Decomposition of Change in Education and Fertility on Female Labour Force Participation in Peninsular Malaysia between 1970 and 2000

Beatrice Lim [1,2*], Martin O'Brien[3], Dayangku Aslinah Abd Rahim[1,2], Roslinah Mahmud [1,2]

[1]Faculty of Business, Economics, and Accountancy, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia

[2]Centre for Economic Development and Policy, Universiti Malaysia Sabah, 88400 Kota Kinabalu, Sabah, Malaysia

[3]Faculty of Business and Law, University of Wollongong, Wollongong, New South Wales, 2522, Australia

*Corressponding Author: beatrice@ums.edu.my

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Abstract

Malaysia has experienced a significant increase in women's work participation during 1970 and 2000 when its economy was transformed from a commodity producer to a manufacturing exporter. This study re-examines the determinants of female labour force participation (LFP) in Peninsular Malaysia since 1970s using multiple rounds of census data. Alongside regression analysis of the various determinants of female LFP, the gap in LFP between 1970 and 2000 is examined using the Blinder-Oaxaca (1973) decomposition approach. The analysis reveals that most of the change in female labour force participation rate can be attributed to the change in characteristics and coefficients on both the education and fertility variables. Although greater educational attainment increases female labour force participation rate, the change in coefficients shows that there is a weaker positive pull of education between 1970 and 2000, implying that the returns to education have decreased over these decades. Meanwhile, the decline in fertility contributed to a rise in the female labour force participation rate. However, the change is offset by the change in coefficients which implies that having more children exerts a more negative effect on female labour force participation in 1970 than in 2000. We discuss the policy implications of the results for other Asian countries that are striving to improve female labor force participation.

Keywords: Female labour force participation, Blinder-Oaxaca decomposition, education, fertility, Peninsular Malaysia

1. Introduction

In most nations, the level of female educational attainment and the fertility rate have changed in a way that raises the rate of female labour force participation. Many nations, notably emerging economies, witnessed significant increase in female education in recent decades, accompanied by a decrease in fertility rates. Malaysia is one such country that has experienced tremendous economic development, as well as major shifts in female education and fertility. Even though Malaysia has recognised and

actively promoted the role and involvement of women in the country's economic development through various policies and initiatives since independence, the female labour force participation rate has grown at a much slower rate than in neighbouring Southeast Asian countries (World Bank 2016).

Since 1982 to 2021, Malaysia's labour force participation rate for people aged 15 to 64 ranged between 64.8% and 68.6%. Meanwhile, the female labour force participation rate is historically lower than the male participation rate. As shown in Figure 1, the female labour force participation rate in Malaysia was 44.5% in 1982. The rate showed a modest change from 40% to 49% from 1982 to 2012. In 2013, the female labour force participation rate surpassed the 50% mark for the first time, and it remains at 55.5% in 2021. On the other hand, the male labour force participation rate was 85.3% in 1982 and this has decreased over the decades to 79.7% in 2011. The male labour force participation rate then increased slightly to 80.5% in 2012 and remains at 80.9% in 2021. The gender gap in labour force participation rate has narrowed between 1982 and 2021 from 40.8% to 25.4%. This is a positive sign for women's advancement. At the same time, the closing of the gender gap is also due to a decline in the rate of male labour force participation.

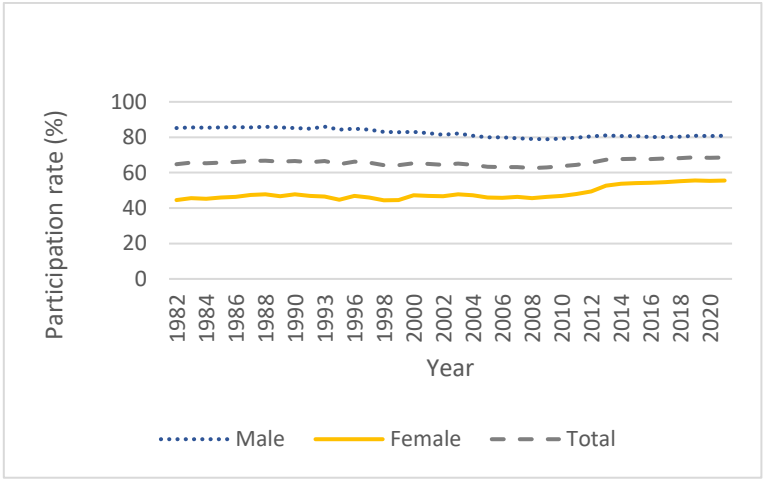


Figure 1. Trends in labour force participation rates in Malaysia (15 to 64 years of age), 1982-2021, Department of Statistics (2023).

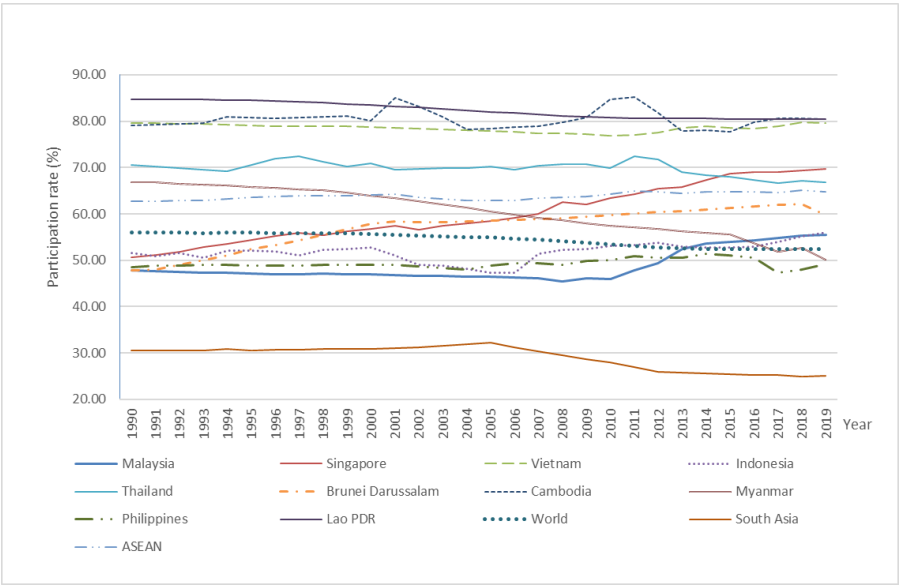


Figure 2. Female labour force participation rate in ASEAN countries, 1990 to 2019, aged 15 to 64. World Development Indicators, World Bank 2023.

In the context of the ASEAN region, the female labour force participation rate in Malaysia has been consistently lower than the ASEAN average ranging between 62% and 65% (as shown in Figure 2). This is of particular concern given the country's immediate policy targeting. In the Eleventh Malaysia Plan (2016-2020) the government has targeted an increase in the female labour force participation rate to 57% by the year 2020 (Economic Planning Unit 2015). In 2020, female labour force participation in Malaysia is 55.3%.

Female educational attainment in Malaysia has increased substantially in the post-independence era. Female adult literacy increased from 61.25% in 1980 to 95% in 2019 (UNESCO 2022). According to data from the World Bank (2018), the net enrolment rate in Malaysia for girls was 98.9% in 2016, and 99.02% for boys. Meanwhile at the secondary level, net enrolment ratio is higher for girls at 75.43% as compared to boys at 69.19% in 2018 (World Bank 2023). The gross enrolment in tertiary education increased significantly from 7% in 1990 to 40% in 2009 (Ministry of Women, Family and Community Development 2011). By 2017, females in Malaysia made up 62% of the undergraduates in public universities (Ministry of Higher Education 2017).

Apart from the changing landscape in female educational attainment, the fertility rate in Malaysia has also decreased in the period studied and this change in fertility has an impact on the population structure. In Malaysia, the median age of the population has increased from 23.6 years (2000) to 30.4 years (2022). The dependency ratio decreased from 59.2% to 43.9% during these periods. This indicates the transition towards an aging population (Department of Statistics Malaysia 2022). In the year 2010, the population aged 60 and above was a total of 7.9% of the Malaysian population and this is projected to increase to 9.5% by the year 2020.

Theoretically, a higher level of educational attainment and a decline in fertility are posited to increase the level of female labour force participation. If, as conventional economic theories suggest, increased female educational attainment and declining fertility push Malaysian women to enter the labour market, the combined effects of education and fertility should result in a rising rate of female labour force participation. In Malaysia, however, the female labour force participation rate has only increased moderately over the past decades. This study, therefore, aims to identify the main determinants of female labour force participation in Malaysia between 1970 and 2000 and to what extent do these determinants affect female labour force participation. To achieve this, the change in female labour force participation rate between 1970 and 2000 is decomposed into changes in characteristics and coefficients using a non-linear Blinder-Oaxaca (1973) decomposition method.

With the increasing challenges of an aging population in the future, the underutilised female resources remain the best alternative workforce available in the country. The effort to increase female labour force participation therefore continues to be a key policy focus for the Malaysian Government. Increasing female labour force participation will not only enable women to be financially independent but the country can also reduce its dependency on foreign labour. Given the numerous significant benefits that could result from increased female labour force participation, the findings from this study can aid policymakers in developing labour market strategies that can address the conundrum *vis*-à-*vis* the integration of women into the economy, not only for Malaysia but also for other emerging economies that face similar challenges.

Following this introduction, section 2 presents the literature review. The methodology used in this study is detailed in section 3. Section 4 discusses the results and findings, and Section 5 concludes.

2. Literature Review

An individual's labour supply decisions depend on the individual's preferences for work and leisure. This preference can be influenced by many determinants which may include the individual's traits, human capital endowment, family background and demographic characteristics as well as institutional and government policies.

Education is by far one of the most important determinants to explain growth in female labour force participation. It is therefore imperative to understand the link between female education and labour market behaviours. In theory, female education can increase the productivity of women both at home (Becker 1975) and at work (Schultz 1961). If education results in greater productivity at home, increased educational attainment may in fact cause a reduction in female labour force participation. Alternatively, if education increases labour market opportunities for women, education investments contribute to positive economic growth (Lincove 2008, pp.45-46).

Most studies have shown that education has a positive effect on female labour force participation (see for example Contreras, Puentes & Bravo 2005; Ntuli & Wittenberg 2013; Olowa & Adeoti 2014). In Australia, women's participation increased tremendously in the 1980s and 1990s as a result of rising educational attainment and falling fertility (Evans & Kelley 2008). A rise in educational levels was found to have increased female labour supply in Europe (Vlasblom & Schippers 2004). In developing countries like Chile and South Africa, education also has had positive effects on female labour force participation (Contreras et al. 2005; Ntuli & Wittenberg 2013).

In contrast, other studies have documented a negative relationship between education and female labour force participation (Das & Desai 2003; Dasgupta & Goldar 2006). Lam and Duryea (1999) found that Brazilian women with primary education and lower birth rates than uneducated women still had low participation rates despite increasing wages. Female education attainment also increased significantly during the Green Revolution in India while returns to human capital showed no increase (Behrman et al. 1999). In these cases, it is argued that the aim of female schooling is improved home production. Lam and Duryea (1999) argued that families enjoy greater benefit from the production of high-quality children than from women's wages with the initial increase in levels of female education. With secondary schooling, women's wages exceed the value of home production, and women enter the labour market. This explanation suggests that the relationship between education and female labour force participation is U-shaped. This is observed in developing countries. Some studies indicate that primary education of mothers improves child health, while secondary education creates labour market opportunities (Gille 1985; Mason 1993).

In countries where the trend of female labour force participation has been shown to be stagnant and declining in recent years, it is found that the effect of education has weakened (Hotchkiss 2006; Klasen & Pieters 2015). The impact of education on female labour force participation changes over time. In the United States, the growth of female labour force participation was stagnant at the beginning of 1997 and has declined since 2000 (Hotchkiss 2006). According to Hotchkiss (2006), the result from the maximum likelihood probit model indicates that although college education attainment for women in 2005 has increased when compared to 2000, it is less of a pull factor into the labour market in 2005 and this has put downward pressure on labour force participation. The recent decline in the female labour force participation rate in the US is attributed to a decline in labour participation among highly educated married women with young children (Bradbury & Katz 2005). Bradbury and Katz (2005, pp.66-67) provided several explanations to this trend including changes in: (i) women's wages and labour market opportunities; (ii) other family income; (iii) preferences and cultural norms; (iv) characteristics of potential entrants; and (v) labour market attachment and the timing of breaks.

In India, while educational attainment has increased, the effect of education on female labour force participation has decreased between 1987 and 2011 (Klasen & Pieters 2015). The estimates of the average marginal effects indicate that labour force participation declines with the rise of education up to primary levels. On the other hand, the positive effects of higher education could reflect positive selection effects due to endogenous selection where girls with a stronger labour market orientation tend to self-select into higher education. This explains the decline in the positive effects of secondary and tertiary education over time in India. Furthermore, if the increase in educational attainment has been driven by the increased supply of education, positive selection among highly educated women is greater in 1987 than in 2011 (Klasen & Pieters 2015, pp.14-15). However, Klasen and Pieters (2015) did not test this due to a lack of instruments for educational attainment.

Besides education, female labour force participation behaviour is affected by familial events such as marriage and fertility (Blundell & MaCurdy 1999). A large number of studies have investigated the relationship between fertility and female labour force participation (Angrist & Evans 1998; Karbownik & Myck 2012; Maurin & Moschion 2009; Moschion 2013). According to Becker's (1981) model of specialisation, in societies where "men tend to have higher incomes than women, the arrival of children leads to a reduction in women's paid work as they take over the bulk of unpaid work". When compared to men, the labour force participation of women is largely entwined with the decisions of household and children.

The theory of female labour supply suggests that there is a strong negative correlation between the presence of children in a household and female labour supply. This relationship has been observed in many countries (Francesconi 2002; Mincer 1962; Moffit 1984; Nakamura & Nakamura 1990; Klasen & Pieters 2015). Additionally, the negative trade-off between fertility and female labour force participation in developing countries are determined by various socio-economic factors including living arrangements (Mason & Palan 1991; Wong & Levine 1992). A negative relationship between fertility and female labour force participation was observed in several OECD countries in the 1970s but the correlation between fertility and female labour force participation became positive in the late 1980s (Del Boca & Locatelli 2006). This change was attributed to changes in work-family policies such as the introduction of parental paid leave and affordable childcare. However, it was observed that Southern European countries with low fertility still had low levels of female labour force participation while Nordic countries with high fertility had higher levels of female labour force participation. This indicates that some societies seem to be more successful in mitigating the role incompatibility of work and motherhood than others (Gornick, Meyers & Ross 1997). Del Boca and Locatelli (2006) stressed that the availability of flexible work arrangements such as part-time work and generous childcare related benefits can reduce the incompatibility of motherhood penalty. However, while part-time opportunities are, in general, widespread in the Nordic countries, this type of employment is not common in Southern European countries, resulting in low employment rates among mothers with children (Del Boca & Locatelli 2006). In countries where there are limited policies that reconcile work and family, there seems to be only modest growth in female labour force participation.

In general, the literature shows that individual characteristics of females, such as education and fertility, in a country change over time and these have different impacts on female labour force participation. More importantly, in the few countries where the female labour force participation trend has stagnated, the pull of education has weakened over time. Many possible explanations have been put forward. In the case of a developing country, this could possibly be due to changes in female characteristics and behaviours as well as changes in labour market conditions. While many studies have attempted to identify the determinants of female labour force participation in Malaysia (Ma 2017; Asadullah 2020; Roslilee, Nurul Nadia & Mawarti 2016; Rulia, Muhammad Mehedi & Md Sohel 2020; Sharifah Nabilah & Mansor 2022; Siah & Lee 2015), there is limited study that utilises the census data of Malaysia to examine the change in the determinants of female labour force participation. In a span of three decades. Between 1982 and 2021, female labour force participation in Malaysia increased from 44.5% to 55.5% or 10%. Malaysia has advanced significantly in economic development and the opportunity for girls have increased tremendously in educational attainment (Asadullah 2020; Asadullah, Mansor & Savoia 2021). However, these achievements have not been translated into the labour market. This paper aims to analyse the changing effect of education and fertility on the trend of female labour force participation in Malaysia.

3. Methodology

The Blinder-Oaxaca decomposition method is used to decompose the determinants of female labour force participation in Malaysia between 1970 and 2000. The method can be used to examine to what extent the gap between the female labour force participation rates in 1970 and 2000 can be explained by differences in characteristics and differences in coefficients. The female labour force participation decision in this study is modelled with logit regression as the outcome of interest is represented by a

dichotomous variable which takes the value of 0 and 1. This section will describe how the Blinder-Oaxaca (1973) decomposition can be used in a non-linear model as suggested by Yun (2004).

The Blinder-Oaxaca (1973) decomposition technique is useful for identifying and quantifying the separate contributions of group differences in measurable characteristics and coefficients. The decomposition technique was first used to decompose mean differences in log wages based on a regression in a counterfactual manner to explain the differences between two comparison groups. The difference in wages between gender and race can be explained by distinguishing the gap into explained and unexplained components. Apart from identifying gender and race differentials, the Blinder-Oaxaca (1973) decomposition has also been used to decompose changes over time to address issues such as changes in labour force participation rates over time. Using this technique, the separate contributions of group differences in measurable characteristics, such as education, marital status and fertility, can be quantified.

The Blinder-Oaxaca (1973) framework is outlined here as illustrated in Sinning, Hahn and Bauer (2008, p.481). By considering a linear model for two separate groups, $g = (A, B)$, the linear regression model can be given as:

$$Y_{ig} = X_{ig}\beta_g + \varepsilon_{ig} \tag{1}$$

where $i = 1, \dots, N_g \; and \; \sum_g N_g = N$.

The regression can be decomposed according to Blinder-Oaxaca (1973) so that:

$$\overline{Y}^A - \overline{Y}^B = \left[(\overline{X}^A - \overline{X}^B)\widehat{\beta}^A\right] + \left[\overline{X}^B(\widehat{\beta}^A - \widehat{\beta}^B)\right] \tag{2}$$

where $\overline{Y}^g = N_g^{-1}\sum_{i=1}^{Ng} Y_{ig}$ and $\overline{X}^g = N_g^{-1}\sum_{i=1}^{Ng} X_{ig}$.

In equation (2), the first term on the right-hand side represents the explained components of the difference in mean outcomes as a result of the difference in observable characteristics. The second term represents the unexplained components of the difference in mean outcomes which is due to difference in coefficient estimates. The contribution of the differences in characteristics and coefficients of individual variables or detailed composition obtained from the Blinder-Oaxaca (1973) decomposition method is useful to answer many relevant economic questions. For example, in the case of female labour force participation, the methodology can identify to what extent does the change in educational attainment explain the differences in the rate of female labour force participation between two time periods.

3.1 Source of Data

This study utilises data from the Malaysian Household and Population Census Surveys for the years 1970, 1980, 1991 and 2000 accessed from the IPUMS-International database. The survey was administered by the Department of Statistics Malaysia. The census covers a large representative sample of the population. The data are cross-sectional in nature and provide individual unit records. A total of 2% from the sample for each census year is accessible. The censuses for 1970 and 1980 include observations for Peninsular Malaysia only, while in 1991 and 2000 two other East Malaysian states were included. In order to allow for comparability for all census years, only observations from Peninsular Malaysia were included. As Peninsular Malaysia is more densely populated and comprises 75% of the population (Ong 2013), the choice of sample for this study will still provide a good overview of the female labour force participation trend in Malaysia.

The final dataset used for this analysis is constructed from women aged 20 to 54 years old who are considered the prime working age group. Observations for male individuals are dropped. Women aged 20 are more likely to have completed schooling and be in the labour market. The census contains rich demographic information including labour market status, age, ethnicity, marital status, level of

education, living strata and household type. This is one of the few studies that attempts to link women to their household members. Information for both spouse and children can be obtained by linking the person number in the household using the relationship code given in the database. Therefore, it is plausible to establish the relationship of women and their spouse or children in a household. While more recent census data is available for the year 2010, it does not allow the identification of household relationship in a large representative dataset. Therefore, the data from 2010 is not included in this study, as the effect of children cannot be examined from the dataset. The Census data used does not contain information on household income, wages or non-wage income. Therefore, this study does not attempt to estimate a standard labour supply equation. The use of the education variable can reasonably provide a proxy for wage and income.

The observations with missing labour force participation and educational attainment information are not included as these are key variables in this analysis. The final samples from the respective census years are as follows: 32,406 (1970); 37,900 (1980); 62,598 (1991); and 79,001 (2000). The construction of the dataset is given in Table 1.

Table 1: Details of samples.

	1970	**1980**	**1991**	**2000**
A. Total observations from census	175,997	182,601	347,892	435,300
B. Total female observations	87,489	91,595	172,569	214,786
C. Observations dropped (non-Peninsular Malaysia states)	-	-	14,218	18,898
D. Total female observations (20 to 54 years old)	32,636	38,415	62,598	81,859
E. Observations dropped (missing information on labour force participation status)	230 *0.7% of (D)*	515 *1.34% of (D)*	-	-
F. Observations dropped (missing information on education)	-	-	-	2,858 *3.5% of (D)*
G. Total observations used in the analysis	32,406	37,900	62,598	79,001

Source: Malaysian Population and Housing Census Surveys - 1970, 1980, 1991 and 2000.

3.2 Descriptive Statistics

The descriptive statistics for the sample are presented in Table 2. The summary provides some clues on how the change in characteristics affects female labour force participation decisions between 1970 and 2000. In general, the female labour force participation rate in Peninsular Malaysia shows an increasing trend. here was a 5-percentage point increase from 1970 to 1980. This change can be attributed to the growth in the manufacturing sector in the 1970s which provided employment opportunities for females, especially in urban areas. Over a period of 30 years, the female labour force participation rate has increased by 8.42 percentage points.

As discussed earlier, the fertility rate in the country has declined since independence. Although an overall decline in the fertility rate was observed, the fertility rate of the non-Bumiputera group showed a sharp decline when compared to the Bumiputera group. The Bumiputera (sons of the soil) group consist of the Malays and other indigenous natives including the Ibans and the Kadazans, while the Chinese, Indians and other ethnicities are non-Bumiputera. Additionally, from the late 1970s to the early 1980s, there was a slight increase in the fertility rate among Bumiputera women partly due to the introduction of the New Population Policy (NPP) in the early 1980s with the target of increasing the population fivefold to 70 million by the year 2100. Following that, several measures were introduced to encourage large family sizes. These changes affect the composition of the population.

The educational attainment for females increased significantly over the period studied. The proportion of females with no schooling decreased dramatically so that by 2000, the mean proportion of women with no schooling is only 0.06. By 2000, approximately 70% of the total females in the sample had at least secondary level schooling or beyond. The mean of women with tertiary education has increased from 0.008 in 1970 to 11.8 in 2000. The improvement in educational attainment can be attributed to the Government's continuous investment in education infrastructure as well as various other reforms in the education system and policies implemented since independence.

Table 2: Summary of descriptive statistics.

	1970		1980		1991		2000	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FLFP	0.402	0.490	0.455	0.498	0.465	0.499	0.486	0.500
Age	33.533	9.777	33.011	9.662	33.856	9.403	35.010	9.520
Age20_24	0.239	0.426	0.241	0.428	0.194	0.395	0.169	0.375
Age25_29	0.168	0.374	0.203	0.402	0.189	0.392	0.170	0.375
Age30_34	0.166	0.372	0.158	0.365	0.181	0.385	0.162	0.368
Age35_39	0.133	0.340	0.122	0.327	0.152	0.359	0.160	0.366
Age40_44	0.114	0.318	0.115	0.319	0.121	0.326	0.141	0.348
Age45_49	0.097	0.296	0.087	0.281	0.083	0.276	0.113	0.316
Age50_54	0.083	0.276	0.075	0.264	0.081	0.273	0.087	0.281
Single	0.148	0.355	0.209	0.406	0.223	0.416	0.218	0.413
Married	0.770	0.421	0.731	0.444	0.733	0.442	0.740	0.439
Widowed/divorced/ separated	0.082	0.274	0.061	0.239	0.044	0.205	0.042	0.201
Bumiputera	0.537	0.499	0.549	0.498	0.555	0.497	0.572	0.495
Non-Bumiputera	0.463	0.499	0.451	0.498	0.445	0.497	0.428	0.495
Extended household	0.298	0.457	0.455	0.498	0.383	0.486	0.301	0.459
Spouse work	0.610	0.488	0.614	0.487	0.618	0.486	0.648	0.478
Urban	0.432	0.495	0.488	0.500	0.632	0.482	0.735	0.441
Rural	0.568	0.495	0.512	0.500	0.368	0.482	0.265	0.441
No schooling	0.472	0.499	0.281	0.450	0.130	0.336	0.063	0.243
Primary	0.415	0.493	0.444	0.497	0.343	0.475	0.238	0.426
Lower secondary	0.050	0.217	0.122	0.328	0.193	0.395	0.211	0.408
Upper secondary	0.057	0.231	0.143	0.350	0.279	0.448	0.370	0.483
Tertiary	0.008	0.088	0.010	0.099	0.055	0.228	0.118	0.323
Total children	2.670	2.422	2.267	2.175	2.012	1.961	1.928	1.861
Total children under 6 years	0.915	1.092	0.698	0.948	0.633	0.912	0.536	0.833
Total children 6 years and over	1.754	2.035	1.569	1.959	1.379	1.689	1.392	1.672
Child<6 years_0 child	0.496	0.500	0.571	0.495	0.604	0.489	0.647	0.478
Child<6_1 child	0.215	0.411	0.226	0.418	0.213	0.409	0.206	0.404
Child<6_2+ children	0.289	0.453	0.203	0.402	0.183	0.387	0.147	0.354
Child 6 years_0 child	0.419	0.493	0.471	0.499	0.475	0.499	0.465	0.499
Child 6 years_1 child	0.145	0.352	0.128	0.334	0.136	0.343	0.135	0.342
Child 6 years_2+ children	0.437	0.496	0.401	0.490	0.389	0.487	0.400	0.490
Number of observations	32,406		37,900		62,598		79,001	

Note: SD represents standard deviations, FLFP is female labour force participation.

3.3 Model Specification

The empirical analysis in this paper is divided into two main parts. In the first part, the effect of the variables determining the female labour force participation rate is examined using a logit model. In the

second part, the contributions of each variable in terms of the characteristic and coefficient effects were analysed using the Blinder-Oaxaca (1973) method.

The model in this study includes variables usually found in a standard labour supply equation. Female labour force participation is greatly influenced by educational attainment, with greater schooling being associated with increases in the probability of labour force participation, Meanwhile, married women, with spouse present, the presence of children reduces the probability of participation in the labour market (Killingsworth & Heckman 1986, p.123).

The logit model of female labour force participation can therefore be estimated as follows:

$$\Pr(FLFP = 1|X) = F(\beta_0 + \sum_{j=1}^{6}\beta_{1j}\,Age_j + \sum_{j=1}^{3}\beta_{2j}\,Married_j + \beta_3 Bumiputera + \beta_4 Extended_household + \beta_5 Spouse_LFP + \beta_6 Urban + \sum_{j=1}^{5}\beta_{7j}\,Education_j + \sum_{j=1}^{3}\beta_{8j}\,Child < 6_{\ j} + \sum_{j=1}^{3}\beta_{9j}\,Child6_j \quad (3)$$

where *FLFP* is a dummy variable which is equal to 1 if an individual is in the labour force and 0 otherwise, *j* is the index for dummy variables and *X* is a vector of explanatory variables including age, marital status, ethnicity, type of household, spouse labour force participation, living strata, education level and fertility as measured by the child variables. The detailed set of dummy variables in the model is given in Table 3.

Table 3: Definition of explanatory variables

Variable	Definition
FLFP (Female Labour Force Participation)	Binary variable. 1=the woman is in the labour force at the time of the survey; or 0=the woman is not in the labour force.
Age	Binary variable. 1=if the individual's age in years falls into one of the following categories: 20-24 years, 25-30 years, 31-34 years, 35-39 years, 40-44 years, 45-49 years, 50-54 years
Married	Binary variable. 1=if the individual's marital status falls into the following categories: Married, single, widowed/divorced/separated, or 0 otherwise.
Bumiputera	Binary variable. 1=if ethnic group is Bumiputera; or 0=if ethnic group is not Bumiputera.
Extended household	Binary variable. 1=if woman lives in an extended household; or 0=if not living in an extended household.
Spouse LFP	Binary variable. 1=if spouse participates in the labour force; or 0=if no spouse present or spouse not in the labour force.
Urban	Binary variable. 1=if woman lives in an urban area; or 0=if not living in an urban area.
Education	Binary variable. 1=if the individual's educational level falls into the following categories: No schooling, primary, lower secondary, upper secondary, tertiary, or 0 otherwise.
Child<6	Binary variable. 1=if the individual's child status falls into the following categories: No children under 6, 1 child under 6, 2 or more children under 6, or 0 otherwise.

Child>6	Binary variable. 1=if the individual's child status falls into the following categories: No children aged 6 and above, 1 child aged 6 and above, 2 or more children aged 6 and above, or 0 otherwise.

Source: Author's own work.

One of the most important determinants of female labour force participation is human capital (Becker 1962; Mincer 1962), which in this study will be represented by the level of education. A higher level of education is expected to have a positive effect on female labour force participation (Mincer 1962). In this study, the level of educational attainment is divided into several categories: no schooling; primary; lower secondary; upper secondary; and tertiary. The 1970, 1980 and 1991 censuses contain more details on educational attainment where some individuals were reported to have some primary school or have completed primary school. However, in the 2000 census, information on 'some primary completed' only is given. Therefore, the primary category used in this analysis comprises individuals who have either some primary school or have completed primary school. The primary education category is the omitted category.

On the other hand, the child status variables are responsible for the largest share of the explained variation in most female labour supply studies (Nakamura & Nakamura 1994, p.133). The presence of pre-school children especially affects the female participation decision (Cleveland, Gunderson & Hyatt 1999, p.133). Therefore, child variables are included in this study. They are divided into two categories - whether women have children younger than 6 years and/or have children 6 years or older as the presence of younger and older children may affect female labour force participation differently due to the difference in care required. The effect of female labour force participation for women with children can be examined with respect to women with no children. Thus, the omitted category is women with no children.

4. Results

This section reports the estimates for the determinants of the probability of female labour force participation in Peninsular Malaysia analysed using logit regression. This section presents the results from the logit regression and the average marginal effects estimated from the logit regression. Then, the findings from the decomposition analysis to disentangle the sources of changes in female labour force participation over time into changes in characteristics and coefficients are reported.

4.1 Average Marginal Effects of Logit Estimations

The coefficients estimated from the logit regressions and the average marginal effects estimated from the logit model on female labour force participation for 1970, 1980, 1991 and 2000 are given in Table 4. The average marginal effects show how the probability of female labour force participation changes as the dummy variable changes from 0 to 1, holding all other X equal. For categorical variables, the effects of discrete changes are computed.

From Table 4, the marginal effects for the various age categories indicate that, relative to the base category (35 to 39 years), the probability of participating in the labour force is low especially for 20 to 24 years and 50 to 54 years. Between 1970 and 2000, the negative effects have decreased significantly especially for the 20-24 age group from -0.075 to -0.177. This is likely to be due to females staying longer in school including for the acquisition of tertiary education. The time required to achieve higher educational attainment has been found to delay female labour force participation in many countries (Dayioglu & Kirdar 2011; Lee et al. 2008).At the other end of the spectrum, the older age group is most likely to have retired early from the labour market, with the probability of participation decreasing from -0.108 to -0.195. The negative effect for women aged 30 to 34 is close to zero; negative but not significant. The marginal effect for women from the 25 to 29, 40 to 44 and 45 to 49 age groups

decreased, especially in 1991 and 2000, suggesting that, together with the reference group, these women are the prime working age group in the labour force.

In general, the average marginal effects indicate that education has a positive effect on female labour force participation. However, the effect of education on female labour force participation has weakened over time. The effects of individuals with no schooling decreases from 1970 to 2000. In 2000, a woman with no schooling is less likely to participate in the labour market than a woman with primary education. However, the effect is not significant. From 1970 to 2000, the strength of the effects of education for upper secondary level has gradually weakened over time although the estimates are still positive. Similarly, the effects of lower secondary school on female labour force participation decisions have also weakened over time between 1970 and 2000. The effects of tertiary education fluctuated over time, peaking in 1980. It is interesting to note that the marginal effects of education on female labour force participation were lower in 1991 when compared to 1980 although still positive and significant. When compared to the average marginal effect in 1980 (0.427), the estimates in 2000 (0.208) indicate that tertiary education is less of a pull factor for female labour force participation in 2000.

In terms of marital status, the estimates indicate that marriage reduces the probability of participating in the labour force. Single women are more likely to work than married women. However, the positive effect decreased significantly from 1991 to 2000 from 0.297 to 0.159. While in general being married reduces labour force participation (Euwals et al. 2011; Lee et al. 2008), the results also imply that the gap of work participation between never-married and married women has decreased over time, suggesting that the role of married women is no longer confined to the household. Likewise, women who are separated, divorced or widowed are also more likely to work than married women. The average marginal effect for women in this category is 0.167 in 2000.

The participation status of married women is also influenced by fertility. The presence of children (both under and over 6 years old) in a household reduced the probability of female labour force participation. The negative effects on female labour force participation of having children in either age group are larger over time indicating that it has becoming more challenging to combine work and family in recent decades than in previous decades.

Children may exert pressure to the budget of households, pushing women into the labour market. The results from the marginal effects is intuitive where it indicates that a woman who has a spouse currently working is less likely to participate in the labour market. Except for 1970 where there was a positive effect, the remaining years examined showed negative marginal effects. In 2000, a woman with a working spouse was 0.078 less likely to work than a woman with no spouse or no working spouse present. The effect was largest in the year 2000. Living arrangements also affect female labour force participation, in that female living in extended households tend to participate more than females living in non-extended households. This finding is consistent with Kolodinsly and Shirey (2000) and Ogawa and Ermisch (1996) and Sheng, Zhang and Yan (2012) suggesting that in Peninsular Malaysia, co-residence has increased female labour force participation. The present of other adult members provide childcare assistance to women allowing them to work.

Table 4: Logit model and average marginal effects

	1970	1980	1991	2000	1970	1980	1991	2000
	Logistic regression coefficient				Average Marginal Effects			
Category: Age (Reference group: Age35-39)								
Age20_24	-0.341***	-0.230***	-0.868***	-0.870***	-0.075***	-0.049***	-0.170***	-0.177***
	(0.0508)	(0.0482)	(0.0401)	(0.0350)	(0.0112)	(0.0103)	(0.0078)	(0.0071)
Age25_29	-0.133**	-0.026	-0.302***	-0.094**	-0.029**	-0.006	-0.059***	-0.019**
	(0.0470)	(0.0443)	(0.0344)	(0.0300)	(0.0104)	(0.0095)	(0.0067)	(0.0061)
Age30_34	0.018	-0.049	-0.032	-0.035	0.004	-0.010	-0.006	-0.007
	(0.0437)	(0.0426)	(0.0311)	(0.0277)	(0.0096)	(0.0091)	(0.0061)	(0.0056)
Age40_44	-0.076	-0.148**	-0.207***	-0.049	-0.017	-0.032**	-0.041***	-0.010
	(0.0472)	(0.0451)	(0.0348)	(0.0285)	(0.0104)	(0.0096)	(0.0068)	(0.0058)
Age45_49	-0.153**	-0.300***	-0.412***	-0.338***	-0.034**	-0.064***	-0.081***	-0.069***
	(0.0512)	(0.0503)	(0.0404)	(0.0319)	(0.0113)	(0.0107)	(0.0079)	(0.0065)
Age50_54	-0.491***	-0.746***	-0.839***	-0.962***	-0.108***	-0.159***	-0.165***	-0.195***
	(0.0569)	(0.0553)	(0.0443)	(0.0385)	(0.0125)	(0.0117)	(0.0086)	(0.0077)
Category: Marital status (Reference group: Married)								
Single	1.130***	1.056***	1.514***	0.783***	0.249***	0.226***	0.297***	0.159***
	(0.0539)	(0.0465)	(0.0398)	(0.0359)	(0.0116)	(0.0097)	(0.0075)	(0.0072)
Widowed/divorced/	0.692***	0.701***	0.934***	0.820***	0.153***	0.150***	0.184***	0.167***
separated	(0.0517)	(0.0535)	(0.0476)	(0.0449)	(0.0113)	(0.0113)	(0.0092)	(0.0091)
Category: Ethnicity (Reference group: Non-Bumiputera)								
Bumiputera	-0.156***	-0.139***	-0.224***	-0.072***	-0.034***	-0.030***	-0.0439***	-0.015***
	(0.0269)	(0.0244)	(0.0197)	(0.0180)	(0.0059)	(0.0052)	(0.0039)	(0.0037)
Category: Household type (Reference group: Non-extended household)								
Extended household	0.019	-0.016	0.220***	0.241***	0.0041	-0.003	0.043***	0.049***
	(0.0266)	(0.0231)	(0.0189)	(0.0177)	(0.0059)	(0.0049)	(0.0037)	(0.0036)
Category: Spouse work (Reference group: No spouse, no working spouse)								
Spouse working	0.230***	-0.221***	-0.141***	-0.388***	0.051***	-0.047***	-0.028***	-0.079***
	(0.0349)	(0.0345)	(0.0289)	(0.0281)	(0.0077)	(0.0074)	(0.0057)	(0.0057)

(continued)

Table 4: (continued)

	1970	1980	1991	2000	1970	1980	1991	2000
	Logistic regression coefficient				Average marginal effects			
Category: Living strata (Reference group: Rural)								
Urban	-0.791***	-0.504***	-0.227***	0.068***	-0.175***	-0.108***	-0.0446***	0.014***
	(0.0280)	(0.0250)	(0.0205)	(0.0197)	(0.0059)	(0.0053)	(0.00402	(0.0040)
Category: Education (Reference group: Primary)								
No schooling	0.333***	0.335***	0.044	-0.059	0.074***	0.072***	0.009	-0.012
	(0.0279)	(0.0286)	(0.0311)	(0.0379)	(0.0061)	(0.0061)	(0.0061)	(0.0077)
Lower secondary	0.184**	0.120***	0.101***	0.168***	0.041**	0.026***	0.020***	0.034***
	(0.0578)	(0.0362)	(0.0259)	(0.0240)	(0.0127)	(0.0077)	(0.0051)	(0.0049)
Upper secondary	1.363***	1.056***	1.021***	0.929***	0.301***	0.226***	0.201***	0.189***
	(0.0583)	(0.0385)	(0.0256)	(0.0229)	(0.0125)	(0.0079)	(0.0048)	(0.0045)
Tertiary	-0.474**	1.997***	0.762***	1.025***	-0.105**	0.427***	0.150***	0.208***
	(0.1650)	(0.1460)	(0.0516)	(0.0331)	(0.0364)	(0.0309)	(0.0100)	(0.0065)
Category: Child less than 6 years (Reference group: None)								
Child<6_1 child	-0.179***	-0.343***	-0.352***	-0.394***	-0.040***	-0.073***	-0.069***	-0.080***
	(0.0352)	(0.0314)	(0.0258)	(0.0226)	(0.0078)	(0.0067)	(0.0051)	(0.0046)
Child<6_2+ children	-0.277***	-0.570***	-0.761***	-0.765***	-0.061***	-0.122***	-0.150***	-0.156***
	(0.0357)	(0.0351)	(0.0294)	(0.0268)	(0.0079)	(0.0074)	(0.0057)	(0.0054)
Category: Child 6 years or more (Reference group: None)								
Child6+_1	-0.037	-0.066	-0.283***	-0.565***	-0.008	-0.014	-0.056***	-0.115***
	(0.0402)	(0.0390)	(0.0302)	(0.0268)	(0.0089)	(0.0083)	(0.0059)	(0.0054)
Child6+_2+	-0.122***	-0.009	-0.491***	-0.719***	-0.027***	-0.002	-0.096***	-0.146***
	(0.0348)	(0.0340)	(0.0268)	(0.0238)	(0.0077)	(0.0073)	(0.0052)	(0.0047)
Number of observations	32,406	37,900	62,581	79,001	32,406	37,900	62,581	79,001

Notes: Sample of women aged 20 to 54. Standard errors are in parentheses. Statistically significantly different from zero at the *0.05 level, **0.01 level and ***0.001 level.

Table 5: Aggregate decomposition of female labour force participation rate, 1970-2000

	At 1970 coefficients	% of gap	At 2000 coefficients	% of gap	Pooled coefficients	% of gap
Overall						
Year 2000	0.486***		0.486***		0.486***	
	(0.00176)		(0.00176)		(0.00176)	
Year 1970	0.402***		0.402***		0.402***	
	(0.00272)		(0.00272)		(0.00272)	
Difference	0.084***		0.084***		0.084***	
	(0.00324)		(0.00324)		(0.00324)	
Explained	0.036***	42.4	0.140***	166.3	0.094***	111.6
	(0.00626)		(0.00347)		(0.00291)	
Unexplained	0.049***	57.6	-0.056***	-65.9	-0.010*	-11.7
	(0.00690)		(0.00453)		(0.00407)	
Explained						
Age	0.0042***	5.0	0.0104***	12.4	0.0083**	9.8
	(0.00081)		(0.00070)		(0.00060)	
Marital status	0.0124***	14.7	0.0045***	5.4	0.0078***	9.2
	(0.00121)		(0.00070)		(0.00068)	
Ethnicity	-0.0013***	-1.6	-0.0010***	-0.6	-0.0010***	-1.0
	(0.00027)		(0.00014)		(0.00014)	
Household type	0.000015	0.0	0.000159	0.2	0.000114	0.1
	(0.000025)		(0.000151)		(0.000109)	
Spouse labour force status	0.0021***	2.5	-0.0030***	-3.6	-0.0014***	-1.6
	(0.00037)		(0.00034)		(0.00021)	
Living strata	-0.0585***	-69.5	0.0042***	50.2	-0.0155***	-18.4
	(0.00316)		(0.00123)		(0.00107)	
Education	0.0656***	77.9	0.0942***	111.9	0.0729***	86.6
	(0.00539)		(0.00324)		(0.00266)	
Child less than 6 years	0.0010***	11.8	0.0231***	27.4	0.0176***	20.9
	(0.00132)		(0.00088)		(0.00073)	
Child 6 years or more	0.0012**	1.4	0.0066***	7.8	0.0052***	6.1
	(0.00038)		(0.00051)		(0.00041)	
Unexplained						
Age	0.0037***	4.4	-0.0028*	-3.4	-0.0005	-0.5
	(0.00096)		(0.00142)		(0.00150)	
Marital status	0.00061	0.7	0.0060	7.2	0.0045	5.3
	(0.00484)		(0.00454)		(0.00564)	
Ethnicity	0.0013**	1.5	0.0006*	0.7	0.0010**	1.2
	(0.00048)		(0.00023)		(0.00037)	
Household type	-0.0091***	-10.9	-0.0085***	-10.1	-0.0105***	-12.5
	(0.00132)		(0.00122)		(0.00161)	
Spouse labour force status	-0.0188***	-22.3	-0.0129***	-15.3	-0.0179***	-21.3
	(0.00139)		(0.00099)		(0.00174)	
Living strata	0.0416***	49.4	-0.0110***	-13.1	0.00753***	8.9
	(0.00170)		(0.00066)		(0.00070)	
Education	-0.0296***	-35.2	-0.0622***	-73.9	-0.0476***	-56.5
	(0.00333)		(0.00708)		(0.00843)	
Child less than 6 years	0.0244***	29.0	0.0089***	10.6	0.0188***	22.3
	(0.00250)		(0.00118)		(0.00205)	
Child 6 years or more	0.0134***	15.9	0.0072***	8.5	0.0110***	13.1
	(0.00176)		(0.00151)		(0.00201)	
Constant	0.0210*	24.9	0.0193*	22.9	0.0240*	28.5
	(0.00968)		(0.00894)		(0.01170)	
Number of observations	111,407		111,407		111,407	

Notes: Standard errors are in parentheses. Statistically significantly different from zero at the *0.05 level, **0.01 level and ***0.001 level.

The contribution of determinants to changes in the female labour force participation rate can be quantified using the Blinder-Oaxaca (1973) decomposition analysis. First, separate logit models for female labour force participation are estimated for both 1970 and 2000. Then the changes are decomposed into changes in characteristics (explained components) or changes in coefficients (unexplained components) for each variable. Table 5 gives the aggregate results from the decomposition analysis for the female labour force participation rate in Peninsular Malaysia between 1970 and 2000.

Between 1970 and 2000, the female labour force participation rate increased from 40.2% to 48.6%, by approximately 8.4%. Therefore, a positive value in the share of percentage change can be interpreted as contributing to the increase in the female labour force participation rate while a negative value in the share of percentage change contributes to a decline in the female labour force participation rate. Using the 1970 coefficients, a total of 42.4% in this gap is explained by changes in characteristics while a total of 57.6% is explained by the changes in coefficients and other unobservable factors. However, using the 2000 coefficients, a total of 166.3% of the gap in female labour force participation rate is explained by the change in characteristics. This is offset by a negative contribution in the change of coefficients and unobservable factors of 65.9%.

The reported estimates differ when using the 1970 and 2000 coefficients as the reference groups. If estimates from coefficients and covariates differ substantially, the measured contribution will vary and the true contribution of a variable will lie somewhere in between (Klasen & Pieters 2015). Therefore, in this analysis, a pooled regression is also estimated for the model where the mean from both groups is used as the reference group. In this model, the gap in female labour force participation is explained almost entirely by the change in characteristics, accounting for 111.6% while there is a negative effect of 11.7% in the change in coefficients.

In summary, the gap in female labour force participation between 1970 and 2000 in Peninsular Malaysia is largely attributed to the positive contribution of changes in characteristics. The changes in characteristics are explained mostly by the education and fertility variables. Other variables, including marital status and age, also contribute to the positive increase in female labour force participation. The remaining variables analysed which include the spouse labour force participation rate, the household type and the living strata were found to reduce the gap in the female labour force participation rate. In contrast, the change in coefficients is mainly driven by the negative contribution of education. The coefficients such as the spouse labour force status and the household type have similar negative contributions. However, the decline in the fertility coefficient is seen to contribute to the rise in the female labour force participation rate. Meanwhile, the constant term also contributes to the rise in female labour force participation between 1970 and 2000 in Peninsular Malaysia. However, it represents a change in behaviour that could not be explained by the observed characteristics.

5. Discussion and Conclusion

The female labour force participation rate in Peninsular Malaysia has increased between 1970 and 2000. However, the rate of growth has been modest from the 1980s. Apart from the change in participation behaviour, the descriptive statistics indicate that there are notable changes in the characteristics of the population studied. In general, there is a shift towards higher educational attainment where a large proportion of women have attended at least secondary school. During this period, the fertility rate has declined.

Female labour force participation in Malaysia has been influenced by the changes in the composition of the Malaysian economy (Asadullah et al 2021). In the 1970, there were gradual increases in women's labour force participation rates, which resulted from a combination of declines in agricultural employment and sizeable growth in non-agricultural employment, especially among younger women. (Hirschman & Aghajanian 1980). Malaysian females have enjoyed increased educational opportunities early after Independence. By late 1960s, the government provided nine years of free education (Asadullah et al 2021).

Access to education has increased the role of women in all spheres of live. Educational attainment is Malaysia especially for females have increased tremendously. However, female labour force participation in Malaysia is lower than other ASEAN countries such as Vietnam and Indonesia. Vietnam experiences several decades of high female labour force participation growth boosted by policy choices including economic reforms and a push toward improving education focusing on gender equality (Banerji, Hlatshwayo, Gjonbalaj & Le 2018). The impact of the Vietnam War led to a decline in the male population relative to female population. The Doi Moi reforms in 1986 ignited economic growth in Vietnam pushing females into the labour market. Although a large share of female remains engaged in agriculture, female wage workers increasingly joined the large service and foreign direct investment sectors (Banerji et al. 2018). The first education reform plan (1993-2000) is successful in providing females equal access to education. The reform successfully trained and produced high-skilled females that stayed on in the work force postwar. In Vietnam, the success in the participation of high-skilled women in the labour force is also attributed to generous family-friendly laws regarding childcare and maternity (Banerji et al. 2018). In Malaysia, urban middle-class women struggled to juggle the dual role of home and work as they faced increasingly higher opportunity costs of working outside the home as a result of the limited childcare support system (Ariffin 1994; Stivens 2000). In addition, not all Malaysian women could expect an equal sharing of household responsibilities between husbands and wives (Yacob & Noor 1993). Malaysian households, like those in many non-Western countries, presume more traditional gender roles (Westman 2005). Although flexible work arrangements are becoming more common in recent years, the structure of employment in Malaysia is highly formal with limited availability of part-time and casual work (Aziz 2011, p. 11). The implications from this study are important. When women have access to childcare, they can work longer hours, achieve higher productivity and income, and find employment in the formal sector (World Bank 2022). There is no legal standards to guide regulations on the provision of childcare, however, government may support working mother and families through various childcare options (World Bank 2022).

Women in 2000 were more likely to have a secondary education than they were in 1970. Given that more education increases the returns to labour supply, the increase in education raises the probability of being in the labour force. This is intuitive and consistent with the human capital theory. Data from the Malaysian Income and Household Survey 1997 indicated that there are high and positive private returns to education in Malaysia, especially at the higher education level. For example, by moving from the upper secondary to the pre-university level, females receive an annual marginal gross return of 23.3% (Chung 2003). Nevertheless, while educational attainment of females has generally increased over the decades, the weaker pull of education is reflected in the unexplained component of the education variable implying that the probability of work participation for females with more education has decreased over the decades. This finding is consistent with Hotchkiss (2006) and Klasen and Pieters (2015). According to Hotchkiss (2006, p.13), the possibility of positive assortative mating, where highly educated women are more likely to marry highly educated men, resulted in a decline in female labour force participation as a result of the availability of non-labour income especially in the case where the husbands have high earning power. This potentially explains the case of the women in Peninsular Malaysia, where the rate of female labour force participation declined albeit higher educational attainment between 1970 and 2000.

Men in general continued to have a high participation rate regardless of their level of education as they are traditionally regarded the breadwinners for their families (Yahaya 2009). In the meantime, the findings in this study indicate that the participation rate for women is higher among more educated women. Increased opportunities in education have eroded the perception of women as homemakers and secondary earners; more educated women, especially those with at least a secondary level education, are more likely to work. The change in behaviour to education indicates a large negative response to work among women with no schooling or only primary education. This could be due to a lower market demand for women without education. Women with limited education face limited job opportunities and lower wage rates. The marginal gain from staying at home therefore potentially outweighs the gains of working in the labour market. The reservation wage for women with limited education is lower than their educated counterparts. Women with lower education levels may also find that the opportunity cost of staying at home is lower as compared to women with higher education. The impact is not necessarily

negative when women do not work. There can be indirect impacts to the economy. Women not in the labour force still engage in household production, including child caring activities, which are not accounted for in the national income accounting. Thus, although women do not work, the acquisition of greater levels of education is still an important priority to the Government. In the process of becoming an advanced economy, Malaysia continues to invest in knowledgeable and skilled workers.

The characteristics that have traditionally pushed women out of the labour market, such as the number of children, contribute to the rise in the female labour force participation rate. The change for the category of children aged under 6 years old is larger than the change for children aged 6 years or more. There is also a change in behaviour for women with no children either under 6 years old or aged 6 years or more. Having no children intuitively leads women to work more. On a different note, a woman who has two or more children in either age category contributes negatively to the gap in the female labour force participation rate. When a woman has two or more young children, she might choose to stay home as childcare costs can be high. This is especially true for women with lower education where the opportunity cost of work is low. A more highly educated woman is more likely to be able to afford childcare or domestic helpers in the household, allowing her to participate in the labour market.

Although the literature shows that the impact of younger children on maternal work is greater than older children, the decomposition analysis indicates that women with two or more children aged 6 years or more also contribute negatively to the gap in the female labour force participation rate. A tabulation of education attainment and the number of children indicates that the percentage of women who have more than two children aged 6 years, or more is higher among women with no schooling or only primary schooling. This implies that these women, who face a lower opportunity cost of staying at home, are less likely to work, regardless of the age of the children. These women in general are also older. In Malaysia, there is no re-entry mechanism for women who have left the labour market during their childbearing years. There are limited part-time or casual job opportunities. Once women leave the labour market in the childbearing and child-rearing stage, the probability of returning to work when children are older is low. In general, the negative effect of fertility on female labour force participation rate has increased over time as evidenced in the marginal effects estimates. The estimates ranged between -0.081 to -0.156 for the various child categories examined. While a similar negative effect was also found in India for children aged 0 to 4, the estimate was considerably smaller at -0.039 in 2011 (Klasen & Pieters 2015). In Africa, the marginal effect of fertility was also small at -0.03 in 2004 for children under 7 years (Ntuli & Wittenberg 2013) and the effect has been quite constant.

Overall, the findings indicate that the key determinants affecting the change in female labour force participation in Peninsular Malaysia between 1970 and 2000 are education and fertility. In terms of education, the average marginal effects indicate that women with tertiary education were more likely to work in the year 2000 relative to women with only primary education, and the effect is higher relative to women with other education levels. The findings in this study suggest that the Government's investment in education has resulted in the intended outcome to increase female labour force participation. However, the positive effects of higher education could possibly be a result of positive selection effects where women with greater career aspirations select into higher education. The discussion above also implies that it has become increasingly difficult to combine work and family. Social policies or family friendly policies, including those related to childbearing and child-rearing such as parental leave, provisions for childcare and flexible working arrangements, have been implemented to induce more females to enter the labour market. However, the recent COVID-19 pandemic has affected women's participation at work implying that the government should continue to emphasize agenda on female development. In order to put female labour force participation back on track, the findings in this study tentatively suggest that there should be greater policy emphasis on childcare and family-friendly policies in general.

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