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Fertility Situation among Urban and Rural Residents in Indonesia; Based on Indonesian Census 2010

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Abstract. Indonesia is a large country with a big share of the world's population. The fertility rate can vary in different areas caused of some factors, including culture, socioeconomic status, education, social support, etc. This research analyzed the census data in 2010, examining the fertility rate differential in urban and rural areas in Indonesia using the Brass method. The method estimated indirect estimation of the fertility rate, including adjusted age-specific fertility rate (ASFR), adjusted total fertility, and adjusted birth rate. The descriptive analysis explained the fertility situation in Indonesia's urban and rural areas. The result revealed that the adjusted ASFR in urban areas was higher than in rural areas when women were aged 25-39, while in the rural areas, the adjusted ASFR was higher than in the urban area when women were aged 15-24. The estimated number of birth have a similar pattern with adjusted ASFR. Rural regions have higher total fertility, birth rate, and general fertility rates than urban residents. Marriage status and contraceptive use impact fertility differences between urban and rural areas. In conclusion, rural areas had a higher fertility rate than urban areas based on the Indonesian census 2010.

1 Background

Indonesia ranks fourth globally in terms of population size. However, caused by reduced population growth in the twentieth century (after mid the 90s), Indonesia is expected to fall to eighth place by 2050. Other countries contribute to the high increase in population, including African countries, India, Pakistan, and the United States [1]. Declining fertility is one cause of the declining population in the country. As a result of declining fertility, the proportion of children will fall, and the proportion of working-age increases [2].

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Some studies determine the total fertility rate in Indonesia from 1990 to 2010 using indirect estimation. The indirect estimation uses some techniques, namely the Own child technique, The Rele regression, and The Palmore regression. All of the methods analyzed the Indonesia census data and revealed that the total fertility rate in Indonesia declined from 1990 to 2010. The Own child technique revealed that the total fertility rate was from 3.3 in 1990 to 2.4 in 2010. The Rele regression also showed that the Indonesian total fertility rate declined from 3.4 in 1990 to 2.4 in 2010. In addition, The Palmore regression also revealed that the total fertility rate fell from 3.6 in 1990 to 2.3 in 2010 [3].

Individual and regional factors influenced the fertility level, including family programs, support from family, occupation, socioeconomic status, and place of residence. People with high economic status, high level of education, and work in the urban area tend to have a lower fertility rate [4]. Another study in Findland also revealed that the total fertility rate is the highest in small towns and rural areas. In addition, the total fertility rate is low in urban areas. The study discussed that economic opportunities and culture cause variations in fertility rates in urban and rural areas [5].

On the other hand, Indonesia also faces a problem related to fertility change, namely child marriage. Households with lower expenditure, rural areas, and low education risk of child marriage in Indonesia. Girls from families with lower expenditures have a five times chance of getting married before age 18. In rural areas, girls have three times to get married before they are 18 years old. In addition, girls from a family with low education have three times to get married before they are 18 years old. Child marriage leads to some problems related to health aspects and domestic violence. UNICEF predicted 375 girls married under 18 years old in Indonesia [6].

In urban areas, both male and female, Indonesian people are dominated by late marriage. Late marriage can impact on fertility rate in Indonesia [7]. Late marriage leads to maternal mortality, neonatal mortality, and negative consequences on children and mothers [8]. Older women have a high risk of death related to pregnancy. Women aged 35 or older have three times more deaths than women aged 25-29 [9]. Generally, the fertility chance will decrease after 30 years old, and fertility is predicted to end five or ten years before menopause [10].

Many studies revealed that the fertility situation in Indonesia uses some approaches, such as estimating fertility using some indirect methods in Indonesia to calculate the fertility rate, and some research examined the risk factors of declining fertility in Indonesia. However, no previous study examined the fertility situation in urban and rural using the census 2010. The Indonesian government has conducted the 2020 census; however, the data has not been published yet. Thus, this used the 2010 population census data from the Indonesian Statistics Agency. This study explored urban and rural fertility differences by calculating the adjusted age-specific fertility rate, adjusted birth rate, estimated number of births, and general and total fertility rates.

2 Material And Methods

2.1 Population data

This study used data from the census in 2010, conducted in 33 provinces, 497 districts, 6,651 sub-districts, and 77,126 villages. The census enumeration collected data from residents who usually resided (de facto). Residents traveling for six months or more or have been in residence for six months or more were enumerated where they lived at the time of enumeration. Indonesian Statistic Agency explained that the census was of good quality by

providing trained human resources. The Indonesian Statistics Agency also explained that data collection's completeness was regarded as good in all censuses in Indonesia [11]. The researcher can freely access the census data on the Indonesian Statistic Agency websites and open access [12].

2.2 Method

This study used the P/F ratio Brass method based on data about all children to answer the research purpose. The method can estimate adjusted age-specific fertility rates, adjusted total fertility, and adjusted birth rate. In the calculation process, this method needs some required data before calculation processes, including the number of Children Ever Born classified by the five-age year group, the number of children born during the year preceding the survey or census classified by the five-age year group, the total number of women in each the five-year age group (15-49 years old), and the total population to estimate birth rate. The required data can be shown in Table 1. In addition, a detailed P/F ratio Brass method discussion can be found in another source [13].

The descriptive analysis summarizes data using some tools, including tables, figures, graphs, etc. The descriptive analysis identifies variables before making the inferential assumption [14]. This research used Microsoft Excel (Microsoft Corporation) to calculate the indirect fertility estimation. A detailed calculation of this research can be shown in the appendix.

3 Results and Discussion

A total of 34,092,152 reproductive women aged 15-49 years old lived in the urban area, while 31,116,652 reproductive women lived in rural areas. Rural areas have a higher number of children born and birth than urban areas in the past year (Table 1). However, the Indonesian Statistics Agency did not mention the province or region grouped in urban or rural areas.

Table 1. Women population, Children Ever Born, and Birth in the past year in Indonesia (15-49 years old of women), The Census 2010

Age group	Urban			Rural		
	Number of women	CEB	Birth in the past year	Number of women	CEB	Birth in the past year
15-19	5,412,484	224,800	117,832	4,853,944	430,960	226,486
20-24	5,487,223	2,104,335	632,096	4,516,697	3,064,824	803,169
25-29	5,694,873	5,896,600	932,080	4,984,259	6,862,743	855,722
30-34	5,189,673	8,955,161	723,789	4,691,655	9,830,145	628,816
35-39	4,701,426	10,655,654	398,881	4,466,188	11,782,507	378,104
40-44	4,151,035	11,068,675	122,641	4,051,105	12,245,485	131,786
44-49	3,455,438	10,280,166	24,574	3,552,804	11,691,086	33,350
Total	34,092,152	49,185,391	2,951,893	31,116,652	55,907,750	3,057,433

Source: Indonesia Census, 2010

Figure 1 shows the Age-Specific Fertility Rate (ASFR) in Indonesia based on the census 2010. Women 15-24 years old in rural areas have high fertility than in urban areas. The high fertility in urban areas occurred at 25-34 years old. However, the ASFR in 35-49 years old seems similar in both regions. The ASFR rapidly increased and peaked in urban areas,

with approximately 25.1 to 147.8 live births per 1,000 women, from 15-19 to 25-29 years old. In rural areas, the ASFR increased and peaked from 51.1 to 160.7 live births per 1,000 women, from 15-19 to 20-24 years old. After reaching peaked of ASFR in both areas, the ASFR gradually decreased to 4.8 live births per 1,000 women in urban areas and 6,2 live births per 1,000 women in rural areas at both 45-49 years old
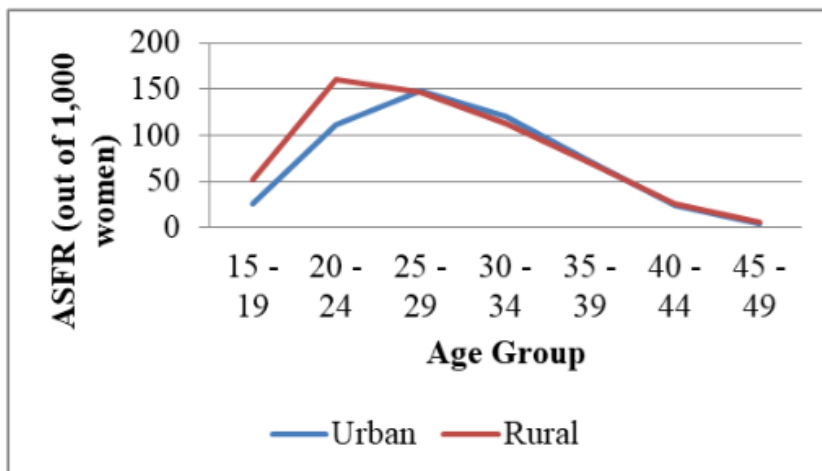

Figure 1. The Age-Specific Fertility Rate in Indonesia, 2010

Figure 2 shows the number of birth estimations in urban and rural areas in 2010. The rural area has a high birth estimation than the urban area when the women aged 15-24 and 40-49. However, the birth estimation in urban areas dominated rural areas among women aged 25-29. The highest estimate of birth number in rural areas was approximately 1,693,318 in women aged 25-29. The highest number of birth estimations in the urban area was predicted at 1,873,613 women aged 25-29.
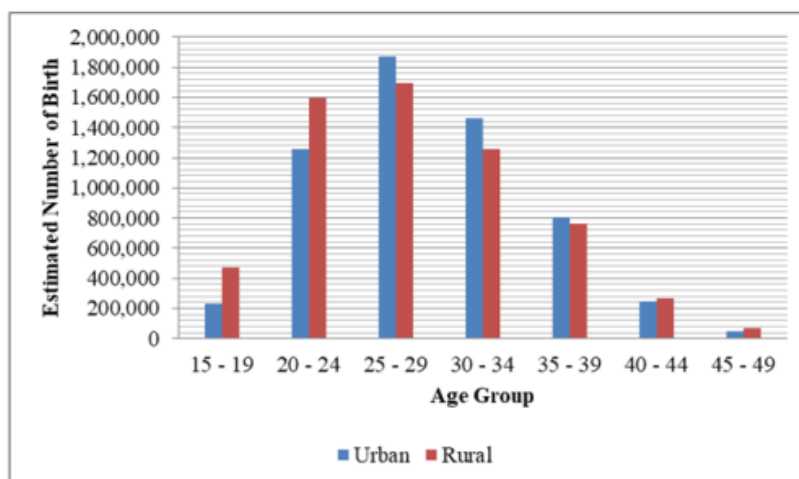

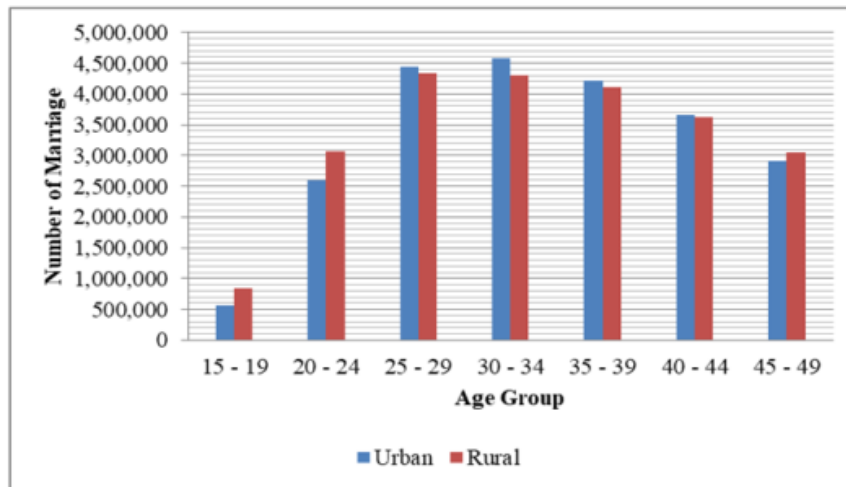**Figure 2.** The number of birth estimation in Indonesia, 2010

Figure 3. Population 15-49 Years of Age by Age Group and Marriage Status in Urban and Rural

Table 2 provides three fertility indicators: the adjusted birth rate, adjusted total fertility rate, and general fertility rate. The result revealed that the rural areas have higher fertility indicators than the urban areas, with an adjusted birth rate of about 0.051, an adjusted total fertility rate of 2.8 birth per 1,000 women, and a general fertility rate of 0.1963.

Table 2. The estimation of adjusted birth rate, adjusted total fertility rate, and general fertility rate in Indonesia, 2010

Fertility indicator	Urban	Rural
Adjusted Birth Rate	0.0501	0.0512
Adjusted Total Fertility	2.5263	2.8633
General fertility rate	0.1739	0.1963

Source: Indonesian Census, 2010

The total fertility rate (TFR) represents the average birth in women of productive age in a period. At the micro-level, TFR can describe the number of births in women. If the TFR is more significant, it can affect the birth interval. TFR also explains rapid population growth [15]. Changing TFR can make policymakers develop a new policy to adjust the fertility condition, including marriage age restrictions, allocation of health workers, social security systems, prevention and treatment programs related to reproductive health, etc. [16]. Marriage and contraception are two major proximate factors associated with variation in fertility rates among urban and rural residents. Both major factors are associated with women getting pregnant [17].

3.1 Marriage and fertility

Marriage can directly impact women about duration risk women to pregnancy. It means that if the women have a long period of marriage, they have a high risk of being pregnant and having more children (17). A first marriage or cohabitation can influence women's reproductive performance and social status. In developing countries, high fertility is caused by early marriage and teenage pregnancy—moreover, the purpose of marrying most women

is to have children. One-half and three-quarters of married women in developing countries got children after two years of marriage [18].

This study found that women aged 15-24 in rural areas tend to increase the adjusted ASFR related to young marriage in rural areas. Young women who live in rural areas are more likely to marry than those in urban areas. The different age of marriage for women in urban and rural areas has been found in this research. The number of women's marriages in rural areas was higher than in urban when the women were aged 15-24. However, in urban areas, the number of women's marriages dominated more than in rural areas when women aged 25-44 years.

In East Java Province, one of the provinces in Indonesia, some women choose to marry when they are under 18 years old. Young marriage was approximately 55.9% of total women marriages in East Java province, dominated in rural areas. Early marriage will increase a woman's chances of having children at a young age. In addition, if women become pregnant at a young age, they have a high risk of death of their baby and themselves. The Indonesian government has issued a marriage age regulation for at least 19 years old to minimize the adverse effects of childbearing [19]. High child marriage tends to occur in rural areas with low-education populations. For example, in Nigeria, child marriage in rural areas is twice in urban areas. However, urban residents face a later marriage related to opportunities for paid employment, higher education, culture, and exposure to modern social norms [20].

In Indonesian culture, young women prefer to marry an older man because women assume that older men have more economically established. The community gives negative stigma if women marry more youthful men because it can lead to conflict due to economic and communication aspects. Women also assume that older men are more interested in marrying young women. In addition, in Muslim belief, marriage and having children are a process to get a reward from God in the hereafter. If people are longer married, they have a big chance of getting a reward from God. Thus, this situation encouraged women to marry at a young age and become pregnant [19]. Consequently, the fertility rate can be changed starting from a young age.

Other factors related to young marriage in Indonesia can also influence the fertility change among urban and rural residents, e.g., sexual intercourse, education, media exposure, and economic factors. Young people who have sex first when he was 12-14 years old are at risk of getting married, especially those who live in a place that holds the culture, religious and social norms [19]. This fact aligns with the Rahadi and Sofwan research that reveals that 56% of young people aged 18 years married in Semarang City, Indonesia, have done premarital sex [21].

3.2 Contraception and fertility

Residential areas, including urban and rural areas, significantly influence people to use contraception. If the residents use contraception, it can impact the fertility level among the population [22]. Previous research has also revealed that residential areas are related to pregnancy status. The study conducted by Seran et al. using the 2017 Indonesian Demographic Health Survey (IDHS) data revealed that the urban residents are the most significant contraception users than the rural residents. Contraceptive users in urban areas were dominated by 40-44 years working women, who graduated from secondary education level, live with partners, have health insurance, have the highest economic status, and most of them are multipara [23].

Previous research revealed that Indonesian women living in urban areas were 0.82 times more using contraception than women living in rural areas. The research results also

showed that education affects contraceptive use in urban and rural areas. Women with secondary education were 1.06 times more using contraception than women with low education. Working women were 0.95 times more using contraception than those not working [24].

Urban residents are more accessible access to health services to support contraception use, e.g., clinics, drugstores, and hospitals that provide contraceptive services. Because the health service is widely available in the urban area. However, rural residents cannot easily access health services. Due to transportation issues, women with low economic status cannot access health services. This condition can affect the use of contraceptives among rural women. Thus, the fertility level of rural women may be higher than urban women [25].

Based on previous research, contraceptive use among urban women was associated with socio-demographic factors, socio-psychological factors, and other factors related to urban health services. Socio-demographic factors related to contraception use in urban areas include education, family income, type of work, age, parity, religion, and ethnicity [23]. Access to health care is a big issue for women who will access contraceptive services. The local government needs to increase the number of health workers in rural areas to provide active contraceptive services [26].

Contraception can impact micro and macro levels. At the micro-level, contraception can control birth and the number of families. While at the macro level, contraception can control population growth to reduce the national burden. The Indonesian government implements family planning policies to prevent population explosions that can impact unemployment, criminality, etc. [24].

3.3 Strength and limitation

This research can describe fertility estimation among the census population in Indonesia, including urban and rural areas. This research analyzed census data collected from 33 provinces. This research used descriptive analysis. Some weaknesses of this analysis include the inability to prove the relationship between cause and effect. If the question in the census questionnaire is difficult to understand and gives a different perception between the enumerator and the respondents, the respondents' answers may be less precise.

4 Conclusion

Rural areas have a higher adjusted total fertility rate and birth rate than urban areas. However, a detailed analysis of adjusted age-specific fertility rates showed that women aged 15-24 years in rural areas had a higher fertility rate than in urban areas. In urban areas, women aged 25-39 had a higher fertility rate than in rural areas. Two major proximate factors associated with variation of fertility change in rural and urban are marriages and contraception. For future studies, the researcher needs to conduct further research designs and data analysis to prove the cause and effect of fertility change in urban and rural areas.

References

1. H-P Kohler, JR Behrman, D Arianto. Indonesia Perspectives: Pop and Demogrp. Post 2015 Consens [Internet]. 2015;1–65. Available from:

http://www.copenhagenconsensus.com/sites/default/files/indonesia_packet_population.pdf. (2015)

2. United Nations Population Division. Demographics Population Change. World Popul Policies [Internet]. 2005;100–3. Available from: http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/demographics/total_fertility_rate.pdf. (2005)

3. TH Hull. Contemporary Demographic Transformations in China, India and Indonesia. Contemp Demogr Transform China, India Indones. 2016;(July). (2016)

4. U Lutfiah, B Besral, M Herdayati. Makara J Heal Res. **21**(1):6–12. (2017)

5. H Kulu. Expliquer la variation urbano-rurale de la fécondité. Reg Stud. **47**(6):895–912. (2013)

6. SJ Blaser. Child marriage in Indonesia. Unicef. (October):1–107. (2016)

7. J Nobles, Buttenheim A. J Marriage Fam. **70**(4):904–18. (2008)

8. S Martin. Delayed marriage and childbearing: Implications and measurement of diverging trends in family timing. Soc Inequal [Internet]. 2002;(October). Available from: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Delayed+Marriage+and+Childbearing:+Implications+and+Measurement+of+Diverging+Trends+in+Family+Timing#0. (2002)

9. A Nove, Matthews Z, Neal S, Camacho AV. Lancet Glob Heal. **2**(3):e155–64. (2014)

10. W Cates. Age and fertility. Hosp Pract. **17**(8):21. (2012)

11. Badan Pusat Statistik. Berita resmi statistik [Internet]. Badan Pusat Statistik. Available from: https://papua.bps.go.id/pressrelease/2018/05/07/336/indeks-pembangunan-manusia-provinsi-papua-tahun-2017.html. (2021)

12. Badan Pusat Statistik. Penduduk Indonesia Hasil SP 2010 [Internet]. Badan Pusat Statistik. [cited 2022 May 3]. Available from: https://www.bps.go.id/publication/2013/03/05/becb3c0fa2dbec4af7a24430/penduduk-indonesia-hasil-sp-2010.html. (2013)

13. United Nation. Indirect Techniques for Demographic Estimation. New York: Departement of International Economic and Social Affair; (1983)

14. P Kaur, J Stoltzfus, V Yellapu. Descriptive statistics. Int Acad Med. **4**(1):60–3. (2018)

15. The World Bank. Determinants and Consequences of High Fertility. Determ Consequences High Fertil. 2010;(June). (2010)

16. M Eslami. Decreasing Total Fertility Rate in Developing Countries. J Fam Reprod Heal [Internet]. **10**(4):163–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28546814%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5440814. (2016)

17. Pupulation Division. Fertility Levels and Trends in Countries With Intermediate Levels of Fertility. America (NY). 2002;(March):11–4. (2002)

18. A Islam, A Rahman. Age at first marriage and fertility in developing countries : A meta analytical view of 15 Demographic and Health Surveys. Clin Epidemiol Glob Heal [Internet]. **8**(3):775–9. Available from: https://doi.org/10.1016/j.cegh.2020.01.018. (2020)

19. A Imron, SM Habibah, UK Aziz. Determinant age at first marriage among women in east java. J Biometrika dan Kependud. 2020;9(December):104–11. (2020)

20. CA Smith, RP Stone, S Kahando. Int Rev Educ. **58**(4):533–55. (2012)

21. DS Rahadi, Indarjo Jurusan Ilmu Kesehatan Masyarakat S, Ilmu Keolahragaan F, Disetujui Dipublikasikan D. Perilaku Seks Bebas Pada Anggta Club Motor X Kota Semarang Tahun 2017. J Heal Educ [Internet]. 2017;2(2):115–21. Available from: http://journal.unnes.ac.id/sju/index.php/jhealthedu/. (2017)

22. J Bongaarts. Demogr Res. **37**(1):129–46. (2017)

23. AA Seran, AD Laksono, A Dewi, P Sujoso, I Ibrahim, N Baharia. Does Contraception Used Better in Urban Areas ?: An Analysis of The 2017 IDHS (Indonesia Demographic and Health Survey). Sys Rev Pharm [Internet]. 2020;11(11):1892–7. Available from: http://www.sysrevpharm.org/?mno=45453. (2020)

24. H Idris. Factors Affecting the Use of Contraceptive in Indonesia: Analysis from the National Socioeconomic Survey (Susenas). J Kesehat Masy [Internet]. 2019;15(2):117–23. Available from: http://journal.unnes.ac.id/nju/index.php/kemas%0AFAKTOR, (2019)

25. National Population and Family Planning Board. Indonesia 2012 DHS. Stud Fam Plann. 2014;45(3):399–409. (2014)

26. A Mahmud, M Ekoriano, AS Titisari, UT Wijayanti, MA Sitorus, A Rahmadhony. Determinants of Modern Contraceptives Use in Indonesia: A Spatial Analysis. Syst Rev Pharm. 2021;12(3):769–77. (2021)

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