論 文 概 評

論文の内容の要旨

This dissertation aims to explain how fertilities in the world have been changing and what is important for fertility recovery, through several empirical analyses. The major background of this study is that the fertility transition – substantial decline of fertility – was observed in the second half of the 20th century in both developed and developing world. Chapter 2 confirms that the global fertility convergence which started in the second half of the 1990s continues until 2017, which could be explained by the global fertility transition and the modest recovery of fertility in developed countries. Such global fertility convergence results in the increase in the number of countries which face low fertility and aim to raise their fertility not only in the developed world but even in the developing world. Chapter 3 finds that the probability for a country to have a raise-fertility-policy might raise, if the country's fertility level is lower and the ratio of elderly is higher. Chapter 4 empirically shows that the key to fertility recovery is further gender equality along with further economic development. Chapter 5 focuses on East Asia where fertility declined obviously even in developing countries. The obvious recovery of fertility has not yet been observed in the region, which might be because no country in the region has reached the stage where both female labor participation and income are high enough for fertility recovery.

First of all, Chapter 2 of this study reexamines fertility convergence by extending Dorius (2008), who explored global fertility convergence with quinquennial data from 1955–2005. Using annual data for 187 countries in 1960–2017, this study examines global as well as regional fertility convergence from three angles: β-convergence, inequality indices, and standard deviation.

β-convergence is defined as the greater rate of fertility decline in higher-fertility countries compared to lower-fertility countries. Inequality indices and standard deviation are used to examine fertility convergence in terms of the decline in inequality (σ-convergence).

This dissertation confirms the finding of Dorius (2008) that global fertility convergence starts in the second half of the 1990s after the fertility divergence until the first half of the 1990s. Moreover, it finds that global fertility convergence continues after 2005 until 2017. This study also shows that the global fertility divergence in 1960–1995 could be explained by the persistent high fertility in sub-Saharan Africa, while the global fertility convergence in 1995–2017 could be explained by smaller differences of TFRs between most regions' and the world's than the previous period (1960–1995).

Furthermore, this study comprehensively examines fertility convergence by region for the first time and finds that whether fertility convergence within a region has been confirmed or not could be predicted by the level of the region's total fertility rate (TFR) in 1960. In regions with a mean TFR of six or less in 1960 (Europe, East Asia and the Pacific, Central Asia, and the Americas), fertility has been converging in recent decades, while fertility convergence is not confirmed in regions with a mean TFR of over six in 1960 (the Middle East and North Africa, sub-Saharan Africa, and South Asia). The result is consistent with another finding of this study: that global fertility convergence is most clearly observed if conducting a β-convergence estimation with samples of TFR1960≦5.8.

Chapter 3 focuses on the probability of raise-fertility-policy in a country. The data on the policy stance on fertility is derived from the Population Policies Datasets (United Nations 2019). Through multi-nominal logistic regressions on the dataset including 181 countries for 2001–2015, this dissertation confirms that the lower TFR level and the higher elderly population ratio might be the positive determinant for the probability of raise-fertility-policy.

Chapter 4 aims to empirically confirm that fertility rebound depends not only upon the inverse J-shaped relationship between fertility and income which previous studies such as Luci-Greulich and Thévenon (2014) found, but also upon another convex relationship between fertility and gender gap – The trend toward gender equality, which works negatively on fertility at the initial stage, works positively on fertility from the certain level. The hypothesis comes from Day (2018) and Myrskylä, Kohler, and Billari (2011 (revised 2013)). Day (2018) presented a theoretical model explaining what was behind the inverse J. In the model, economic growth, via gender wage gap reductions, encourages households to raise the paid female labor supply and have more children by substituting childcare services for maternal time. Myrskylä, Kohler, and Billari (2011 (revised 2013)) confirmed that the inverse J between TFR and the HDI (Human Development Index (UNDP 2019) in Myrskylä, Kohler, and Billari (2009) is conditional on gender equality. They found that the relationship between TFR and the Global Gender Gap Index (GGGI) changed from negative to positive at the certain level.

To achieve the purpose, this dissertation conducts dynamic panel estimations (difference-GMM) on the dataset for 2007–2016 including 144 countries. It uses the GGGI by the World Economic Forum as a proxy of gender equality (World Economic Forum 2006–2015). As a

result, this dissertation confirms the convex relationship between TFR and the GGGI for high-income samples, when estimating with the inverse J between TFR and income. The convexity comes from the convexity between TFR and the GGGI Economy sub-index.

Finally, Chapter 5 focuses on East Asia where fertility declined obviously even in developing countries. It aims to apply two already discovered relationships that describe fertility recovery in developed countries to East Asia: the U-shaped relationship between fertility and FLP (female labor participation), and the inverse-J-shaped relationship between fertility and income. It uses a panel dataset of 176 countries including 13 East Asian countries from 1990 to 2014. Pooled OLS, fixed effects, and random effects models are tested. It confirms both the U-shape and the inverse J-shape, suggesting that fertility recovery could be realized if both FLP and income are high enough and increasing. What should be stressed is that the U-shape is peculiar in the region. Lower-income countries' data move from the upper-right to the bottom, while higher-income countries' data move from the upper-left to the bottom, which is attributable to the convergence of FLP that is quite polarized in the beginning of the period (1990). No country in the region has reached the stage where both FLP and income are high enough for fertility recovery.

As the conclusion of all the analyses, this dissertation has emphasized:

- Along with the global fertility transition and the modest recovery of fertility in developed countries, fertilities have been converging in the world.
- The lower fertility and higher elderly population ratio might result in the higher probability on the policy stance to raise fertility.
- Both economic development and the progress toward gender equality beyond the certain levels are necessary for fertility recovery.
- No country in East Asia has reached the stage where both female labor participation and income are high enough for fertility recovery.

The results stresses that gender equality as well as economic development are important in the society which aims to raise its fertility. It goes without saying that gender equality should be pursued not for some other goals but for its own sake and maternal roles should not be forced on women (Duflo 2012; Kabeer 2016). However, at the same time, gender equality is not just intrinsically but also instrumentally important (Dilli, Carmichael, and Rijpma 2019). However, this dissertation does not examine how gender equality should be enhanced through appropriate policies. Further research on the area could be conducted as the next step.

論文審査の結果の要旨

In the final examination and the previous discussions, the following suggestions including those for the future research works were pointed out.

The First suggestion was that regarding the relationship between fertility rebound and

improvements of gender equality (and income level), the influence of inflows of immigrants should be taken into account. The responses on this point were as follows: 1) it would be worth analyzing fertilities by racial classification if its data were available, since immigrants might contribute to raising fertility rate; 2) another effect of accepting immigrants could be to raise the affordability to receive childcare services, since immigrants would be the providers of the services with low labor costs (according to some previous study). The effect might, however, leads to another problem of wage gap among female workers; 3) there would be the other argument that the childcare services have scale merits to raise children, which could improves the affordability to have the services with cost reduction. There would be room to be investigated further as future research on this point.

The second suggestion was related to the timing of fertility-raise-policy for emerging market economies such as Vietnam and Myanmar. The policy might be too early for developing countries who suffer from over-supply of labor and poverty trap. On the other hand, the policy might be too late for matured middle-income countries like Thailand, who already enters the phase of the "population onus". Thus the timing of policy recommendation could be critical for middle-income countries. The response was that the point seems to be the turning point of the dependent population ratio: Thailand already reached the bottom of this rate in 2010 and the ratio has risen rapidly since then, thereby having adopting fertility-raise-policy; and Vietnam reached the bottom in 2015 and Myanmar will reach it in 2025, thereby their policy adoption being in a critical timing.

Lastly, the research might require policy analyses for raising fertility rate and gender equality. On this point, the dissertation excuses this point in the conclusion by stating that this dissertation does not examine how gender equality should be enhanced through appropriate policies and further research on the area could be conducted as the next step.

Although there has been much room for improvements, the dissertation is considered to have contributions enough to deserve a doctorate dissertation. The dissertation is based on the author's papers, which were published in the professional academic journals with high quality. Chapter 5 comes from the author's paper entitled "Fertility, female labor participation and income in East Asia", which was published in "International Journal of Development Issues, 2018, 17(1): pp. 69-86". This paper received the 2019 Highly Commended Award in this Journal. Chapter 4 is also based on the author's paper entitled "Convex relationship between fertility and gender gap, Economics Bulletin, 2019, 39(3): pp. 2014-2026". This Journal is listed in the Social Sciences Citation Index (SSCI).

Through the comprehensive consideration, consequently, the committee unanimously agreed that the dissertation meets the requirement for the doctorate's degree.