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FEMALE UNEMPLOYMENT RATE ON FERTILITY RATE IN RELATION TO REPRODUCTIVE HEALTH LAW IN THE PHILIPPINES: A MULTIVARIATE ANALYSIS

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ABSTRACT

The population of the Philippines continues to grow over the years, which leads to different economic concerns. The aim of this study is to determine the significance of the Reproductive Health Law and female unemployment rate on fertility rate in the country. Most studies imply a negative relationship between female unemployment rate, GNI per

capita, registered marriages, and reproductive health programs on fertility rate. The result of these studies adheres to the author's claim that there is a negative relationship among variables. A quantitative research design was used in this study. The used of multiple regression analysis examined the relationship of each explanatory variable to fertility rate based on the data gathered from 1980 to 2020. Results show that RH Law has a negative relationship on fertility rate, while unemployment rate has a positive relationship on fertility rate. This indicates that fertility rate declines because of the implementation of the RH Law that will result to slowdown the increase in population.

Keywords: Female unemployment rate, Fertility rate, GNI per capita, Reproductive Health Law.

INTRODUCTION

The Reproductive Health Law (RH Law) is one of the most controversial laws in the Philippines which dictates that the government must align its policies to ensure that the country's resources will bring development, especially among the poor, and promote reproductive health, women empowerment, and gender equality. The total population of the Philippines rose from 61.9 million in 1990 to 108.1 million in 2019 according to the World Bank and the country is one of the fastest-growing populations in the ASEAN region (NEDA, 2019). The fertility rate of the country is consistently decreasing over the years but it is still the third highest in the region since 2016 based on the World Bank data. Furthermore, according to the Philippine Statistics Authority (PSA), the female unemployment rate in the country has also declined over the years, and it was at 4.9% in 2019. The number of registered marriages in that same year is 431,972. Lastly, the country's Gross National Income (GNI) per capita in 2019 is at \$3,850, which is the highest ever recorded based on the World Bank data.

In 2018, the country's female unemployment rate is at 5.1% according to the PSA but it also has the second highest fertility rate in the ASEAN region at 2.576, just behind Laos. Based on the current GNI per capita, the Philippines is currently classified as a lower-middle-income country. The country is on its way from a lower middle-income country in 2019 to an upper middle-income country in the

near term (World Bank, 2021). On the other hand, teenage pregnancy and unions outside marriage are some of the issues that may question the significance of marriage affecting fertility.

This law is the government's way to promote family planning, educate adolescents on sexuality and reproductive health, and provide prevention and treatment for sexually transmitted diseases (Cabral, 2013). It aims to protect women's rights, especially mothers and the entire nation, and infuse health consciousness. Moreover, it also emphasizes that the family is a fundamental social unit of society. Therefore, the law also upholds the families' rights and people to a sustainable and healthy environment. The law also recognizes and ensures that people will have protection and equal treatment on the well-being of children, youth, and the unborn. David and Atun (2014) stated that the proximate determinants of fertility in the Philippines include marriage, income, educational levels, and labor force participation of the households. Similarly, Abo-Zaid (2013) claimed that macroeconomic aggregates such as female unemployment rate, income, GDP growth rate, and the female participation rate in the labor force also significantly impacts fertility decisions. Brooks (2002) stated that unemployment is the Philippines' one of the most critical problems and the key indicators of the economy's weaknesses. The Philippines' unemployment rate has fluctuated around 7 to 14 percent. Prior to the economic growth's downturn related to the 1997 Asian financial crisis, the unemployment rate dropped to a cyclical low of about 8 percent in 1996. However, the Philippines experienced a surge of more than 11 percent in 2000 and 2001, which is more than twice the average rate from neighboring countries. Furthermore, Albert and Vizmanos (2017) stated that women make up a smaller percentage of the labor force than men in the Philippines. Cazzola et al. (2016) emphasized that high unemployment levels create a sense of uncertainty that affects the household's fertility decisions. The foreseeable event can likely result in a short-term reduction in the fertility rate.

LITERATURE

Standard economic models of fertility suggest that the demand for children has a negative link to periods of high unemployment (Del Bono et al., 2015). Scholars have been examining the relation

between unemployment and fertility for more than a century. Some studies have found that fertility declines with unemployment in the short-run. However, it is uncertain if these declines persist in the long-run because women may opt to delay childbearing to better economic times (Currie and Schwandt, 2014). The introduction of family planning is undoubtedly related to the significant and constant decline in fertility (Bailey, 2012).

Fertility is one of the three primary components of dynamics that determine the population structure, scale, and composition (Ibeji et al., 2020). The level of fertility rate in a country is one factor that affects economic activities. Women's fertility is influenced based on knowledge, culture, income, and socio-demographic background. As defined by Jensen et al., (2015), Fertility is the natural capability to produce offspring. It allows marriage and cohabiting couples to decide whether to bear a child or not, influencing a country's total fertility rate. Lai and Tey (2014) stated that the Philippines' population growth rate is among the highest in Southeast Asia due to its relatively high fertility level. The continuous increase in population has led to poverty, unemployment, hunger, and human resources scarcity. Cazzola et al. (2016) utilized unemployment rate through a regression model to estimate its relationship with the fertility rate. The sex-specific unemployment rate is the generally used measurement in the empirical tests wherein the unemployment rates are classified by gender. Raymo and Shibata (2017) explained that focusing on only one sex would underplay the relationship between unemployment growth and non-standard employment with fertility by failing to consider the additional effects in the other sex.

Alvarez (2011) used GNI per capita to evaluate the hypothesis that it does not significantly affect fertility. Higher income is associated with a decrease in the number of children per woman (Amarante, 2014). While this may be true to some studies, others found more complex explanations in the relationship between income and fertility. Hassan and Mahabir (2018) found that the impact of income on fertility rate depends on how families see their children either as future investment to increase family income or they may look at costs of having children which favors quality over quantity. In addition, they argue that income is also affected by other economic and institutional factors such as poverty, inflation, and political stability which in turn affects people's fertility plans.

Marriage is also one of the explanatory variables used in this study. However, in most studies, marriage was not expressly defined. But a quite closer definition of marriage which is family was defined in the study of Smith (2019) as a household whose members are related in a specific way through marriage, blood or lineage, or adoption. Moreover, fertility rate and marital status are interrelated (Yasuda et al., 2019). Usually, researchers focus on the impact of marriage on fertility because it was assumed that childbearing mostly happens within marriages and it presumes that fertility outside marriage is nonexistent (Biney et al., 2020). Fertility must be explained by factors within marriage and the factors that may affect both fertility and nuptiality must be explored although in opposite directions or under different timings (Hertrich, 2017).

Yong et al. (2019) stated that social status can also affect people's marriage attitudes and the number of children desired. Hertrich (2017), Smith (2019) and Yasuda et al. (2019) discovered that age at marriage in the first stage increases together with fertility. However, fertility decreases while the age at marriage continues to increase more or less. The decline in fertility that is expected with changes in marriage is based on the assumption that marriage is the accepted context for having children. Islam (2017) and (Dommaraju, 2011) argued that the marriage pattern has the highest contributor to fertility decline.

Most studies involved socio-economic determinants as a key indicator of RH Law. Lai and Tey (2014) used socio-economic determinants in identifying its significance to fertility; the result shows a negative correlation between the two variables. However, Ali (2018) stated that socio-economic factors such as age, sex and number of children have no significance to RH Law. Furthermore, these contrasting views will help the researchers in thoroughly analyzing their study. Cazzola et al. (2016) conducted a time series analysis on data to explore the connection between trends in male and female unemployment and fertility rates in Italy. Moreover, the dynamic regression model was also used to determine the precise correlation between unemployment and fertility. Malik (2006) used a linear regression method to examine the relationship between health and economic growth where the rate of growth is measured using gross national income while health status is measured using infant mortality rate, life expectancy rate and crude health rate. GNI per capita was also used as one of socioeconomic variables in fixed effects regression models by Bongaarts (2020) to

estimate the impact of public programs and socioeconomic variables on fertility. Kengnal and Bullapa (2016) employed autoregressive distributed lag bound testing approach recommended by Pesaran et al., (2001) to study the relationship among female fertility rate, labour force participation of women, degree of urbanization, and GNI per capita. The study also used Granger causality test to ascertain if there is a causal relationship among the variables. Taher (2020) used a multivariate regression model to examine the relationship between fertility rate and independent variables such as education, GDP per capita, male employment and female employment. Yong, et al. (2019) used the General Linear Model to analyze people's attitudes towards marriage and their desire for having children. The Poisson regression model was used by Dommaraju (2011) to examine the influence of marriage age on total fertility. Furthermore, Biney et al. (2020) used bivariate and multivariate analysis in their study to investigate the sociodemographic factors and identify predictors of fertility by relationship status while Yasuda et al. (2019) constructed their own interdependence model which include marriage, fertility rate and other socioeconomic factors. Lastly, Islam (2017) used the aggregate model of Bongaarts where it expressed the total fertility rate as a multiplicative function of the four indices namely; marriage, contraception, postpartum in fecundability and induced abortion, and the total fecundity rate. Bongaarts (2020) identified the trends and preferences of couples using fixed effect regression. Finlay & Fox (2013), Eroglu et al. (2020), Lentejas (2018), Tanyag (2015) used mixed method analysis, while Lai and Tey (2014) used bivariate and multiple classification analysis to determine socioeconomic factors that can affect reproductive decision making. Kiani et al. (2016) used multistage cluster sampling method to identify the significance of social determinants of health and women's empowerment in producing children.

Female Unemployment and Fertility

Hwang et al. (2018) stated that women in developing countries are more inclined to work unlike before. However, most of them still struggle with the dilemma between family or pursue their career once they have children. Hashimoto and Kondo (2012) indicated that in many developed countries, Japan has demonstrated a decline in the fertility rate while there was a rise in youth unemployment rate for decades.

According to Goldstein et al. (2013), the effects of economic conditions on fertility levels is also a topic of interest among the public. Some authors characterized unemployment as a dimension of economic condition. Kreyenfeld et al. (2012) stated that since the 1980s, demographers have kept an eye on economic uncertainty as a possible cause of why people postpone or reconsider their fertility plans, which results in a decline in the fertility rates in Europe. The authors emphasized in their study that economic uncertainty is deemed as an individual risk factor and can also be characterized by unemployment, working part-time or in a limited contract. The results of the study shows that the strong link between high unemployment and low fertility in East Germany supports the theory that adverse economic conditions result in a decrease in fertility. In addition, the Vignoli et al. (2020) shed light on the entry into the labor market with economic uncertainty and its impact on having a first child in Italy. The study stated that in modern Europe, the rise of economic uncertainty is deemed as a critical factor in women deferring childbearing.

Furthermore, Pailhe and Solaz (2012) investigated whether unemployment and job insecurity impact fertility. Their findings show that employment uncertainty is linked with childbearing. Busetta et al. (2019) analyzed the relationship between persistent joblessness and women's fertility intentions and showed that high levels of persistent joblessness result in a low level of fertility and women plan to have a child only if there is a better economic condition that will allow them to properly raise their child. However, Raymo and Shibata (2017) derived a different result when they analyzed the association of unemployment and non-standard employment with fertility in Japan. Findings showed that high unemployment and non-standard employment for men contribute to low fertility. In contrast, high unemployment and non-standard employment for women have a positive relationship with fertility. There are a series of studies that examine the impact of unemployment on household fertility decisions. However, standard economic models demonstrate that unemployment has an offsetting effect on fertility (Aksoy, 2016).

Amariei (2012) examined the influences of unemployment on fertility levels in contemporary societies and results indicated that unemployment has a strong negative link to fertility. However, Ozgoren et al. (2018) pointed out that the correlation between the two variables is a topic that needs further clarification, particularly

in developing countries where fertility rates are still in motion. That is because the evidence on the relationship between unemployment and fertility among women in developing countries depicts a vague idea. Furthermore, Orsal et al. (2018) suggested that there has been a fundamental change in the relationship between unemployment and fertility. The authors analyzed if and how much the relationship between economic conditions and fertility changed over time for the twenty-two OECD countries. In addition, Currie and Schwandt (2014) implied in their study that there are different effects of unemployment on fertility in the short-run and the long run and the strongest fertility response to changes in the unemployment rate are women between the ages of 20 and 24. However, as their age increases, the negative relationship does not persist and becomes weaker until it reaches zero for women aged 40 and over. Jafari et al. (2016) performed a panel data analysis to examine the effect of socio-economic factors such as unemployment rate, marriage, divorce, and urbanization on total fertility rate and used the unit root test and Pedroni Cointegration test to examine the cointegration of the given variables. Based on their results, all the variables were cointegrated which means they all exhibit a long-run relationship. However, Fernandez-Crehuet et al. (2020) used fractional integration and cointegration techniques to examine the long-run relationship between unemployment and fertility in a number of European countries along with Japan and the US and showed that the two variables don't have a long-run equilibrium relationship.

Del Bono et al. (2015) demonstrated the relationship between unemployment and fertility using an instrumental variable approach and focused on white-collar jobs because they thought this job type is more likely to be an essential factor of productivity. Based on their results, unemployment has a very strong negative correlation with fertility on Austrian white-collar women. Their study supports the conventional view that unemployment has a negative relationship with fertility level. It implies that economic conditions significantly impact the decision of childbearing. Moreover, it established that local unemployment rates play a vital role in inhibiting a women's fertility decision. If there are high unemployment levels, women tend to wait before having a child. Therefore, aggregate unemployment reduces transition to parenthood (Amariei, 2012; Cazzola et al., 2016; Busetta et al., 2019). However, Aksoy (2016) laid out a counterargument to this proposition. The author re-investigates the causal effects of

unemployment on fertility in England and hypothesizes that male and female unemployment has different impacts on fertility levels. The results suggest that the female unemployment rate increases with the fertility rate. Women tend to take advantage of the low opportunity cost of having children. The findings imply that the substitution effect dominates the income effect for unemployed women. Yu and Sun (2018), elaborated the concept of reduced opportunity cost for women in parenthood. The authors explained that motherhood requires a lot of time and energy for her child. Thus, it can reduce her income since becoming a parent may interfere with her work. But if a woman is unemployed, she no longer has to worry of losing earnings through childbearing. Therefore, her opportunity cost of transitioning to motherhood reduces. Furthermore, the cross-national research by Schmitt (2012) suggested that unemployment among women exerts a positive impact on the probability of having a first child. It infers that those women who have a hard time balancing work and family have a higher likelihood of starting a family during unemployment. Inanc (2015) investigated the transition to the first births of a child with unemployment. Szklarska (2019) revealed that the labor market is a determinant of low fertility levels. Young adults tend to postpone their decision to have children. That is because they intend to look for a stable job and establish their labor market position. Therefore, assuming that children are a normal good, a high unemployment rate will have a negative effect on the demand for children, holding other factors constant (Aksoy, 2016).

Gross National Income (GNI) per Capita and Fertility

Doepke (2015) delved deeper into the concept of Becker's theory of fertility choice and provided additional thoughts and stated that the theory centers on the changes in income and price levels to understand fertility patterns. The study also focuses on the notion of the quantity-versus-quality tradeoff in fertility choices. Amarante (2014) stated that Becker's theory of fertility choice corresponds with the results of empirical tests studying the association between higher income and decreasing fertility. The author stressed the idea that the opportunity costs of children are determined by the wages of parents. Consequently, this factor may offset the increased demand for children if income rises. Some studies used GDP per capita as their variable for income and economic growth. Taher (2020) investigated the factors affecting the fertility rate in Tunisia and it used GDP per capita as a basis for

income and economic growth. The result of the analysis showed that GDP per capita together with other factors such as education and urbanization have a negative relationship with fertility rate. However, income or economic growth is not the main factor of the fertility decline in the country. Sibe et al. (2016) examined the controversial relationship between population growth and per capita income. The study mentioned the contradicting Malthusian model which proposes the idea that a rising population is a threat to economic growth and the Kremerian model by Michael Kremer which suggested that world population is one key factor for economic growth.

Bongaarts (2020) showed that declines in wanted fertility dominate declines in unwanted fertility while all socio-economic indicators moved to the expected direction, such as increases in education, GNI per capita and percent urban, and declines in child mortality. However, the coefficient of GNI per capita in the regression analysis is not significant with total fertility rate. In addition, fertility changes affect economic growth which in turn, changes in economic growth affect fertility according to Li (2016). The study also used the fixed effects method as well as pooled OLS and it used GNI per capita as a criterion for the classification of countries as low income up to high-income countries. The results showed that at the current period, a high fertility rate will result in lower economic growth which means that they have a negative relationship and poor countries significantly have stronger negative effects on the current economic growth than in rich countries.

Alvarez (2011) re-examined the effect of the cultural indicators of female autonomy and economic development as measured by GNI per capita on fertility. The study assumes that women's cultural emancipation from men mainly causes fertility decreases rather than a reduced need for children due to urbanization and higher GNI per capita. The author formulated a hypothesis that GNI per capita has a significant positive effect on fertility decline. This paper conducted a Bivariate analysis to determine the correlation of the given variables. The statistics show that there is a weak negative correlation between GNI per capita and the total fertility rate. However, some might speculate that countries with little or no fertility change are usually core countries with higher GNI per capita similar to Kengnal and Bullapa (2016). The authors analyzed the relationship between urbanization, female labor force participation rate, gross national income per capita,

and fertility rate in India using the Granger causality test. The findings suggest that cointegration exists among the three variables in India. Moreover, the results also indicate that urbanization, labor force participation rate, and per capita gross national income are negatively associated with fertility. It means that the increase in urbanization, labor force participation rate, and per capita income leads to a fertility rate decrease. Malik (2006) conducted a study that aims to provide an understanding on how health affects the economic growth in India. The study included life expectancy, infant mortality, annual population growth rate, and total fertility rate as health indicators and on the other hand, is the gross national income. It was observed that an increase in fertility rate will decrease gross national income and these effects come out to be significant in all three regressions conducted in the study. It means that there is a negative relationship between GNI and fertility. Fertility decline is the effect of improvements in the standard of living (Davalos & Morales, 2017).

Cordoba and Ripoll (2014) explained that limits on intergenerational transfers are critical in comprehending the negative fertility-income relationship. They emphasized three impacts of wages on optimal fertility decisions; first, higher wages lift the cost of raising children, resulting in low fertility. Second, higher wages further increased children's consumption and health, resulting in a positive fertility-wage relationship. Lastly, higher wages and higher parental spending reduces the marginal utility of consumption, thus increasing the amount of utility gains from having children. It is also mentioned that the greater the diminishing marginal utility of income, parents increase the willingness to provide for a child. Ashraf et. al (2013) implied that a decline in fertility increases income per capita, however it is still dependent on the value assigned to it and how it is viewed to be significant.

Marriage and Fertility

Biney et al. (2020) showed that both marital and nonmarital childbirths have a significant contribution to fertility levels. The decreasing rate of marriage in South Africa is not leading to a decline in fertility as a significant proportion of childbearing may be occurring outside of marital unions. The recent fertility decline in the country is likely to be related to premarital or nonmarital childbearing. Moreover, it was discovered that wealthier women were significantly less likely to have

marital births. However, Hertrich (2017) stated that the relationship in the trends between nuptiality and fertility changes over time. In the first period, the marriage age has increased without decreasing fertility. But the fertility increase that happened is only temporary as it eventually decreases with the continuous increase in the age of marriage. The result in the first period suggests that changes in marriage are a less factor for fertility transition than a main driving force of fertility decline. However, in the latter period, the fall in fertility level is still consistent with the rising trends in delayed age at marriage (Islam, 2017). Furthermore, Islam (2017) analyzed the transition of fertility levels in Oman. Results showed that over the period, marriage is the number one determining factor of fertility change and contraception has the least significance in reduction of fertility.

Dommaraju (2011) observed that even in societies where nonmarital childbirth does not carry any stigma, getting married is still a step towards motherhood and within the context of India, the increase in marriage age has no significant effect in decreasing the reproductive span, which is supposed to decrease fertility. The decline in fertility in the country can be linked to marital fertility changes instead of marriage age changes. One of the drivers of fertility decline in India is their overuse of women's sterilization as a primary method of contraception. This may imply that marriage and fertility trends change independently (Hertrich, 2017).

Yong et al. (2019) determined the causes of marriage and birth decline in developed East Asian countries by knowing people's attitudes towards marriage and children to their social status affordance, which they define as the perceived attainability of social status to achieve his or her life goals including having family and children. The results support their argument that their concern for endowed social status can reduce affordability, which would lead to less favorable attitudes towards marriage and will prefer fewer children. It also draws attention to other concerns where the increasing costs and expectations for modern living negatively affect marriage and fertility especially when there is a need for higher status to accomplish mating objectives. Dommaraju (2011) has the same argument wherein changes in marriage patterns have contributed to fertility decline. Marriage is increasingly delayed, and the number of single persons continues to rise, suggesting that marriage has a significant influence on fertility.

Several studies see the relative effects of the reduction in the proportion of married women and the reduction in marital fertility (Smith, 2019). Yasuda et al. (2019) focused on marriage and fertility in Japan. Results showed that percentage of married female has a positive impact on fertility rate as well as female employment. It indicates that as trends in marriage decline, the fertility rate will also decrease. Another point of interest for other studies is the influence of imposed policies on marriage and fertility within one's jurisdiction. The government has the ability to make laws that focus on population and marriage control. In the past, China experienced a demographic change that has reformed marriage and reproductive norms in its young population (Luo et al., 2020).

Kuang et al. (2019) noticed that the Philippines is undergoing a transition where cohabitation is increasingly practiced. Their study provides insight on why and on what group of people has cohabitation increased in the country. The findings suggest that those who have nonmarital births are more likely to cohabit than marry, further polarizing class patterns of partnership and family formation. Although pregnancy or having a child were very strong predictors of union formation for cohabiting and married women, pregnancy is more strongly linked to marriage, and having a child is more strongly related to cohabitation. It means that the incentive to marry is strong when a woman becomes pregnant to legitimate the birth. Given high levels of unintended fertility in the Philippines, the findings indicate that concerns regarding sexual initiation and first and subsequent partnerships may be ideal for intervention for reproductive health services for the people (Gipson & Hicks, 2017). Though studies focused on marriage and fertility, few noted their interdependence (Yasuda et al., 2019).

Reproductive Health Law and Fertility

The rapid population growth worldwide has led academic individuals to pursue the global population-control program to reduce fertility. The program paved the way for the use of contraceptives and family planning. The result of the empirical study conducted by De Silva & Tenreyro (2017) showed that the implementation of the program coincides with the world's total fertility decline. Economic growth, urbanization, educational attainment and other socioeconomic factors cannot adequately explain the drastic decline in fertility. Finlay and

Fox (2013) used of mix method analysis to determine the effect of legal changes and the decline in fertility. Interviews were also conducted to comprehend the reasons for the regulatory reform and conflicting theories for the decline in fertility. Bailey (2012) mentioned that the use of federal family planning programs has a significant effect in reducing fertility rate.

Bongaarts (2020) examined the critical determinants needed to decrease the continent's fertility rate and identify couples' trends and preferences using regression analysis and identified total fertility rate, wanted total fertility rate, and unwanted total fertility rate. Eroglu et al. (2020) which identified women's reproductive behavior and perspective on fertility in Turkey used a mixed-method approach which findings shows women of little or no educational background tend to have more children than women with academic titles. In addition, sex preference on child causes increased in childbearing. A male child is preferred compared to female child, it is also believed that procuring a more significant number of children will strengthen the family and will serve as a retirement fund in the future. Kiani et al. (2016) maximized the use of multistage cluster sampling methods. Findings show that women empowerment in reproductive decision making has significantly influenced social determinants such as socioeconomic factors, health system and psychosocial factors. In general, socio-economic development leads couples to produce fewer children (Eroglu et al., 2020). Sabermahani et al. (2017) revealed that family planning programs include paying non-cash subsidies for the first three periods of the economic policy model, which result in a direct effect on fertility. However, it is also mentioned that cash subsidies are foreseen to be ineffective in the long run.

Compared to neighboring countries, the Philippines has the highest population growth rate (Lai & Tey, 2014). A high level of fertility is the root of different major economic problems. After a long plenary debate and mass protests, the RH Act was enacted into law 2012 (Tanyag, 2015). The Act sought to promote self-awareness, safety, and better quality of life. The commonality of studies indicated that policy implementation with strict enforcement will reduce the country's increasing fertility rate (Finlay and Fox, 2013; Tanyag, 2015). Meanwhile, countries that lack funds in providing the needed service record a minimal decrease in childbearing. It then implies a negative correlation between the changes in total fertility rate and funds for family planning (Bailey, 2012; De Silva & Tenreyro, 2017).

Lentejas (2018) identified the effect and issues of RH Law implementation in the Philippines and showed that there are concerns that hinder the use of contraceptives in the community. Misconceptions and fear of contraceptive side effects and personal perceptions affect the decision for childbearing. It emphasized women's need for education and knowledge on family planning, and on addressing fertility-related social expectations. Similarly, Lai and Tey (2014) used bivariate and multiple classification analysis which identifies socioeconomic variables such as ethnicity, residence, education, work, and health to be interconnected and has a confounding effect on fertility. Evidence of studies reveals the importance of marriage and contraceptive use as direct determinants of fertility. Ali (2018) mentioned that most of the respondents were aware and equipped with the proper knowledge regarding RH Law. A descriptive and correlational method is used in the study which the results show no significance between socio-demographic profile and perception on RH Law.

Based on the empirical studies, the total fertility rate is the most utilized outcome variable. It gives utter figures about the average number of children a woman would have if she survives all her childbearing years (Hassan & Mahabir, 2018; Adebawale et al., 2020). The studies mentioned earlier that the unemployment rate is the widely used explanatory variable to determine the correlation between unemployment and fertility. Many scholars claimed that income also affects fertility patterns across regions. In line with this, GNI per capita is the commonly used explanatory variable to evaluate the hypothesis if GNI does not significantly affect fertility (Alvarez, 2011). Apart from that, marriage is also one of the primary explanatory variables utilized in the studies since it concludes that marital status always affects fertility patterns (Biney et al., 2020). Another factor considered as a determinant of changes in fertility levels is the implementation of family planning policies. Some studies show that the introduction of family planning programs is associated with the constant decline in the fertility rate (Bailey, 2012).

Amariei (2012) demonstrated that Romania's unemployment rate was continually rising, whereas the total fertility rate has been declining for the last two decades. Findings showed that unemployment has a strong negative link to fertility. This empirical study in Romania supports the standard economic model that unemployment and fertility hold a negative relationship. Moreover, it establishes that

unemployment plays a vital role in inhibiting a woman's fertility decision. Therefore, the higher the unemployment rate, the longer the individuals wait before having a child (Amariei, 2012; Pailhe and Solaz, 2012; Cazzola et al., 2016; Busetta et al., 2019). However, Aksoy (2016) re-examined the causal effect of unemployment on fertility and showed that the female unemployment rate and fertility rate both increased, and claimed that women tend to take advantage of the low opportunity cost of having children. Moreover, it also indicates that the substitution effect dominates the income effect. Unemployment and fertility have a negative relationship since most studies have shown that unemployed people tend to postpone their decision to have children because they intend to look for a stable job and establish their labor market position (Szkłarska, 2019).

Bongaarts (2020) focused on investigating the patterns of wanted and unwanted fertility in sub-Saharan Africa and employed GNI per capita, women's educational attainment, child mortality, percent urban and family planning programs implemented in the country. The empirical tests show that the decline in wanted fertility dominates unwanted fertility. In contrast, the other explanatory variables moved to the expected direction, such as increase in GNI per capita, education and percent urban, and declines in child mortality. Alvarez (2011) hypothesized that GNI per capita has a positive effect on fertility decline. The results show a weak negative correlation between GNI per capita and the total fertility rate. Also, the findings show that GNI per capita is insignificant in the bivariate analysis.

Dommaraju (2011) and Islam (2017) argued that marriage always has a significant effect on fertility. However, they discovered that marriage is the number one determining factor of fertility change, while in East Asia, changes in marriage patterns have contributed to fertility decline. Still, changes in marital fertility have had a far more significant effect on fertility decline. The same result in the region can be seen in the study of Yong et al. (2019), where East Asians' concern for social status and expectations for modern living reduces affordability, which negatively affects attitudes towards marriage, and they will prefer fewer children. Hertrich (2017) showed that the relationship in the trends between nuptiality and fertility changes over periods of time where at first there is a temporary increase in both marriage age and fertility, but eventually fertility will decrease as the age of marriage continues to increase.

Even though it is a part of East Asia, the exact opposite of the previous argument was discovered in Japan through the study of Yasuda et al. (2019), where percentage of married female impacted fertility rate and female employment. Biney et al. (2020) argued that the diminishing rate of marriage is not the leading cause of reduction in fertility as a significant portion of childbearing happens outside of marriage. The insignificance can also be seen in India's result as the decline in fertility in the country can be linked to marital fertility changes instead of marriage age changes (Dommaraju, 2011). Luo et al., (2020) showed that Chinese women were delaying their marriage and were having fewer children, which cause the total fertility rate in the country to decline and even dropped below the replacement level and this may be because of the Chinese government's policy that sets a minimum age for marriage, 20 years for women and 22 years for men.

Bongaarts (2020), Eroglu et al. (2020), Kiani et al. (2021), Lai and Tey (2014) emphasized the importance of female education on reproductive decision making. Findings showed that females with no or little educational background tend to produce more children than females with higher academic achievement. Cultural norms and values hinder the use of contraceptives, for it is perceived to be a sin. On the other hand, Bongaarts (2020) findings highlighted that family planning would only prevent unwanted fertility, but it will not entirely reduce fertility due to women's preference of acquiring a large family. Implementing the law with strict enforcement will reduce the increasing fertility rate (Finlay and Fox, 2013; Tanyag, 2015). However, Ali (2018) contradicted the use of sociodemographic factors as an indicator of the RH Law. Another literature showcase that the legalization of abortion has no significance to fertility decline in Ghana (Finlay and Fox, 2013). Sabermahani et al. (2017) revealed that paying non-cash and cash subsidies has two different outcomes: paying non-cash subsidies positively affects fertility while paying cash subsidies and other incentives negatively affect fertility.

METHOD

Research Design

This study focused on the relationship of female unemployment rate, GNI per capita, marriage and RH law to fertility rate. This

study gathered data from the Philippine Statistics Authority (PSA), Macrotrends, and the World Bank. The locality of the study covered from the year 1980 to 2019. Thus, a time-series approach was utilized to examine the effect of some treatment or intervention. Cazzola et al. (2016) conducted a time-series analysis to determine the complex relationship between unemployment and fertility. The variables in this study are the following; Fertility Rate, Female Unemployment Rate, Gross National Income per capita, Registered Marriages and the Reproductive Health Law. Fertility rate was measured through the total fertility rate. The annual data for the total fertility rate of the Philippines was obtained from Macrotrends. The female unemployment rate was collected from the annual records of the PSA. GNI per capita was gathered from the World Bank. Marriages was collected from the annual reports of the total number of registered marriages in the PSA. Dummy variable RH Law was measured as a numerical value of 0 is used to identify the absence of RH law, and a numerical value of 1 is used to indicate the start of its implementation up to the current period.

Statistical Treatment

The study used multiple regression analysis to identify the relationship between the dependent variable (Fertility rate) and independent variables (female unemployment rate, GNI per capita, registered marriages and RH Law). The formulated regression model comprises the following:

$$\text{Fertility Rate} = \beta_0 + \beta_1 \text{Female Unemployment Rate} + \beta_2 \text{GNI per capita} + \beta_3 \text{Registered Marriages} + \beta_4 \text{RH Law(dummy)} + e.$$

Normality of Residual

This study conducted various statistical tests to determine whether the data meet the assumptions of the multiple regression model. In order to formulate valid inferences from the regression, this study tested if the residuals are normally distributed. If the p-value is less than the predefined significance level, then the researchers will reject the null hypothesis and accept the alternative hypothesis that there is non-normality in the distribution. If the p-value is greater than the predefined significance level, then the null hypothesis will be accepted that the residuals are normally distributed.

Heteroskedasticity

This test determines the absence or violation of homoscedasticity, which means that the occurrence of unequal variance is present in the study, whether the variance of the residual from regression is influenced by the predictor variables. If the variance of the regression residuals of the model is time varying, the parameters and their standard errors are said to be biased and inefficient. This condition is known as heteroskedasticity and if uncorrected could lead to wrong conclusions and decisions on the part of the investigator. To detect the presence of heteroskedastic disturbances in the residuals, the White Heteroskedasticity Test will be used:

$$u^2 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_1^2 + \alpha_5 X_2^2 + X_3^2 + \alpha_6 X_1 X_2 + \alpha_7 X_1 X_3 + \alpha_8 X_2 X_3 + v_i$$

where u^2 is the squared regression residuals regressed against the explanatory variables, their squares, and cross products.

RESULTS AND DISCUSSION

Table 1 shows that female unemployment rate and registered marriages are stationary at first difference. Thus, it denotes a strong stationary and that the mean does not change with time. Meanwhile, total fertility rate and GNI per capita are stationary at second difference which implies a weak stationary. Identifying stationary allows ascertain regression analysis. Jafari et al. (2016) used first order differencing on all variables to establish and identify stationary which allows them to avoid misleading statistical analysis. Similarly, Sibe et al. (2016) identified the long run relationship between population growth and economic growth in most populated countries in the world and used the unit root test wherein the result showed that population and GDP per-capita are stationary at first difference. Furthermore, the findings of their study showed that population growth has a direct relationship with economic growth. Another study that validates the importance of identifying stationary is conducted by Orsal et al. (2018), wherein he examined the changing relationship between unemployment and total fertility, they used panel unit root test in which he divided it into long and short panel, in order to achieve stationary for the short panel, the author used first difference model with robust standard errors. The result implies that good economic conditions are associated with a

high record of fertility rate and bad economic conditions lead to lower fertility rate.

Table 1

Unit Root Test

Variable	Level	Prob	First Difference	Prob	Second Difference	Prob
Total Fertility Rate	1.609050	0.9993	-1.168071	0.6781	-6.026483	0.0000
Female						
Unemployment Rate	-1.063120	0.7206	-7.281446	0.0000	-7.030856	0.0000
GNI per Capita	0.719937	0.9911	-2.073662	0.2559	-5.487866	0.0001
Registered Marriages	-1.728427	0.4093	-4.449929	0.0010	-6.512039	0.0000
RH Law	NA	NA	NA	NA	NA	NA

Table 2 shows the results of Johansen Cointegration Test for all the given variables. This section presents two types of test statistics namely, trace statistics and the maximum eigenvalue statistics. Based on the results, table 2 shows that there is cointegration among the variables. The computed trace statistics and maximum-eigenvalue statistics indicate that there are 2 cointegrating equations at the 0.05 level. The findings of both test statistics show that at most 1, we can reject the null hypothesis that there is no cointegration relationship among the variables since the calculated p-value is $\leq 5\%$. This indicates that the variables exhibit a long-run relationship. Moreover, this evidence of cointegration among variables rules out the possibility of spurious correlations and therefore genuine equilibrium relationships exist as indicated by the test of null or alternative hypotheses of Maximum-eigenvalue and Trace statistics. The results of the Johansen Cointegration test validate the study of Currie and Schwandt (2014), wherein they claimed that there is an established long-term effect of unemployment on fertility. However, the authors claimed that there is a negative relationship between unemployment and fertility in the short-run, which is in contrast with the researchers' results. They also stated that this negative effect of unemployment on fertility persists over time. Moreover, the panel data analysis of Jafari et al. (2016), showed similar findings that total fertility rate, unemployment and marriage had a long-run linkage since the variables were cointegrated. Kengnal and Bullappa (2016) justifies fertility rate and GNI per capita are cointegrated both in the short-run and long-run using the ARDL bound testing approach.

Table 2

Cointegration Test

Hypothesized	Trace		Max-Eigen	
No. of CE(s)	Statistic	Prob.	Statistic	Prob.
None	106.1421	0.0000	44.34912	0.0020
At most 1	61.79294	0.0015	33.02908	0.0090
At most 2	28.76387	0.0654	17.93296	0.1324
At most 3	10.83091	0.2221	7.126615	0.4743
At most 4	3.704293	0.0543	3.704293	0.0543

Table 3 shows that female unemployment rate, GNI per capita, registered marriages and RH law are significant to total fertility rate. Results showed that female unemployment rate, GNI per capita and registered marriages have positive effect on total fertility rate, while RH law have negative effect on the total fertility rate.

Table 3

Estimation Results (Dependent Variable: Total Fertility Rate)

Variable	Coefficient	Std. Error	t-Statistic	Prob.	VIF
Constant	1.678839	0.283448	5.922910	0.0000	NA
Female					3.178592
Unemployment Rate	0.074170	0.023089	3.212291	0.0028	
GNI per Capita	0.001060	8.22E-05	12.90737	0.0000	8.710985
Registered Marriages	1.19E-06	4.75E-07	2.497577	0.0172	1.546570
RH Law	-0.374378	0.177776	-2.105897	0.0423	5.644378

Table 4

Diagnostic Tests

R-squared	0.960721	Akaike info criterion	-0.371016
Adjusted R-squared	0.956357	Schwarz criterion	-0.162044
F-statistic	220.1306	Hannan-Quinn criter.	-0.294920
Prob(F-statistic)	0.000000	Durbin-Watson stat	0.591066
Jarque-Bera Stat	2.303705		
Prob (Jarque-Bera Stat)	0.316051		
Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	36.49178	Prob. F (1,35)	0.0000

(continued)

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.435622	Prob. F(4,36)	0.2422
Heteroskedasticity Test: ARCH			
F-statistic	11.02654	Prob. F (1,38)	0.0020
Ramsey RESET Test			
	Value	df	Probability
t-statistic	1.976463	35	0.0560
F-statistic	3.906408	(1, 35)	0.0560

In the relationship between female unemployment rate and total fertility rate, the result was supported by the study of Schmitt (2012) where they found out that unemployment has a positive impact on the transition to motherhood in some countries in Europe like Germany and the United Kingdom. The same relationship was also found in the study of Inanc (2015) where unemployment has a positive effect on fertility decisions especially among young individuals in the UK. However, the difference between the result of this study and the findings of other studies is the trend where unemployment and fertility are both rising in other studies while the trend of both variables in the Philippines is decreasing. Furthermore, the positive relationship between GNI per capita and total fertility rate contradicts the findings of other studies. The most opposite of the result can be seen in the study of Malik (2006) where it found out that an increase in fertility rate is significant to the decrease of GNI in all regressions conducted. Other studies may be less contradicting to the significant positive relationship of GNI per capita and total fertility rate in this research. Bongaarts (2020) found a negative relationship between GNI per capita and fertility but the coefficient of GNI per capita is insignificant. This significance can be seen in the study of Alvarez (2011) as well as the result showing a very weak negative effect of GNI per capita on fertility.

In addition, the positive relationship between registered marriages and total fertility rate is supported by the study of Yasuda et al. (2019) where the current married rate has a positive effect on birth rate and they also found that late marriage and stable living standards are significant in affecting the fertility rate. The findings in the study of Yong et al. (2019) also agree on the positive relationship between marriage and fertility and it says that East Asians' desire for endowed social status can lead to less favorable attitudes towards marriage and they will prefer less children. This study, however, compared to the findings of other studies, was not able to find what can be the causes or

factors behind this relationship in the Philippines. Lastly, the negative relationship between RH Law and total fertility rate is supported by the study of Bailey (2012) where the establishment of family planning programs decreases childbearing in both funded and unfunded counties although the decline is faster in funded counties. This was also in line with the argument of De Silva and Tenreyro (2017) that the speed of fertility decline coincides with the neo-Malthusian global population-control movement that created a number of policies which aimed to lower the fertility rates globally as these policies were varied depending on the socioeconomic context of each country. Table 3 also shows that there is normality in the estimation results, there is no heteroskedasticity using Breusch-Pagan-Godfrey, and there is no misspecification error in the estimation.

CONCLUSION

The evidence showed that the total fertility rate in the Philippines is declining throughout the years. This indicated that the RH law significantly influences the household's fertility decisions during their unemployment period. This study shed new light on the impact of the female unemployment rate on the total fertility rate. Based on the results, the female unemployment rate and the total fertility rate have a positive relationship. This indicated that the female unemployment rate decreases with the total fertility rate in the Philippines. As stated in previous studies, this can imply that unemployed women take advantage of the low opportunity cost of having children since they will not have to worry about losing income through childbearing. This study examined other variables that can affect the fertility rate in the Philippines. The analysis showed that GNI per capita and registered marriages are significant and have a positive effect on the total fertility rate while the existence of Reproductive Health Law has a negative effect on the total fertility rate. It is also found that there is autocorrelation between the variables used.

However, further studies are needed to have a deeper understanding of the relationships between each of the independent variables to fertility rate. The lack of data regarding the potential factors that affect these relationships may lead to insufficient information which may lead to ineffective and inefficient decisions. Having more detailed data such as those that are classified by age groups could be better

to have potential focus groups in addressing the issues especially of reproductive health and unemployment such as fertility rate by age group found in the study of Biney et al. (2021) and average wealth or income by age group as it was used in the study of Adebowale et al. (2020). Since this kind of topic is not yet widely studied in the context of the Philippine. Nevertheless, this study contributes in having an understanding about population and other factors that may affect women and their fertility in the Philippines and it shows that the Reproductive Health Law is an effective tool in addressing the issue regarding the growing population of the Philippines and the access of women to reproductive health care.

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