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Does Labour Supply Respond to Globalisation? Malaysia Evidence from Micro Data

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***Abstract*—**Globalisation is a phenomenon that cannot be avoided. As globalisation allowed free flow of inputs including labour, it may affect job opportunities for the locals. Therefore, investigate the determinants of labour supply is essential in understanding the structure of labour market in the new era of globalization. The objective of this article is to examine labour supply by taking into account the globalisation effect. The study covers 3885 households in Peninsular Malaysia who are chosen using stratified random sampling. The labour supply model will be the basis for the analysis. The basic labour supply determinants are own wage and non-labour income. However, the extended labour supply model incorporates other variables like spouse wage, number of children and individuals characteristics like education level and age. Besides, the globalization indicator will also be incorporated as another independent variable.

***Keywords*—**globalization, head of households, labour supply, wage

I. Introduction

In the recent debate on the effects of increasing international integration on the labour market, most of the attention has been devoted to evaluate the impact of trade on wages and employment. However, there might be other paths through which globalization influences the labour market, one of these is the effect on labour supply. Globalisation is a process where interlink between countries in the world becomes more intense and flow of inputs between one country to another will be much easier. In the context of labour market, the inflow of labour input is more relevant, because it gives implication on local labour especially in terms of job opportunities. Individual perception on the impact of globalization may change their attitude towards being working, but on the other hand, the labour supply may increase to cope with increasing cost of living due to globalization. Labour supply plays a very important role in an economy's development. A robust and sufficient labor force promotes development, and development, in turn, feeds back on labour market conditions. Two aspects of labour supply have been important; firstly, quantity of labour as represented by population growth rates, rising female labour force participation rates and migration. Secondly, quality of labour as represented by education levels and health status (life expectancy).

In Malaysia, labour supply or labour force refers to those who, during the reference week, are in the 15-64 years age group (in completed years at last birthday) and who either employed or unemployed. The most important determinant of labour supply is labour force participation rate (LFPR), which is defined as number of labour force divided by number of population aged 15-64 years old. In 2010 total number of labour force in Malaysia was 11, 566.8 thousand persons or abour one-third of Malaysian total population. Of this, 11,171 thousand persons are employed and the remaining 385.8 thousands are unemployed. The LFPR for the total economy was declining from 64.9 percent in 2001 to 63.2 percent in 2007 and the same patterns are shown by male's and female's LFPR [1].

Our starting point is the traditional view of labour supply determinants such as own wage, spouse wage, non labour income, number of children, age and education level. Nowadays, it is important to take into account effect of globalization because globalization allowed free flow of inputs including labour, which may affect job opportunities for the locals. Consequently, investigate the determinants of labour supply is essential in understanding the structure of labour market in the new era of globalization. This study contributes to the literature by investigating the traditional determinants of labour supply as well as the effect of globalization to labour supply. In addition, studying the behavior of labour market can give rise to important policy implications.

Therefore, the objective of this article is to examine determinants of heads of household labour supply by taking into account the globalization effect. The analysis will be based on the data collected from the field survey in 2011. The study covers 3885 households in Peninsular Malaysia who are chosen using stratified random sampling. The data include information on heads of households, their spouses, families, education background and employment background. Since the main purpose of the study is to look at the impact of globalization on labour market structure, the data also cover questions on globalization from the point of views of respondents.

II. Literature Review

The elasticity of labour supply with respect to wage rate plays a critical role in many economic policy analyses. There are many studies of labour supply elasticity accessible. Most of the empirical results for the elasticity of hours of work with

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respect to the wage rate significantly differ in sign and range. It appears from the literature that the first estimation on the labour supply elasticities was made by [2] in his 'Theory of Wage'. He collected and aggregated the data for 38 US cities from census of manufacture and examined both time series and cross-section data on hours of work and hourly earnings. He concluded that labour supply elasticities are between negative 0.1 and 0.2. [3] mentioned that modern labour supply often separates the income and substitution effects and make use of micro data instead of aggregated data. Using data from US coal mining in the first decades of the 20th century, [4] finds the labor supply elasticity to be in the range 1.9–6.8 in the short run and infinite in the long run. However, [5] shows that the quantitative relationship between employment and wages depends crucially on whether wages are regressed on employment or the other way around, and indicates that the reason is measurement error. He concludes that even though it is reasonable to interpret this relationship as evidence of upward sloping supply curves, such regressions 'are just not very informative' on the supply.

[6] report that across 18-20 estimates of own wage labor supply elasticities in various studies; the median elasticity was 0.08 for men and 0.78 for married women. For cross wage elasticities, [7] point out that a median spouse wage elasticity of 0.13 for married men's labor supply and -0.08 for married women's labor supply, although study of the 1980s by [8]analyzing labor supply conditional on having positive hours, reports a cross elasticity of roughly -0.4 to -0.5 for women and -0.001 to -0.06 for men. These surveys indicate that women's labor supply is considerably more sensitive to their own wages than is men's. This difference is usually explained by the traditional division of labor in the family, in which women are seen as substituting among market work, home production and leisure, while men are viewed as substituting only or primarily between market work and leisure [9].

Most of the studies about effect of spouse's wages to labour supply focus on labour supply of wives respond to husbands' wages. Since, given traditional gender roles, women are perceived as secondary earners within the family, their labor supply is likely to be more negatively affected by their spouse's wages. [10] examined the effect on a married woman's labour supply decision of non-labour income and of her own wage rate in Hungary. The micro analysis showed that total montly household non-labour income has been defined as the sum of two different income components, first, the sum of sosial transfers that are received by any member of the household and second, the montly share of yearly profits. Firstly, the empirical results indicated that wage elasticity for married woman is estimated to be significant positive. Secondly, household earnings other than the wive's (alternatively, earnings of husband when he is head of the household) were estimated to have no significant negative effect on probability of supplying labour). These imply that Hungarian women take their labour supply decisions independently of their husband's or other members of the household's earning. Finally, the non-labour income effect is consistent with lesuire being a normal good. On the other hand, [11] demostrated that the labour supply of Canadian wives responded strongly changes in husband's wages during the 1980s.

Generally, as workers age, they may prefer to decrease their number of working hours due to health constraints or care obligations. As a result, one may expect to observe a steady drop in working hours before full retirement. [12] concludes that among older American workers who left their job between 1992 and 2000 about 13% would have stayed in their job if they could have reduced their number of working hours. In Sweden, about 7 percent of the workers aged 50 years and above claim to have physical problems which restrict them from continuing work in the present occupation until the official retirement age, but that shortening working hours would solve the problem [13].

Education is significantly correlated with economic growth, which, in turn, affects the labour supply patern. [14] found a significant positive effect of education on the female labour supply to the urban labour markets in Sudan. Conversely, [15] showed that increases education levels are associated with decreases in household's labour supply and increases in their off-farm labour supply in rural Ghana. [16], who studied labour supply in Sudan, found a negative and significant relationship between education and labour supply in the agriculture sector. Although the empirical findings are rather varied, a strong research tradition supports human capital theory as a theoretical framework to clarify and predict the relationship between education and labour supply. Supposedly, labours with higher educational levels are more likely to be active in the labour force since education is an investment that is positively correlated with earnings' potential.

Most of the literatures on labour supply give special attention on females because of their different characteristics compared with males especially when dealing with house chores. Most studies mentioned about a strong relationship between females labour supply and family size including the age structure of the children. The relationship between children's age and female labour supply was the main focus in the studies by [17]-[18] and [19]. All of them demonstrated that children's age structure has significant impact on female labour supply with negative effect for younger age children (<6 years old) and positive effect for the older age (>12 years old). The study by [20] in Mexico and [21] in the United States supported that mother substitute raised female LFPR. In a more specific study, [22] found that when number of children increased by three folds, female LFPR would decrease by 8-10 percentage points. The first child is shown to give a greater impact on female labour supply due to higher attention given to him/her by the parent. For example, [18] found that the twin first birth reduced female labour supply by 37 percentage points for 15-24 age group and 10 percentage points for the 25-34 age group. The present of children aged less than 6 years old has greater negative impact on female labour supply (see for example, [23]). [24] compared estimates of male labor supply from time-use data with those

from conventional survey data using a so called double-hurdle model. Referring to previous studies they noted that the presence of young children normally decreases work hours for women while the effect for males has typically become nonsignificant or weakly positive. In Malaysia, [25] found that number of children aged below 6 years old and 7-19 years old have negative impact on female hours of work in the handicraft industry.

The effects of foreign workers are traditionally viewed in terms of complementarity or substitutability with natives in the production of household service. In the literature review, most of the simple theoretical models of labour supply suggest that an increase of foreign workers in the native labour market may result in lower wages and/or higher unemployment of natives if they are perfect substitutes to immigrants. In addition, empirical studies typically conclude that immigration has economically irrelevant or no effects on wages and employment of natives, see [26] for survey, is that foreign workers do not have a sizeable and significant effect on employment and wages of natives in the same segment of the labour market, even when the foreign workers supply shock is large [27] uses 1990 census data to study the effects of immigrant inflows on United State labour market. He found that immigrant inflows over the 1980s reduced wages and employment rates of low-skilled natives in Miami and Los Angeles by 1-3 percentage points. These finding imply that massive expansion of immigrant may have significantly reduced employment rates for younger and less-educated natives in both cities.

[28] analysis indicates that immigration lowers the wage of competing workers: a 10 percent increase in supply reduces wages by 3 to 4 percent. Using German data for the period 1975-1997, [29] concludes that the direct impact of immigration on native wages is small as a ten percent increase in labor supply stemming from immigration is predicted to reduce wages by less than one percent, with a stronger negative impact for low-skilled natives. In recent work based on US census data, [30] extends the structural modeling approach of [28] to assess the overall impact of immigration on wages while allowing for imperfect substitutability between native and immigrant workers. Their empirical estimates point to a negative, but small, direct partial effect: an immigration shock that increases the labor force in a particular skill cell by ten percent reduces wages of natives of the same group by approximately one percent. However, [31] argue that increased specialization might explain why many empirical analyses of the impact of foreign workers on wages and employment for less-educated native born find small effects. They found that foreign workers specialized in occupations that required manual and physical labour skills while natives specialized in jobs more intensive in communication and language tasks. While [32] showed that immigration in Italy had a displacement effect on low educated natives (both for male and females).

III. Theoretical Framework and Methodology

Households are suppliers of labour. Individuals are assumed to be rational and seeking to maximize their utility function. The static labour supply theory assumes each individual has a quasi-concave utility function ([6] and [7]):

$$U = f(C, L) \tag{1}$$

Where C is the consumption and L is the leisure hours, however, individuals are constrained by the working hours available to them. Therefore, hours of work (H) are H = T – L, T is the total time available. Suppose P is the price of goods and service, W is hourly wages rate and non-labour income, Y. The individual budget constraint is:

$$PC = WH + Y$$
$$PC = W(T - L) + Y$$
$$PC + WL = WT + Y \tag{2}$$

In static model, non labour income, Y is typically the sum of two components: asset income and other unearned income. The right side of equation 2 often defined as "full income" from which consumer purchases consumption goods and leisure [6]. Derivation of individual's labour supply function is derive by maximize utility function subject to the budget constraint. The indirect utility representation of preferences is given by:

$V = (P, W, Y) = MaxU(C, T - H)$ s.t.

$PC = WH + Y$

Set the Lagragian expression;

$$L = (C, H, \lambda; P, W, Y) = U(C, T - H) - \lambda(PC - WH - Y)$$

The first order conditions are;

$$\frac{\partial L}{\partial C} = U_C(C, T - H) - \lambda P = 0$$
$$\frac{\partial L}{\partial H} = -U_L(C, T - H) + \lambda W = 0$$
$$\frac{\partial L}{\partial \lambda} = -PC + WH = + = 0$$

Or simply the first two conditions take the familiar form;

$\frac{U_L(C, T - H)}{U_C(C, T - H)} = \frac{W}{P} =$ Marginal Rate of Substitution

Therefore, the individuals labour supply equation is obtained as below;

$$H = H(P, W, Y) \text{ or}$$
$$H = H(\frac{W}{P}, Y)$$
$$H = H(HSW, Y) \tag{3}$$

Where $\left(\frac{W}{P}\right) = HSW$

We assumed that P is constant, thus nominal wage (W)s equal to the real wage (HSW). Besides these two basic variables, there are other factors that could determine

individuals labour supply such as spouse wage, number of children and individuals characteristics like education, age, and so forth that can be summarized as Z_i. Therefore, equations (3) can be written as,

$$H = H(HSW, Y, Z_1, Z_2 \ldots\ldots\ldots) \quad (4)$$

Table I shows results of the reliability test for pilot study data. The questions cover some statements to measure globalisation indicators. All values of Cronbach Alpha are above 0.8, which are considered as very good. This indiçâtes that all constructs are appropriate in measuring globalisation. Therefore, no modification were made on the questionnaires after the pilot test.

IV. Model Specification

In order to achieve the objective of this paper, the study uses the logistic regression model for labour supply equation to capture head of households and does not go to work and who go to work. In general, logistic regression is used to measure the functional relationship between the qualitative dependent variable and the quantitative and qualitative

TABLE I
Reliability Tests

Gloabalisation Indicators	Cronbach Alpha (N=30)
Determinants of choices for children's education	
before 1995 (23 constructs)	0.895
after 1995 (23 constructs)	0.942
Trend of demand for higher education	
before 1995 (12 constructs)	0.920
after 1995 (12 constructs)	0.937
Importance of field of children's education	
before 1995 (11 constructs)	0.933
after 1995 (11 constructs)	0.969
Importance of children's educational institutions	
before 1995 (19 constructs)	0.603
after 1995 (19 constructs)	0.970
Influence of globalisation on children's aquired skills	
before 1995 (10 constructs)	0.941
after 1995 (10 constructs)	0.912
Globalisation effect on career development	
before 1995 (6 constructs)	0.953
after 1995 (6 constructs)	0.961
Impact of globalisation on wages and employment	0.971

Source : Pilot Survey 2011

independent variables. The dependent variable with a dichotomous character is used, whereby, the value 1 denotes if a head of household is working and 0 values denotes if a head of household is not working. Therefore, the model is estimated in logistic binomial form.

Model used is as follows:

$$P_i = 1(1 + e^{-z}) \quad (5)$$

with P_i as the probability of workers having been mobile ($Y = 1$). Probability to choose the other is ($Y = 0$) written as;

$$(1 - P_i) = 1/(1 + e^{-z}) \quad (6)$$

Therefore, the probability of a worker changing jobs is;

$$e^z = P_i/(1 - P_i) \quad (7)$$

The model is then transformed to a logarithm model to produce the equation;

$$z_i = \ln(P_i/(1 - P_i)) = \ln = e^{zi} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n \quad (8)$$

The estimation of the logistic model utilises likelihood ratio test (LRT) as indicator for fitness of the model and t-test for identifying the significant of the parameters. The estimation model for this study is as follows,

$$LS_i = \beta_0 + \beta_1 HSW_i + \beta_2 SW_i + \beta_3 HEDU_i + \beta_4 HAGE_i + \beta_5 NLY_i + \beta_6 NUMC_i + \beta_7 GLOB_i + \beta_8 HFL_i + \beta_9 HWEG_i + \mu_i \quad (9)$$

Where, *LS* is head of households labour supply denote 1 if working and 0 otherwise, *HSW* is head of households monthly wages, *SW* is is spouse monthly wages, *HEDU* is head of households level of education, *HAGE* is head of households age, *NLY* is household non- labour income, *NUMC* is household number of children, *GLOB* is effect of globalization measured by household's min score based on perception, *HFL* is dummy variable for the present of foreign labour in head of households job place, *HWEG* is head of household perception of wage effect from the present of foreign labour, μ is error term and I is household. The level of education is categorized into two measures, year of schooling and level of educational attainment (secondary and tertiary).

V. Results and Discussion

Table II presents head of households profile from the survey data. In total, 3885 head of households were interviewed. In terms of demography profile, expectedly, the majority of the head's of the household are men (67.0 percent). Malay make up the largest population of the sample (69.5 percent), follow by Chinese (27.1 per cent), India (2.2 percent) and other races (0.6 percent). The majority of the head of the households who are in the range between 46-55 year of age, which represents 33.4 percent of the sample. Very small percentage of the households is aged above 56. A greater proportion of the head of the households are attaining secondary level of education (48.5 percent), than are attaining degree (19.1 percent), diploma (18.7 percent) and primary level of education (12.6 percent). As shown in Table II, more than half of the respondents (55.2 percent) work in the domestic private sector, 32.7 percent in public sector and only 6 percent in multinational private sector. In 2011 (year of data collection), sector breakdown of respondents was as follows : services 64.8 percent, manufacturing 11.3 percent, agriculture 10.9 percent, construction 6.5 percent and mining 0.3 percent. The

majority of them are service and sales workers (22.7 percent), professional (16.9 percent) and clerical support workers (9.4 percent).

The respondents were also asked to choose among seven ranges of monthly income. Of the total number of 3885 respondents, the majority (36.9 percent) of the respondents indicated monthly income of RM1001-RM2500, 28.3 percents receive monthly income of RM2501-RM4000. The head of households who receive monthly income RM8001-RM10000 and more than RM 10001 are very few with the percentage of about 2.5 percent and 2.3 percent respectively. In terms of non-labour income, majority of the head of the households (98.2 percent) receive less than RM1000 per month.

Descriptive statistics of the explanatory variables are shown in Table III. Expectedly, the mean of the monthly income for the head's of the household (RM3216) is higher than that their spouse's monthly income (RM1897). In terms of education level, the mean of the level of education for head of the households is 11 years. A descriptive statistic result also reveals that majority of the household attaining secondary education. On average, the head of the households are 44 years (M=44.48, SD=10.86) with the eldest is 89 years and the youngest is 21 years. On average, respondents non-labour monthly income are RM76 (M= 76.34, SD=1197.04) with the maximum RM70100 and minimum zero. During the data collection, on average, there are 3 children present in each Malaysian family.

As human capital is as important as physical capital, the labour market structure (demand and supply) may also change whenever in the globalization, labour is rather mobile.

Therefore, the awareness of globalization characteristics is chosen based on the head of the household's perception on the effect of globalization on career development, wages and employment. Based on these variables, the effect of globalization is classified into two groups, (i) 1 to 3.99 as low ; (ii) 4 to 7 as high. As shown in the Table III, the overall heads of household perception on the effect of globalization on career development is high (M= 5.49, SD=1.16) while the perception of wage effect from the present of foreign labour is low (M= 1.53, SD=2.33).

The logistic regression model estimation shows only two variables are significant to influence the workers' decision to work in model 1, namely, head of household age and non-labour income as noted in Table IV. Variable of head of household age shows to have negative impact on the working decision and significant at 1%, but non- labour income has a

TABLE II
RESPONDENTS PROFILES

Variable	Frequency (N= 3885)	Percentage (%)
Sex		
male	2612	67.0
female	1273	32.8
Race		
Malay	2700	69.5
Chinese	1074	27.1
India	86	2.2
others	25	0.6
Age		
25	107	2.8
26-35	865	22.3
36-45	1002	25.8
46-55	1297	33.4
>56	612	15.8
Education Level		
primary	4899	12.6
secondary	1886	48.5
diploma/STPM	728	18.7
degree	742	19.1
others	40	1.0
Working Experience		
<10 years	1354	34.9
11-20 years	1120	28.8
21-30 years	980	25.2
>30 years	393	10.1
Missing	38	1.0
Job Sector		
public	1271	32.7
domestic Private	2145	55.2
multinational Private	232	6.0
missing	237	6.1
Employment Sector		
services	2516	64.8
manufacturing	440	11.3
agriculture	424	10.9
mining	12	0.3
construction	253	6.5
missing	240	6.2
Occupational Classification		
managers	326	8.4
professional	655	16.9
technicians and associate professionals	341	8.8
clerical support workers	365	9.4
service and sales workers	881	22.7
skilled agricultural,forestry and fishery workers	342	8.8
craft a and related traders workers	57	1.5
plant and machinery-operators and assemblers	229	5.9
elementary occupations	454	11.7
missing	235	6.0
Monthly Income/Wages		
<1000	535	13.8
1001-2500	1435	36.9
2501-4000	1099	28.3
4001-6000	486	12.5
6001-8000	143	3.7
8001-10000	99	2.5
>10001	88	2.3
Monthly Non-Labour Income		
<1000	3815	98.2
1001-2500	54	1.4
2501-4000	12	0.3
4001-6000	2	0.1
>10001	2	0.1

Source: Pilot Survey 2011

TABLE III
DESCRIPTIVE STATISTICS

Variables	Heads of Household			
	Mean	Min	Max	Std Deviation
heads of household monthly income/wages	3215.78	200	60000	3005.22
spouse's monthly income/wage	1897.66	0	37000	1866.73
year of schooling	11.78	0.00	17.00	3.38
secondary education	.49	0	1	.500
tertiary education	.38	0	1	.485
age	44.38	21	89	10.86
non-labour income	76.34	0.00	70100.00	1197.04
number of children	2.50	0	10	1.764
globalisation mean (after 1995)	5.49	1	7	1.16
impact of globalisation on wages	1.53	1	7	2.33
foreign workers	.34	0	1	.474

Source: Pilot Survey 2011
Notes: * significant level 10 %
*** significant level 1 %

TABLE IV
RESULTS OF LOGISTICS REGRESSION
ESTIMATES FOR MODEL 1 (YEARS OF SCHOOLING)

Variables	Model 1 (Years of Schooling)		
	β	Exp(β)	Marginal effect
intercept	11.197 (0.026)	72898.542	-
head of household income	0.000 (0.000)	1.000	0
spouse income	0.000 (0.000)	1.000	0
years of schooling	-0.007 (0.026)	0.993	-0.000004577
head of household age	-0.168 (0.011)***	0.846	-0.00010985
household non-labour income	0.001 (0.001) *	1.001	0.000000654
household number of children	-0.031 (0.040)	0.969	-0.000002027
globalisation perception (after 1995)	0.077 (0.063)	1.080	0.000050350
foreign labour	-0.149 (0.338)	0.861	0.000097431
wage effect from foreign labour	-0.061 (0.066)	0.941	-0.000039888
Nagelkerke R^2		0.324	
N		3885	

Source: Pilot Survey 2011
Notes: * significant level 10 %
*** significant level 1 %

positive relationship and significant at 10%. This is also shown by the odd ratio of less and greater than one respectively.

In model 2 (Table V), besides the age and non-labour income remain significant, another significant variable is level of secondary education. The log odd of being in the labour market is higher for head of household with secondary level of education as compared to those with the primary level of education.

TABLE V
RESULTS OF LOGISTICS REGRESSION
ESTIMATES FOR MODEL 2 (LEVEL OF EDUCATION)

Variables	Model 2 (Level of Education)		
	β	Exp(β)	Marginal effect
intercept	11.098 (0.793)	66068.227	-
head of household income	0.000 (0.000)	1.000	0
spouse income	0.000 (0.000)	1.000	0
secondary education	0.335 (0.186) *	1.398	0.00026361
tertiary education	0.137 (0.269)	1.147	0.00010781
head of household age	-0.172 (0.011) ***	0.842	-0.00013536
household non-labour income	0.001 (0.001) *	1.001	0.00000079
household number of children	-0.030 (0.040)	0.971	-0.00002361
globalisation Perception (after 1995)	0.077 (0.063)	1.080	0.00006059
foreign labour	-0.156 (0.340)	0.856	0.00012276
wage effect from foreign labour	-0.064 (0.066)	0.938	-0.00005036
Nagelkerke R^2		0.326	
N		3885	

Source: Pilot Survey 2011
Notes: * significant level 10 %
*** significant level 1 %

VI. CONCLUSION

The results from the both logistic labour supply models demonstrate an expected sign for coefficient of age, which is negative and significant. These imply that the older is the head of the household, the decision to work is less and this finding accord with the theory. Another interesting finding is that non-labour income is positive and significantly affects the labour supply, which means that non-labour income is one of the main concerns for the head of the household on the working decision.

But the unexpected results derived from the own wage, which demonstrates that the decision to work among the head of households are less when wages increase. These findings contradict with the theory and one explanation for the contradiction is that backward labour supply curve. However, the year of schooling variable, which is assumed to be positively related to labour supply, is not statistically

significant. But the higher is the level of education for the head of the household, the higher would be their labour supply, which demonstrates that the decision to work among the head of households with secondary level of education are more than that those who attain only primary level.

Globalisation is not significantly affecting the head of household labour supply, which mean that globalisation process is not a main concern of the head of household in securing their jobs. This finding support our hypothesis that globalisation will play a minor role since the intensity of globalization in Malaysia is still at the moderate level. Other variables seem not significantly affecting head of household labour supply in the sample.

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