Determinants of Labour Force Participation Rate in Malaysia from Gender Perspective

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Abstract

Labour force participation rate (LFPR) is always a concern in economic view in Malaysia. This research study on how the labour force factors will affect the LFPR according to gender perspective for every state in Malaysia from the year 2011 to 2016. Static Panel Data analysis were used in this study. By using Fixed effect model (FEM), outside labour force, non-married, secondary, and tertiary education level have inverse relationship with male LFPR, while the marital status of labour force has positive relationship with male LFPR. Next, for the effect of determinants and characteristics of labour force on female LFPR, Random effect model (REM) was used. The model shows that unemployed, widowed status, outside labour force, and marital status have an inverse relationship with female LFPR. Meanwhile, non-formal education level, tertiary education level, and age group between 40-64 have positive relationship with female LFPR. In conclusion, it is important to understand the LFPR according to gender in Malaysia because it will shape the comparative advantage and describes the situation of Malaysia's labour market. This study provides an overview of labour force in Malaysia using an appropriate statistical modelling known as panel data approach.

Keywords: Fixed effect model, Labour force participation rate, Panel data analysis, Random effect model

1. Introduction

Labour force participation rate (LFPR) plays an important role in analyzing and investigating the macroeconomic and the microeconomic success of economic stabilization of a country. It is important to have studies that provides an overview of the labour market for any countries according to ethnic groups, age groups, living strata, gender, and the educational attainment. In Malaysia, after a few years independence, the World Bank's country-classification system have qualified Malaysia as a middle-income country (Zainal & Bhattasali, 2008). Malaysian economy was focused on the primary products such as tin and rubber to generate growth of economy and employment prior to 1957. In the year 1957, the role of manufacturing was quite minor such as processing the rubber, timber, tin, foodstuffs, and light engineering works (Yusoff *et al.* , 2000).

However, due to the global development in industrial sector, Malaysia was in Industry 2.0 (Rubaneswaran, 2017). Malaysia Budget 2018 has also allocated new incentives for companies to invest in new technology, tools, and equipment to help local companies to adopt new technologies towards Industry 4.0 (MIDF, 2017). Malaysia's aim is to be the Industry 4.0 along with high-income nation that are both sustainable and inclusive by 2050, as stated in the National Transformation agenda. Therefore, a systematic solution or method is needed to convert the structure of the country's economy to achieve a high-income-nation status. The labour market of Malaysia is an important point of view to the government or private sectors, policy-makers or economic researchers by referring to the progress of the labour force participation through the increasing growth of economic in Malaysia. Gender inequality in labour force is one of the major issues of labour market in Malaysia. The United Nations Development Programme's (UNDP) Human Development Index 2013 ranks Malaysia Gender Inequality Index at 42nd out of 148 countries (UNDP, 2013). LFPR is defined as the ratio of the number of persons in labour force to number of person in the working age population (15–64 years) and is expressed in percentage.

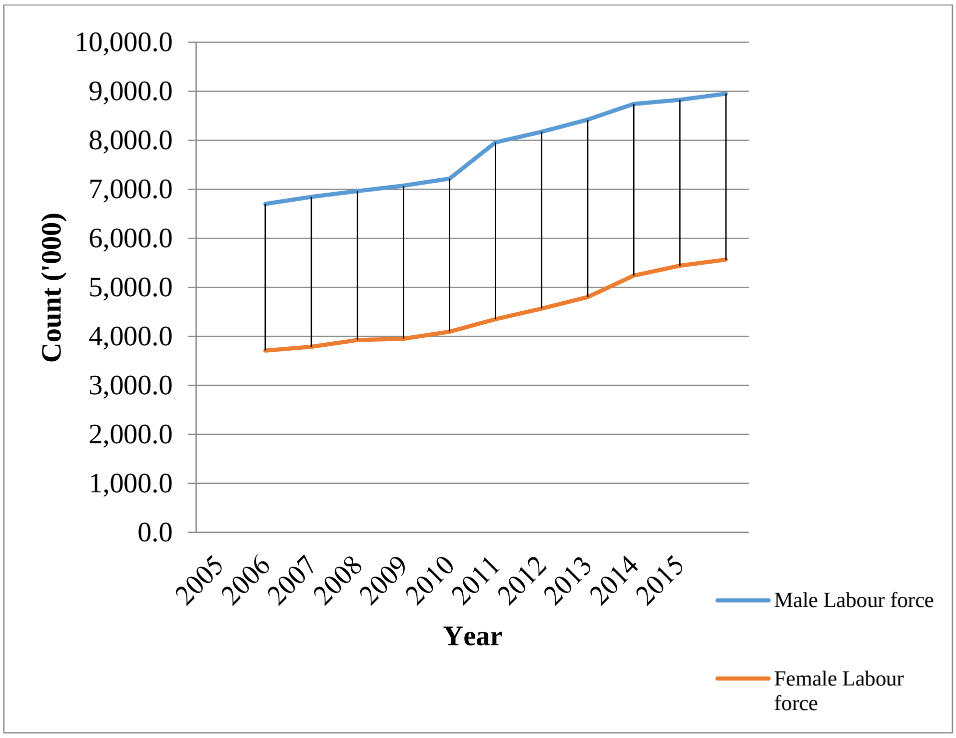

Figure 1: Labour Force by Gender
Source: Department of Statistics Malaysia

Figure 1 shows labour force by gender from year 2005 to 2015. Overall, the male labour force was higher compared to the female labour force over the years and showed upward trend throughout the study period. Although the female labour force increases over the years, but the labour market is dominated by male labour force. Due to inequality of gender in the labour force, it is important for this study to give confirmation about the labour market which may help the policy maker sector to monitor the progress towards attainment of gender equality, living strata, education level, and marital status in employment goals. This will help the policy makers in policy implementation that will utilize all labour force in Malaysia with a most productive ways which leading to the enhancement of the economic growth.

The economic activity of a population depends on the demographic characteristics of that population. Therefore, the proportion of economically active persons contrasts between sub-groups of that population. LFPR is defined as the ratio of the number of persons in labour force to the number of person in the working age population between 15 to 64 years and is being expressed as percentage. It is defined as below (ILMIA, 2017):

$$\begin{array}{c}\text{Labour force}\\ \text{participation rate}\end{array} = \frac{\text{No. of persons in the labour force}}{\text{No. of persons in the working age (15-64 years)}} \times 100 \qquad (1)$$

The LFPR is [illegible] l of labour market slack (Juhn & Potter, 2006). There were many previc [illegible] es that has been conducted globally. Gender inequality in terms of la [illegible] nployment, occupational distribution, top management employment [illegible] average monthly salary were major issues highlighted in the description on labour market structure in Malaysia. The complication of this phenomenon was further compounded when unemployment rate among the tertiary-education level for females was higher than that of the males in Malaysia (Wye & Rahmah, 2012). Meanwhile, in Saudi, Naseem and Dhruva (2017) stated that female labour force participation (FLFP) plays a key role in economic development. Over a period of 50 years, Saudi's FLFP is extremely low. The study used regression model, in which the dependent variable was FLFP rate and independent variables were unemployment rate (u-rate), fertility rate, urban population, and higher education. The results show that fertility rate, u-rate, and urban population were statistically significance on female labour force participation rate, except higher education.

Statistics indicate that Malaysian labour market is mostly dominated by male participants, where male LFPR is about 85.3% and 80.6% in year 1982 and year 2015 respectively. Several studies indicate that female in general show less tendency to participate in labour force as they are more favored towards family, managing household affairs, and housework (Kolodinsky *et al.*, 2000). Nor & Said (2014), investigated the LFPR in Malaysia by locality and gender perspectives. Labour Force Survey data for Malaysia in years 2000, 2005, and 2010 were used in the study and the results of the logistic regression models showed that tertiary education and age group of 25–34 years were significant and positively impact on the LFPR for both genders. Based on marital status results, married and divorces men were significantly more inclined to enter the workforce. The findings of the logistic regression model showed that the age group 25–34 years was the main determinant of rural and urban LFPR. However, the probabilities that people in urban areas will participate in the labour market were higher than of those in rural areas. Furthermore, educational components in urban areas were more significant compared to those in rural areas.

Female LFPR has generally increased in Malaysia in the past 30 years, but the percentage of female with tertiary education participating in the labour force was lower as compared to the male counterparts. It was stated that out of 70% female students who successfully further their studies at university, only 30% of them chose to participate in the labour force, while the remaining chose to become full-time housewives (Halim *et al.,* 2016). With this regard, Malaysia needs a balanced enrolment of male and female students at tertiary institutional levels.

Furthermore, Zaheer and Qaiser (2016) carried out a research on investigating variables that affected the female LFPR in Pakistan. The data was taken from year 1990 until 2013 and the analyses were done by using Ordinary Least Square regression. The results of the study indicated that population of female has a positive and significant impact, while unemployment rate of female and mortality rate have a negative and significant impact on female LFPR. The other variables such as GDP growth rate of the country and fertility rate have negative and insignificant impact on participation of female LFPR in labour force of Pakistan.

In other research, Mohamed (2015) studied and analyzed labour markets in four developing countries: China, Colombia, Egypt and Sierra Leone to investigate the determinants of the labour force participation, salary, and willingness to pay for job-related benefits. The technique used in this research were logistic regression, OLS, and Tobit models. The results of the logistic regression analysis revealed that age, age-squared, gender, household head, difficult health, and marriage, were statistically significant determinants of the labour force participation in all nations. While, the OLS regression analysis showed that gender, wealth, and higher educational attainment were main determinants of salary. The results from the model revealed that gender, household size, income, location, and education played a role in determining willingness-to-pay (WTP) for social security and other job-related benefits.

Apart from the techniques described previously, there were many studies which related to panel data analysis on LFPR that has been conducted before. For example, Taşseven et al. (2016) carried out a research on panel data analysis on female LFPR in Organization for Economic Co-operation and Development (OECD) countries from year 1990 to 2013. The results shows that unemployment rate, fertility rate, and gross domestic product (GDP) per capita are affecting the female LFPR positively and significantly. Sasongko et al. (2020) conducted a study on panel data analysis such as POLS model, FEM and REM for female labor force participation rate in Indonesia from 2014 to 2018. The results stated the FEM is the most appropriate model and showed that provincial minimum wage and education levels have significantly positive effects on female LFPR. However, economic growth has no significant effect on the female LFPR.

Due to the motivation from other studies in the context of labour force, in this study, panel data analysis methods will be used to investigate the relationship between determinants of labour force toward the LFPR in Malaysia. It is also used to estimate the influences of LFPR by controlling for unobserved time constant heterogeneity. By using panel data, it can incorporate the state dependence effect and re-estimate the effect of LFPR of Malaysia. The panel data used in this study offers the possibility of analyzing the relationships between determinants of labour force and LFPR by observing variables according to states for a consecutive periods. The results of the research will provide valuable insights for policy makers, employers, and market participants to identify the relationship of determinant variables of the labour force and LFPR in order to improve the workforce policies and combating the issues of the labour market. It is important for policy maker to design the policies, projects, and programs, particularly those that aimed at promoting gender equality in employment sector.

2. Materials and Methods

The data of Labour Force Survey (LFS) report published by Department of Statistics Malaysia is used in this research. The analysis focuses on the balance data for year 2011 until year 2016. This study models the effect of explanatory variables on the LFPR in all thirteen states and three federal territories. Due to the availability of the data without missing values, the data from years 2011-2016 for each states are being analyzed in this study. The Static panel is used which includes Pooled OLS (POLS) model, Fixed effect model (FEM), and Random effect model (REM).

Pooled OLS (POLS) model is the individual effect which does not exist, while the ordinary least squares (OLS) produces efficient and consistent parameter estimates. In POLS model, the error term ε_{it} is defined as summation of states different (u_i), year different (λ_t) and well-behaved problems (v_{it}). The well-behaved problems are heterogeneity and autocorrelation problem. By applying the ordinary least square method, there are no differences between the states and years, where the states different (u_i) and year different (λ_t) will be assumed to be zero. The Pooled OLS model is shown as below:

$$y_{it} = a + \beta_{OLS} x_{1it} + \beta_{OLS} x_{2it} + \ldots + \beta_{OLS,k} x_{kit} + u_i + \lambda_t + v_{it} \quad (2)$$

Let $u_i = 0,\ \lambda_t = 0$, then

$$y_{it} = a + \beta_{OLS} x_{1it} + \beta_{OLS} x_{2it} + \ldots + \beta_{OLS,k} x_{kit} + v_{it} \quad (3)$$

If the states effect are not zero ($u_i = 0$), the POLS model may result to Lagrangian Multiplier (LM) Test (Breusch-Pagan, 1980) which can test the most appropriate model between Pooled OLS model or Random effect model (REM). The LM test is easy to compute which is defined as below:

$$LM = \frac{NT}{2(T-1)}\left[\frac{\sum_{i=1}^{N}\left(\sum_{t=1}^{T}\hat{\varepsilon}_{it}\right)^2}{\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{\varepsilon}_{it}^2}\right] \quad (6)$$

where N = total number of states , T = total number of years and $\hat{\varepsilon}_{it}$ = Ordinary least square residuals. Lagrangian Multiplier follows Chi-square distribution (χ^2) with the degree of freedom equal to one under the null hypothesis. Rejecting this hypothesis indicates that Pooled OLS model might not be the appropriate model.

Hausman test is used to test the most appropriate model between FEM and REM. The Hausman test (Hausman, 1978) is based on the idea that the difference between two consistent estimators tends to zero. The Hausman statistic is given by:

$$Haus = \left(\hat{\beta}_{fe} - \hat{\beta}_{re}\right)' \left[Var_{fe} - Var_{re}\right]^{-1} \left(\hat{\beta}_{fe} - \hat{\beta}_{re}\right). \quad (7)$$

where

β_{fe} = parameter estimate of Fixed effect model

β_{re} = parameter estimate of Random effect model

$Variance_{fe}$ = variance-covariance matrix of estimator β_{fe}

$Variance_{re}$ = variance-covariance matrix of estimator β_{re}

If the result shows that the significant level is smaller than 5%, this means that the null hypothesis will be rejected and FEM will be used.

By obtaining the most appropriate model, diagnostic check is used to detect the model component that has misspecification and evident as model misfit. It can identify the estimates of important parameters. There are two diagnostic check tests known as heteroskedasticity and serial correlation. Modified Wald Statistics for group wise method is used to detect the heteroskedasticity of the model (Antonie *et al.* , 2010). If the *p*-value is smaller than the significance level, the null hypothesis will be rejected, showing that there is heteroskedasticity effect which is the variances are not constant. For checking serial correlation in the model, a new method of serial correlation test derived by Wooldridge (2002) is attractive because it can be applied under general conditions and is easy to be implemented. Wooldridge's method uses the residuals from a panel model in first–differences, which removes the individual-level effect, based on the time–invariant covariates and the constants. If the *p*-value is smaller than the specified significance level, the hypothesis will be rejected. It can be concluded that there is serial correlation problem in the model.

3. Results and Discussion

This section describes the analysis of the data that are being used in this study. Table 1 shows the descriptive statistics of labour force participation rate by gender difference. Column 1 represents the states of Malaysia, follows by column 2, 3, 4, and 5 represents gender differences with their respective mean, standard deviation, minimum, and maximum value.

Table 1: Descriptive Statistics of Labour Force Participation Rate By Gender Difference

State	Mean		Std.Dev		Min		Max	
	Male	Female	Male	Female	Male	Female	Male	Female
Johor	81.98	48.71	0.44	2.86	81.4	45	82.4	50.9
Kedah	77.4	48.2833	0.75895	3.93569	76.5	42.3	78.3	51.9
Kelantan	72.35	46.0167	1.14674	2.91164	71	41.6	74.4	49.5
Melaka	76.2	52.3333	1.54013	3.49438	73.9	47.3	78.2	55.7
Negeri Sembilan	77.35	49.25	1.04067	2.70389	75.4	44.3	78.2	51.1
Pahang	80.1333	47.6167	0.70899	4.04743	78.8	41.9	80.6	51.6
Penang	76.2833	44.1833	0.57067	1.7383	75.6	42.6	77.3	46.7
Perak	76.1	42.2833	1.34759	3.88969	74.4	35.9	77.3	46.3
Perlis	80.75	58.3167	0.501	1.64246	79.9	56.7	81.3	61.3
Selangor	85.7667	50.6833	0.43665	3.15685	85.3	46.2	86.4	54.7
Terengganu	83.0667	52.3333	0.75542	2.3398	82.1	48.4	83.8	55.1
Sabah	81.6667	59.8667	0.73121	4.2046	80.2	54	82.2	65.4
Sarawak	75.6333	43.3667	0.5465	1.07641	74.9	41.3	76.2	44.2
Kuala Lumpur	79.9833	58.0833	1.4566	2.39033	78	55.2	81.8	61.8
Labuan	85.15	47.3833	1.15715	1.30754	83.6	45	86.6	48.9
Putrajaya	83.1667	77.9167	2.20061	1.959	80.7	75	86.1	80.3

Based on the value of mean for male LFPR, Selangor has the highest mean for the male LFPR, followed by Labuan and Putrajaya. Meanwhile, the lowest mean for the male LFPR is Kelantan. Meanwhile, based on the value of mean for female LFPR, Putrajaya shows has the highest mean for the female LFPR, followed by Sabah and Perlis, and the lowest mean for the female LFPR is Perak.

Table 2 shows male and female LFPR model estimations. Column 1 present the variables name. Meanwhile, column 2, 3, and 4 provide the specification of the model for male LFPR: Pooled OLS, REM and FEM respectively. Column 5 shows the appropriate model which is FEM with heteroskedasticity problem for male LFPR. Next, column 6, 7 and 8 provide the specification of the model for female LFPR: Pooled OLS, REM, and FEM respectively. While column 9 shows the appropriate model which is REM with serial correlation problem for female LFPR. Based on the fitted models, the male LFPR model estimation is shown below:

$$\begin{aligned} llfprmale_{it} = {} & \beta_0 + \beta_1 lemployed_{it} + \beta_2 lunemployed_{it} + \beta_3 loutsidelabour_{it} + \beta_4 lnonformal_{it} \\ & + \beta_5 lprimary_{it} + \beta_6 lsecondary_{it} + \beta_7 ltertiary_{it} + \beta_8 lnomarried_{it} + \beta_9 lmarried_{it} \\ & + \beta_{10} lwidowed_{it} + \beta_{11} ldivorced_{it} + \beta_{12} lageG1_{it} + \beta_{13} lageG2_{it} + \varepsilon_{it} \end{aligned} \quad (9)$$

While, the female LFPR model estimation is given as below:

$$
\begin{aligned}
llfprfemale_{it} = \beta_0 + \beta_1 lemployed_{it} + \beta_2 lunemployed_{it} + \beta_3 loutsidelabour_{it} + \beta_4 lnonformal_{it} \\
+\beta_5 lprimary_{it} + \beta_6 lsecondary_{it} + \beta_7 ltertiary_{it} + \beta_8 lnomarried_{it} + \beta_9 lmarried_{it} \\
+\beta_{10} lwidowed_{it} + \beta_{11} ldivorced_{it} + \beta_{12} lageG1_{it} + \beta_{13} lageG2_{it} + \varepsilon_{it}
\end{aligned} \quad (10)
$$

Let G1 be the age group 15-39 and G2 be the age group 40-64 and t = 2011, 2012, …, 2016 and i = 1, 2,…, 16.

Table 2: Male and Female Labour Force Participation Rate Model Estimation

Variables	POLS male LFPR	REM male LFPR	FEM male LFPR	FEM male LFPR with Hetero	POLS female LFPR	REM female LFPR	FEM female LFPR	REM female LFPR with Serial Correlation
lemployed	-0.932***	-0.665***	-0.196	-0.196	0.736	0.679	0.970	0.752
	(0.243)	(0.256)	(0.273)	(0.192)	(0.499)	(0.490)	(0.583)	(0.481)
lunemployed	0.00467	0.00291	0.00987	0.00987	-0.0324**	-0.0244*	0.00134	-0.0243**
	(0.00622)	(0.00855)	(0.0103)	(0.00842)	(0.0128)	(0.0147)	(0.0219)	(0.0124)
loutsidelabour	-0.197***	-0.159***	-0.194***	-0.194***	-0.571***	-0.603***	-0.520***	-0.586***
	(0.0114)	(0.0131)	(0.0250)	(0.0253)	(0.0235)	(0.0250)	(0.0534)	(0.0279)
lnonformal	0.00168	-0.00522	-0.00921**	-0.00921*	0.0151**	0.0176**	0.0142	0.0151**
	(0.00363)	(0.00426)	(0.00430)	(0.00495)	(0.00745)	(0.00799)	(0.00917)	(0.00677)
lprimary	0.0151	0.00616	-0.0125	-0.0125	-0.0202	-0.0139	-0.00562	-0.0110
	(0.00982)	(0.0100)	(0.0101)	(0.00916)	(0.0201)	(0.0201)	(0.0216)	(0.0156)
lsecondary	0.0811***	-0.0292	-0.101**	-0.101**	-0.0754	-0.00704	-0.0309	-0.0169
	(0.0255)	(0.0290)	(0.0436)	(0.0460)	(0.0524)	(0.0548)	(0.0930)	(0.0515)
ltertiary	-0.0492***	-0.0763***	-0.0776***	-0.0776**	0.113***	0.129***	0.0645	0.120***
	(0.0134)	(0.0172)	(0.0237)	(0.0275)	(0.0276)	(0.0309)	(0.0506)	(0.0250)
lnomarried	0.119*	0.135**	0.123**	0.123***	-0.204	-0.262**	-0.329***	-0.253*
	(0.0675)	(0.0564)	(0.0480)	(0.0285)	(0.138)	(0.122)	(0.102)	(0.137)
lmarried	0.192	0.162	0.160*	0.160**	-0.571**	-0.636***	-0.676***	-0.621**
	(0.123)	(0.105)	(0.0934)	(0.0734)	(0.253)	(0.225)	(0.199)	(0.245)
lwidowed	-0.0275***	-0.0134*	-0.00345	-0.00345	0.0476***	0.0372**	0.00745	0.0213
	(0.00863)	(0.00745)	(0.00664)	(0.00507)	(0.0177)	(0.0159)	(0.0142)	(0.0167)
ldivorced	0.00304	0.00326	0.00294	0.00294**	-0.00252	-0.00656	-0.0115*	-0.00486
	(0.00400)	(0.00335)	(0.00277)	(0.00123)	(0.00821)	(0.00731)	(0.00592)	(0.00492)
lG1	0.553***	0.440***	0.157	0.157	0.251	0.330	0.471	0.275
	(0.142)	(0.151)	(0.166)	(0.123)	(0.292)	(0.287)	(0.355)	(0.316)
lG2	0.227***	0.190**	0.0297	0.0297	0.324*	0.372**	0.347*	0.344**
	(0.0810)	(0.0831)	(0.0880)	(0.0356)	(0.166)	(0.162)	(0.188)	(0.175)
Constant	4.914***	4.762***	5.062***	5.062***	3.631***	3.655***	1.712**	3.561***
	(0.144)	(0.149)	(0.306)	(0.243)	(0.296)	(0.288)	(0.653)	(0.279)
Observations	96	96	96	96	96	96	96	96
R-squared	0.943	0.6754	0.745	0.745	0.978	0.9172	0.940	0.997
Heteroskedasti-city			318.59		1.20			
			(0.0000)		(0.2726)			
Serial Correlation			0.217		7.291			
			(0.6481)		(0.0165)			

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: LM test and Hausman test for the Male and Female Labour Force Participation Rate

LFPR	LM test	Hausman Test
Male	3.62 (0.0286)	131.02(<0.0001)
Female	24.32(0.0000)	-160.07 (.)

Table 3 shows the LM test and Hausman test for male and female LFPR. To specify the appropriate model of the male LFPR, the Breusch and Pagan Largrangian Multiplier test is used to compare the preference between POLS model and the REM. The results of Chi-square (χ^2) value is 3.62 with *p*-value 0.0286. Since the *p*-value is smaller than the significance value, the null hypothesis is rejected. The REM is more appropriate compared to the POLS model. In other words, there are state-specific effects or heterogeneity effect in the data. Next, the Hausman test is conducted to compare the goodness of fit between these two models. The results of Chi-square (χ^2) value is 131.02 and the *p*-value is less than 0.0001. Since the *p*-value is smaller than significance level, the null hypothesis is rejected. It gives an indication that the FEM is more appropriate than the REM. Therefore, it can be conclude that the POLS model and REM are inconsistent and inefficient, and FEM is the best model to determine the influence and the effect of determinants and characteristics of labour force towards the male LFPR.

Once FEM is identified as an appropriate model, various diagnostic checking are then performed. The heteroskedasticity test shows the result of Chi-square (χ^2) value is 318.59 with *p*-value less than 0.0001, leading to the rejection of the null hypothesis. This means that the variances are not constant and heteroskedasticity problem occurred. Next, the checking of the model with first-order autocorrelation is carried out. The Wooldridge test for autocorrelation in this panel data shows the result of test statistics 0.217 with *p*-value 0.6481. The null hypothesis is not rejected and it can be conclude that there is a no serial correlation problem in the first-order autocorrelation in this panel data. Since the FEM only indicates the heteroskedasticity problem, the FEM has to rectify by using the robust standard error estimation as shown in Column 5 in Table 2. FEM with robust estimator shows similar significant variables with Fixed effect model with similar *R*-square value.

Next, to specify the appropriateness model of the female LFPR, Breusch and Pagan Largrangian Multiplier test is used to compare the preference between POLS model with the REM. The Chi-square (χ^2) value is 24.32 with *p*-value less than 0.0001. Since the *p*-value is smaller than the significance level, the null hypothesis is rejected. The REM is more appropriate than the POLS model. Next, the Hausman test is conducted in order to compare the goodness of fit between the REM and FEM. The result of Chi-square (χ^2) value is -160.07 with unknown *p*-value. Since the Chi-square (χ^2) value is less than zero, model fitted on these data fails to meet the asymptotic assumptions of the Hausman test. A negative statistic of Chi Square is normal for a small sample, as obtained in our study (Bălă & Prada, 2014). We can conclude REM is the appropriate model in determining the influence and the effect of determinants and characteristics of labour force towards the female LFPR. Furthermore, various diagnostic checks are performed. The heteroskedasticity test shows the χ^2 value is 1.20 with *p*-value 0.2726. The null hypothesis is failed to reject, which indicates that the variances are constant. It can be concluded that there is no heteroskedasticity problem occurred.

The Wooldridge test is carried out to check for autocorrelation and it panel data shows the result of test statistics value 7.291 with *p*-value 0.0165. Since the *p*-value is smaller than the significance level, the null hypothesis is rejected indicating that there is a serial correlation problem in the first-order autocorrelation in panel data. Since the REM only indicates the serial correlation problem, the REM has to rectify by using the panel-corrected standard error estimation that shown in Column 9 in Table 2. REM with panel-corrected standard error estimator shows similar significant variables with REM and R-square value has increases, which indicate a better fit for the model.

4. Conclusion

In this research, we aim to determine the influence and the effect of determinants and characteristics of labour force towards the LFPR based on gender differences of all states in Malaysia from year 2011 until year 2016. Since the FEM of male LFPR showed that it has the heteroskedasticity problem where the variance are not equal, thus FEM with robust estimator will be the best fitted model. The model shows that the male labour forces who are classified in the group of outside labour force, non-married, secondary, and tertiary education level have inverse relationship with male LFPR, while the married person have positive relationship between male LFPR. Next, the REM is the most appropriate model for determinants and characteristics of labour force toward female LFPR. The REM shows that it has the serial correlation problem, thus REM with panel-corrected standard error estimator will be the best fitted model. The model shows that the determinants such as unemployed, widowed status, outside labour force, and non-married and married status showed inverse relationship with female LFPR. While the labour force with non-formal education level, tertiary education level, and in age group between ages 40-64 have positive relationship with female LFPR.

This study highlighted the factors contributing to the male and female LFPR. Therefore, it is important for the policy makers to develop some policies to promote the equality of gender participating in the labour market by taking into consideration the factors affecting it. These finding suggest that the Malaysia policy makers needs to consider work age, and education level as policy instrument to increase the female LFPR. They should also encourage the male and female youth to enter the labour market and offering the opportunities for continuous learning to upgrade their competencies. The youth who will enter the labour force need to be prepare with new skills needed by Industry revolution 4.0. By gaining new or higher level skills, this will motivates them to enter labour market and it will lower gender disparities in Malaysia’s labour market. Furthermore, to encourage the female labour force especially those who are married to enter the labour market, some policies or flexibility such as job quotas, job matching, parental leave, facilitating mobility, and flexible hours for working should be implemented.

Besides that, the finding in this study of similar to Nor & Said (2014), and Dayioglu and Kirdar (2010). In both studies, they found that marriage affects negatively towards women’s decision to enter the labour supply while otherwise among men. One of the most salient features of female LFPR in Turkey is that it depends on educational attainment: participation rates increase substantially with education (Dayioglu & Kirdar, 2010). Nor & Said (2014) concluded that people with higher educational achievement are inclined to enter the labour market than those having lower education level. Its leads to the conclusion that education levels decide the labour force participation level in Malaysia regardless of gender basis. However, their involvement is still lower compared to the men labour force. Next, in Pakistan, Faridi et al. (2009) concluded that all the levels of education except basic level to middle level education have a positive relationship and significant impact on female LFPR. It suggested that more education facilities and opportunities should be provided to female youth especially in vocational, technical and, job oriented education to encourage them to enter the labour market.

However, this study still has some limitations. It only considered 6 years times period, starting from year 2011 until 2016. Further research could consider extending the length of the study period especially by including the data of labour force participation in the end of the year 2019 onwards, where the pandemic Covid-19 started. Due to the pandemic situation currently, it has dramatically affects in many sectors such as economic downturn, extreme poverty, reducing the family income and working hours. This situation will surely have a deep impact on the labour market of all countries globally as well as Malaysia. It will be an interesting issue to be analyzed in the context of labour force participation in Malaysia.

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