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The Relationship between Female Labour Force Participation and Fertility Rate: Empirical Evidence from Malaysia

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Abstract

This study examines the relationship between Total Fertility Rate (TFR) and Female Labour Force Participation Rate (FLFPR) during the period 1990 to 2013 in Malaysia. The data collected based on secondary data. The analysing refers to unit root test, simple regression, Johansen Cointegration, and Granger causality test. The results confirm there is a negative relationship between TFR and FLFPR. However, TFR shows rapidly decreasing each year. Meanwhile, the result from the Johansen Cointegration test shows long run relationship between TFR and FLFPR. Furthermore, Granger causality shows that TFR do give impact to FLFPR. Therefore, policy implication provided base on our results. The government needs to provide more suitable facilities for female employment especially mother who in career.

Keywords: *Total Fertility Rate, Female Labour Force Participation Rare, Unit root test, Simple regression, Johansen cointegration test, Granger causality test.*

1 Introduction

The relationship between Female Labour Force Participation and Fertility is a topic that has received a lot of attention in the literatures pertaining to social sciences and economics in particular (Mishra and Smyth, 2009). The researchers are probing to investigate the causal relationship which to date is an equal of great potential and interest (Mishra and Smyth, 2009). Becker (1965) have showed in his study about the theory of allocation of time implies the importance of labour supply and fertility decisions. The researcher proclaimed that fertility decision has some economic consequences and is one of the cost of having a child is the forgone earnings of the person caring for the child at home, in most cases the mother, stated by Papapetrou (2004).

Nowadays, most of countries show a recent increase in female labour force participation rate (FLFPR). At the same time, the total fertility rate (TFR) has fallen significantly even in rapidly developing middle economies. This correlation shows negative relationship between fertility and women labour force participation. Chung

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(2012) has stated that the "Career First, Settle Down Later" is one of the young women goals for the five years in Singapore. Most of them have recently graduated from the university. Almost 99% Singapore women would not prefer to start a family and to have children. Most of these women would prefer to find a job with good salaries and progress in their careers within the next two or three years. Singapore total fertility rate is estimated to be 0.78 children per woman in 2012. This shows the lowest in the world and well below the 2.1 needed to replace the population.

Similarly in Malaysia, the increase in the labour force participation rate of women could to be a certain extent by the decline in fertility rate such as from 3.9 in the year 1982 to 3.3 in 1993 (Tey, 1994). The trend of fertility rate in Malaysia shows a rapidly decreasing trend. Simultaneously, the postponement of marriage among women subsequently leads to postponement in giving birth to the first child, stated by Aminah (1999). In this study, the assumption been made by describes that fertility is depends on female labour force participation.

Malaysia has a very large population of productive potential work force (Abu Bakar, Nor'Aznin and Norehan. A, 2007). Moreover, female group are highly important as a contributors to the country's economic and social development. This group have participated over the years in growing the economy. According to World Bank (2017), International Labour Organisation (ILO) shows the rapidly increases of FLFPR in Malaysia since 2010, shown in Figure 1.1 Female Labour Force Participation Rate. The rate shows rapidly increases from 43.75% in 2010 to 49.17 in 2013, increases 5.42%. However, the graph shows slightly increases from 49.21 in 2014 to 49.31 in 2015, increases 0.1%.

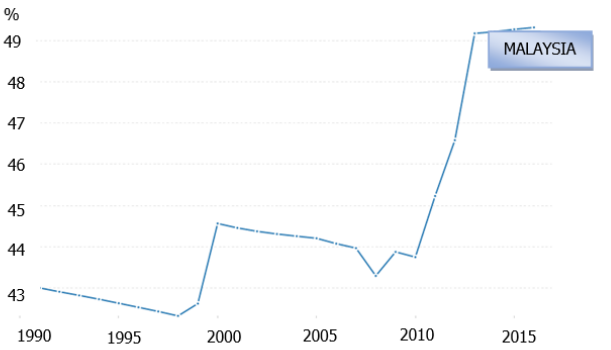

Figure 1.1 Female Labour Force Participation Rate (% of female population ages 15+)

In the year 1966 to 2007, Malaysian economy had enjoyed high economic growth rate more than four decades with its strong growth momentum at an average of 6.71% per annum even though facing several crises during this period. Four major crises have been identified during the observed period: oil crisis of 1973 to 1974, commodity/electronic crisis of 1985 to 1986, Asian currency crisis of 1997 to 1998, and United States (U.S.) financial crisis in 2000.

In terms of economic structure, the Malaysia's economic activities can be categorised into three main sectors: primary, secondary and tertiary sectors. Since its independence, the Malaysian economy has experienced of significant structural changes, from the agricultural based economy to a manufacturing dominated economy as the source of growth. The increase of population as from 10.9 million in 1970 to 25.7 million in 2005 at a growth rate of 2.3% per annum and it needed employment opportunities. Hence, women starts participate in labour force participation. The increasing of female labour force participation causes of decreasing on fertility rate.

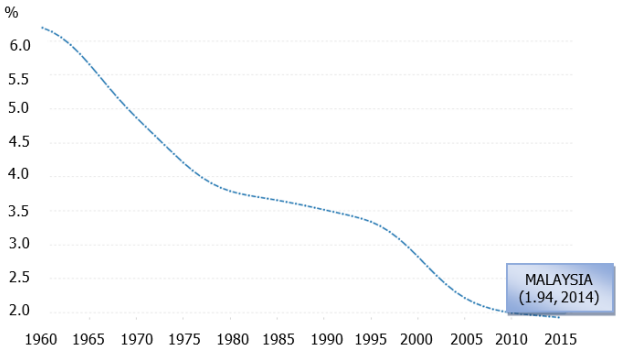

Figure 1.2 Total Fertility Rate (Births per woman)

Figure 1.2 Total Fertility Rate for Malaysia shows declining rate from 3.9 in 1982 to 3.3 children per woman in 2001. The decreasing in fertility rate may in turn be trace to the rise in the average age at marriage thus reducing the span of active reproductive life. The average of marriages for women is 23.5 year in 1980s, and it starts increase to 24.7 years in 1990s, 25.3 in 2004. The postponement of age at marriage among women led to the postponement in giving birth to the first child. The most important determinant of fertility is women's education. As primary education is becoming universal and more women are pursuing higher education, family size can be expected to drop further. Therefore, the highest FLFP in within the age group of 20 to 24, coinciding with the end of schooling age and before the age of marriage. Hence the age of marriage together with fertility bears a relationship with female labour force participation (Abu Bakar, Nor'Aznin and Norehan. A, 2007).

The objective of this study is to examine the relationship between female labour force participation and fertility in Malaysia from 1990 until 2013. This is paper outlined follow as; Section 2 is literature review. Section 3 shows data and methodology of this study. Next, Section 4 shows the empirical results. Lastly, Section 5 presents the concluding remarks.

2 Literature Review

There have been many studies conducted to examine the relationship between fertility and female labour force participation. Butz and Ward (1979) have documented the empirical analysis for fertility and female labour force participation. The researchers highlighted a negative relationship between these variables.

Abdullah and Abu Bakar (2011) studied the causal relationships between fertility and female labour force participation in four selected Asean countries. The results revealed that women labour force participation rate has a negative impact on total fertility rate. This represents the increase in women participation rate will reduce the total fertility rate and not the other way around.

Engelhardt, Kögel, and Prskawetz (2001) found that there is consistent with simultaneous movement of fertility and female employment brought about by common exogenous factors such as social norms, social institution, and financial incentive. At the same time, they also found a significant negative correlation until the 1970s, respectively 1980s (depending on the country under investigation) and on insignificant or weaker correlation afterwards. Killingswanth and Heckman (1986) show from empirical analysis and economic theory which is the exits a story relation between fertility and female labour force participation. One of the reasons due to this problem is female employment might lead to lower fertility since working reduces women available time and raising children is time-intensive. This might force female choose to have fewer children and also could lead to higher fertility by booster family income. Rana and Tasnim (2009) show the factors that influence the decision of married women (in the age of 16 until 60 years) to participate in labour force activities in Pakistan. This study found that women's age, women as head of the household, women's education, household poverty, family husband's unemployment and low income, and rural locality have a significant positive effect on labour force participation of married women.

3 Data and Methodology

The time series data was used in this empirical analysis. The sample runs from 1990 through 2013 in Malaysia. In the analysis, we test for the existence of a relationship between fertility and female labour force participation. There are two macroeconomic variables will be tested in this analysis. The fertility rate will be taken from total of birth per woman. Labour force participation rate, female data is taken from the percentage of female population ages from 15 until 64 was represent as female labour force participation. The data need to regress on first difference of fertility and first difference of logarithm of female labour force participation. The data was collected from Malaysia Statistics Department.

According to Abdullah and Abu Bakar (2011), it is better to use two models with different dependent variables. The first one using Total Fertility Rate (TFR) and the second one is using Female Labour Force Participation Rate (FLFPR) as the dependent variables.

$$TFR_t = \alpha + lnFLFPR_t + \varepsilon_t \quad (1)$$

$$lnFLFPR_t = \alpha + TFR_t + \varepsilon_t \quad (2)$$

Where

$$TFR = Total\ Fertility\ Rate$$
$$FLFPR = Female\ Labour\ Force\ Participation\ Rate$$
$$t = time\ series$$
$$\alpha = the\ parameter\ for\ the\ explanatory\ variables$$
$$\varepsilon = error\ term$$

Before estimating the simple regression test and Granger Causality to test causality relationship between Total Fertility Rate and Female Labour Force Participation Rate, this study used the unit root tests to assess the stationary properties of the time series data. Next, the simple regression analysis is use to find the relationship between those variables. Then, the Johansen cointegration is to check the long run relationship between TFR and FLFPR. Lastly, the Granger causality test for TFR and FLFPR.

4 Empirical Results

TABLE 1 presents the results of unit root which consist of ADF test and Philips-Perron. This result indicates that all series are non-stationary at level but stationary in the first differencing; the null hypothesis of non-stationary can be rejected at 1%, 5% and 10% significance level.

TABLE 1: Result of Unit Root test

VARIABLE		TFR	FLFPR	TFR	FLFPR
UNIT ROOT		Augmented Dickey-Fuller (ADF)		Philips-Perron	
LEVEL	CONSTANT	-0.3874 (0.8984)	-0.04486 (0.9450)	-0.2750 (0.9168)	1.0608 (0.9961)
	CONSTANT AND TREND	-2.7947 (0.2106)	-1.9165 (0.6173)	-2.7699 (0.2190)	-2.2349 (0.4533)
FIRST DIFFERENCES	CONSTANT	-6.3232 (0.0000)***	-6.4363 (0.0000)***	-6.3058 (0.0000)***	-6.8531 (0.0000)***
	CONSTANT AND TREND	-6.2293 (0.0001)***	-6.7513 (0.0000)***	-6.2099 (0.0001)***	-8.4130 (0.0000)***

Note: ***,**,* indicates the rejection of null hypothesis of non-stationary at 1%, 5% and 10% significance level.

TABLE 2 displays the simple regression test results. The absolute value of the t-statistic for the slope coefficient (16.48) is greater than the critical t-value at the ninety-five percent confidence level (0.05). This provides support for our hypothesis that TFR strongly depends on FLFPR. The calculated adjusted R-squared (91%).

TABLE 2: Simple Regression Test Results

INDEPENDENT VARIABLE	β	T-STAT	Prob.
Constant	14.8336	0.3426	0.0000***
Fertility	-0.8519	0.0421	0.0000***

R-squared: 0.9491 Durbin-Watson stat: 0.7902
Note: ***,**,* indicates the rejection of null hypothesis of non-stationary at 1%, 5% and 10% significance level.

By using the Johansen cointegration, this result shows there is long run relationship between total fertility rate and women labour force participation rate, shown in TABLE 3. Based on the null hypothesis, there is no cointegration in the data. For alternative hypothesis is represent there is cointegration in the data set. Since the value of probability is less than 5% significant level, this study needs to reject null hypothesis. The Johansen test proves that FLFPR and TFR are co-integrated to each other in the long run relationship.

TABLE 3: Johansen Cointegration Test Results

Cointegration with linear deterministic trend with restriction						
Null Hypothesis	Trace Statistics	5% Critical value	Prob.	Max-Eigen Statistics	5% Critical value	Prob.
r = 0 r < =1	40.5243 12.0122	15.4947 3.8415	0.0000*** 0.0005***	28.5121 12.0122	14.2646 3.84147	0.0002*** 0.0005***

Note: ***,**,* indicates the rejection of null hypothesis of non-stationary at 1%, 5% and 10% significance level.

Meanwhile, the Granger causality tests results show that there is one-way causality which runs from TFR to FLFP. In other words, there is no negative relationship between FLFPR and TFR in Malaysia.

From TABLE 4, the null hypothesis is FLFPR does not Granger Cause TFR. The TFR is cannot be rejected at 10 percent significance level. This can be defined as the Granger causality cannot runs from FLFPR to TFR. However, the TFR does Granger Causality to FLFPR. The result shows significant in 10% level which means that need to reject null hypothesis. This means that TFR does give impact to FLFPR. This finding concludes TFR will affect FLFPR.

TABLE 4: Pairwise Granger Causality Test for Malaysia

Null Hypothesis	F-Statistic	Probability
LGFR does not Granger Cause LGFLFP	6.5007	0.0080***
LGFLFP does not Granger Cause LGFR	0.0327	0.9679

Note: ***,**,* indicates the rejection of null hypothesis of non-stationary at 1%, 5% and 10% significance level.

5 Conclusion

In this research, we examined that there is negative relationship between total fertility rate and female labour force participation rate in Malaysia within 1990 until 2013. Besides, this study has provides support for our assumption that fertility strongly depends on female labour force participation, although there are many factors that affect fertility rate. The study empirical analysis consisted of unit root test which are ADF test and Philip-Perron test, simple regression of total fertility rate and women labour force participation rate, the Johansen Cointegration test and Granger causality test by using time series data for the period 1982 until 2010. The Johansen Cointegration test proves that female labour force participation rate and total fertility rate is co-integrated to each other in the long run relationship. Meanwhile the Granger causality tests which showed that female labour force participation rate have an impact on total fertility rate.

According to Abdullah and Abu Bakar (2011), government has implemented policies such as Family Planning and Reproductive Health which are good policies that may lead to economic growth. This situation is very important for government to promote more jobs that suitable for female. In fact, employers are not supposed to be biased between men and women in their hiring decision for types of jobs that involve both genders.

In National labour legislation also had supporting part-time employment and flexibility in designing work hours, and policies that ease rehiring after maternity leave may crucial to allowing women to achieve continuous participation in the labour force, stated by Aminah (1999). Besides, provision of child-care facilities at the work place can contribute to increase the continuous of labour force especially for mother who wish to work. For Finance Ministry, by considering the increasing cost of child care services, the minister have provided the tax exemption to working mothers on the money they spend to their children for such care. The minister also has provided tax incentives to employers who provide child care facilities at their premises as a way to encourage women with children to remain mote permanently in employment. This is also can turn facilitate the upward mobility of employed women. In Malaysia, the government has expanding educational opportunity in the country. This means that more avenues are available for women to develop the necessary skills and competencies necessary for their economic participation.

References

Abdullah. Norehan and Abu Bakar. Nor'Aznin, 2011, The causal relationship between fertility and women labour force participation: Evidence for the four selected Asean countries, European Journal of Social Sciences, Vol. 26 No. 2, pp. 154-158.

Aminah. Ahmad, 1999, *Women & Work: Challenges in Industrializing Nations*. ASEAN Academic Press London.

Becker, G., 1965, A theory of allocation of time. *Economic Journal*, 75, 493-517

Chung. Kelvin, 2012, Why Singapore's current birth rates may not improve soon, HR & Education. Retrieve from World Wide Web on 15th June 2013. (http://sbr.com.sg/hr-education/commentary/why-singapores-current-birth-rates-may-not-improve-soon)

Engelhardt. Henriette, Kögel. Tomas, and Prskawetz. Alexia, 2001, Fertility and female employment reconsidered: A macro-level time series analysis, Max Planck Institute for Demographic Research, retrieved from world wide web on 25th November 2012. (http://www.demogr.mpg.de/Papers/Working/wp-2001-021.pdf)

Evangelia, P. (2004). Does female employment affect fertility? Evidence from the United Kingdom, *the Social Science Journal*, 41, 235-249.

Killingswanth. M.R and Heckman. J. J, 1986, Female labor supply: A survey, Handbook of Labor Economics.

Mehryar. Amir H., Aghajanian. Akbar, Tabibian. Mohamad and Tajdini. Farzaned, 2002, Women's Education and Labor Force Participation and Fertility Decline in Iran, retrieved from world wide web on 25th November 2012. (http://faculty.uncfsu.edu/aaghajanian/papers/femalelaborforce%20participationfertility.pdf)

Mishra. Vinod and Smyth. Russell, 2009, Female labor force participation and total fertility rates in the OECD: New evidence from panel cointegration and Granger causality testing, *Journal of Business and Economics.*

Ramesh. S, 2012, Singapore hopes to raise fertility rate to at least 1.4, Singapore News, retrieved from world wide web on 25th November 2012. (http://www.channelnewsasia.com/stories/singaporelocalnews/view/1230387/1/.html)

Rana Ejaz Ali Khan and Tasnim Khan, 2009, Labor Force Participation of Married Women in Punjab (Pakistan), Journal of Economic and Social Research 11(2), 77-106.

Tey Nai Peng (1994). *Some Demographic and Health Aspects of Malaysian Women*. Paper presented at the Workshop on Malaysian Women within the Two Development Decades, 5-6 May, Kuala Lumpur