in this paper is the *total fertility rate* (TFR), defined as the average number of children that would be born alive to a woman during her lifetime if she were to pass through all her childbearing years and bore children according to a given year's fertility rate at each age.

TFR is the sum of *age-specific fertility rates* (ASFRs) in a given year. ASFR is the number of births occurring during a given year per 1,000 women of reproductive age classified in single- or five-year age groups. In this analysis, five-year age groups are used. For instance, ASFR for the age group 20-24 years in 2010 can be written like this:

$$\text{ASFR} = \frac{\text{Number of births in 2010 to women 20-24 years}}{\text{Mid-year population in 2010 of women 20-24 years}} \qquad (1)$$

The *mid-year population* is calculated as an average of the population at risk at the start and the end of the given year[3].

Formally, with five years' age groups, TFR in year *t* can be written:

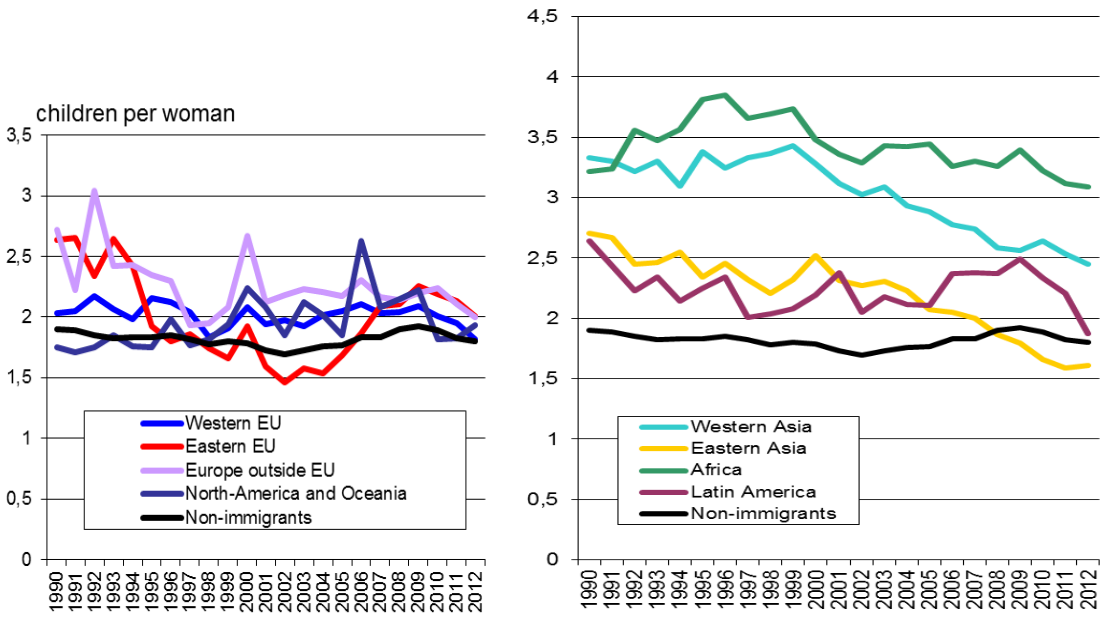
[3] In order to follow the same population at risk from the start to the end of the year, this means that the mid-year population for a given age group, say 20-24 years, has been calculated as the average of the number of women 19-23 years at the beginning of the year and the number of women 20-24 years at the end of the year. The births are accordingly categorised by the mothers' age at the end of the year.

$$\mathrm{TFR}_t = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \mathrm{ASFR}_{a,t} \times 5 = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{b_{a,t}}{w_{a,t}} \times 5 \qquad (2)$$

where a denotes age group, b is number of births and w is midyear female population.

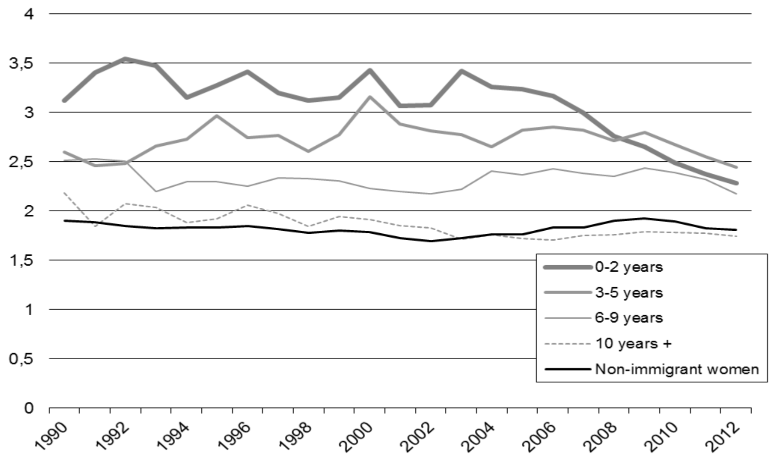
Figure 3 shows the TFR trends for immigrant women in Norway from each of the 8 areas of origin, compared with the TFR for native Norwegian women (non-immigrants). The left panel shows TFR for immigrant women from Europe, North America and Oceania. There are no clear fertility trends among women from Western Europe and North America/Oceania. For women from Europe outside the EU, TFR declined during the 1990s. Immigrant women from today's Eastern EU experienced a fertility decline until 2002. After that, and particularly after the EU enlargement in 2004, their TFR increased noticeably. In 2012 the fertility in this group was two children per women, only marginally lower than the TFR for all immigrant women (2.1 children per woman). The right panel shows the TFR trends for women from Asia, Africa and Latin America. All the groups have experienced a fertility decline during the last two decades. In particular, the decline is strong among women from Eastern and Western Asia.

Fig. 3: Total fertility rate among immigrant women in Norway, by origin area, 1990-2012



As previous literature has shown, immigrant women's fertility is often highest the first years after arrival. Also in this Norwegian data, the fertility is generally highest among immigrant women with short duration of stay. Figure 4 shows the TFR trends for all immigrant women by duration of residence in Norway. There are four groups of residency duration (0-2 years, 3-5 years, 6-9 years and 10 years or more). As an immigrant women stays in Norway, she will transfer from thicker to thinner lines. On average, the TFR difference between newly arrived immigrant women and those with more than 10 years of residence in Norway has been around 1.2 children per woman. The TFR for immigrant women with the longest duration of stay is not markedly different from the TFR among native Norwegian women (since 2005 it has been slightly lower). The figure also shows a substantial fertility decline among newcomers (immigrant women with 0-2 years of residence in Norway) since around 2005.

Fig. 4: Total fertility rate among immigrant women in Norway, by duration of stay, 1990-2012



How much do the different trends described above (such as increased number of women from Eastern EU, decreased fertility among women from non-western countries, decreased fertility with increased duration of stay and decreased fertility among newcomers) contribute to the downward trend we have seen in general fertility among immigrant women in Norway?

One way to examine how much the different factors have contributed to the fertility decline since 2000, is to decompose the general fertility trend among immigrant women into one trend caused by changed composition of immigrant women and another trend caused by altered fertility in different subgroups of immigrant women. This is inspired by the decomposition methods described by Kitagawa (1955) and Das Gupta (1994), but the approach here is somewhat different: In this study, counterfactual TFR paths are created by combining age-specific fertility rates and female mid-year populations from different periods. That allows us to imagine standing in 2000, looking at the future with only one factor changed.

For instance, to explore the composition effect it is possible to change only the number of immigrant women from each area of origin, keeping the fertility rates of the different groups constant at 2000 level. This gives us a picture of how immigrant fertility could have evolved in Norway if, hypothetically, there were no changes in fertility rates in each area of origin after 2000, whereas the number of women from each area of origin (and in each age group) is identical to the real figures from 2000 to 2012.

More formally, the methods can be described as follows: We are interested in the (actual or counterfactual) path of the total fertility rate for all immigrant women. This can be denoted $TFR_{all,t}$. Hence, eq. 1 can be rewritten:

$$TFR_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} ASFR_{all,a,t} \times 5 = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{b_{all,a,t}}{w_{all,a,t}} \times 5 \qquad (3)$$

All births in a certain age group is the sum of all births among immigrant women from all the 8 origin areas (in the same age group) which we denote with an 'o'. Similarly, the number of women in a certain age group is the sum of women from all the 8 origin areas (in the same age group). So we get:

$$\sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{b_{all,a,t}}{w_{all,a,t}} \times 5 = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} b_{o,a,t}}{\sum_{o=1}^{8} w_{o,a,t}} \times 5 \qquad (4)$$

We know from eq. 1 that the ASFR in a certain age group is the number of births divided by the number of women. This implies that the number of births among women in a certain age group (a) equals the ASFR multiplied by the number of women in the same age group, or more formally:

$$ASFR_a = \frac{b_a}{w_a}$$
$$b_a = ASFR_a \ x \ w_a \qquad (5)$$

Substituting this into the last term in (4), we finally get:

$$TFR_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} ASFR_{all,a,t} \times 5 = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{b_{all,a,t}}{w_{all,a,t}} \times 5 = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} b_{o,a,t}}{\sum_{o=1}^{8} w_{o,a,t}} \times 5$$
$$= \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} ASFR_{o,a.t} \times w_{o,a,t}}{\sum_{o=1}^{8} w_{o,a,t}} \times 5 \qquad (6)$$

where $TFR_{all,t}$ is total fertility rate for all immigrant women in year t,

$ASFR_{all,a,t}$ is the age-specific fertility rate for all immigrant women in a given age group in year t,
$b_{all,a,t}$ is all births among immigrant women in age group a in year t,
$w_{all,a,t}$ is all immigrant women in age group a in year t,
$b_{o,a,t}$ is all births among immigrant women from origin area o and age group a in year t,
$w_{o,a,t}$ is all women from origin area o and age group a in year t, and
$ASFR_{o,a,t}$ is the age-specific fertility rate for immigrant women from origin area o and age group a in year t.

Eq. 7 is the short version of eq. 6. It shows that a change in the total fertility rate for all immigrant women can be due to a changed number of women in each group of age and origin area (the composition effect), or a changed fertility in one or more of these groups (altered fertility pattern in the subgroups), or both:

$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} \mathrm{ASFR}_{o,a.t} \times \mathrm{w}_{o,a,t}}{\sum_{o=1}^{8} \mathrm{w}_{o,a,t}} \times 5 \tag{7}$$

If we want to isolate the composition effect, we can create a counterfactual TFR path by changing only the number of immigrant women in each group of origin area and age, keeping the fertility rates for the different groups constant at 2000 level, by using the actual $w_{o,a,t}$ from each year while $ASFR_{o,a,t}$ is kept constant as $ASFR_{o,a,2000}$.

$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} \mathrm{ASFR}_{o,a.2000} \times \mathrm{w}_{o,a,t}}{\sum_{o=1}^{8} \mathrm{w}_{o,a,t}} \times 5 \tag{8}$$

Likewise, if we want to isolate the altered-fertility-effect, we can change only the fertility rates for the different groups, keeping the number of women in each group constant at 2000 level. Then we use the actual $ASFR_{o,a,t}$ from each year, while $w_{o,a,t}$ is kept constant as $w_{o,a,2000}$.

$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8} \mathrm{ASFR}_{o,a.t} \times \mathrm{w}_{o,a,2000}}{\sum_{o=1}^{8} \mathrm{w}_{o,a,2000}} \times 5 \tag{9}$$

To examine the fertility effect of residence time in Norway, the same approach may be used with women divided into groups by duration of stay instead of by area of origin. This study uses 4 categories of residence time (0-2 years, 3-5 years, 6-9 years and 10 years or more) – denoted by r. The equation below shows how the effect of a change in composition of immigrant women by duration of stay can be isolated:

$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{r=1}^{4} \mathrm{ASFR}_{r,a.2000} \times \mathrm{w}_{r,a,t}}{\sum_{r=1}^{4} \mathrm{w}_{r,a,t}} \times 5 \qquad (10)$$

This approach may be developed further, to take into account that all immigrant women belong both to a group of residence time and an origin area group. Dividing the sample into 32 subgroups (4 groups of residence time x 8 groups of origin areas), we can examine the effect of a change in composition of immigrant women with regard to both duration of stay and origin areas – i.e. check what immigrant fertility would be like if the ASFRs for all the 32 subgroups were constant at the 2000 level:

$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8}\sum_{r=1}^{4} \mathrm{ASFR}_{o,a,r.2000} \times \mathrm{w}_{o,a,r,t}}{\sum_{o=1}^{8}\sum_{r=1}^{4} \mathrm{w}_{o,a,r,t}} \times 5 \qquad (11)$$

Likewise, to make a counterfactual TFR-path where the composition of immigrant women in each of the 32 subgroups remains the same as in 2000, whereas the ASFRs are allowed to change like they actually did from 2000 to 2012, the following equation can be used:

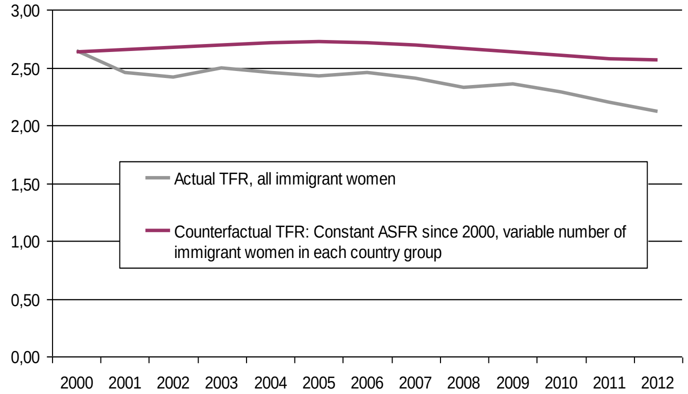
$$\mathrm{TFR}_{all,t} = \sum_{a=(15\text{-}19)}^{(45\text{-}49)} \frac{\sum_{o=1}^{8}\sum_{r=1}^{4} \mathrm{ASFR}_{o,a,r,t} \times \mathrm{w}_{o,a,r,2000}}{\sum_{o=1}^{8}\sum_{r=1}^{4} \mathrm{w}_{o,a,r,2000}} \times 5 \qquad (12)$$

Results

First, the composition effect by origin area is examined by keeping the ASFRs constant for all groups, while letting the numbers of women in each area of origin (and age group) change the way they actually changed in the period 2000-2012. In this period, the share of women from Eastern EU increased markedly, as shown in fig. 2. If the new composition of immigrant women is the main driver behind the fertility decline, we would expect the counterfactual TFR for immigrant women to decline markedly even when the fertility for each area of origin remains constant at 2000 level.

Fig. 5 shows the results of this counterfactual exercise. As we see, the counterfactual TFR only decreased marginally from 2000 to 2012, and it increased somewhat from 2000 to 2005, before declining again. The increase is not so surprising, as the share of immigrant women from Africa and Asia increased in this period (figure 2) and the TFR for African and Asian immigrant women was high in 2000 (figure 3). After 2005, the share of immigrant women from Eastern EU increased sharply (figure 2), and the counterfactual line also starts to decline somewhat around this time. However, the total decline from 2000 is only at 0.07 children per women in this counterfactual case, whereas the actual TFR decline was at 0.52. The changed composition with more immigrant women from Eastern EU thus does not explain the whole TFR change, and it might be fruitful to look for explanations elsewhere.

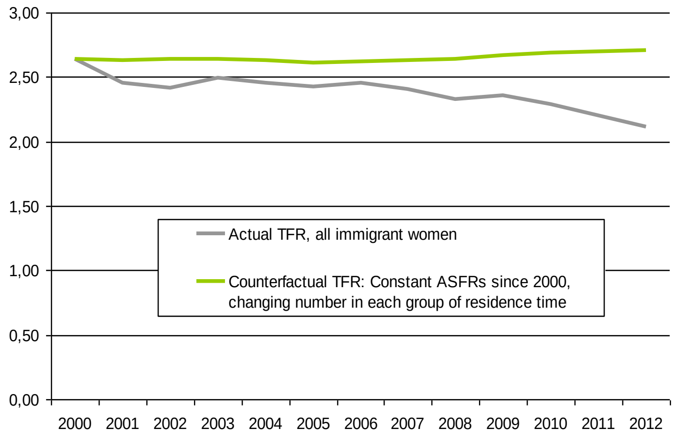
Fig. 5: Total fertility rate among immigrant women in Norway, actual and counterfactual with constant age-specific fertility rates and variable number of women in each area of origin, 2000-2012



As mentioned earlier, fertility often decreases as duration of stay increases. More immigrant women with long duration of residency would consequently imply a lower TFR among immigrant women – all else equal. It is possible to investigate whether increased duration of residency can explain some of the general fertility decline among immigrant women in Norway. In this case, the immigrant women are categorized by years of residency in Norway instead of by area of origin. There are four groups of residency duration (0-2 years, 3-5 years, 6-9 years and 10 years or more). By keeping ASFRs (for all immigrant women combined) constant at 2000 level,[4] and only changing the number of women in each group of residency duration, another counterfactual TFR path can be calculated which isolates the effect of changed composition with regard to duration of residency.

Figure 6 shows that this counterfactual TFR does not decline at all. On the contrary, it has increased since 2005. Even though fertility does go down as time since arrival increases (figure 4), this does not explain the general decrease in immigrant TFR in Norway. The reason for this can be found in figure 2: Since 2000, and particularly since 2005, there has been a massive increase in the number of immigrants in Norway. Many of them consequently have short duration of residency. Even if there are more immigrant women with long duration of residency in Norway (the group with longest duration has increased by 109 per cent from 2000), the increase in number of women with shortest time since arrival has increased even more (by 147 per cent).

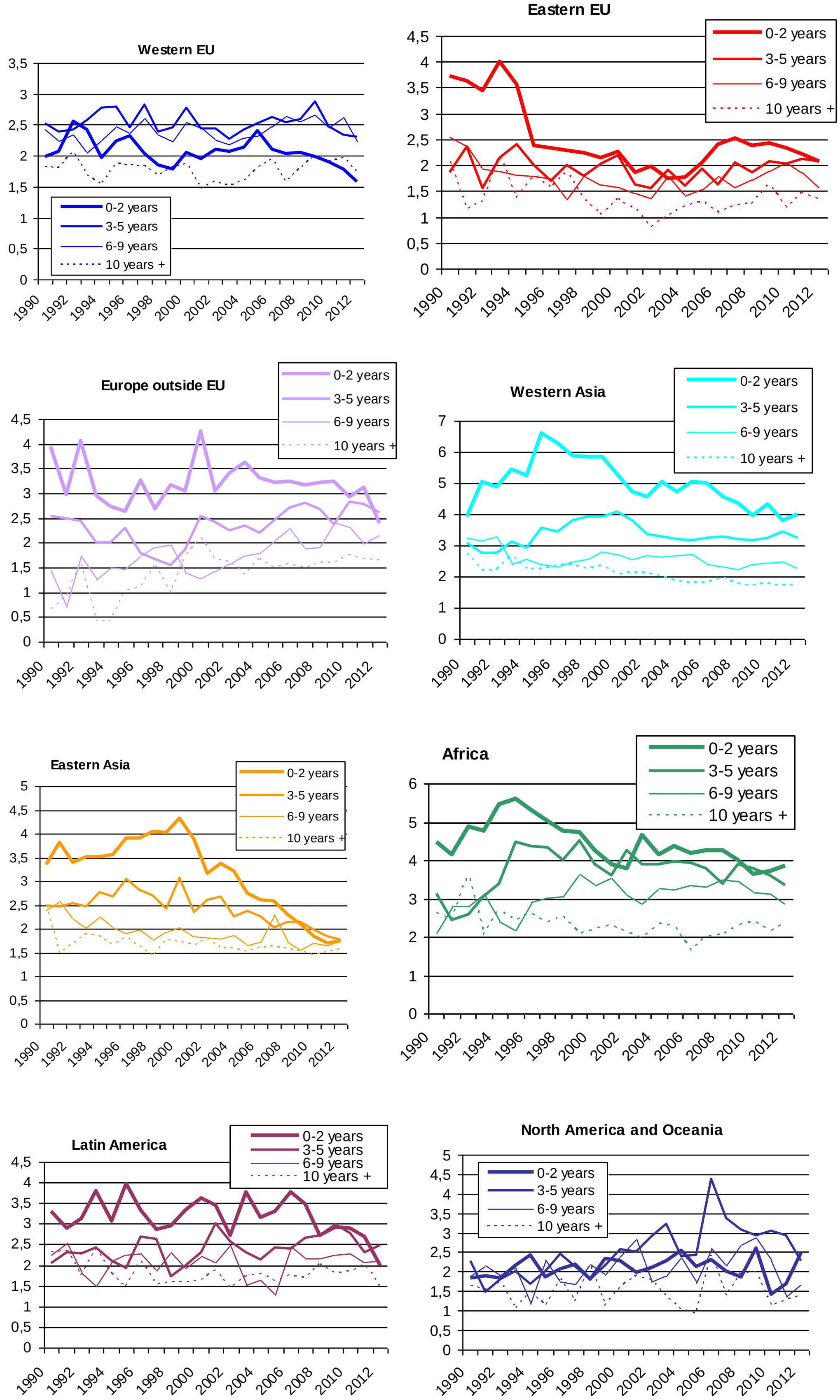
Fig. 6: Total fertility rate among immigrant women in Norway, actual and counterfactual with constant age-specific fertility rates and variable number of women in each group of residency duration, 2000-2012



However, the residency duration effect is quite different among women from different areas of origin. Even though the fertility often is higher for the most recently arrived women, this trend is not universal across areas of origin. In figure 7, the fertility trends are broken down by duration of residency within each group of origin area. While women from Asia and Africa have highest fertility the first years after arrival, the fertility of women from Western EU is highest after 3-9 years.

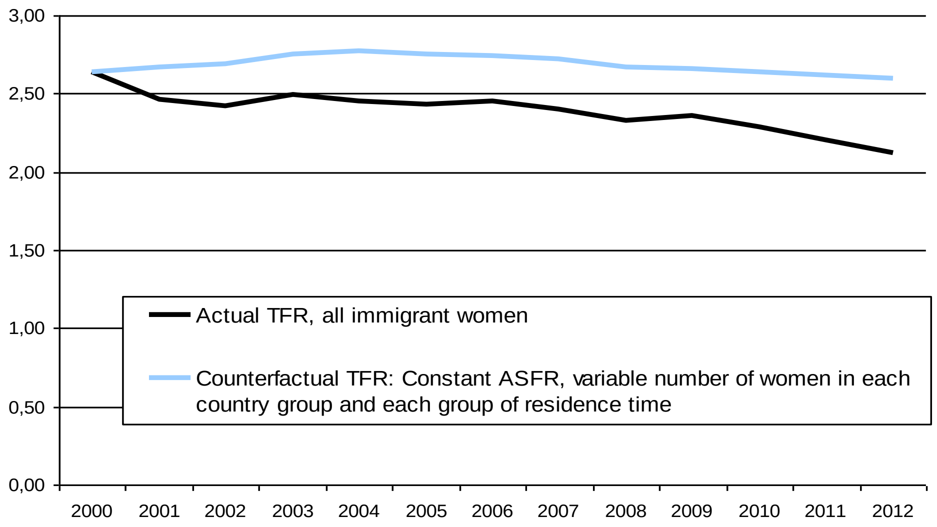
[4] In 2000, the TFR for the four groups of residency duration was 3.4 (0-2 years), 3.2 (3-5 years), 2.2 (6-9 years) and 1.9 (10 years +)

Fig. 7: Total fertility rate among immigrant women in Norway, by area of origin and duration of residency, 1990-2012.



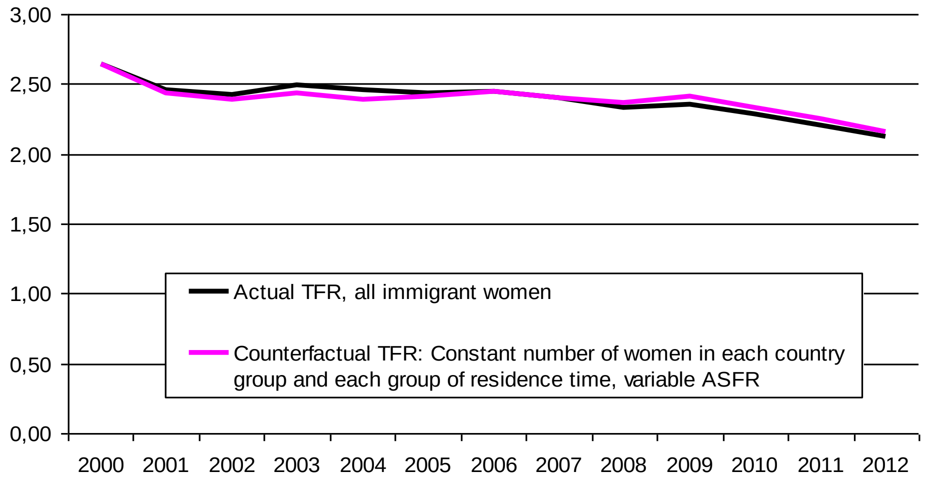
To take into account both dimensions – different fertility by origin area and by duration of stay – a counterfactual TFR is made where the ASFRs in each group of residency duration (4 groups) and each area of origin (8 groups) is kept constant, and the only change is the number of women in each of these 32 groups. This means that we can imagine standing in 2000, looking into the future where the number of women in each group varies like they actually did from 2000 to 2012, but where the fertility pattern in each group (by origin area, age and duration of stay) is frozen at the 2000 level. The result is shown in figure 8. These composition factors – a changed number of women in each group of origin area, age and residency duration – only seems to explain a tiny part of the fall in immigrant fertility in Norway. In this counterfactual path, where only the numbers of women in each group are changed, TFR declines by merely 0.04 children per women from 2000 to 2012. The actual TFR decline was 0.52 children per woman.

Fig. 8: Total fertility rate among immigrant women in Norway, actual and counterfactual with constant age-specific fertility rates and variable number of women in each area of origin and each group of residency duration, 2000-2012



Instead, some of the explanation may be found in altered fertility within each group of residency duration and area of origin, as indicated in figure 2, 3 and 6. To explore this, the opposite exercise of the one just presented is performed: A counterfactual TFR path is made where those factors that were allowed to change in the previous exercises (number of women in each group by origin area, age and duration of stay) are now kept constant, whereas the ASFRs are allowed to change the way the ASFRs actually changed from 2000 to 2012. This counterfactual path, where only the fertility patterns within each group and not the composition of immigrant women are changed, is shown in figure 9. The TFR decline is striking. This counterfactual TFR decreases by 0.48 children per woman from 2000 to 2012. A changed fertility within each group of residency duration and area of origin therefore explains almost all the 0.52 TFR decline among immigrant women from 2000 to 2012.

Fig. 9: Total fertility rate among immigrant women in Norway, actual and counterfactual with changing age-specific fertility rates and constant number of women in each group of origin area, age and residency duration, 2000-2012

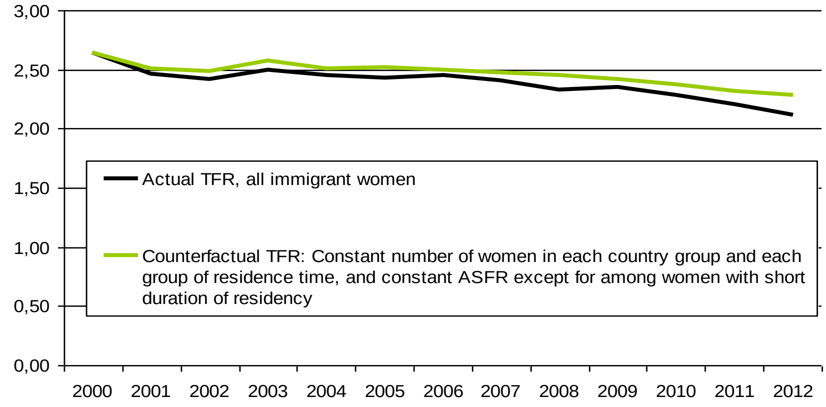


These counterfactual exercises suggest that the main explanation for immigrant fertility decline in Norway is not to be found in different composition of immigrant women (by origin area or duration of stay), but in altered fertility patterns within the different groups.

As shown in figure 4 and 7, the fertility decline has been particularly steep among women with short duration of residency, particularly from certain areas of origin (like Asia, Africa, Europe outside the EU and Western EU). The contribution of the newly-arrived women to the fertility decline can be investigated by changing only the ASFRs for the women with 0-2 years of residency, keeping all other factors constant at 2000 level (number of women in each group of origin area, age and duration of stay, as well as ASFRs for women with 3 or more years of residency). In other words, we can imagine standing in 2000 looking towards 2012 with all factors constant apart from the fertility among the newcomers, which is allowed to change like it actually did in 2000-2012.

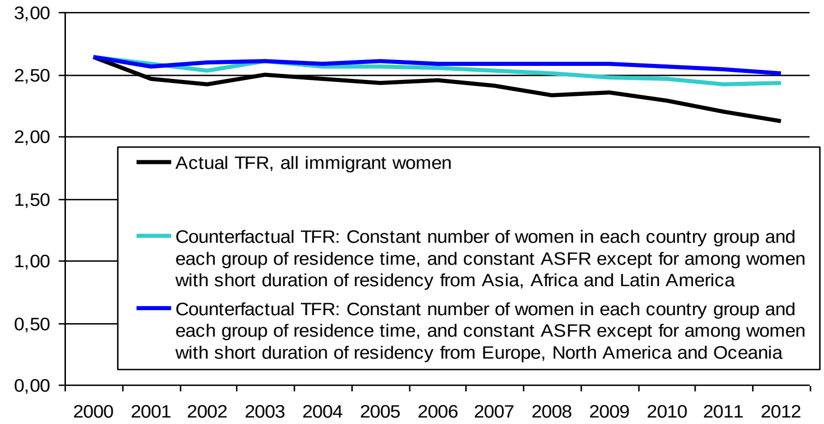
Figure 10 shows the result: If only newcomers’ fertility pattern changed the way it actually did in 2000-2012, whereas composition of immigrant women as well as fertility patterns for all those with 3 years or more in Norway were kept constant at the 2000 level, TFR for all immigrant women in Norway would still decrease by 0.35 children per women.

Fig. 10: Total fertility rate among immigrant women in Norway, actual and counterfactual with constant number of women in each group of origin area, age and residency duration and constant age-specific fertility rates except for among women with short duration of residency (0-2 years), 2000-2012



Newcomers from many areas of origin may have contributed to the fertility fall shown in figure 10. All areas of origin except North America and Oceania had lower newcomers' fertility in 2012 than in 2000 (figure 7). To explore the contribution by newly arrived women from different part of the world, two counterfactual exercises have been performed: In the first one, everything (composition and fertility rates of immigrant women) is kept at constant 2000 levels, except for the ASFRs of women with short duration of residency from Asia, Africa and Latin-America. In the other exercise, everything is constant except for ASFRs of women with short duration of residency from Europe, North America and Oceania. The results are shown in Figure 11. The figure indicates that newcomers from both 'Western' countries and 'developing' countries contributed to the decrease. If only newcomers from 'developing' countries had changed their fertility rate from 2000 to 2012, the fertility of all immigrant women in Norway would be 0.21 children lower per woman. If only newcomers from 'Western' countries changed their fertility, the decrease would be 0.14 children per women.

Fig. 11: Total fertility rate among immigrant women in Norway, actual and counterfactual with constant number of women in each group of origin area, age and residency duration and constant age-specific fertility rates except for among women with short duration of residency from two groups of origin areas, 2000-2012



Discussion

Declining immigrant fertility in a society can be the result of successful integration, or it can be due to other reasons – such as an increased share of immigrant women from low fertility countries or lower fertility among newly immigrated women.

Successful integration may manifest itself in immigrant women's adaption of the new country's fertility norms. So, if an immigrant woman's fertility approaches native women's fertility as her duration of stay increases, it could be the result of adaption and successful integration (it could also be due to higher fertility after migration because of disruption and interrelation of events). Our data shows that women with longer duration of stay generally have lower fertility than newly arrived immigrant women. So increased duration of stay does seem to have a reducing effect on fertility also in Norway, and this may (partly) be due to successful integration. However, the counterfactual exercises show that this reducing effect does not explain the decline in general immigrant fertility in Norway from 2000 to 2012. Although the number of immigrant women with long duration of stay increased, the increase in the number of newly arrived immigrant women was even larger.

A changed share of women from different areas of the world, with an increased number of women from low-fertility countries, is another possible explanation for the fertility decline. However, the counterfactual exercises show that a changed number of women in each group of origin area only explains a tiny part of the fertility fall among immigrants in Norway.

The factor that does explain the lion's share of the general fertility decline among immigrant women in Norway from 2000 to 2012, is a lower fertility within each of the subgroups of women (by origin area and duration of stay), and particularly a lower fertility among newly arrived women. How can this change among the newcomers be explained?

As mentioned earlier, the literature have identified a number of factors which may influence the fertility of immigrant women, such as a woman's *socialization* to her childhoods' fertility patterns, *adaption* to her new countries' fertility norms, *disruption* and catch-up due to the migration event, *interrelation of events* (migration, marriage and family formation), and *selection and characteristics*. These hypotheses have been used partly to explain why immigrants often have a different fertility than natives, and partly why immigrant fertility changes with a woman's duration of stay. Thus, they shed light on some of the fertility patterns which is found also in this study: Immigrants from different areas of origin have different fertility, and particularly high fertility is found among women from high-fertility areas like Africa and West Asia (figure 3) – a feature that may be due to socialization and/or characteristics and selection. And the tendency for immigrant fertility to approach native levels as the immigrants' residence time increases is also confirmed in these data, particularly for women from Non-Western countries (figure 4 and figure 7)[5] – a tendency which may be due to adaption, disruption and/or interrelation of events.

However, as shown in the counterfactual analyses, neither the changing composition of immigrant women from different areas of origin nor the declining fertility with residence time in Norway can explain the substantial decline in general immigrant fertility in Norway since 2000. This decline can mainly be attributed to the fact that newly arrived immigrant women have a lower fertility now than the newly arrived women had a decade ago, a trend that has not been discussed much in the literature.

Can the hypotheses above be used to explain changes <u>within</u> a group of residence time and origin area? In the rest of this section, the different hypotheses will be examined to see if they may explain the fertility decline among immigrant women with 0-2 years of residence time in Norway. In particular, it is examined whether <u>changes</u> in the explanatory factors may have caused fertility changes among the newcomers:

Socialization? Migrants, for instance from Africa, who left their origin area one decade ago, may have been socialized in a different Africa than the migrants who left Africa ten years later. The fertility patterns in large parts of the world have changed substantially since 2000, indicating that socialization also has changed. A changed socialization may be one of the main explanations behind the newcomers' fertility.

Adaption? Since the newly arrived women have not, per definition, stayed long in Norway, changed adaption patterns can hardly be the main candidate to explain the decline among newcomers. The newly arrived women have lived 0-2 years in Norway, and since pregnancy takes some months, there has not been much time for integration before conception.

Disruption? This factor may have changed in different ways: If the tendency for catch-up after disruption weakens, for instance if a lower share of the newcomers have postponed childbearing <u>before</u> migration, the fertility of newcomers may decrease. This may for instance be the case if the share of refugees among the newcomers goes down. Also, if a larger share of women experience disruption <u>after</u> the migration event, so that newly immigrated women wait longer until they start childbearing, the newcomers' fertility goes down. This may for instance happen if the share of labor migrants increases among the newcomers. In Norway, all Non-Nordic immigrants are required to state their reason for immigration, and among immigrant women aged 15-49 (as well as other immigrants) there has been an noticeable increase in the share of labor migrants and a decreasing share of refugees

[5] The distance between the lines in figure 4 may indicate the degree of adaption, how strong the interrelation-of-events/disruption-effect is, or both.

(see Appendix I). Changes in the disruption effect may thus explain some of the reduced fertility via both a lower share of refugees and via a higher share of labor migrants.

Interrelation of events? If migration, marriage and childbearing are less interrelated for the newcomers now than for newcomers a decade ago, we could expect lower newcomers' fertility. This could be the case if there is a lower share of family migrants among the newcomers are. From the figure shown in Appendix I, we also see that the share of family migrants has gone markedly down since 2000. Less interrelation of events may thus explain some of the reduced fertility among newcomers.

Selection and characteristics? Also this factor may have changed in various ways: In the migrants' area of origin, those who emigrate now may come from a different sub-group than the ones who emigrated a decade ago. And in the destination country, there may have been changes in the newcomers' socio-economic characteristics such as income and education – they may be more similar to the natives than the newcomers were a decade ago. However, the connection between women's wages and their fertility is not unambiguous in Norway (Kornstad and Rønsen 2014), and the negative effect of education on fertility is much smaller in Norway than it used to be (Kravdal and Rindfuss 2008). Also, immigrant women with high education do not necessary have lower fertility than immigrant women with low education (Mussino and Van Raalte 2012). This suggests that changing differences between newcomers' and natives' educational and income level, if any, may not explain all the fall in newcomers' fertility.

Other effects? There are other possible explanations for the fertility decrease. One may be found in general fertility theory, where declining TFR is sometimes found to be due to mere postponement of births among the youngest cohorts. If these cohorts catch up with their births at older ages, their cohort fertility will be higher than the period-measure (TFR) for certain years would suggest. Thus, if the younger newcomers postpone their childbearing more than earlier young newcomers did, this may explain some of the newcomers' fertility decline. The figure in Appendix II shows however that although the age specific fertility rates for young newcomers have declined, also the older newcomers have lower fertility now than earlier. And we do not know whether the younger newcomers will catch up with their births later.

Another possible explanation could be that today's newcomers to a larger extent already have got the children they want before entering Norway. However, in the last decade the number of immigrating women aged 15-49 has increased more than the number of immigrating children aged 0-9 (Statistics Norway 2014), suggesting that today's newcomers do not have more children before the migration than earlier newcomers had – or at least they do not bring them to Norway.

Thus, several reasons may explain why we see a lower fertility among the newly arrived immigrant women. Some of these explanations suggest that only the short-term effect of high fertility in the first years after migration is weakened. For instance, if newly arrived immigrant women to a larger extent prefer to postpone their childbearing due to career plans in the Norwegian labor market, or because they do not have to catch up after pre-migration postponement, or because they want to have their children at an older age, or because more of them did not primarily come here for marriage, we can expect recently arrived women to have more children as time goes by and they have spent several years in Norway. That would result in a somewhat higher fertility among women with longer residence time. However, in figure 4 and figure 7 it is hard yet to trace any clear increase in the fertility graphs for women with longer duration of stays, except from among women from Europe outside EU, Eastern EU and perhaps Latin America. If the years to come do not show a general fertility increase among women with longer duration of stays, it may be an indication of a permanently lower fertility among women who have migrated to Norway lately.

Other explanations indicate that the latest cohorts of immigrants will have a lower fertility also as their residence time increases. If changed socialization is a main explanation for the declining fertility among newcomers, we can expect the change to be more permanent as the newcomers spend more time in Norway. The hypothesis of changed socialization is supported by international fertility statistics (United Nations 2013), which shows that the areas of the world with the largest decline in fertility the last decade are Asia, Africa and Latin America. As shown in figure 7, newcomers from these origin areas also show the largest decline in fertility. In Appendix III, the UN fertility figures for Asia, Africa and Latin America are added into the Norwegian fertility figures for immigrant women from these areas. Even if the level of fertility differs between the newcomers and women in their origin area (which may be explained by other factors elaborated above), there is a falling fertility trend for both women who remain in these areas and for women who leave for Norway.

Summary and conclusion

Since 2000, the fertility of immigrant women in Norway has fallen from 2.64 to 2.12 children per women. This study has examined whether the fertility decline is due to changed composition of the immigrants (with an increased share of immigrant women from low-fertility countries in Eastern EU), more immigrant women with longer duration of stay (and thus lower fertility), or altered fertility within subgroups of immigrant women (by area of origin and duration of stay in Norway). This is done by either holding the age specific fertility rates constant at the 2000 level, and letting the numbers of women in each subgroup change the way they did from 2000 to 2012 (to trace the effect of changed composition), or to keep the number of women in each subgroup constant while letting the fertility rates change the way they did from 2000 to 2012 (to trace the effect of altered fertility within the groups). By this approach, it is possible to imagine standing in 2000 looking at the future with only one factor changed at the time.

The counterfactual exercises suggest that a changed composition of immigrant women from different areas of origin (such as more immigrants from Eastern EU) only explains a tiny part of the general fall in immigrant fertility from 2000. The fact that more immigrant women have stayed a longer time in Norway – which generally means lower fertility – does not at all explain the general fertility fall among all immigrant women; although the number of long-residing women increased in this period, the inflow of newcomers increased even more. A changed composition of immigrant women with regard to origin area and duration of stay, with hypothetically no fertility change within the subgroups, would alone have reduced the total fertility rate for immigrant women by only 0.04 children per woman from 2000 to 2012. The actual decline was 0.52. However, if we hypothetically stopped the world in 2000 and only let the fertility pattern change in each subgroup of women (by origin area, age and duration of stay), keeping the composition in each group constant, the general immigrant fertility would decline by 0.48 children per women.

The fertility decline has been particularly large among newly arrived immigrant women. If we only let the fertility pattern of the newcomers change the way it actually changed from 2000 to 2012, keeping all else constant (constant composition of women in each group of origin area, age and duration of stay, as well as constant fertility rates of all women with more than two years stay in Norway), the general immigrant fertility would decline by 0.35.

Various hypotheses are used to explain the fertility fall among the newcomers. Some of these suggest that mainly the short-term effect of high fertility in the period after migration is weakened. Instead of having a child in the first years after arrival, the newcomers may postpone childbearing. If that is the case, we could expect to see some increase in fertility among immigrant women with longer duration of stay. This is already observed among women from some origin areas, but not yet among immigrant women in general. Another possible explanation is that the childbearing patterns in the origin areas have changed, so that the latest newcomers grew up in cultures with other fertility behaviors and values than a decade earlier. Thus, they bring with them other fertility norms than the newcomers a decade earlier brought with them. If this socialization hypothesis holds, and fertility continues to decrease in many parts of the world as United Nations' population projections suggest (United Nations 2013), immigration countries may expect a decreasing fertility among newly arrived women from many developing countries.

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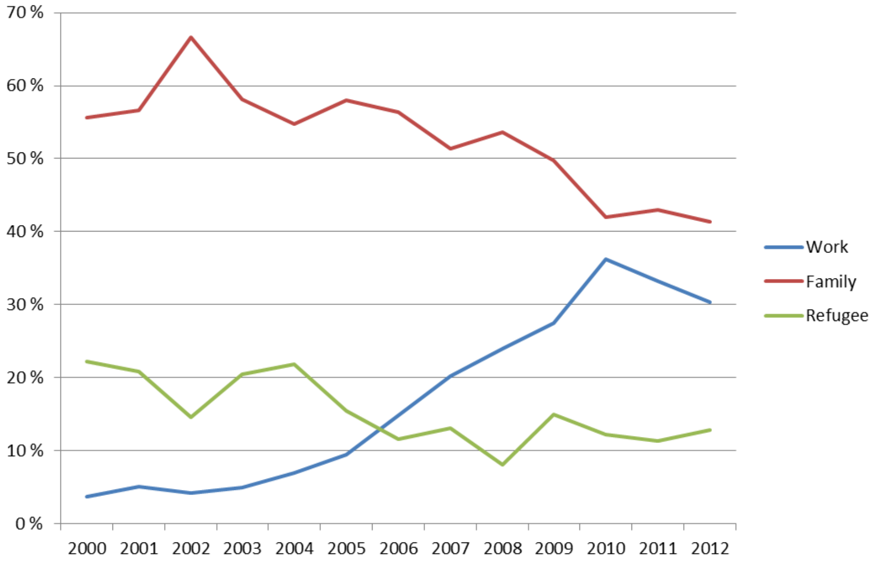
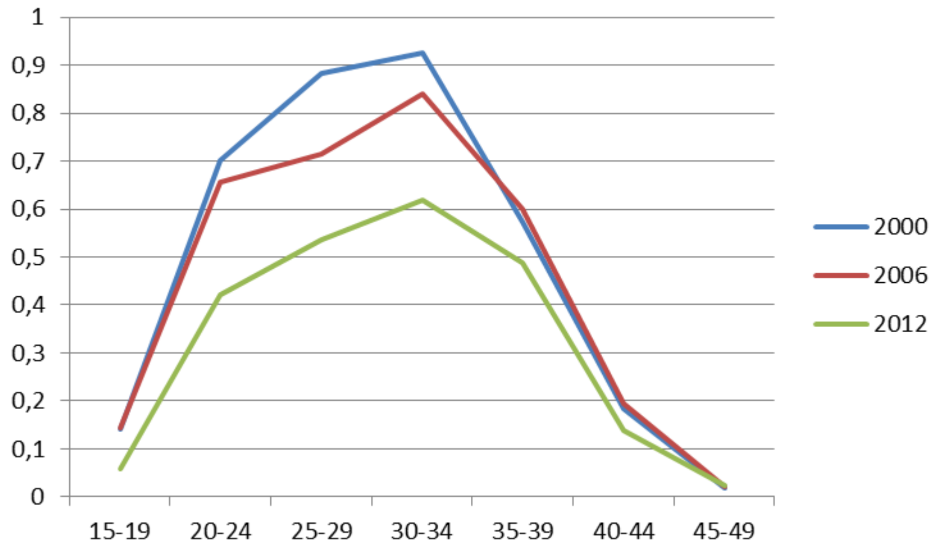
Appendix I

Immigrations of Non-Nordic women aged 15-49, by reason for immigration. Per cent. 2000-2012.



Appendix II

Age-specific fertility rates among immigrant women with 0-2 years of stay in Norway. 2000, 2006 and 2012.



Appendix III

Total fertility rate (TFR) for immigrant women from Africa, Asia and Latin America by time of residence, compared with TFR in the area of origin. 1990-2012