

AGE AT MIGRATION, DURATION OF RESIDENCE, AND FERTILITY AMONG FEMALE MIGRANTS INTO JAVA

Nisa Qonita¹, *Febri Wicaksono²

¹Diploma 4 Statistics Study Program, Politeknik Statistika - Sekolah Tinggi Ilmu Statistika (STIS), 13330 East Jakarta, Jakarta, Indonesia

²Central Bureau of Statistics Buton Distric, 93752 Buton Distric, Southeast Sulawesi, Indonesia

*Corresponding Author: Febri Wicaksono ; Email: febri@stis.ac.id

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ABSTRACT

Keywords:

age at migration,
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Java Island,
fertility,
migration

Java Island has been a main destination for inter-regional migrants in Indonesia for decades. Previous studies has shown that migration can be expected to have a strong effect on fertility behavior of female migrants. The objective of this study is to examine fertility patterns of internal female migrants into Java Island. The generalized poisson regression models are used to investigate the socialization, the disruption, and the adaptation hypotheses in explaining the fertility differences between migrants and non-migrants. This study finds that the fertility rate for migrants is higher relative to the non-migrants. The analysis shows that first, there is a fertility assimilation process in migration into Java Island with fertility increasing gradually with age at migration. Second, there is a fertility disruption process in migration into Java Island with short-term fertility-lowering-effect of migration event. However, this study find no evidence on fertility adaptation process in migration into Java Island.

ABSTRAK

Kata Kunci:

umur saat bermigrasi,
durasi setelah
bermigrasi,
Pulau Jawa,
fertilitas,
migrasi

Pulau Jawa telah menjadi daerah tujuan utama migrasi inter-regional di Indonesia selama beberapa dekade terakhir. Penelitian terdahulu telah menunjukkan bahwa proses migrasi dapat diekspektasikan memiliki pengaruh yang cukup kuat terhadap perubahan fertilitas dari wanita migran. Tujuan dari penelitian ini adalah untuk menganalisa pola fertilitas wanita migran internal yang masuk ke Pulau Jawa. Model generalized poisson regression digunakan untuk menganalisa hipotesis sosialisasi, disrupsi, dan adaptasi dalam menjelaskan perbedaan fertilitas antara migran dan non-migran. Studi ini menemukan bahwa tingkat fertilitas migran relatif lebih tinggi dibandingkan non-migran. Hasil analisis menunjukkan bahwa pertama, ada proses asimilasi fertilitas dalam migrasi masuk ke Pulau Jawa dengan peningkatan fertilitas secara bertahap seiring semakin tuanya umur saat bermigrasi. Kedua, terdapat proses disrupsi fertilitas dalam migrasi masuk ke Pulau Jawa dengan efek penurunan fertilitas jangka pendek dari peristiwa migrasi. Namun, tidak ditemukan bukti adanya proses adaptasi fertilitas dalam migrasi masuk ke Pulau Jawa pada penelitian ini.

INTRODUCTION

The large and concentrated population on the island of Java has long been the focus of attention for researchers and policy makers. Research related to inter-regional migration in Indonesia has shown that the provinces on the island of Java have become the main destination areas for inter-regional migration in Indonesia over the last few decades (1–5). The large migration flow to Java Island can be

associated with the great attraction of the metropolitan areas on Java Island (6).

Migration, as an important life event, can make significant changes to a person's life both in a short and relatively long period of time. Therefore, migration can also be expected to have a fairly strong influence on changes in a woman's fertility (7–9). This is supported by previous studies which have shown that the fertility rates of migrant women are different from those of non-migrant women (10–14).

Several major hypotheses have been put forward to explain the differences in fertility between migrant women and non-migrant women (12). These hypotheses state that differences in fertility can be caused by the effects of socialization, adaptation, or disruption experienced by migrant women. These three effects can be seen from the age at which they migrate and the length of time they stay after they migrate (15). Based on this, the large migration flow to Java Island could also cause changes in fertility patterns among women there, which could then influence the demographic structure of the population on Java Island in the future.

An in-depth analysis of the fertility of migrant women can help policy makers understand the socioeconomic integration of migrant women and changes in family formation and structure in migration destination areas. This is because decisions regarding determining the number of children (fertility) in a household can influence household welfare in various dimensions.

Examples related to this are decisions about investing in children's education and decisions about participating in the workforce. The assumption often used in economics is that investing in children's education is not cheap (16), so that smaller family sizes (fewer children) can increase investment per child and increase the rate of return for the next generation.

In addition, decreased fertility can also reduce time spent caring for children. This can lead to increased work opportunities for migrant women which can then increase family welfare through higher incomes (10).

Although there has been a lot of research on the characteristics of migrants in Indonesia (4–6,17), there is still no research that is able to explain the influence of age when they migrate or the length of time they stay after they migrate to see the effects of socialization, adaptation, or disruption caused by their migration process on the differences between their fertility and the fertility of non-migrant women in Indonesia in general, and on the island of Java in particular. Therefore, to enrich the body of knowledge relating to the impact of migration on fertility in Indonesia, in general, this research aims to investigate whether or not there are differences in fertility between migrant women entering Java and non-migrant women on Java. Then, if there

really is a difference in fertility between migrant women and non-migrant women, this research specifically aims to investigate the impact of the age at which they migrate and the length of time they stay after they migrate to see the impact of the socialization, adaptation and disruption processes experienced by migrant women on their fertility.

METHODS

The data used in this research come from the 2015 Inter-Census Population Survey or *Survei Penduduk Antar Sensus* (SUPAS). SUPAS is a population survey carried out between two censuses. SUPAS uses a two-stage sampling technique using probability-proportional-to-size sampling in the first stage to select 40,750 census blocks and using systematic sampling in the second stage to select 652,000 household samples (18).

The unit of observation and unit of analysis in this study are women aged 15-49 years who have ever been married. Then, this research focuses on the fertility of migrant women who migrate from all regions of Indonesia to six provinces on the island of Java, namely Banten Province, West Java Province, Jakarta Province, Central Java Province, Yogyakarta Province, and East Java Province.

The dependent variable in this study is the fertility of women aged 15-49 years who have been married. The fertility is measured using the number of lives born or *Anak Lahir Hidup* (ALH). The independent variables used in this study are the status of migration, education, work status, first marriage age, the status of the use of family planning tools/methods, household welfare status, residential classification, number of child deaths, duration of residence, age at migration, and flow migration.

The number of ALH as the dependent variable used in this research is data in the form of count data; therefore, this research uses a count data regression model to analyze socialization hypotheses, disruption hypotheses, and adaptation hypotheses in explaining differences in fertility between migrant women and non-migrant women. Then, because the data used have an under-dispersion problem, this research uses

generalized Poisson models to estimate the count data model (19).

The following is the model used to estimate fertility:

$$Y_i = e^{\beta M_i + \gamma X_i} + \varepsilon_i$$

where Y is a measure of fertility of woman i (measured by the number of ALH), M is a migrant indicator, and ε is the residual.

This research uses three Generalized Poisson Regression models to answer the proposed research objectives. The first model is used to see whether there are differences in fertility between migrant women and non-migrant women. The second model is used to test whether there is an influence of the assimilation process of migrants on the fertility of women on the island of Java (socialization hypothesis). Meanwhile, the third model is used to test whether there is an influence of the resocialization process (adaptation) and disruption factors due to migration on the fertility of women on the island of Java (adaptation hypothesis and disruption hypothesis).

The first model uses the migrant indicator M which is a binary category of migrant status. Meanwhile, in the second and third models, the assimilation process of migrants which can provide a socialization effect from the migration process on fertility is measured using "age when the woman migrated"(15). Furthermore, to measure the possibility of a resocialization (adaptation) process, this study uses "length of stay at the migration destination" to see the adaptation effect of the migration process on fertility (15). Then, the disruptive effect of the migration process on fertility is measured using "duration of stay at the migration destination" (15).

Testing the socialization hypothesis in model 2 uses the duration of residence since migrating until now as an indicator of migrants M who are the center of attention. This indicator is a categorical indicator consisting of four categories, namely: 0–5 years, 6–20 years, and 21 years or more, and the non-migrant category. Meanwhile, to test the adaptation hypothesis and disruption hypothesis, in model 3, the migrant indicator M which is the center of attention is age at migration which is a categorical variable consisting of six categories, namely: 0-4 years, 5-11 years, 12-16 years, 17-25 years, 26 years and over, and the non-migrant category.

Previous studies have shown that education level, working status, age at first marriage, contraceptive use status, economic status, residence status, and experience of child death are significant predictors influencing migrant fertility (4,5,15,20,21). Therefore, the three models used in this study also use the vector X variable as a predictor of the fertility of migrant and non-migrant women. The operation of the second vector is working status, which consists of two categories (working and not working). Third is age at first marriage which consists of two categories (<20 years and 20 years or more). Fourth, contraceptive use status, which consists of two categories (using and not using). Fifth, economic status which consists of two categories (poor and not poor). Sixth, the area of residence, which consists of two categories (rural and urban). Seventh, the experience of a child dying, which consists of two categories (ever and never). In full, the operational variables used in the three models are shown in Table 1.

Table 1. Operational Definition of Variables

	Model 1		Model 2		Model 3	
	Variable Name	Category	Variable Name	Category	Variable Name	Category
Y	Number of children born alive	continuous variable	Number of children born alive	continuous variable	Number of children born alive	continuous variable
m	Migration status	- Non migrant - Migrant	Migration status	-	Migration status	-
m	Duration of stay	-	Duration of stay	- 0-5 years - 6-20 years - 21 years+	Duration of stay	-

	Model 1		Model 2		Model 3	
	Variable Name	Category	Variable Name	Category	Variable Name	Category
m	Age at migration	-	Age at migration	-	Age at migration	-0-4 years -5-11 years -12-16 years old -17-25 years old -26 years+
X1	Education	-No school -elementary and middle school -high school -College	Education	- No school - elementary and middle school - high school - College	Education	-No school -elementary and middle school -high school -College
X2	Working status	-Doesn't work -Work	Working status	- Doesn't work - Work	Working status	-Doesn't work -Work
X3	Age at first marriage	-<20 years -20 years+	Age at first marriage	-<20 years -20 years+	Age at first marriage	-<20 years -20 years+
X4	Status of use of contraceptive methods/methods	- Currently using - Not currently using	Status of use of contraceptive methods/methods	-Currently using -Not currently using	Status of use of contraceptive methods/methods	-Currently using -Not currently using
X5	Household welfare status	-Poor -Not poor	Household welfare status	-Poor -Not poor	Household welfare status	-Poor -Not poor
X6	Residential classification	-Rural -Urban	Residential classification	-Rural -Urban	Residential classification	-Rural -Urban
X8	Number of child deaths	continuous variable	Number of child deaths	continuous variable	Number of child deaths	continuous variable

In general, coefficients from non-linear models, such as Generalized Poisson Regressions models cannot be interpreted directly. Therefore, this research analyzes the model formed using Incidence Rate Ratios (IRR). IRR compares estimated fertility rates between two different observations that are contained only in the independent variable M_i or X_i . For example, the IRR for a one unit change in the variable M_i if M_i has a value of 1 for the observed category and a value of 0 for the reference category it can be formulated as follows:

$$IRR(M_i) = \frac{E(Y_i/M_i = 1)}{E(Y_i/M_i = 0)} = \frac{\exp(\hat{\gamma}X + \hat{\beta}(1))}{\exp(\hat{\gamma}X + \hat{\beta}(0))} = \exp(\hat{\beta})$$

RESULT

Table 2 shows summary statistics of the main variables in the study separated by migrant and non-migrant status. In total, 29,360,147 married women aged 15-49 years were observed in this study. The percentage of migrant women from the total data is 12.72%.

Most migrants have lived in their destination for 6-20 years (59.90%). In addition, migrants generally migrate when they are 17-25 years old (47.91%). Migrants tend to have a higher level of education compared to non-migrants, where 59.98% of the migrant sample has a high school education level or above, while only 30.24% of the non-migrant

sample has a high school education level or above. In general, migrants have an older first marriage than non-migrants. 70.54% of the migrant sample married at the age of 20 years and above, while only 46.30% of the non-migrant sample married at the age of 20 years and above. In addition, proportionally, more migrants currently live in urban areas and have good economic status compared to non-migrants.

Table 3 shows the number of ALH. The average ALH of migrants is slightly higher than that of non-migrants. Women who had recently migrated (less than six years ago) had a lower mean ALH compared to non-migrant women, but women who had migrated six or more years ago had a higher mean ALH compared to women who had migrated six or more years ago and women who are not migrants. Regarding age at migration, women who migrated as children (aged eleven years and under) had a lower average ALH compared to non-migrant women, but women who migrated at the age of more than eleven years had an average Higher ALH compared to non-migrant women.

Table 4 shows three Generalized Poisson Regression models to estimate ALH for women aged 15-49 years. Model 1 shows

that the fertility of migrants differs from the fertility of non-migrants. Migrant women have higher fertility (1.10 times higher) compared to non-migrant women's fertility, after controlling for other factors.

Model 2 shows that a longer duration of time after migration may be associated with higher fertility levels. Women who have recently migrated (less than six years ago) have lower fertility compared to the fertility of non-migrant women. After controlling for other factors, on average, migrant women have 20% fewer children than non-migrant women (IRR = 0.80). Meanwhile, women who had migrated six or more years ago had higher fertility compared to non-migrant women.

Model 3 finds that higher fertility among migrants compared to non-migrants is concentrated among migrants who migrate at relatively older ages. Migrant women who migrate at the age of less than five years have lower fertility (0.94 times) compared to the fertility of non-migrant women. Meanwhile, migrant women who migrated at the ages of 5-11 years, 12-16 years, 17-25 years, and more than 25 years had higher fertility compared to the fertility of non-migrant women (1.03 times, 1.05 times, 1.07 times, and 1.17 times).

Table 2. Summary Statistics of the Sample Based on Migrant and Non-Migrant Status

Characteristics	Migrant		Not Migrants	
	n	%	n	%
Level of education				
Never went to school	18,304	0.49	673,927	2.63
elementary and middle school	1,476,657	39.53	17,201,803	67.13
high school	1,578,264	42.25	5,880,848	22.95
College	662,31	17.73	1,868,034	7.29
Working status				
No	2,259,625	60.49	14,577,842	56.89
Yes	1,475,910	39.51	11,046,770	43.11
Age at first marriage				
< 20 years	1,100,489	29.46	13,760,417	53.7
20 years+	2,635,046	70.54	11,864,195	46.3
Using contraception				
No	1,641,768	43.95	10,034,598	39.16
Yes	2,093,767	56.05	15,590,014	60.84

Characteristics	Migrant		Not Migrants	
	n	%	n	%
Economic status				
Poor	1,029,887	27.57	9,486,231	37.02
Not poor	2,705,648	72.43	16,138,381	62.98
Residential area				
Village	275,309	7.37	11,057,020	43.15
City	3,460,226	92.63	14,567,592	56.85
The experience of a child dying				
Once	125.14	3.35	1,411,916	5.51
Never	3,610,395	96.65	24,212,696	94.49
Duration after migration				
0-5 years	859,547	23.01	-	-
6-20 years	2,237,585	59.9	-	-
21 years+	638,403	17.09	-	-
Age at migration				
0-4 years	106,463	2.85	-	-
5-11 years	147,927	3.96	-	-
12-16 years old	263,729	7.06	-	-
17-25 years old	1,789,695	47.91	-	-
26 years+	1,427,721	38.22	-	-

Table 3. Average Number of Children Born Alive or *Anak Lahir Hidup* (ALH)

Characteristics	Migrant	Not Migrants
Migrant Status	1.95	1.94
Level of education		
Never went to school	2.35	2.70
elementary and middle school	2.09	2.05
high school	1.89	1.64
College	1.77	1.67
Working status		
No	2.01	1.95
Yes	1.84	1.94
Age at first marriage		
<20 years	2.27	2.19
20 years+	1.81	1.66
Using contraception		
No	1.64	1.71
Yes	2.18	2.10
Economic status		
Poor	1.90	1.96

Characteristics	Migrant	Not Migrants
Not poor	1.97	1.94
Residential area		
Village	1.94	1.92
City	1.95	1.97
The experience of a child dying		
Once	3.29	3.54
Never	1.90	1.85
Duration after migration		
0-5 years	1.33	-
6-20 years	2.04	-
21 years+	2.46	-
Age at migration		
0-4 years	1.62	-
5-11 years	1.78	-
12-16 years old	1.96	-
17-25 years old	1.90	-
26 years+	2.05	-

Table 4. Generalized Poisson Regression Estimation of ALH

	Model 1		Model 2		Model 3	
	Coefficient	IRR	Coefficient	IRR	Coefficient	IRR
Migrant status						
Migrant	0.10	*)	1.10			
Not a migrant (ref)						
Duration after migration						
Not a migrant (ref)						
0-5 years			-0.23	*)	0.80	
6-20 years			0.12	*)	1.13	
21 years+			0.27	*)	1.31	
Age at migration						
Not a migrant (ref)						
0-4 years					-0.06	*) 0.94
5-11 years					0.03	*) 1.03
12-16 years old					0.05	*) 1.05
17-25 years old					0.07	*) 1.07
26 years+					0.15	*) 1.17
Level of education						
Never went to school (ref)						
elementary and middle school	-0.20	*)	0.82	*)	0.82	*) 0.82
high school	-0.33	*)	0.72	*)	0.72	*) 0.72
College	-0.30	*)	0.74	*)	0.75	*) 0.74
Working status						
No (ref)						
Yes	0.00		1.00		1.00	1.00

	Model 1		Model 2		Model 3				
	Coefficient	IRR	Coefficient	IRR	Coefficient	IRR			
Age at first marriage									
< 20 years (ref)									
20 years+	-0.21	*)	0.81	-0.20	*)	0.82	-0.21	*)	0.81
Using contraception									
Yes (ref)									
No	0.17	*)	1.18	0.17	*)	1.18	0.17	*)	1.18
Economic status									
Poor (ref)									
Not poor	0.01	*)	1.01	0.01	*)	1.01	0.01	*)	1.01
Residential area									
Village (ref)									
City	0.12	*)	1.12	0.11	*)	1.12	0.12	*)	1.13
Number of children who died									
	0.38	*)	1.46	0.38	*)	1.46	0.38	*)	1.46
Intercept									
	0.76	*)	2.13	0.76	*)	2.13	0.76	*)	2.13

Note: *) : significant at α 5% ; (ref): reference category

DISCUSSION

Several major hypotheses have been put forward by researchers in the field of population to explain the fertility behavior of migrant women. These hypotheses are the socialization hypothesis, adaptation hypothesis, and disruption hypothesis. Each of these hypotheses has been confirmed and refuted, both in terms of context, type of migration, and time of research (12).

This research found that migrant women entering provinces on the island of Java have significant differences in fertility compared to non-migrant women. The fertility of migrant women is higher than the fertility of non-migrant women, as shown in model 1.

Further investigation of this study suggests that a longer duration of stay at the migration destination after migrating may be associated with higher fertility levels (model 2). This finding supports the disruption hypothesis.

Disruption hypothesis premises that there will be a decrease in the fertility of migrants shortly after they migrate, but their fertility will return to normal some time later. This can happen because the migration process can cause stress for migrants. This stress can be caused by the economic costs and psychological costs arising from the migration process. This stress can affect the conception process in migrant couples and this behavior

will return to normal once the stress level subsides (7,12,22–25).

In contrast, this study did not find evidence related to the adaptation hypothesis. This hypothesis is related to the differences in social, economic and cultural conditions between the migrant's region of origin and the migrant's destination region.

Adaptation hypothesis puts forward the premise of the possibility of individual resocialization. Migrant fertility behavior, sooner or later, will resemble the dominant fertility behavior found in the migrant's destination environment (7,12,25–28). Therefore, the longer the duration of a migrant woman's stay in the destination area, the more similar the norms she adopts to those of women in the migrant's destination area, including fertility norms, so that the longer the duration of a migrant woman's stay in the destination area, the more similar her fertility level is to women in migrant destination areas.

The findings of this study indicate that fertility does not decrease along with the longer the duration after migrating (model 2). In fact this study found that the highest fertility occurs in the category of migrants with the longest post-migration duration.

This study also finds that higher fertility among migrants compared to non-migrants is concentrated among migrants who migrate at relatively older ages (model 3). These findings support the socialization hypothesis.

This hypothesis is related to conditions and behavior acquired from the migrant's place of origin, especially those acquired during childhood, which can persist into the future, regardless of the form of the new environment faced by the migrant. This hypothesis assumes that the norms and values adopted in the region of origin greatly influence the fertility behavior of migrants in the future (7,12,23,25,29). Therefore, the similarity of norms and values related to fertility held by migrants and residents in the migrant's area of origin means that migrants tend to have the same fertility level as the fertility of women in their place of origin. However, how strongly the norm sticks is influenced by the length of exposure to the norm. Thus, the older a person migrates, the longer that person has been exposed to norms in their area of origin, which can lead to their fertility being more similar to the fertility of women in their area of origin. Meanwhile, the convergence of the fertility levels of migrant women with the fertility of women in migrant destination areas will only occur in the next generation.

CONCLUSIONS AND SUGGESTIONS

Conclusion

This research shows that there is a statistically significant difference in the fertility of migrant women compared to those who are not migrants. Migrant women have higher fertility compared to non-migrant women.

This research has also obtained a deeper perspective on these fertility differences by investigating the influence of age at migration and length of stay after migration on the fertility of migrant women. This research has tested three hypotheses related to the effect of migration on fertility, namely: socialization hypothesis, adaptation hypothesis, and disruption hypothesis. The results of the analysis show that, first, the socialization hypothesis can explain the differences in fertility. The fertility of migrant women increases gradually as the migrant gets older at the time of migration. This shows that the assimilation process of migrant women can cause differences in fertility between migrant women and non-migrant women.

Second, the disruption hypothesis, which assumes that there is a short-term

disruption in fertility in migrants shortly after migrating and that fertility will return to normal some time later, can also explain differences in fertility between migrant women and non-migrant women. The results of the analysis show that migrant women whose duration of stay after migrating to their destination is less long, have less fertility than migrant women whose duration of stay after migrating to their destination is longer.

In contrast, this study found no evidence that the adaptation hypothesis can explain the differences in fertility between migrant women and non-migrant women. The findings of this study show that the fertility of migrant women does not decrease with the longer the duration of residence at the migrant destination post-migration.

Suggestion

This research has shown that migration can make significant changes to women's fertility patterns, both in the short and relatively long periods of time. Policy makers, especially in provinces on the island of Java, can use this research to help understand the socioeconomic integration of migrant women in order to make effective policies, especially those related to family formation and structure.

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